

REVIEWED	DR.	R. SPENCE	BFS	WRS	05-22	DATE
			BY	CHK		

Z:\Projects\20-8\CCR Ph 2\Structures\02.New Bridges\Bridge 44\04_Final Plans\01.BRIDGE 44_TITLE_SHEET.dgn
9/22/2022

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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 10747

TRAFFIC DATA

2020 ADT N/A V.P.D.

2040 ADT 7,400 V.P.D.

TRUCKS 8 %



South Carolina Department of Transportation



PROPOSED PLANS
FOR
RICHLAND COUNTY
PROJECT ID P039719
RAMP F BRIDGE OVER
I-20 CD



SITE LOCATION

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°02'21" N

Longitude 81°05'45" W

NET LENGTH OF ROADWAY	0.000	MILES
NET LENGTH OF BRIDGES	0.026	MILES
NET LENGTH OF PROJECT	0.026	MILES
LENGTH OF EXCEPTIONS	0.000	MILES
GROSS LENGTH OF PROJECT	0.026	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:

INFRASTRUCTURE
CONSULTING & ENGINEERING

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

ENGINEER OF RECORD

FOR CONSTRUCTION : 9/22/2022
DATE

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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
S₀₁ (FEE): 0.10 g
PGA (SEE): 0.39 g
S_{DS} (SEE): 0.82 g
S₀₁ (SEE): 0.28 g

FEE Acceleration Design Response Spectrum Data				
Period (Sec)	S _a (g)	Period (Sec)	S _a (g)	
0.00	0.204	0.60	0.168	
0.01	0.230	0.76	0.132	
0.02	0.256	0.92	0.109	
0.03	0.282	1.08	0.093	
0.04	0.308	1.24	0.081	
0.05	0.334	1.40	0.072	
0.06	0.360	1.56	0.064	To
0.07	0.360	1.72	0.058	
0.09	0.360	1.88	0.053	
0.11	0.360	2.04	0.049	
0.13	0.360	2.20	0.046	
0.15	0.360	2.36	0.043	
0.17	0.360	2.52	0.040	
0.19	0.360	2.68	0.037	
0.20	0.360	2.84	0.035	
0.22	0.360	3.00	0.033	
0.24	0.360			
0.26	0.360			
0.28	0.360			Ts
0.44	0.229			

SEE Acceleration Design Response Spectrum Data				
Period (Sec)	S _a (g)	Period (Sec)	S _a (g)	
0.00	0.393	0.66	0.429	
0.01	0.464	0.81	0.347	
0.02	0.535	0.97	0.291	
0.03	0.607	1.12	0.250	
0.05	0.678	1.28	0.220	
0.06	0.749	1.44	0.196	
0.07	0.820	1.59	0.177	To
0.09	0.820	1.75	0.161	
0.11	0.820	1.91	0.148	
0.14	0.820	2.06	0.137	
0.16	0.820	2.22	0.127	
0.18	0.820	2.37	0.119	
0.21	0.820	2.53	0.111	
0.23	0.820	2.69	0.105	
0.25	0.820	2.84	0.099	
0.27	0.820	3.00	0.094	
0.30	0.820			
0.32	0.820			
0.34	0.820			Ts
0.50	0.564			

Values determined from: Three-Point Method

REV. 0

WRS

09-22-22

RFC PLANS

REV.

PCW

HL

09-20

ASTM F3125

REV.

PCW

HL

07-20

AASHTO 8th Ed.

REVIEWED

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06-22

QUAN.

DR.

GFD

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DES.

BY

CHK.

DATE

NO. 29080

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NO. 4470

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REV. 0

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RFC PLANS

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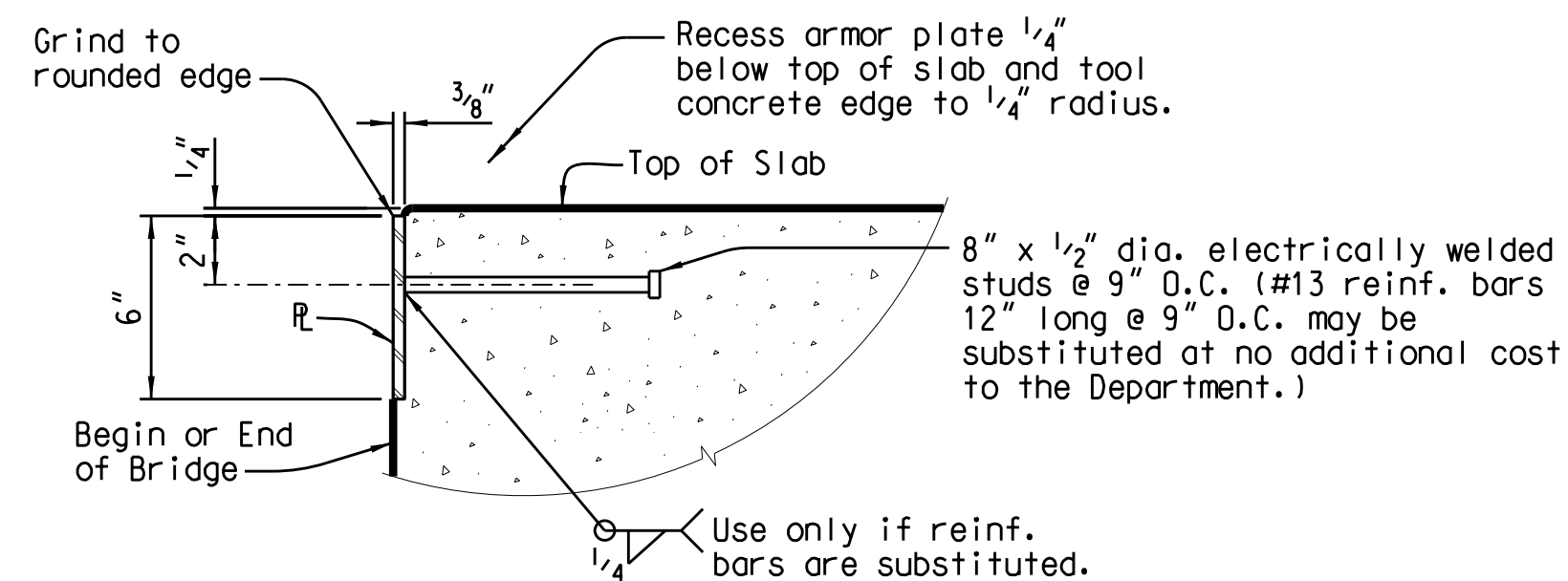
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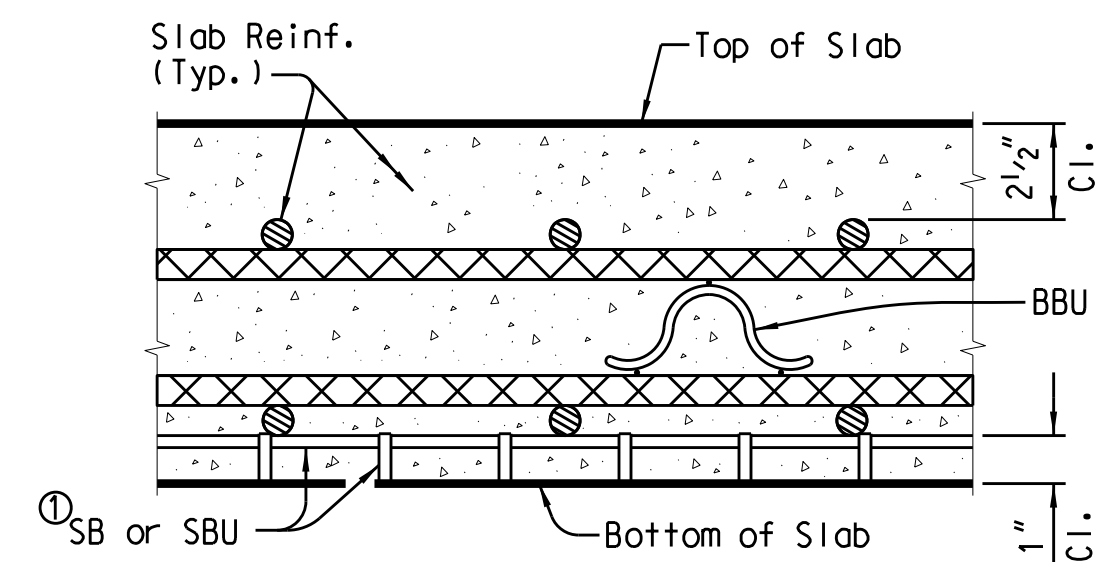
ARMOR PLATE DETAIL

Install $\frac{3}{8}$ " thick plates, as detailed above, at the beginning and end of the bridge.

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

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

Holes, $\frac{9}{16}$ " dia., spaced approximately 2'-0" on center may be provided in the lower portion of the plates to bolt the plates to the forms.



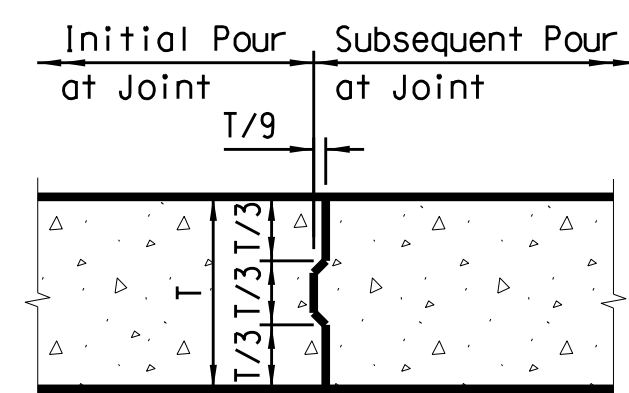
BAR SUPPORT DETAIL

(Section parallel to C roadway)

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

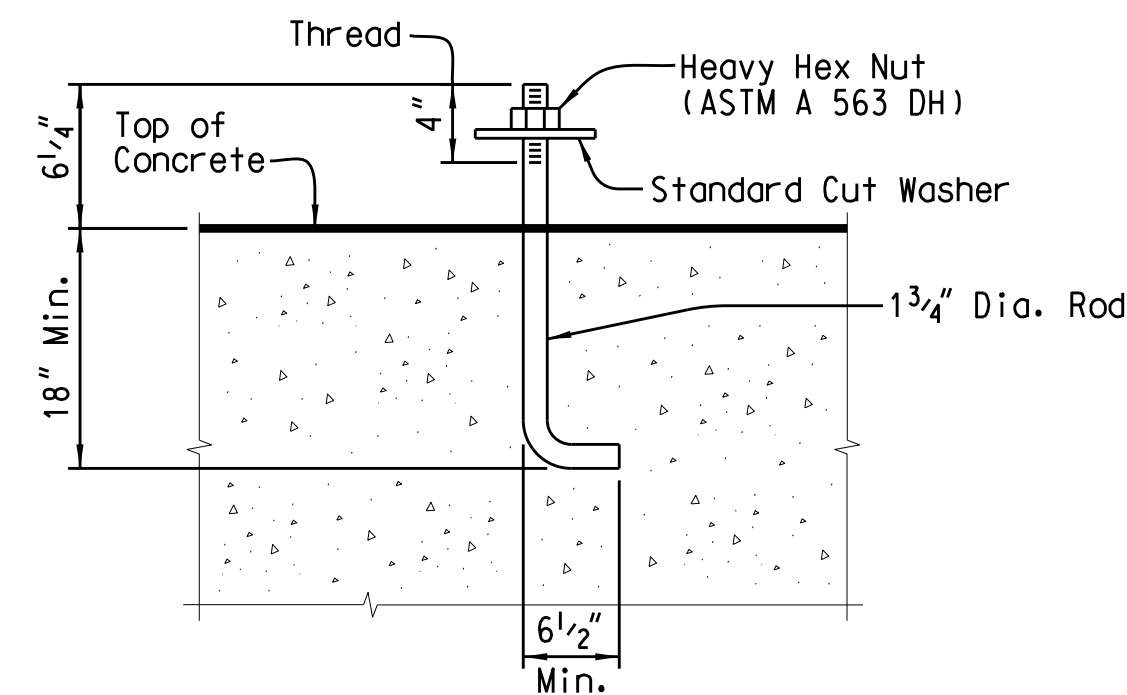
For supports that do not contact forms or floor surfaces, use wire bar supports that conform to the requirements of the Standard Specifications. In applications where galvanized bars are used, use galvanized wire supports.

① Use SBU where steel stay-in-place forms used, use SB elsewhere.



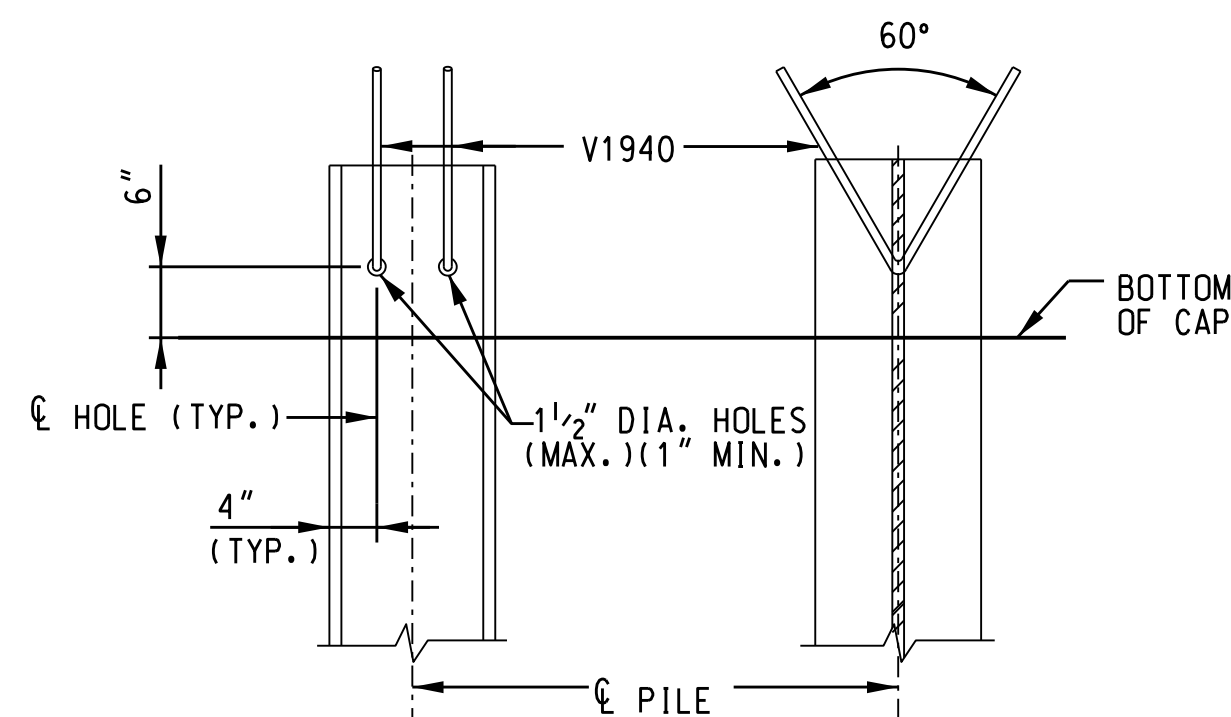
CONST. JT. DETAIL

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



ANCHOR BOLT DETAILS

See reinforcing steel schedule on bent sheets for length and number of anchor bolt assemblies required. Provide anchor bolts that conform with ASTM F 1554 (Gr. 55). Ship anchor bolts and nuts assembled.

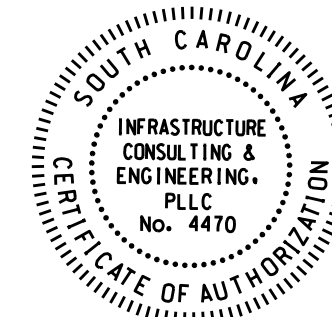
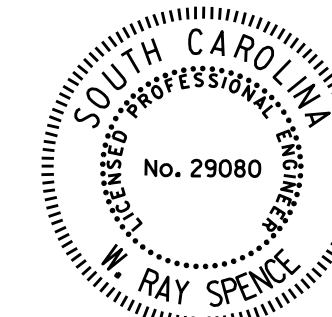


STEEL H-PILE ANCHORAGE DETAIL

NOTES:

DRILL OR FLAME CUT HOLES. GRIND AREA
AROUND FLAME CUT HOLES TO REMOVE
BURRS.

TIE OR TIGHTLY WEDGE THE REINFORCING
BAR AGAINST THE TOP OF THE HOLE.

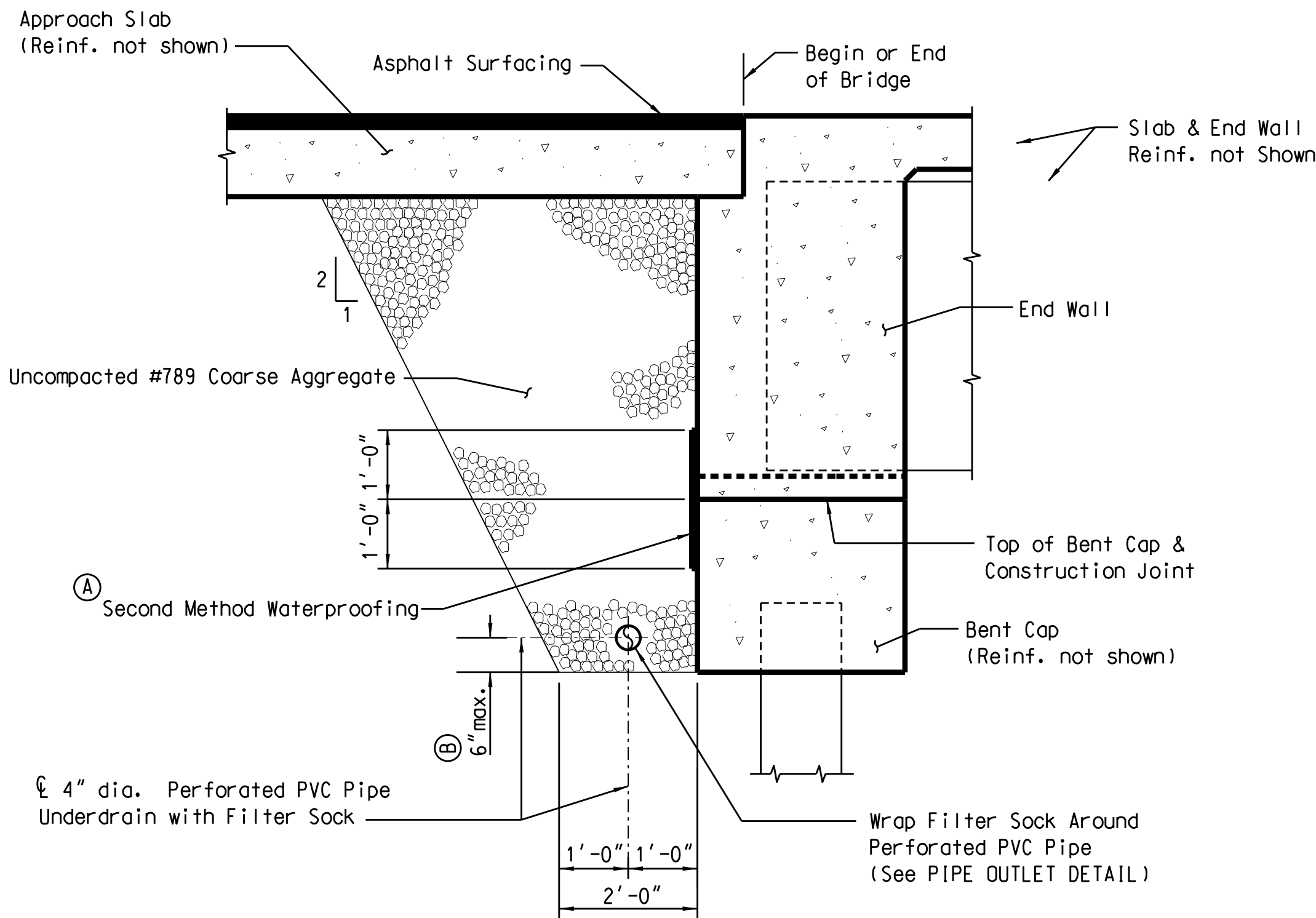


REV. 0	WRS	09-22-22	
	RFC PLANS		
REV.	PCW	LEM	9-1
	Bar Support Det		
REV.	BMH	JXY	12-1
	Const. Jt.		
REVIEWED	WRS 06-22		
QUAN.			
DR.	SRM	GFU	8-07
DES.			
	BY	CHK.	DATE

SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
<u>GENERAL DETAILS</u>	
RAMP F BRIDGE OVER I-20 CD	
COUNTY RICHLAND	ROUTE RAMP F

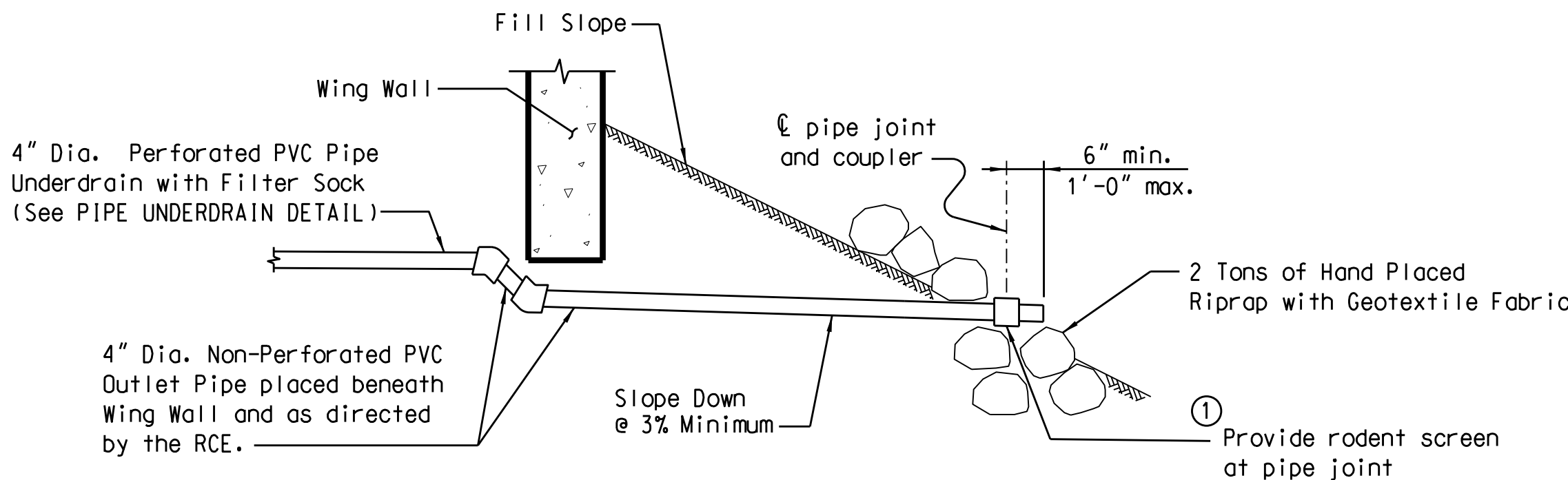
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BRIDGE PLANS ID	SHEET NO.
P039719-B44	5



PIPE UNDERDRAIN DETAIL

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

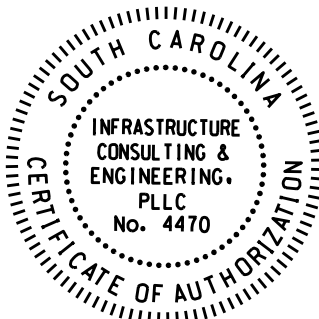
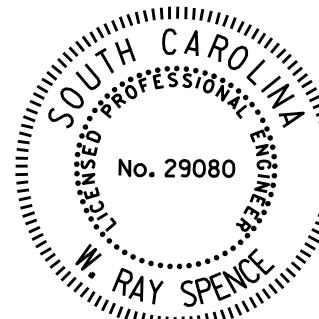


PIPE OUTLET DETAIL

Notes:

Install 4" Dia. Perforated Pipe Underdrain in accordance with Section 802 of the Standard Specifications. Use Uncompactd #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.	WRS	09-22-22
0	RFC	PLANS
REV.		
REV.	PCW	HL 4-19
	22x36	Border
REVIEWED	WRS	06-22
QUAN.		
DR.	SRM	SAN 2-08
DES.		
	BY	CHK. DATE

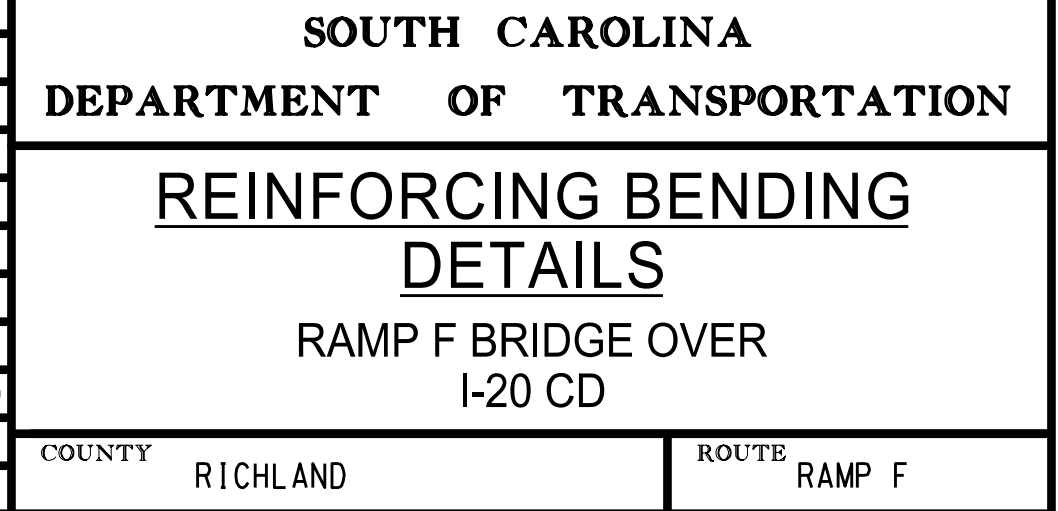


SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

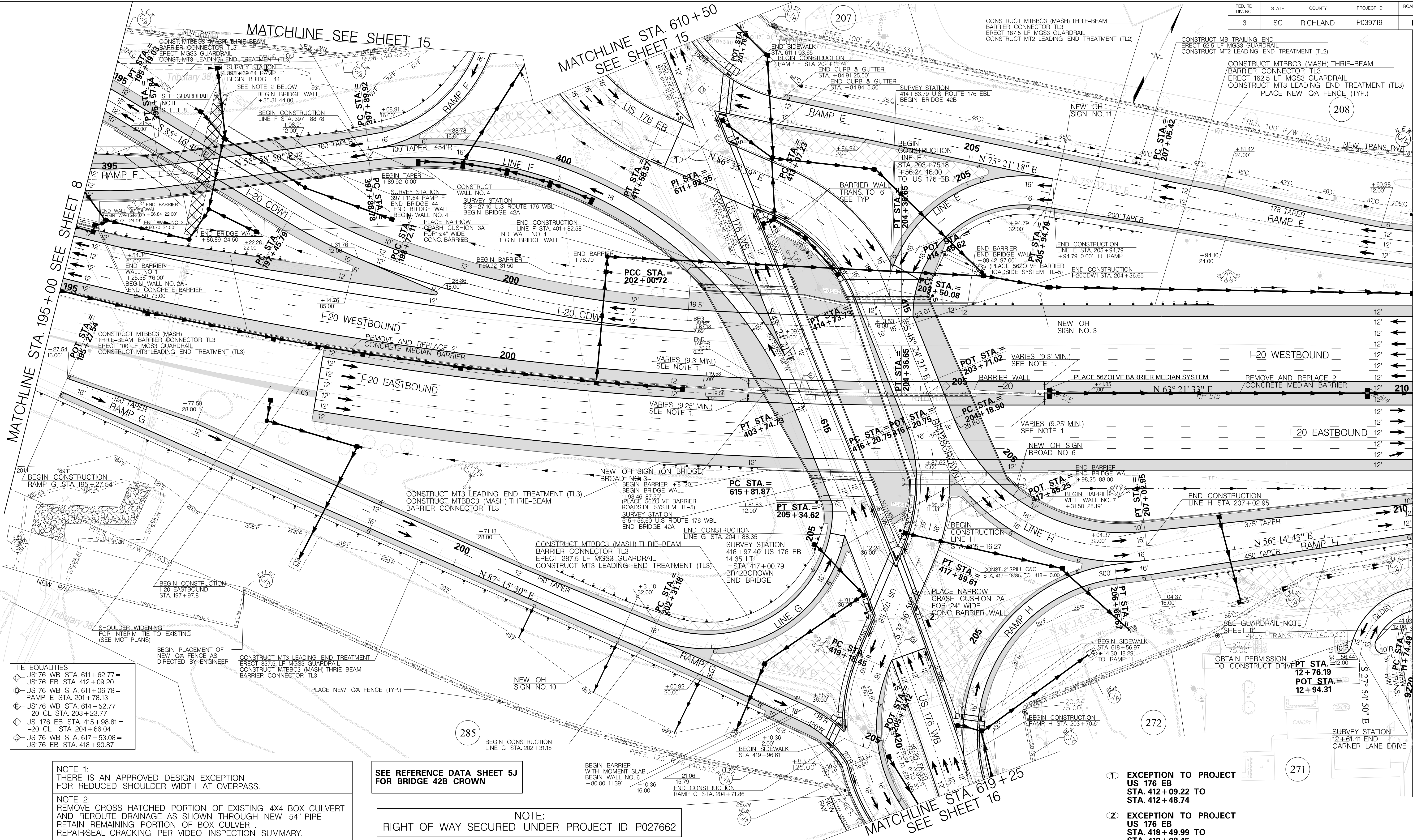
MISCELLANEOUS DETAILS

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND ROUTE RAMP F



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



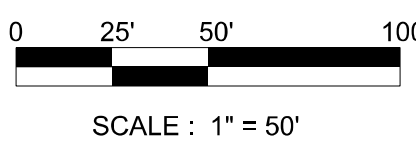
TIE EQUALITIES	
US176 WB STA. 611+62.77=	US176 EB STA. 412+09.20
US176 WB STA. 611+06.78=	RAMP E STA. 201+78.13
US176 WB STA. 614+52.77=	I-20 CL STA. 203+23.77
US 176 EB STA. 415+98.81=	I-20 CL STA. 204+66.04
US176 WB STA. 617+53.08=	US176 EB STA. 418+90.87

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

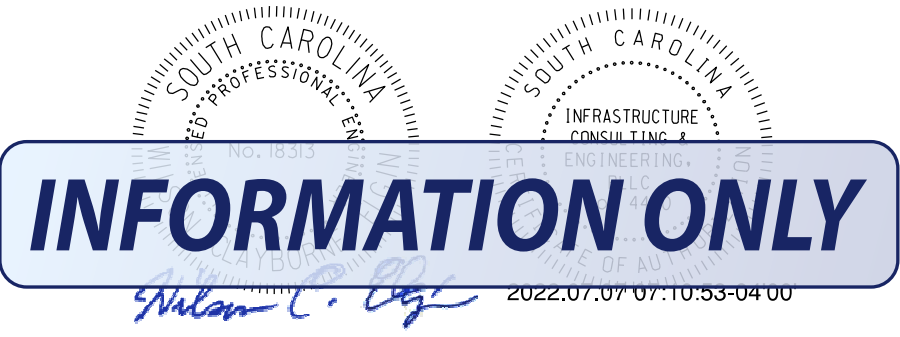
NOTE 2:
REMOVE CROSS HATCHED PORTION OF EXISTING 4X4 BOX CULVERT
AND REROUTE DRAINAGE AS SHOWN THROUGH NEW 54" PIPE
RETAIN REMAINING PORTION OF BOX CULVERT.
REPAIR/SEAL CRACKING PER VIDEO INSPECTION SUMMARY.

SEE REFERENCE DATA SHEET 5J
FOR BRIDGE 42B CROWN

NOTE:
RIGHT OF WAY SECURED UNDER PROJECT ID P027662



ALIGNMENT CONTROL CAN BE FOUND ON
REFERENCE DATA SHEET



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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

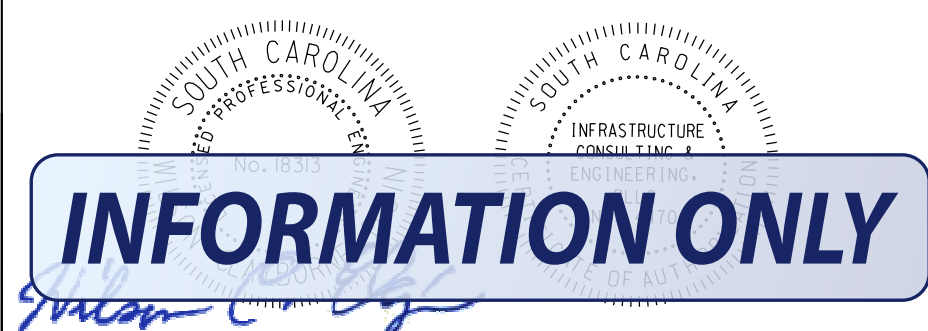
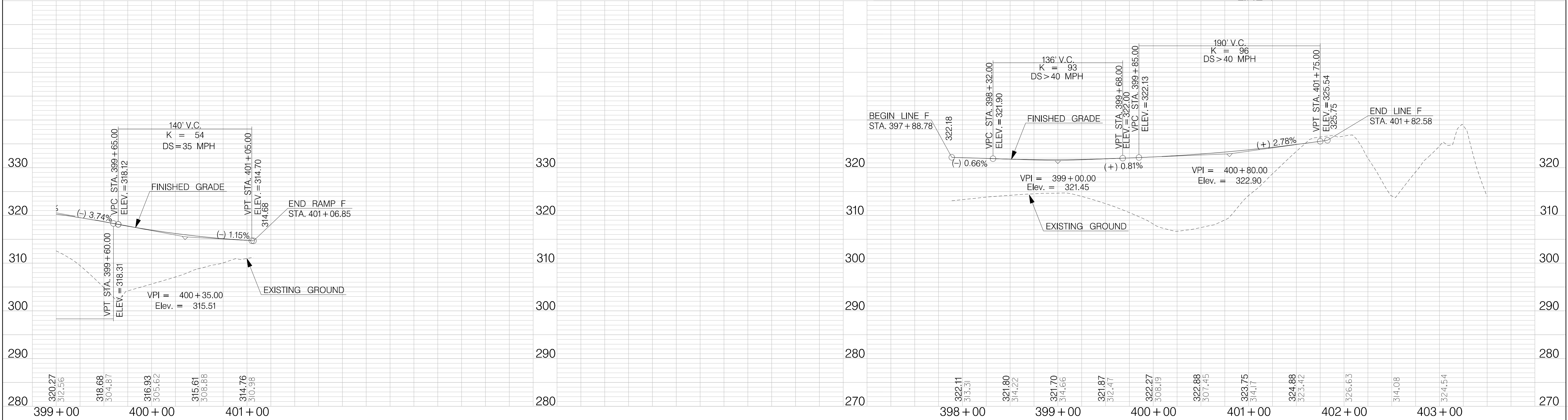
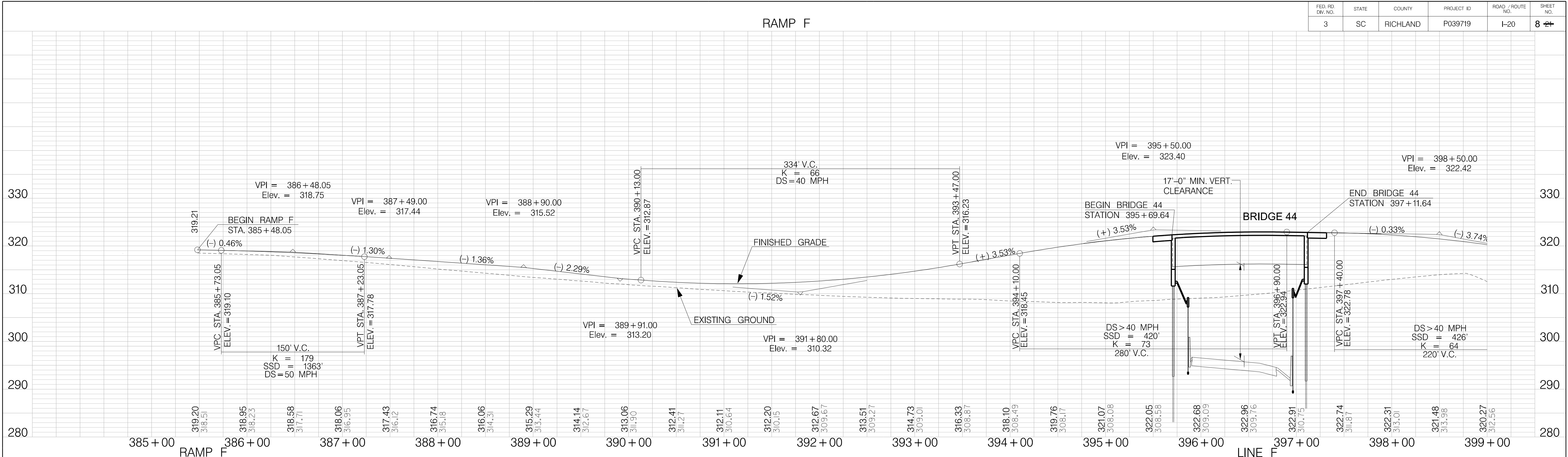
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAROLINA CROSSROADS PHASE 2

PLAN SHEET

Z:\Projects\20-8\CCR Ph 2\Roadway\PLANS\Sheet 9.dgn 7/6/2022

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7/7/2022



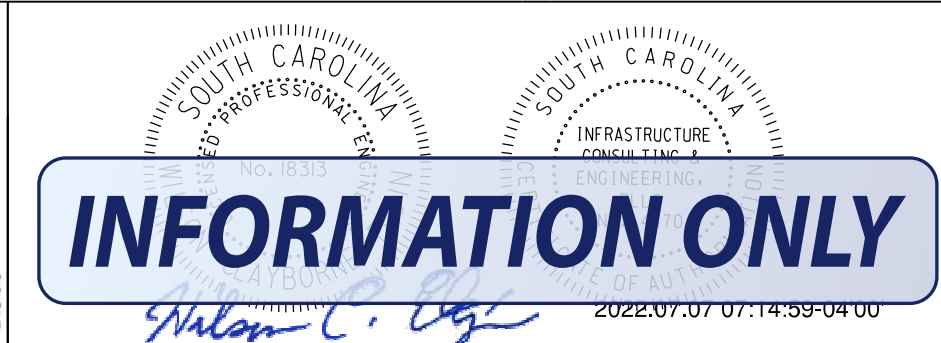
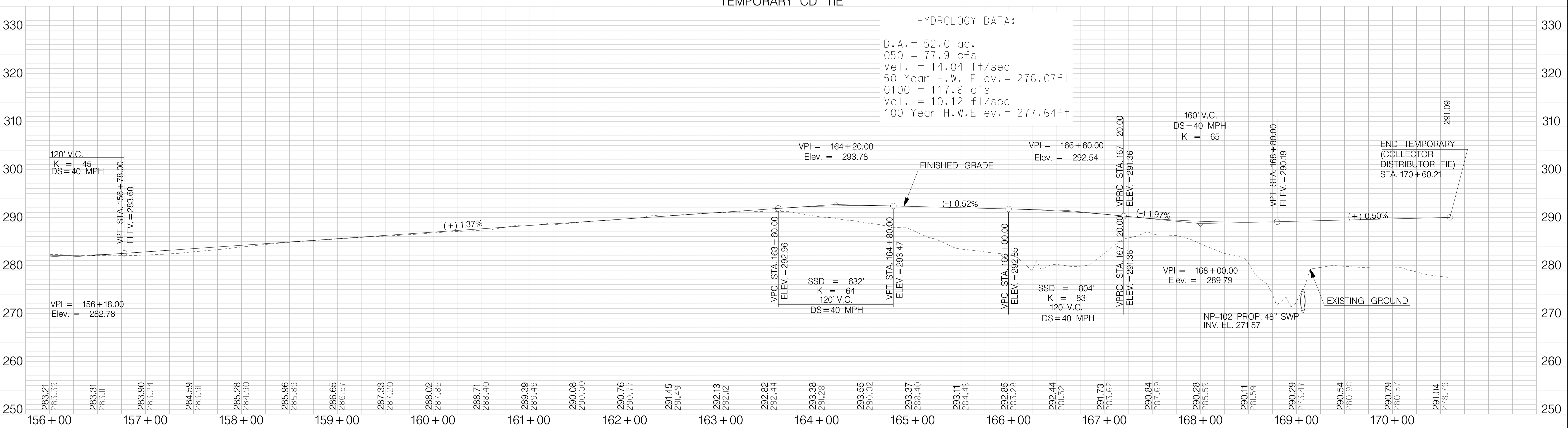
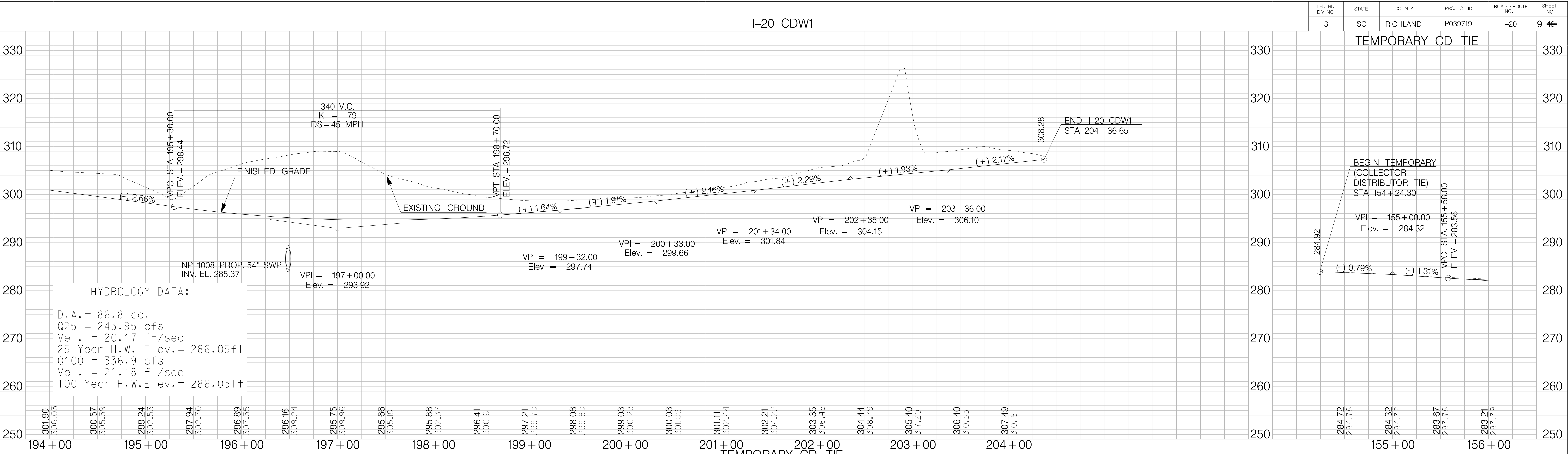
SCALE: 1" = 50' HORIZONTAL 1" = 10' VERTICAL

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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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7/6/2022

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



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

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

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

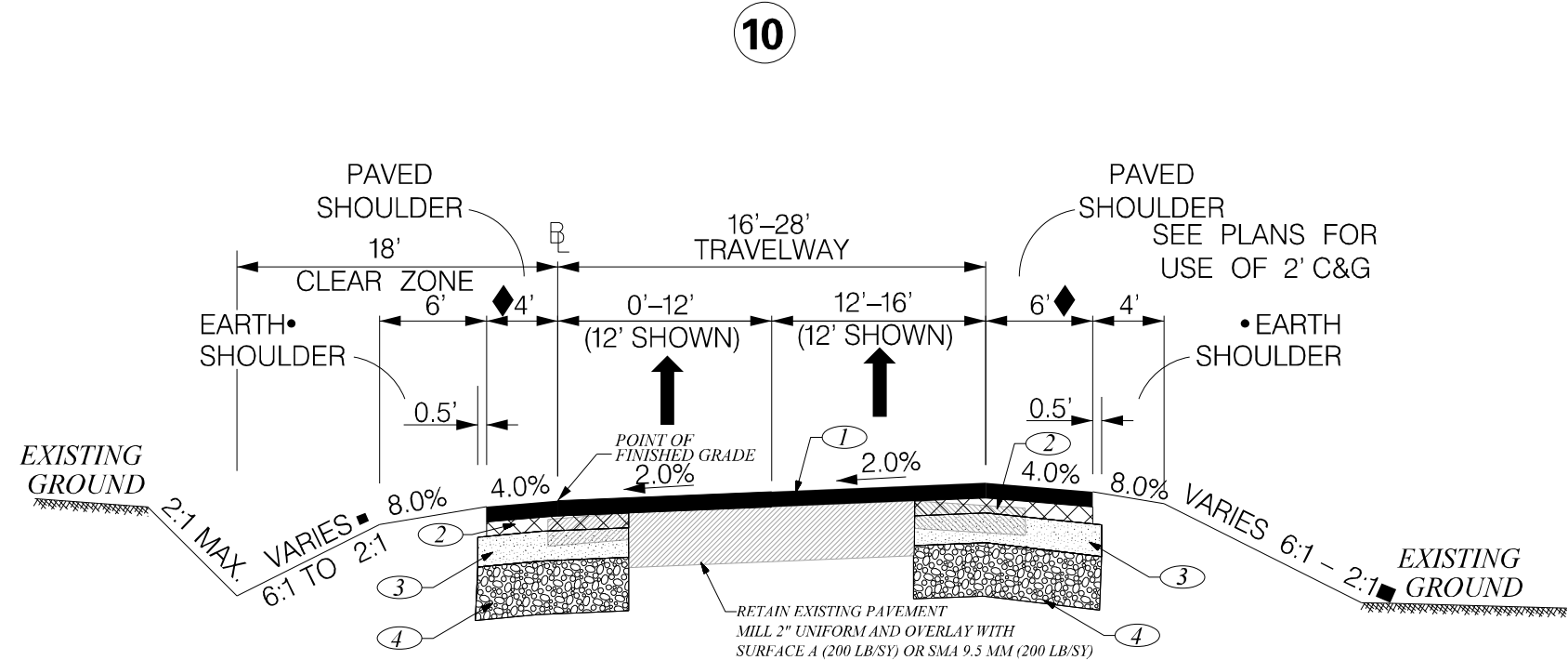
* PLACE MILLED IN RUMBLE STRIPS IN ACCORDANCE WITH STD. DWGS. 401-205-01 AND 401-205-02

■ USE 6:1 SLOPE (0' - 5')
 4:1 SLOPE (5' - 10')
 2:1 SLOPE (10' - OVER)

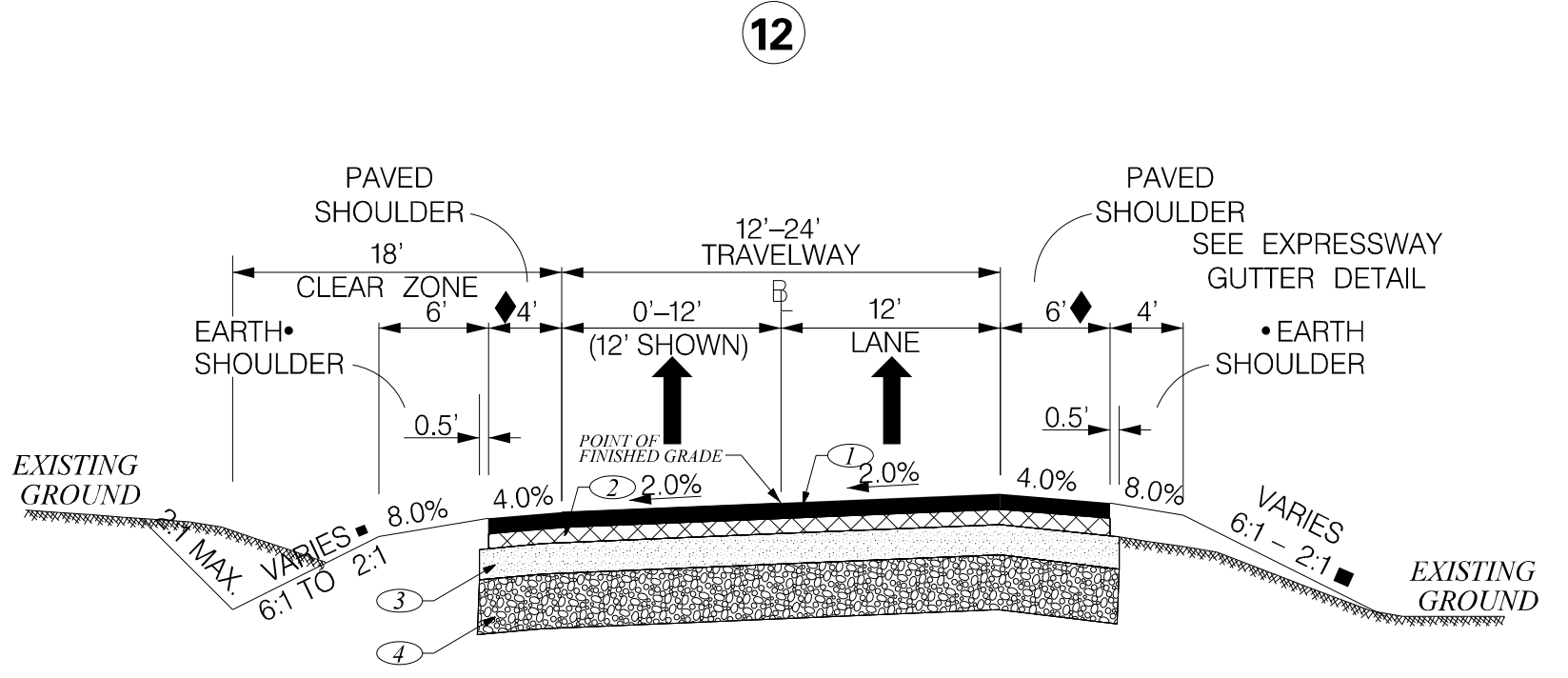
• ADD 3.75' WHERE GUARDRAIL IS ERECTED EXCEPT IN AREAS WITH COMPRESSED SHOULDER STD. DWG. 805-215-00

✂ SEE "S" SHEETS FOR DETAIL OF VERTICAL FACE BARRIER AND CUT/FILL WALLS.

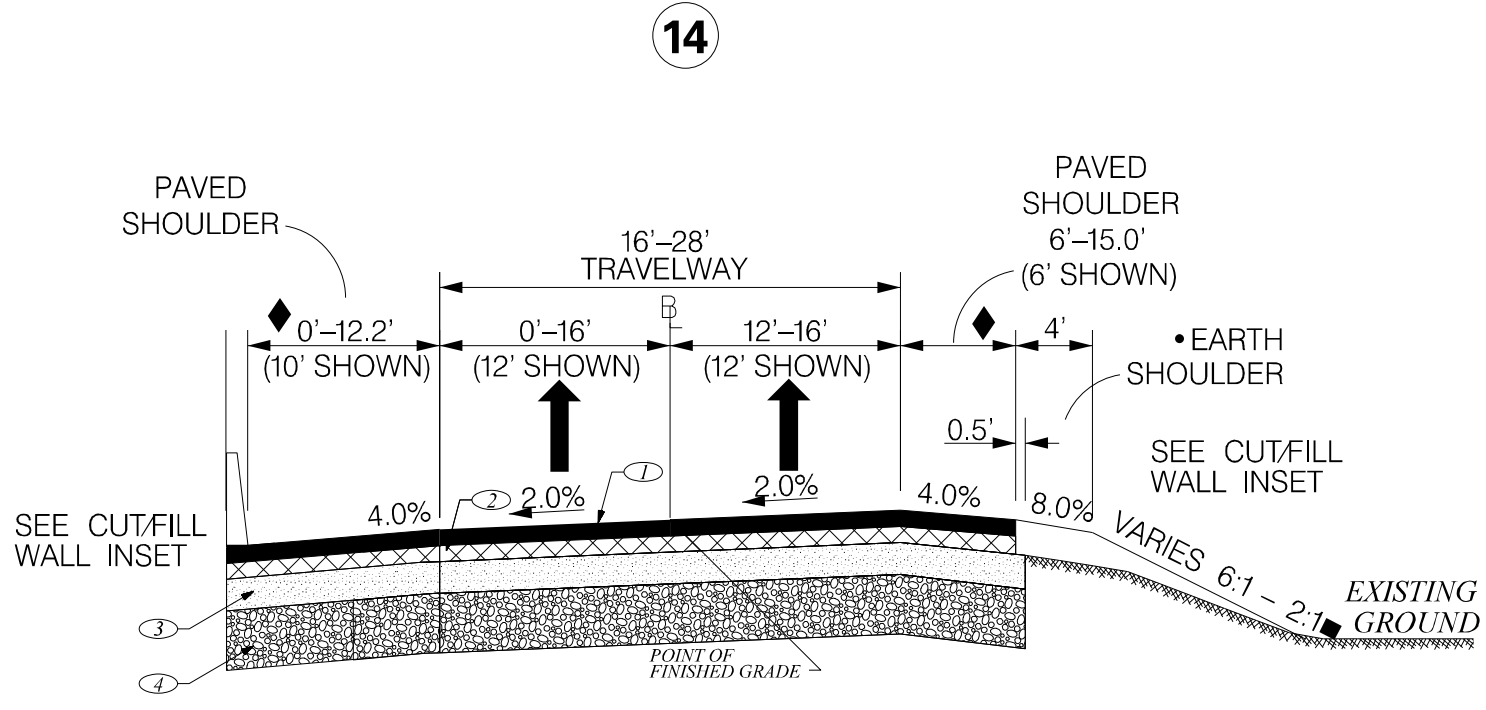
♦ SEE CUT/FILL WALL INSET.



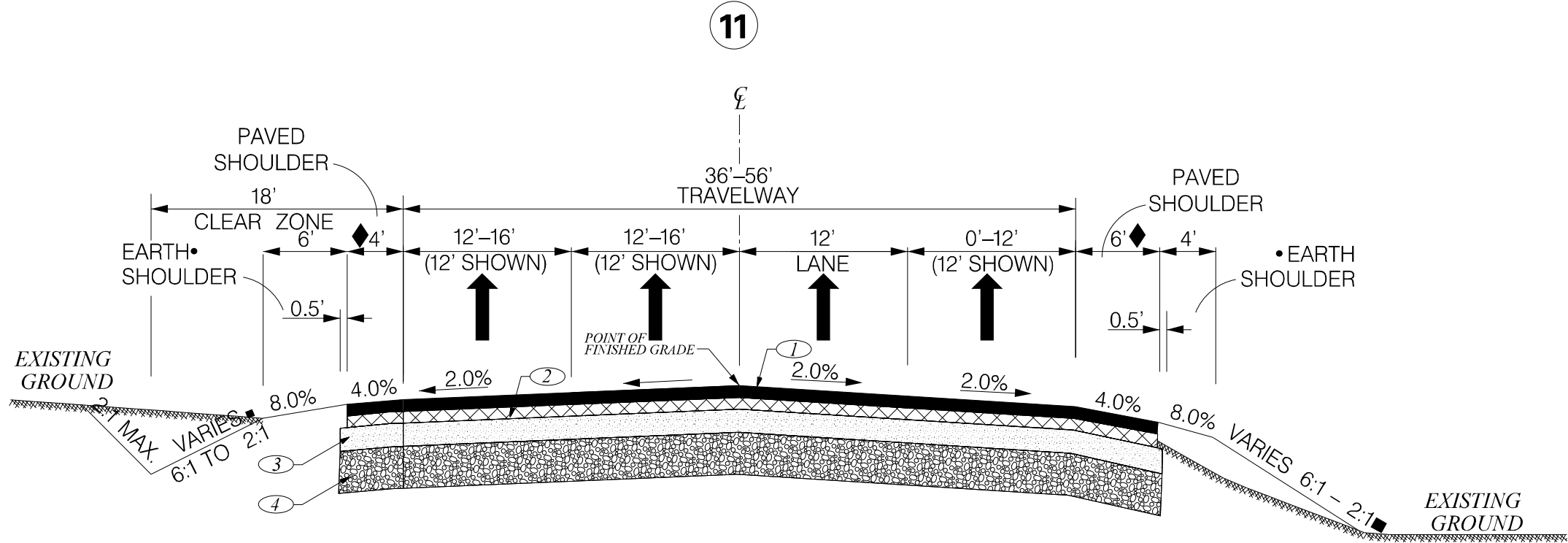
USE THIS TYPICAL SECTION
 RAMP E STA. 202+11.74 TO STA. 205+94.79



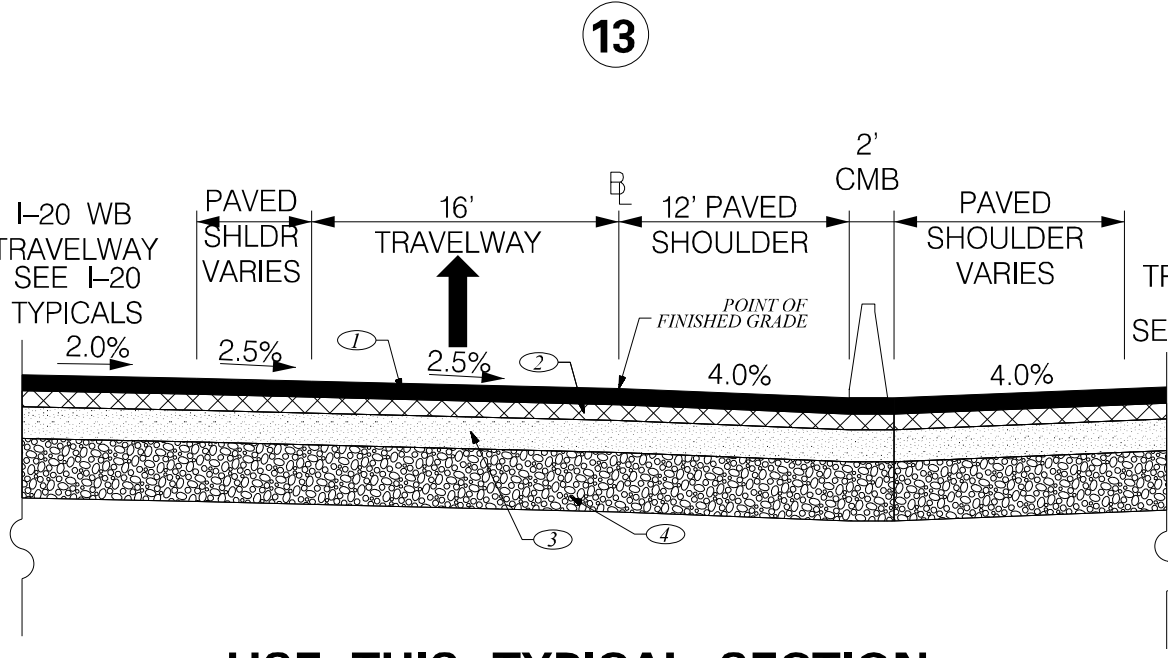
USE THIS TYPICAL SECTION
 RAMP E STA. 211+87.13 TO STA. 227+22.44



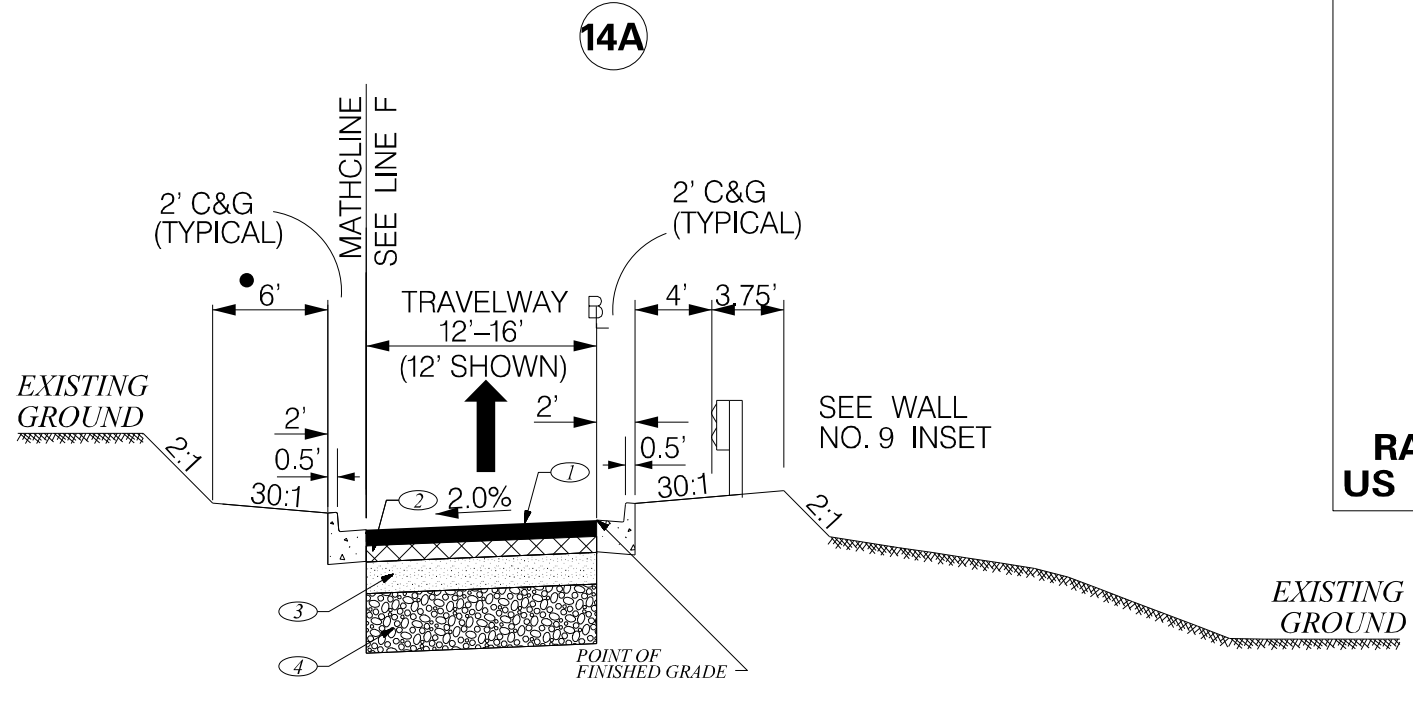
USE THIS TYPICAL SECTION
 RAMP F STA. 390+63.30 TO STA. 397+89.92
 NOTE: SEE PLANS FOR BEGIN AND END BRIDGE



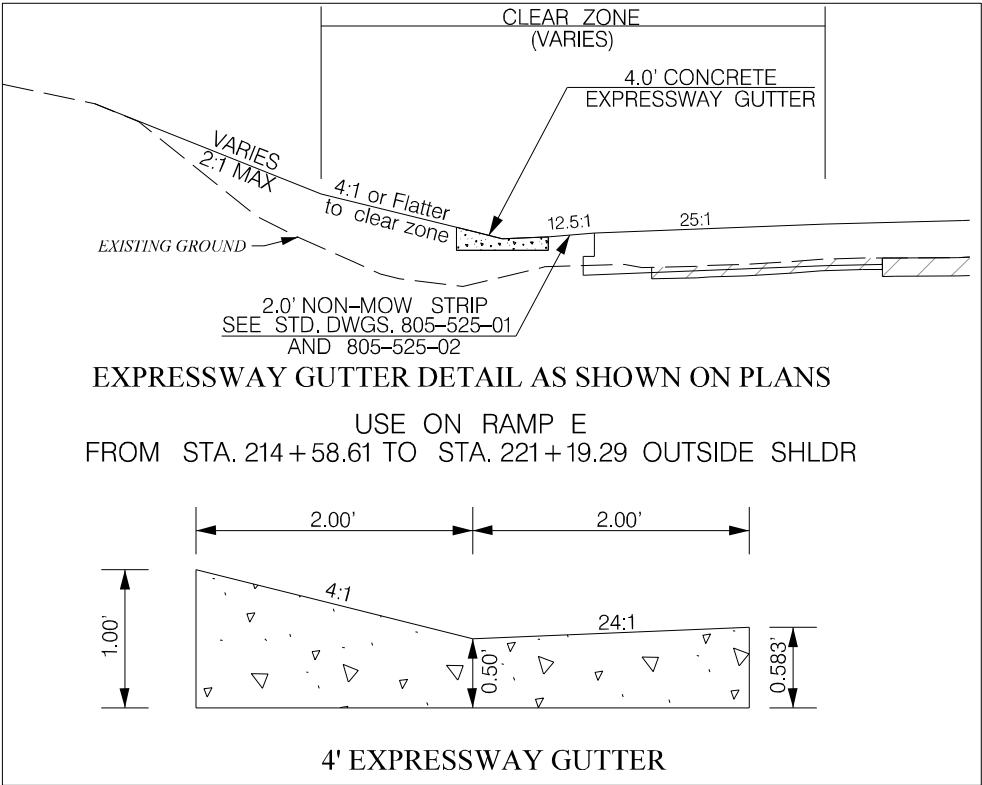
USE THIS TYPICAL SECTION
 RAMP E STA. 205+94.79 TO STA. 211+87.13



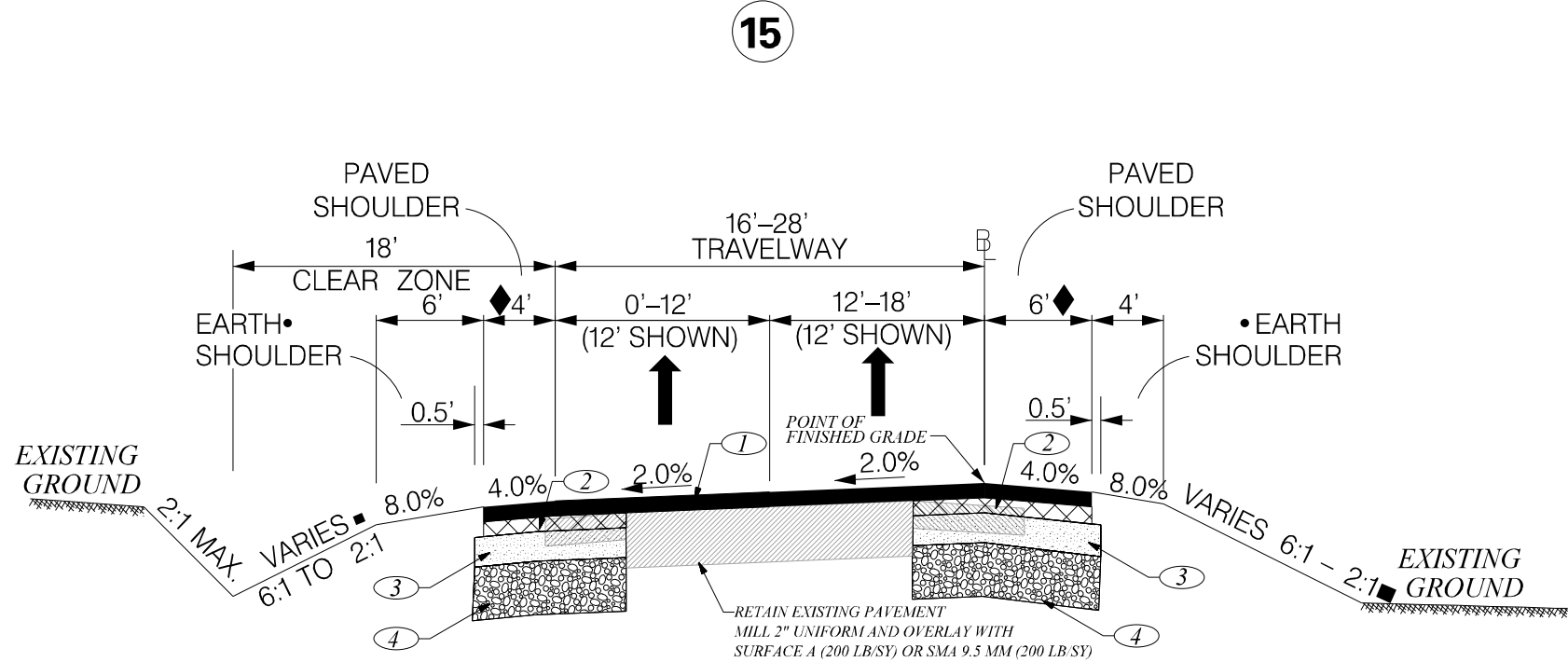
USE THIS TYPICAL SECTION
 RAMP F STA. 385+48.05 TO STA. 390+63.30



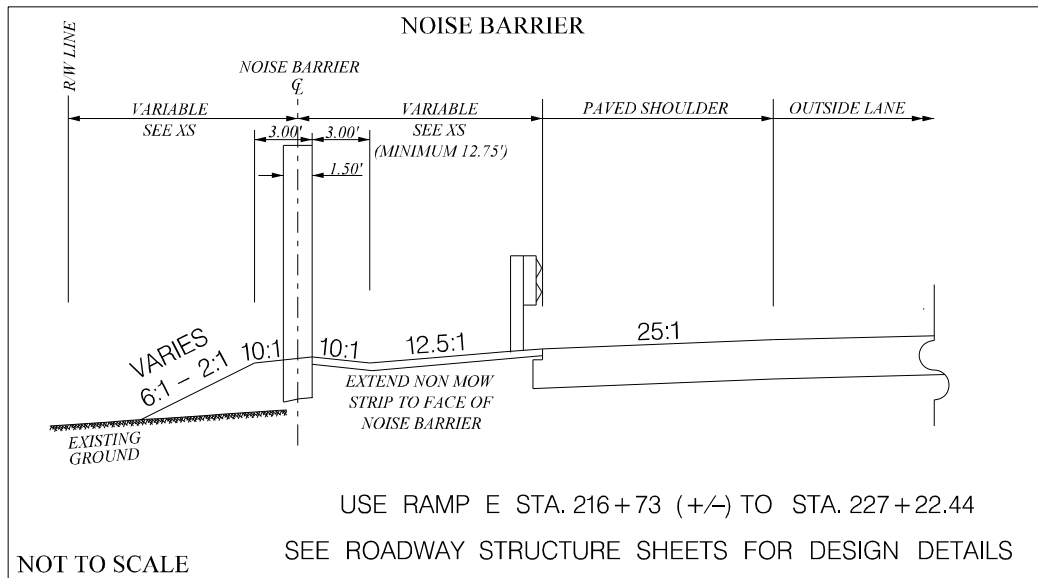
USE THIS TYPICAL SECTION
 RAMP F STA. 397+89.92 TO STA. 401+06.85



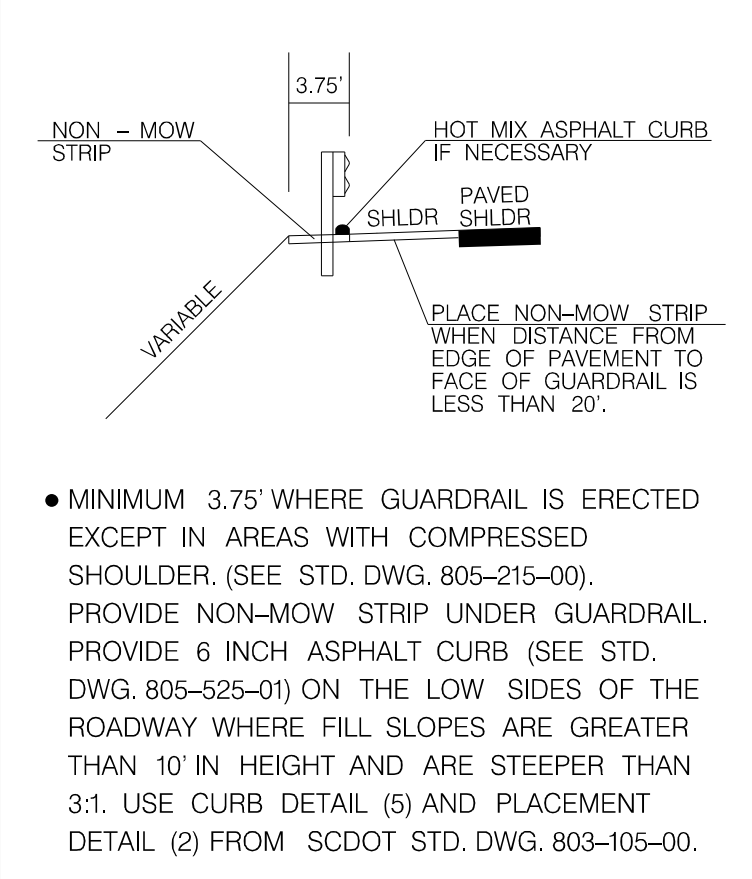
NOTE: TYPICAL SECTIONS ARE LOOKING IN DIRECTION OF TRAFFIC AND NOT NECESSARILY IN DIRECTION OF SURVEY.



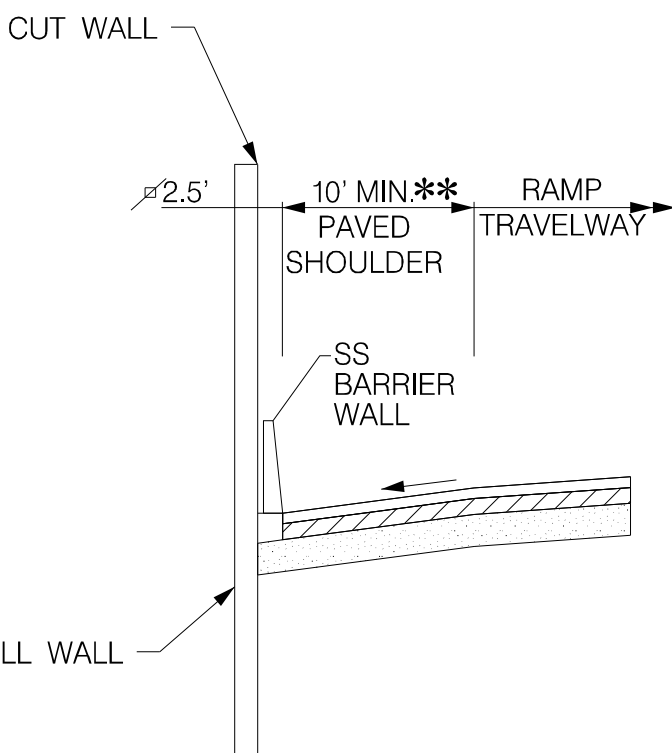
USE THIS TYPICAL SECTION
 RAMP G STA. 195+27.54 TO STA. 202+31.18



NON-MOW STRIP AND ASPHALT FLUME UNDER GUARDRAIL DETAIL



♦ CUT/FILL WALL INSET



** MATCH PAVEMENT DESIGN OF RAMP & PAVE TO THE FACE OF BARRIER WALL. 10' MINIMUM PAVED SHOULDER WIDTH. SOME SHOULDER WIDTHS MAY BE GREATER THAN 10' FOR SIGHT DISTANCE. SEE PLAN VIEW AND CROSS SECTIONS FOR WALL LOCATIONS AND WIDTHS.

FUNCTIONAL CLASSIFICATION:
 URBAN ARTERIAL FREEWAY RAMPS

SEE TABLES ON SHEET 3G FOR PAVEMENT DESIGN OPTIONS

RTE.	DESIGN SPEED			
RAMP	MPH	FROM STA.	TO STA.	
E	40	202+11.74	227+22.44	
F	40	385+48.05	401+06.85	
G	40	195+27.54	202+31.18	

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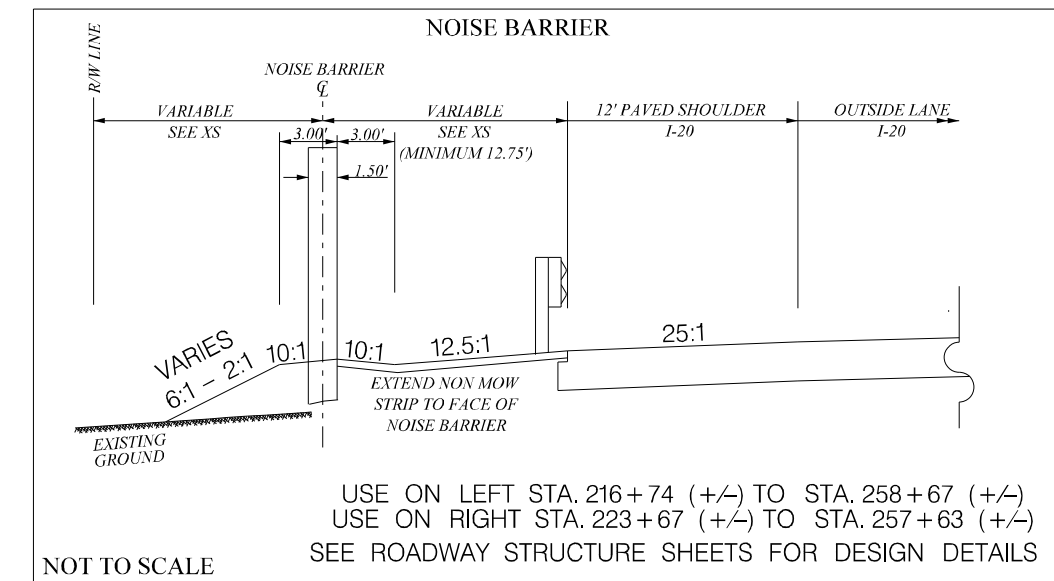
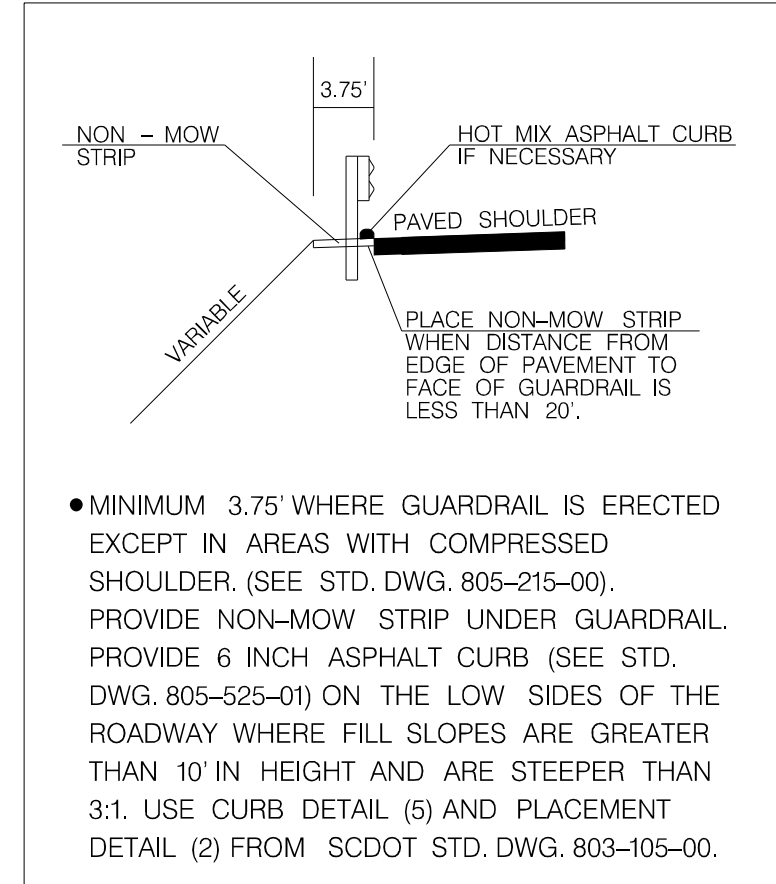
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAROLINA CROSSROADS PHASE 2

TYPICAL SECTION
 SHEET

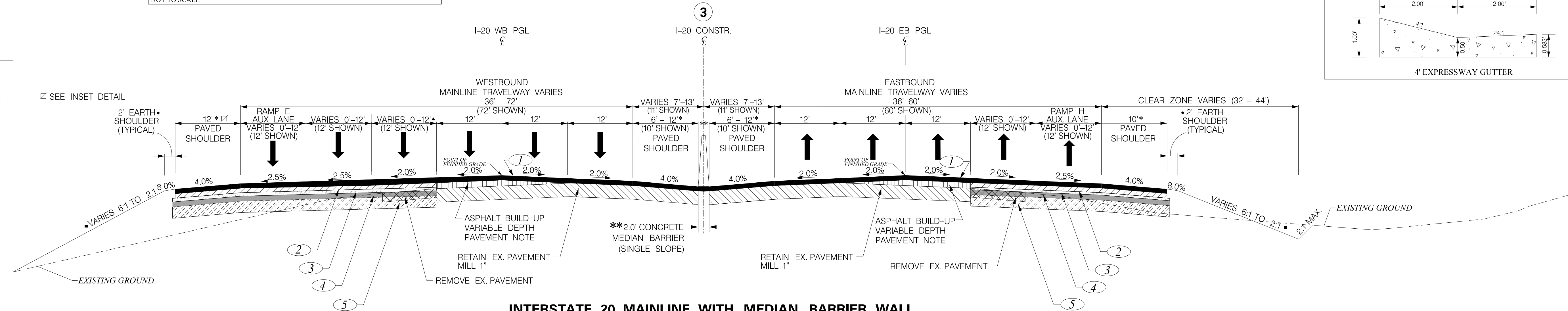
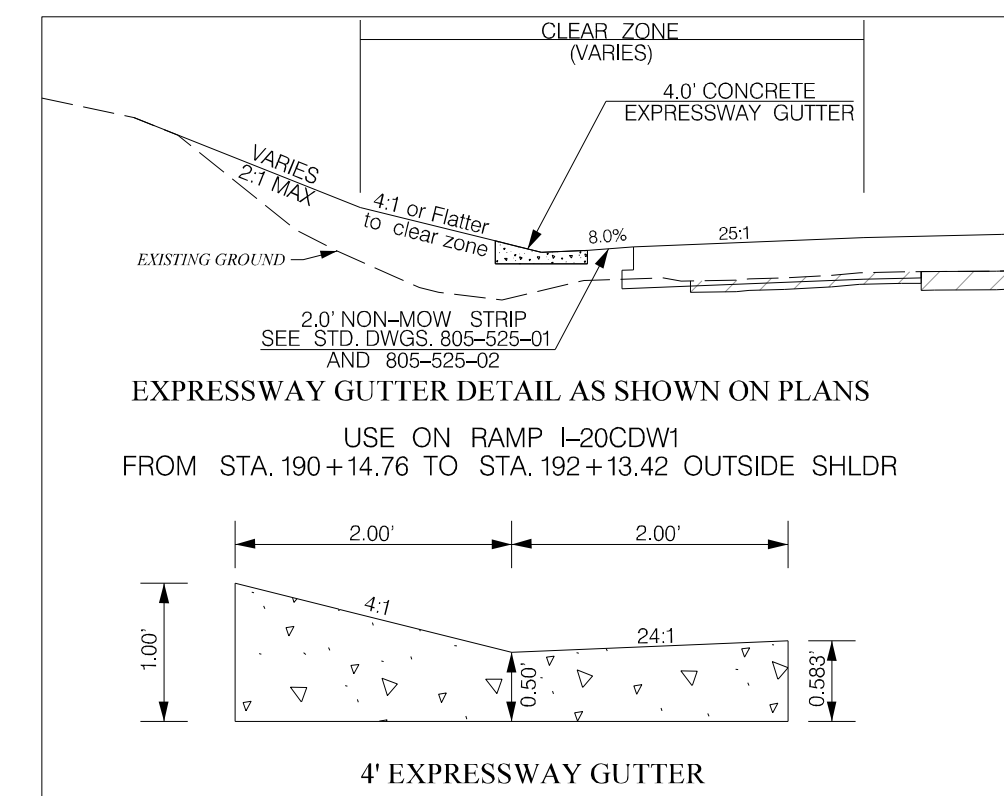
- USE 6:1 SLOPE (0' – 5')
- 4:1 SLOPE (5' – 10')
- 2:1 SLOPE (10' – OVER)

NON-MOW STRIP AND ASPHALT FLUME UNDER GUARDRAIL DETAIL

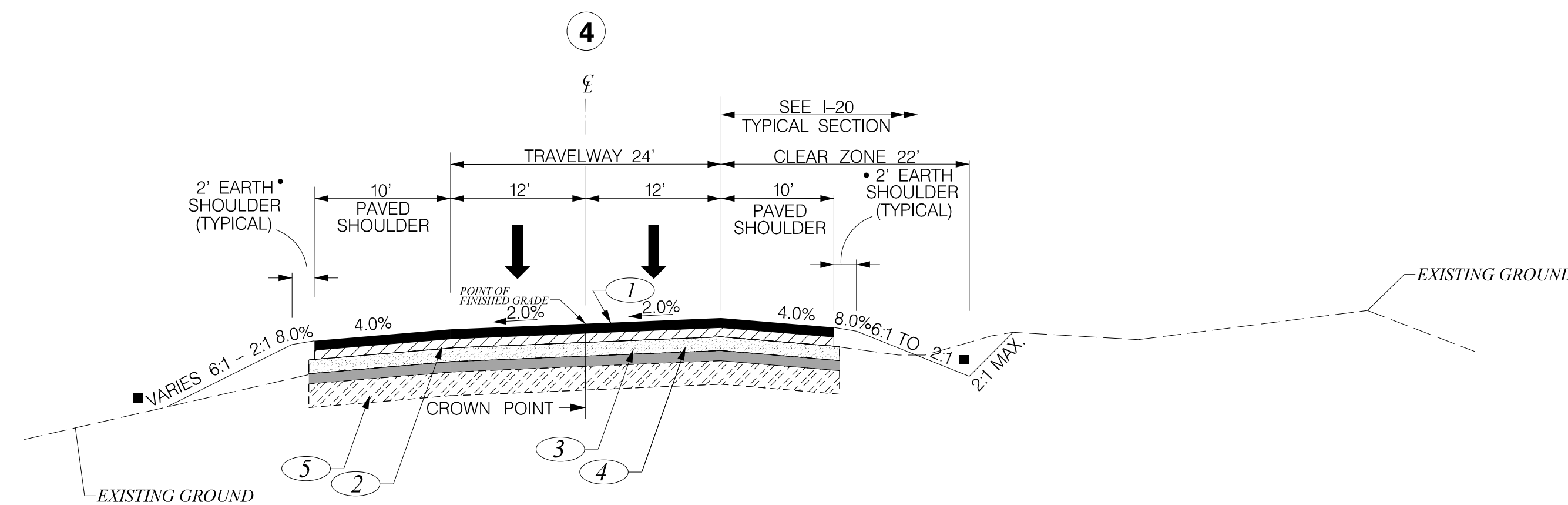


**TYPICAL SECTION OF IMPROVEMENT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
COLUMBIA, S.C.**

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	RICHLAND	P039719	I-20	11 10








INTERSTATE 20 MAINLINE WITH MEDIAN BARRIER WALL
STA. 240+97.05 TO STA. 264+97.26 WESTBOUND
STA. 213+66.70 TO STA. 264+97.26 EASTBOUND
NOTE: I-20 WESTBOUND PGL AND I-20 EASTBOUND PGL
BEGIN AT STA. 252+57.23

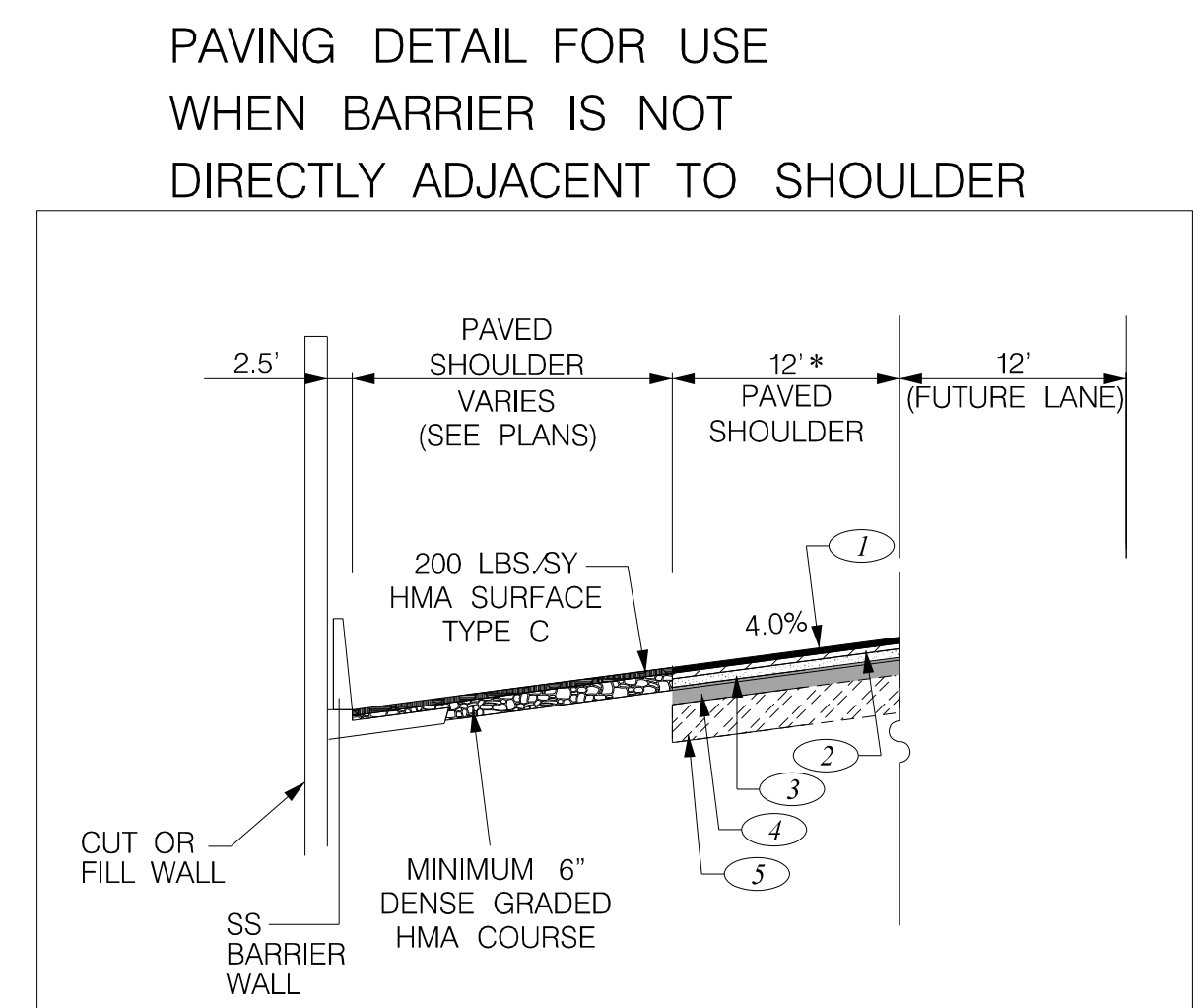


USE THIS TYPICAL SECTION I-20 CDW1
STA. 189+46.39 TO STA. 204+36.65

*VARIABLE DEPTH PAVEMENT NOTE:
LIFTS LESS THAN OR EQUAL TO 1.5 INCHES USE HMA SURFACE TYPE E
LIFTS GREATER THAN 1.5 INCHES USE HMA INTERMEDIATE TYPE B
MILLING FOR CROSS SLOPE CORRECTION SHALL NOT EXCEED 1".*

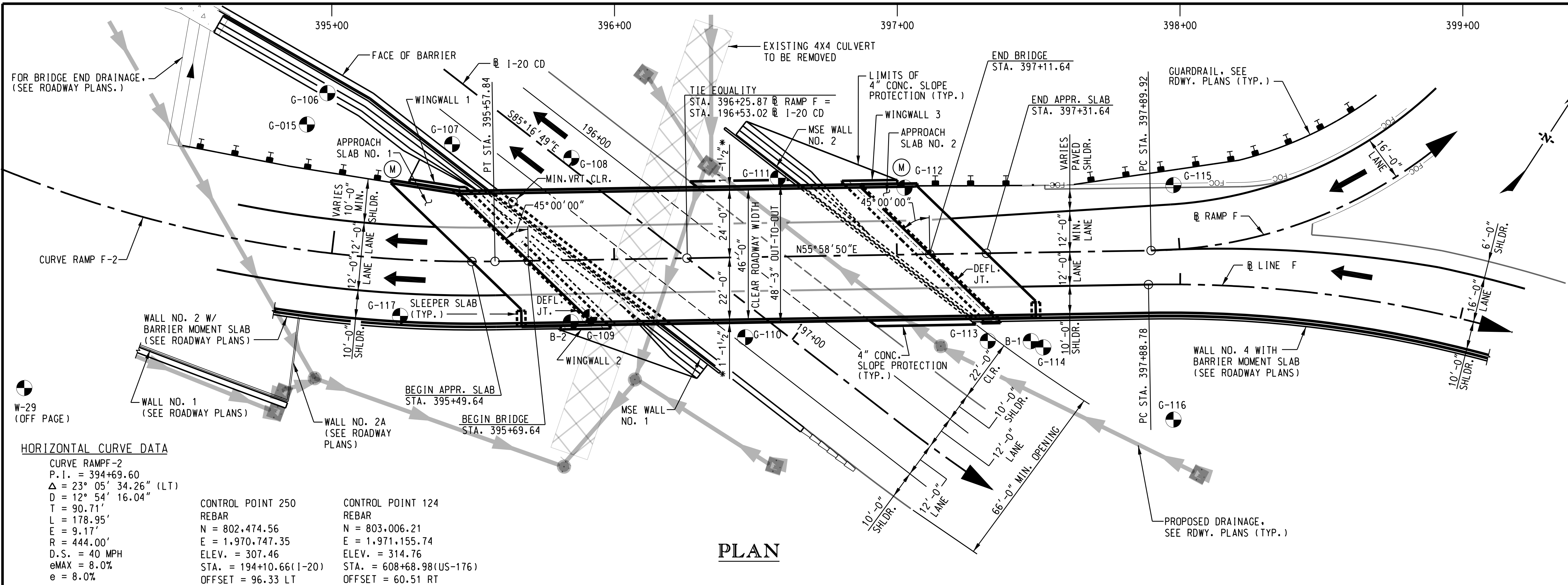
**FUNCTIONAL CLASSIFICATION:URBAN ARTERIAL
FREEWAY_{RTE.}**

SEE TABLES ON SHEET 3G FOR PAVEMENT DESIGN OPTIONS	MPH	FROM STA.	TO STA	    <div>INFORMATION ONLY</div>  <div>N.T.S.</div>	6				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
	60	213 + 80.00	264 + 97.26		5					
	I-20 CDW1				4					CAROLINA CROSSROADS PHASE 2
	45	185 + 25.65	204 + 36.65		3					
				2					TYPICAL SECTION SHEET	
	EXCEPTIONS TO DESIGN SPEED			1						
				0	WCE	7-7-2022	RELEASED FOR CONSTRUCTION			
			REV.NO.	BY	DATE	DESCRIPTION OF REVISION				



INSET DETAIL

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HORIZONTAL CURVE DATA
CURVE RAMP F-2
P.I. = 394+69.60
 $\Delta = 23^\circ 05' 34.26''$ (LT)
D = $12^\circ 54' 16.04''$
T = 90.71'
L = 178.95'
E = 9.17'
R = 444.00'
D.S. = 40 MPH
eMAX = 8.0%
e = 8.0%

CONTROL POINT 250
REBAR
N = 802,474.56
E = 1,970,747.35
ELEV. = 307.46
STA. = 194+10.66 (I-20)
OFFSET = 96.33 LT

CONTROL POINT 124
REBAR
N = 803,006.21
E = 1,971,155.74
ELEV. = 314.76
STA. = 608+68.98 (US-176)
OFFSET = 60.51 RT

BRIDGE PLANS ID
P039719-B44

SHEET NO.
12

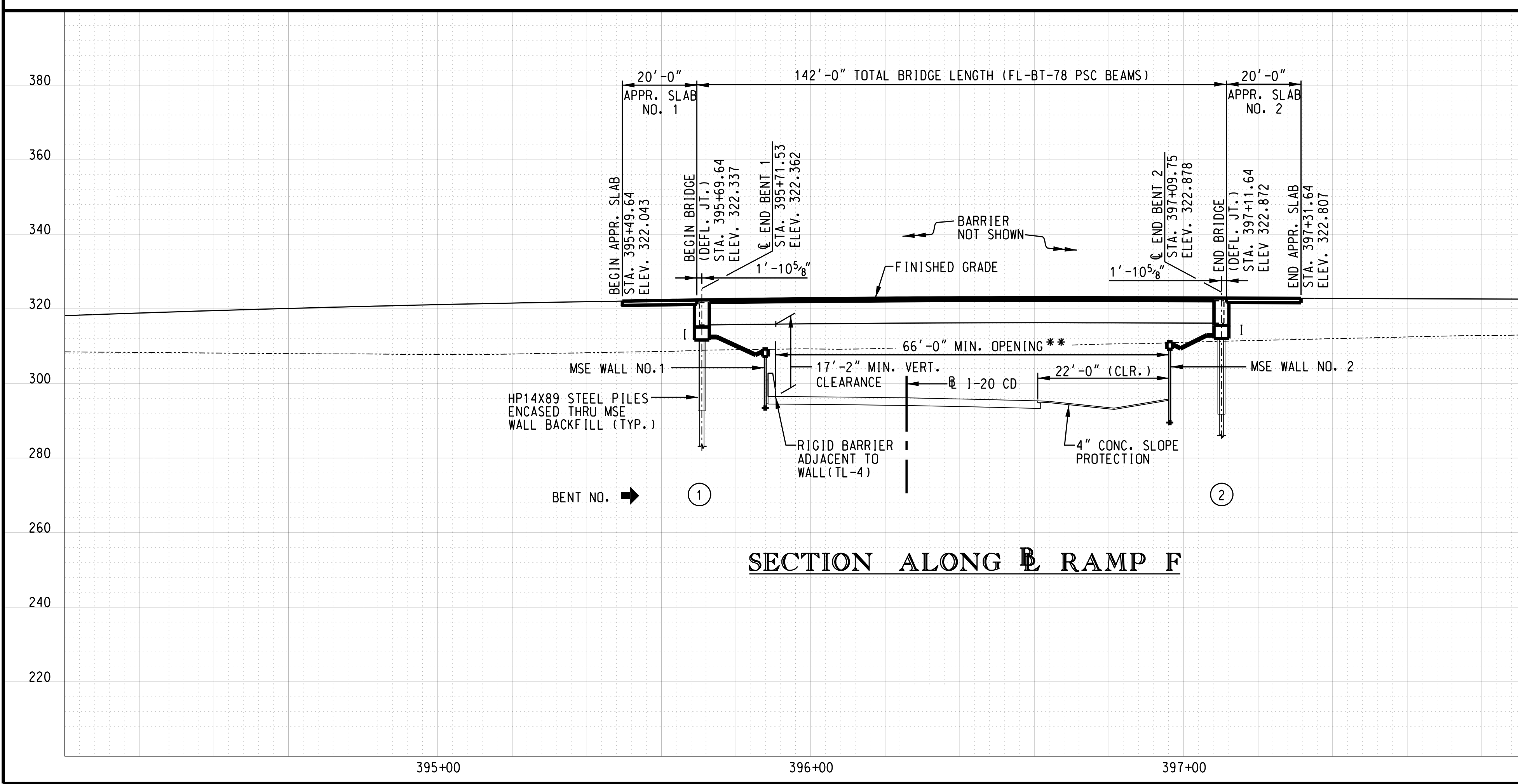
NOTES:
U.N.O. = UNLESS NOTED OTHERWISE.
DECK DRAINS NOT REQUIRED.
* 1'-0" MASH BARRIER PARAPET WITH 1 1/2" SLAB EXTENSION
(M) DENOTES MTB33 GUARDRAIL ATTACHMENT

TEST BORING LOCATIONS		
BORING	STATION	OFFSET
G-015	394+85	44' LT
G-106	394+91	56' LT
G-107	395+42	41' LT
G-108	395+85	36' LT
G-109	395+91	20' RT
G-110	396+46	28' RT
G-111	396+58	28' LT
G-112	397+03	24' LT
G-113	397+32	31' RT
G-114	397+51	34' RT
G-115	398+00	23' LT
G-116	397+95	60' RT
G-117	395+25	20' RT
W-29	205+83.54	192.3' RT
B-56	201+60.83	183.3' LT
CPT B-1	397+46.85	31.3' RT
CPT B-2	395+84.25	21.9' RT
CPT B-3	201+33.71	117.6' LT

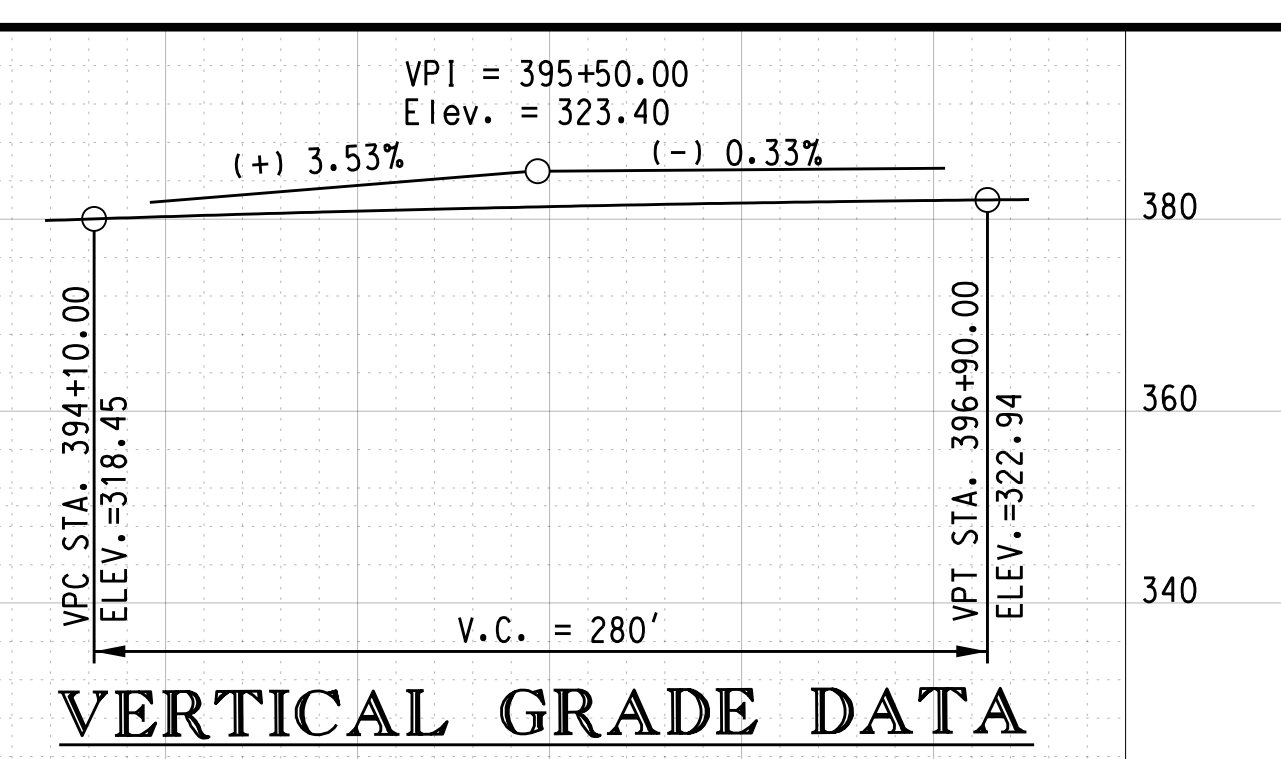
STATIONS AND OFFSETS ARE REFERENCED TO PROPOSED @ RAMP F U.N.O.

STATIONS AND OFFSETS ARE REFERENCED TO @ I-20.

SOME TEST BORING LOCATIONS FALL OUTSIDE OF BRIDGE PLAN VIEW.



I = INTEGRAL
** PERPENDICULAR TO @ I-20 CD



398+00 399+00

REV. 0 WRS 09-22-22 RFC PLANS

REV. 1

REV. 2

REVIEWED WRS 06-22

QUAN. 1

DR. RMH WRS 05-22

DES. WRS ALP 05-22

BY CHK. DATE

SOUTH CAROLINA
No. 29080
W. RAY SPENCE

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

ARCHER UNITED
JOINT VENTURE
INFRASTRUCTURE
CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

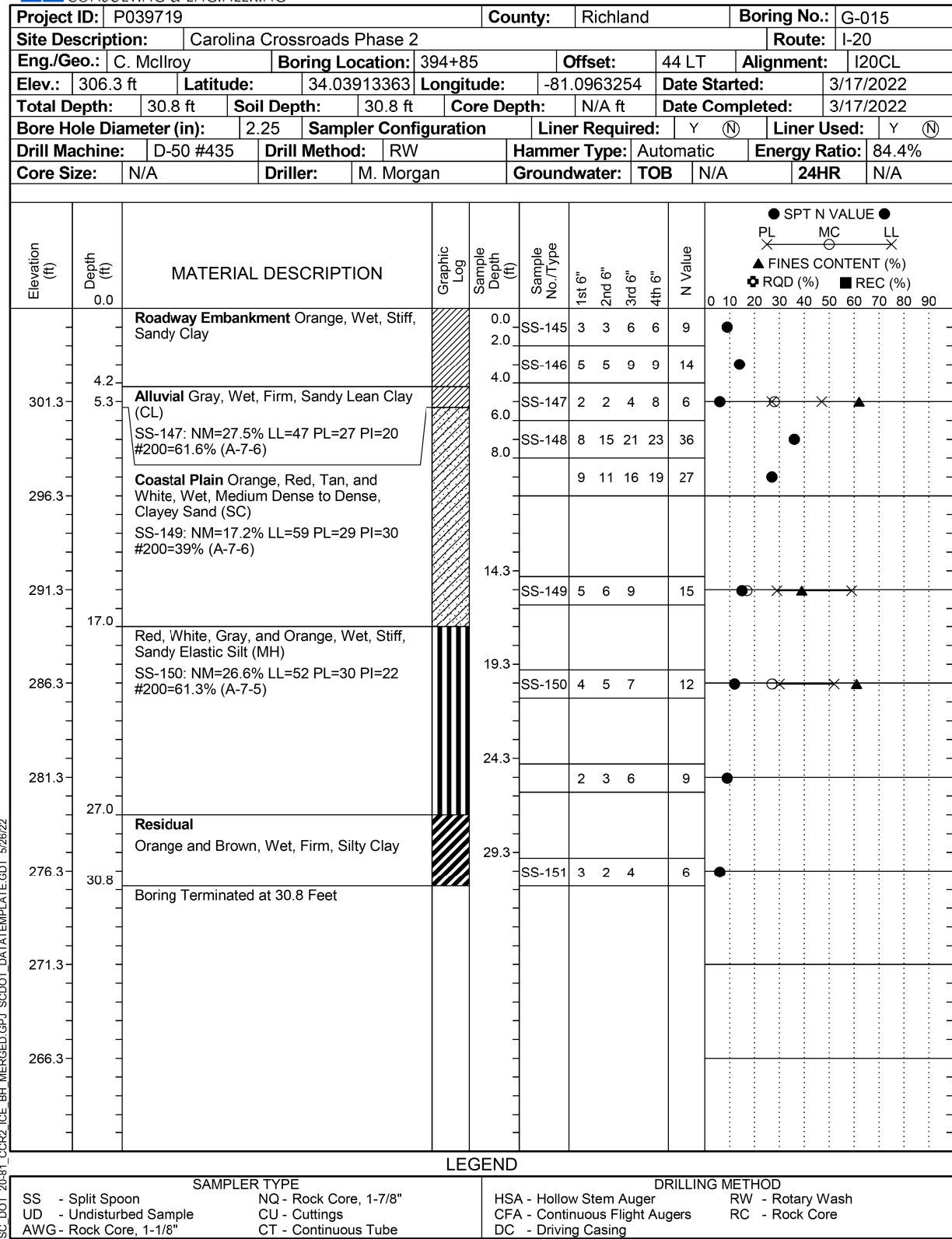
BRIDGE PLAN AND PROFILE

RAMP F BRIDGE OVER I-20 CD

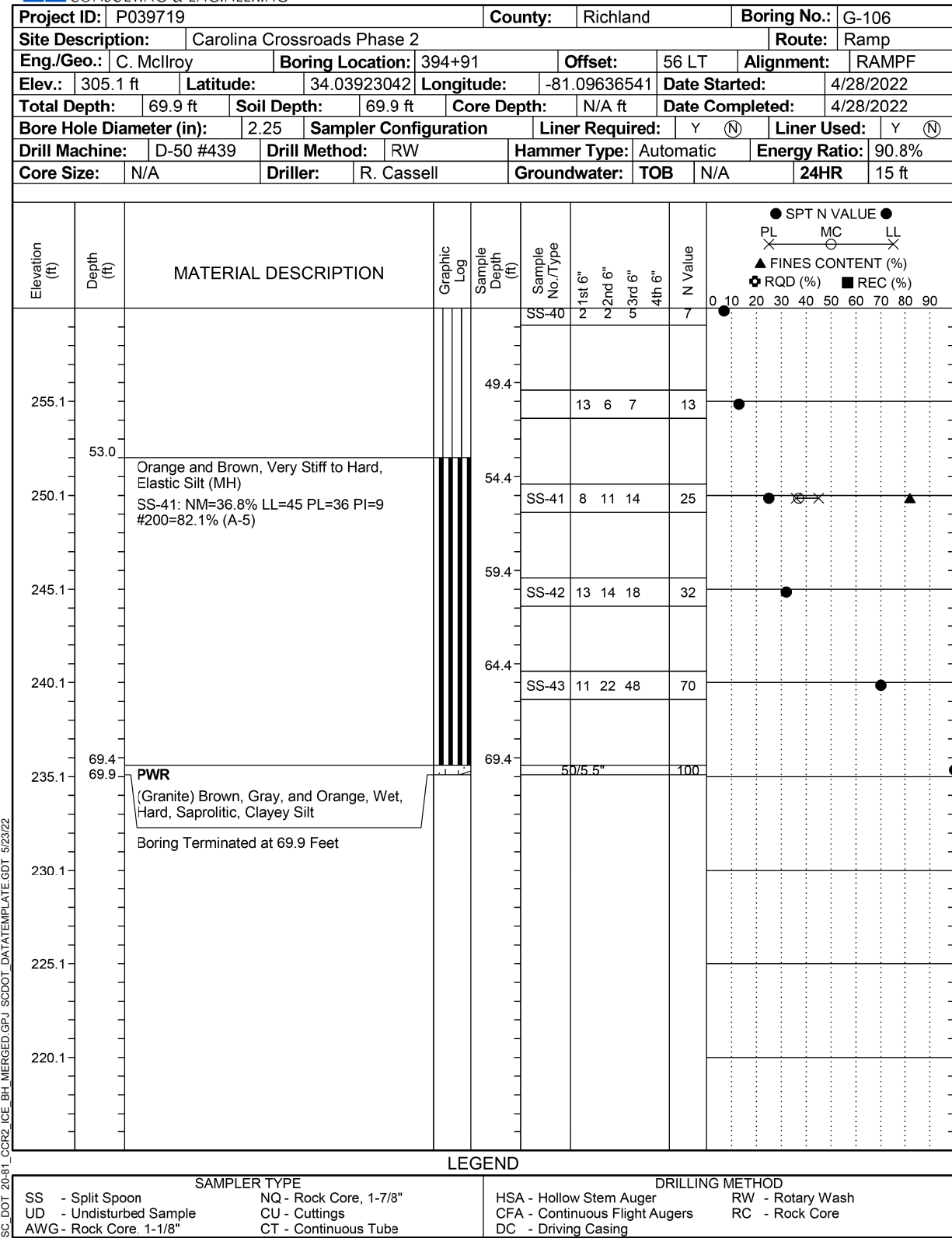
COUNTY RICHLAND ROUTE RAMP F

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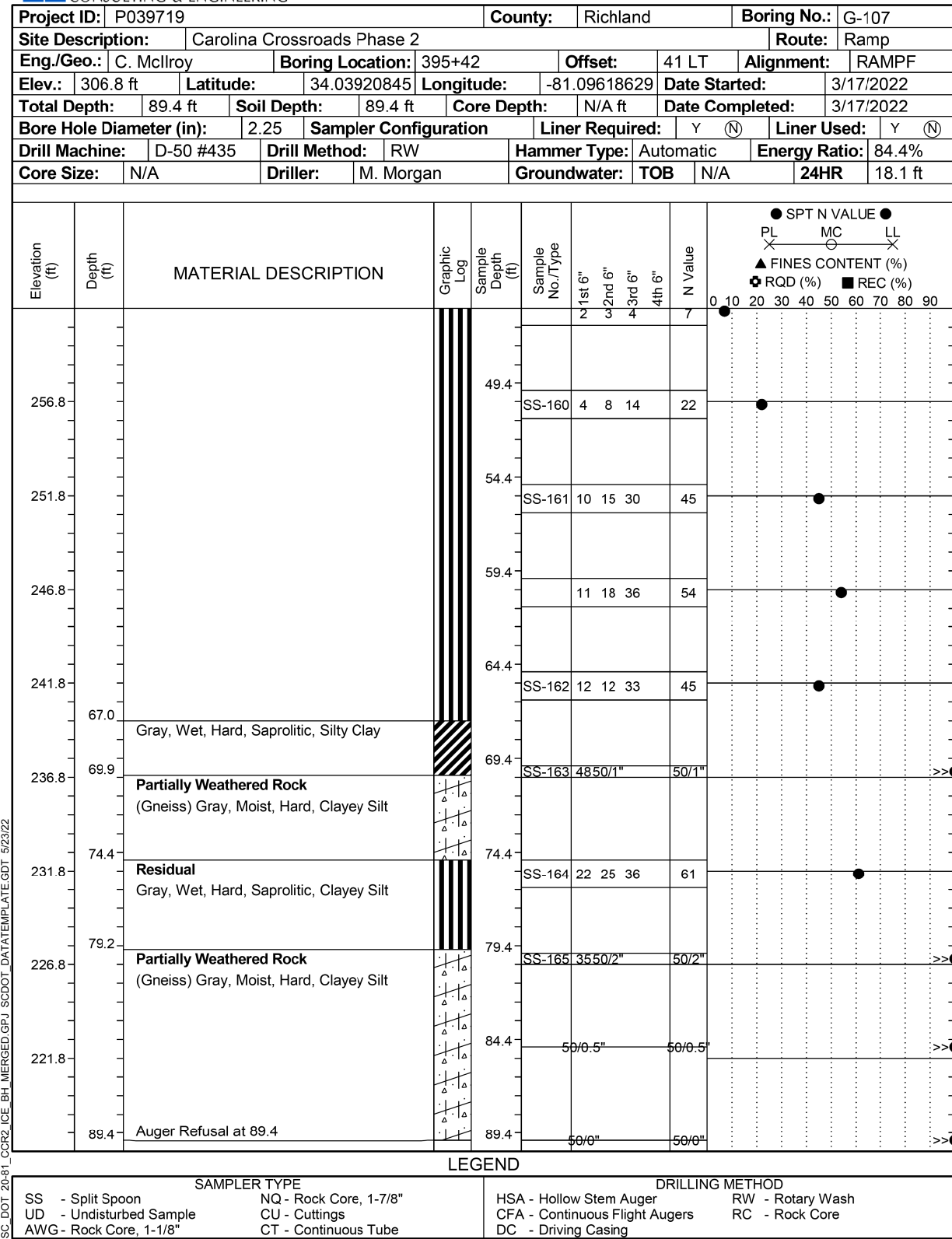
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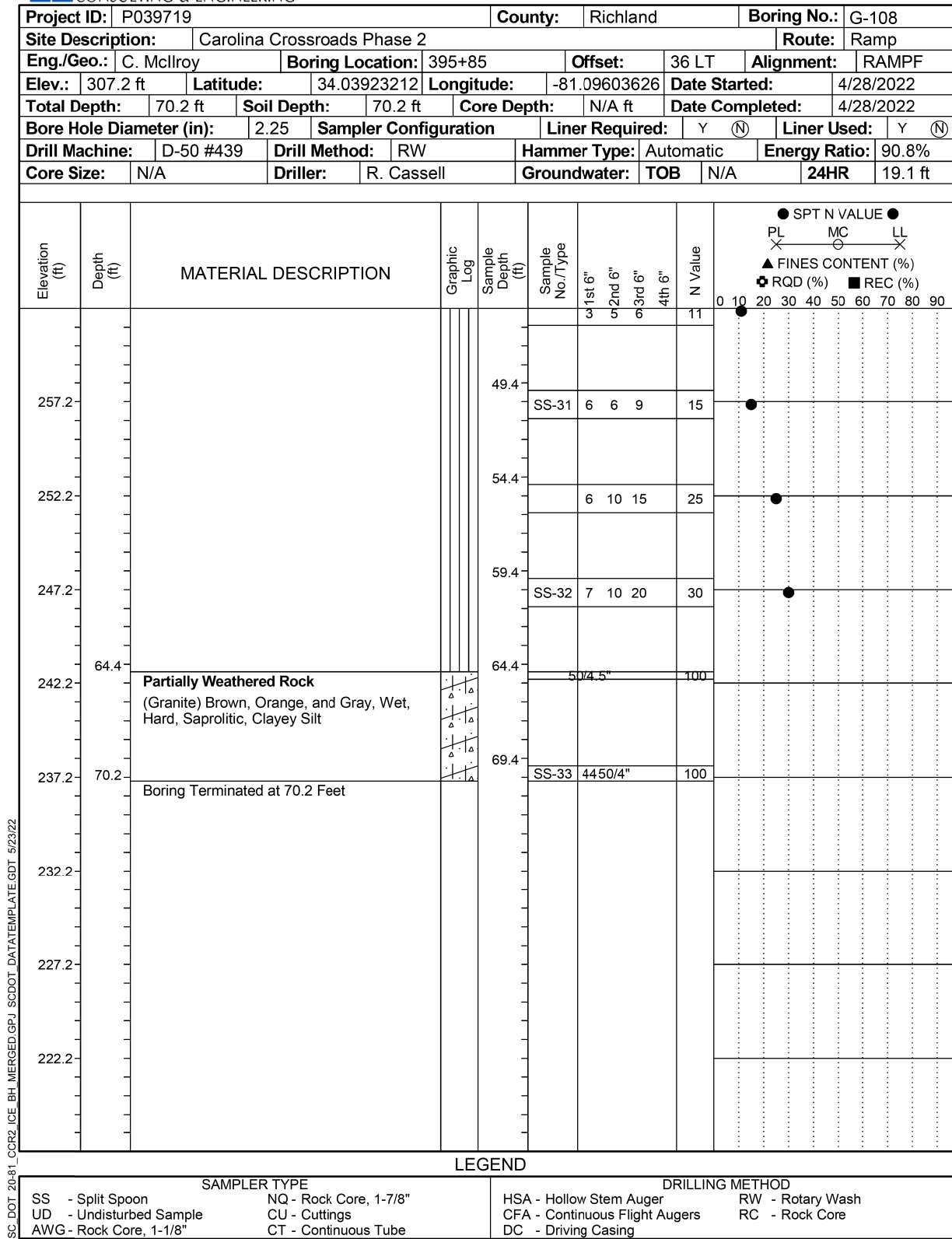
INFRASTRUCTURE
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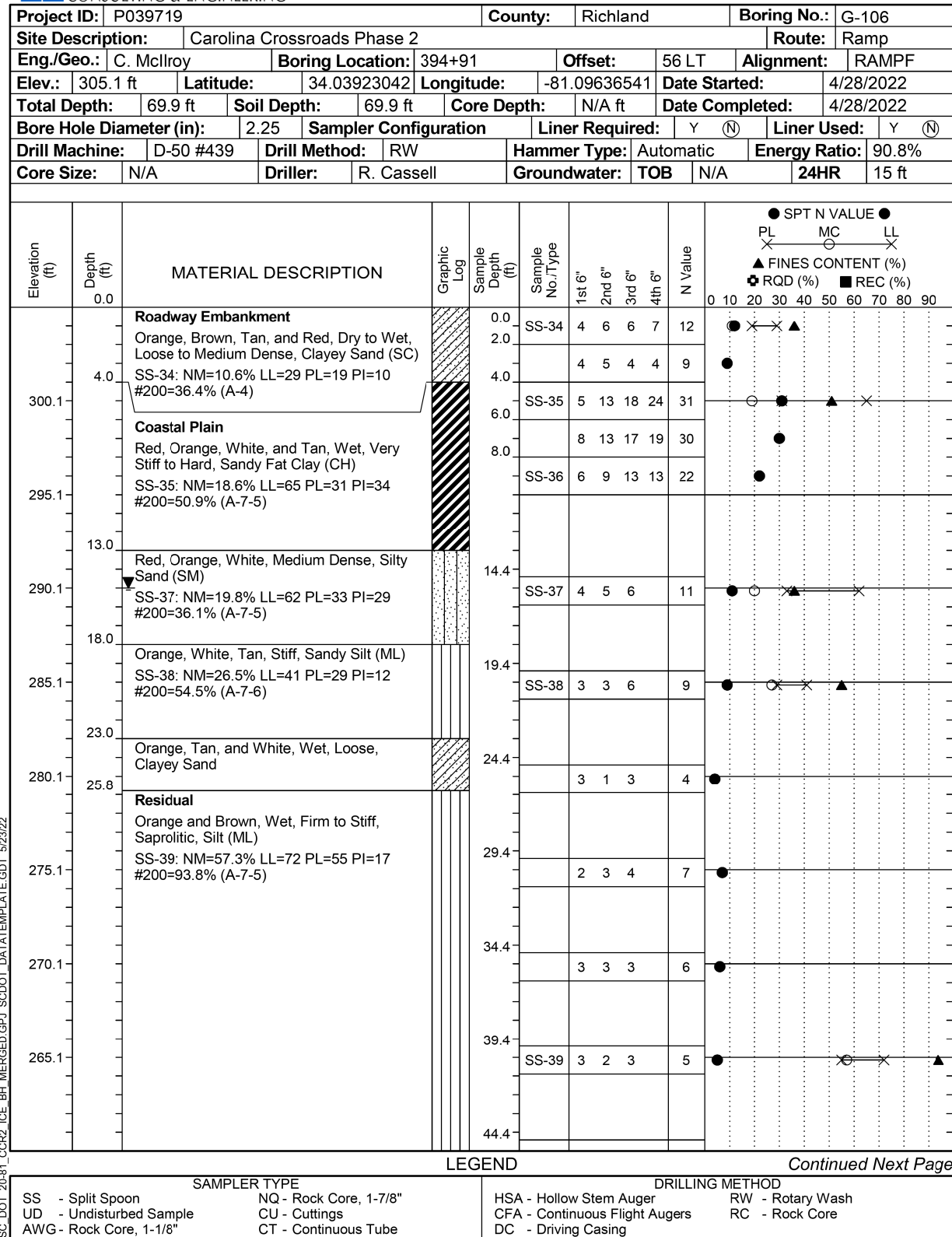
INFRASTRUCTURE
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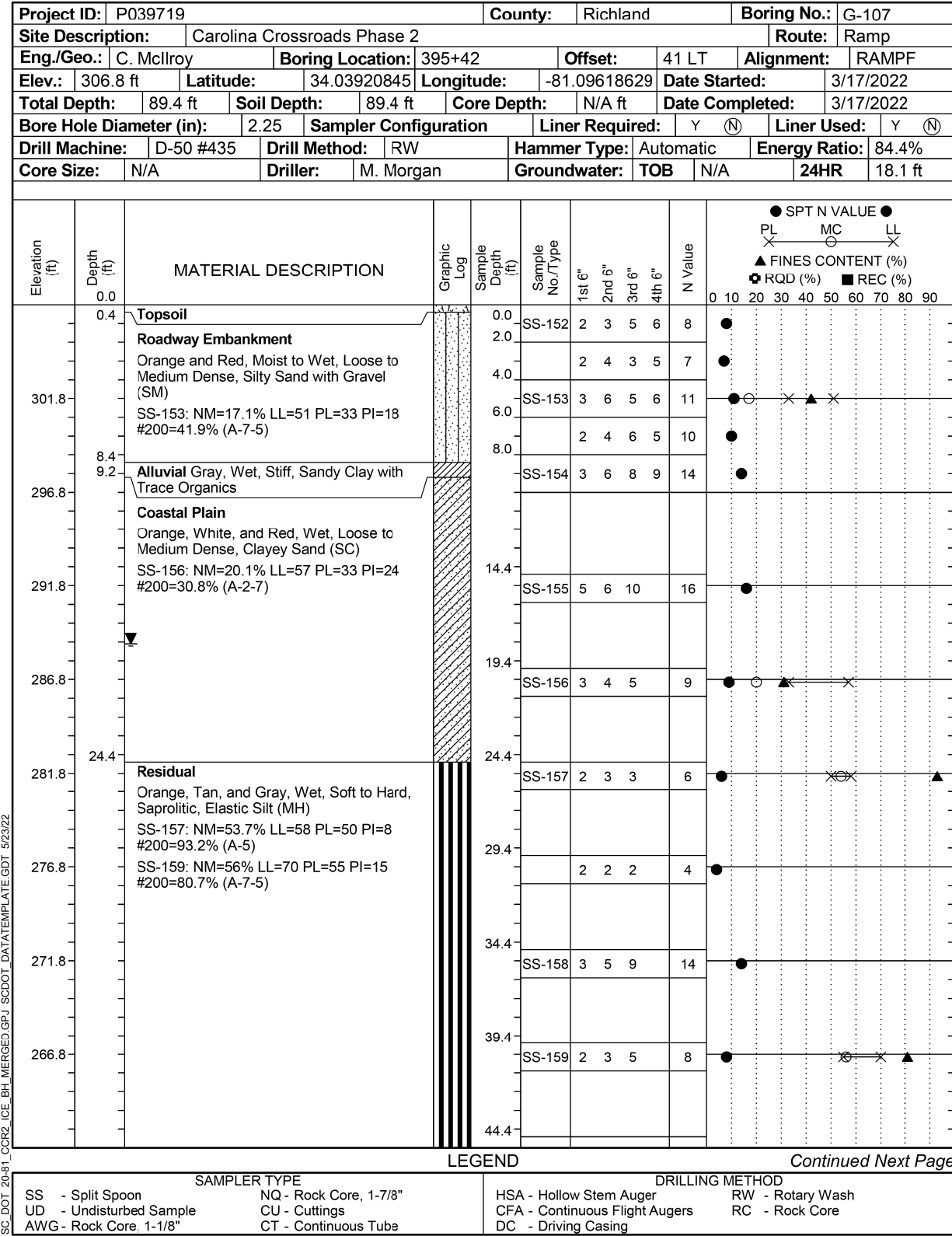
INFRASTRUCTURE
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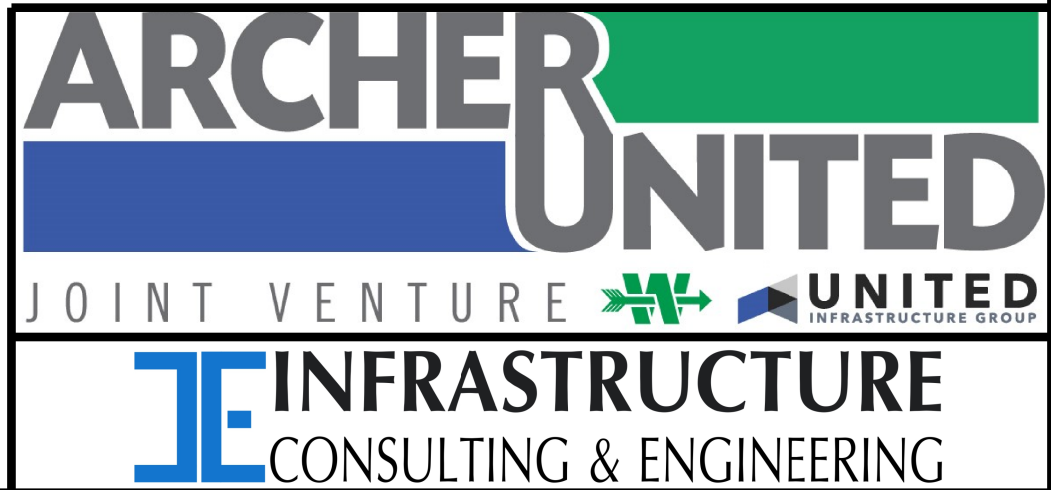
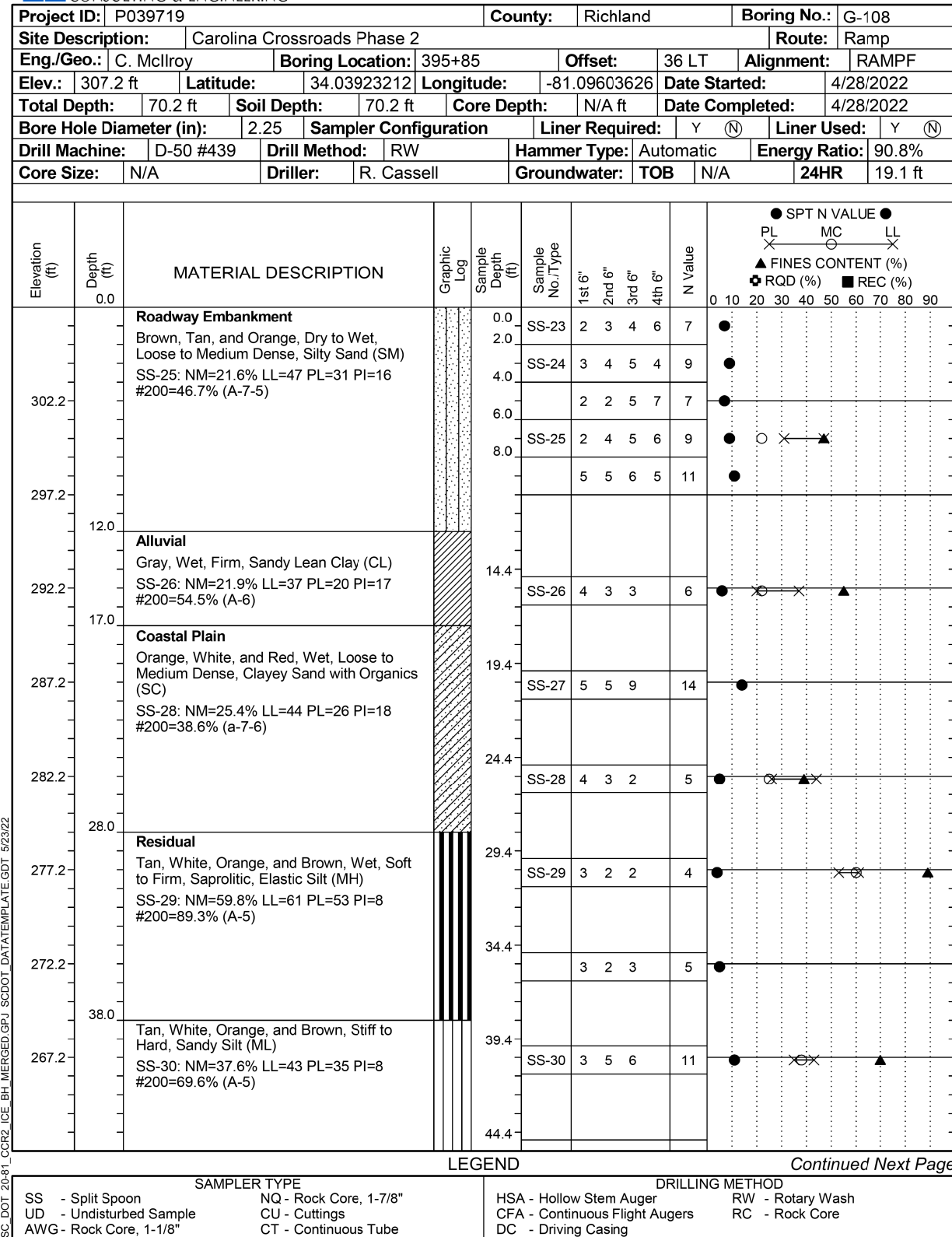
INFRASTRUCTURE
CONSULTING & ENGINEERING



INFRASTRUCTURE
CONSULTING & ENGINEERING



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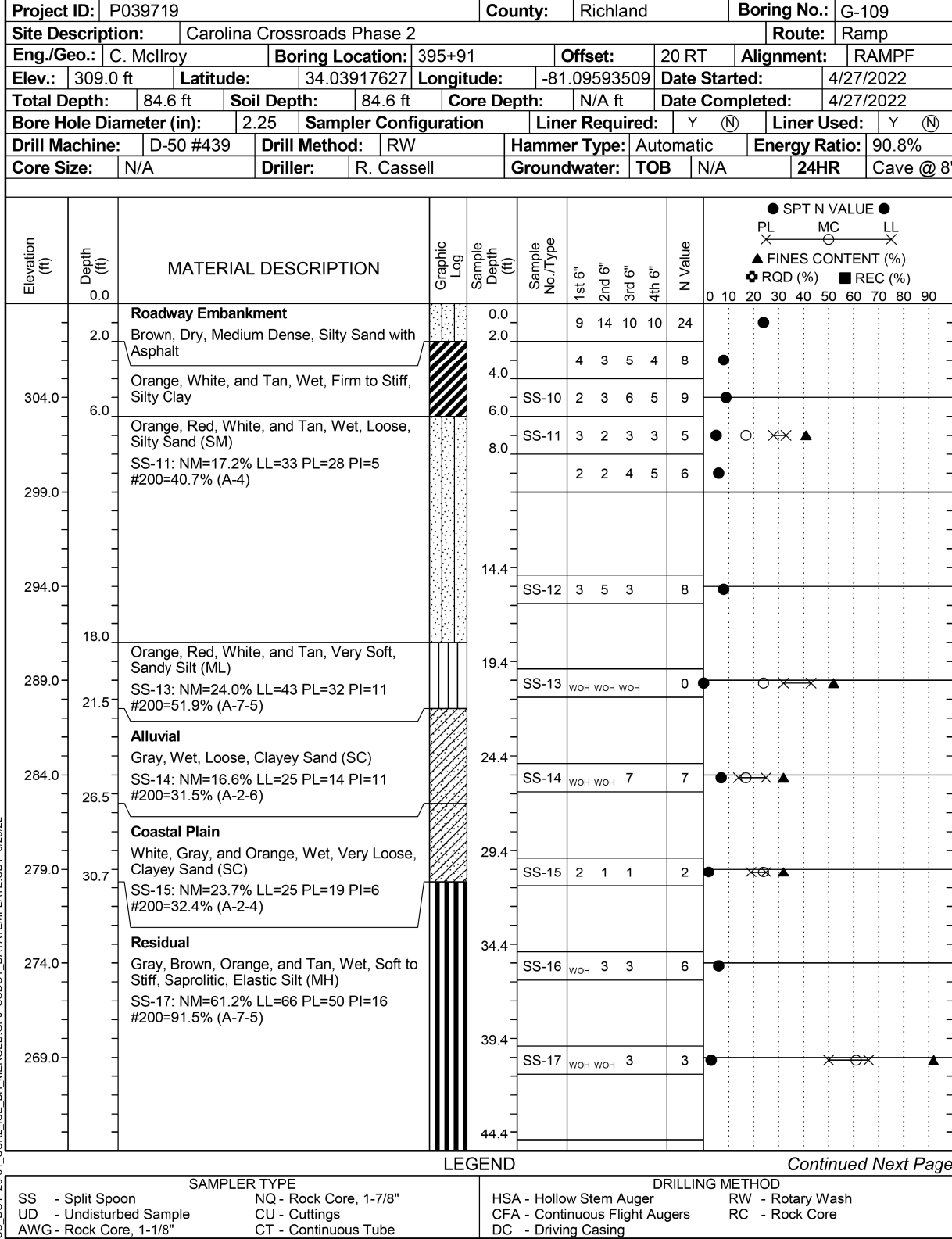


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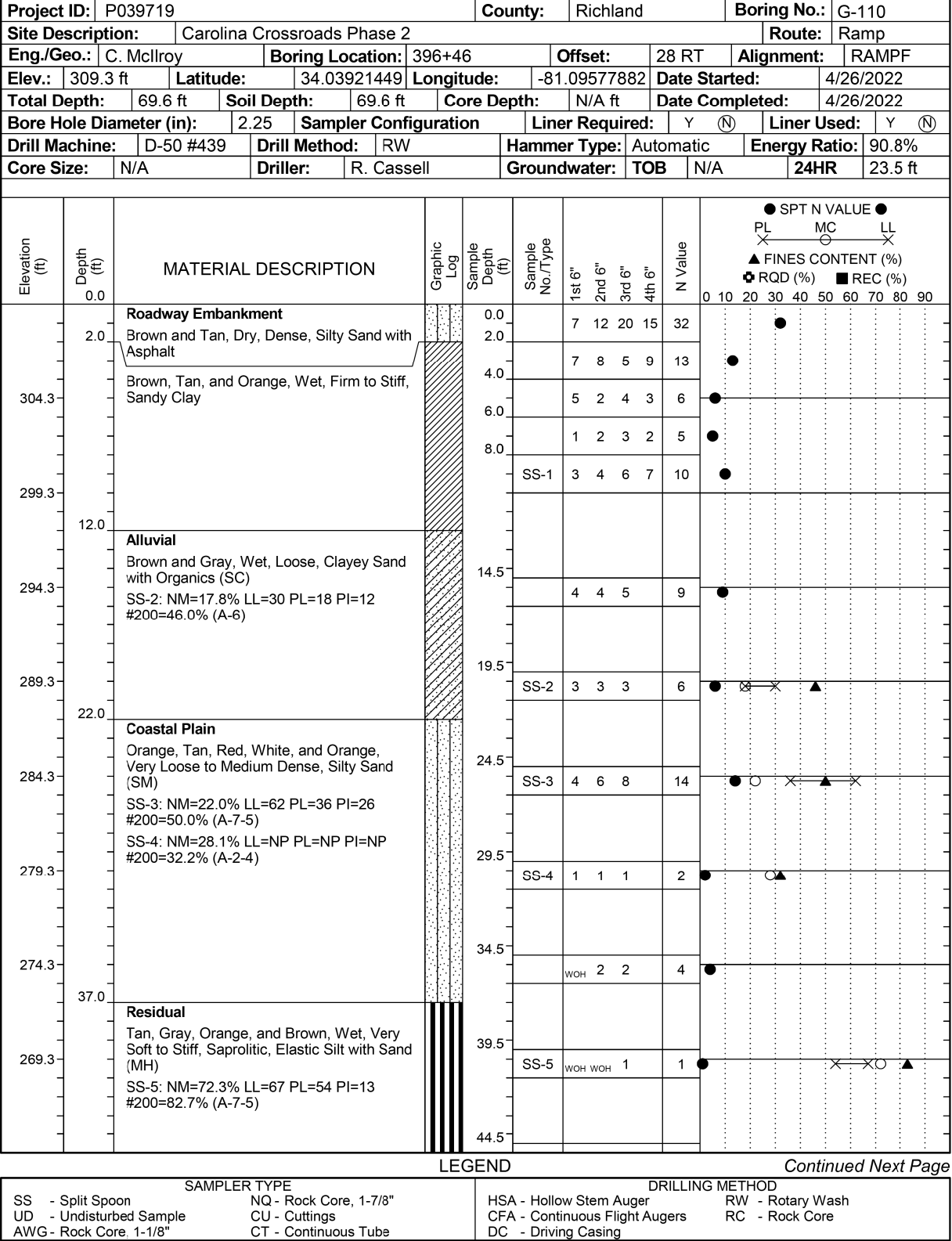
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SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
BORING LOGS (1)	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F

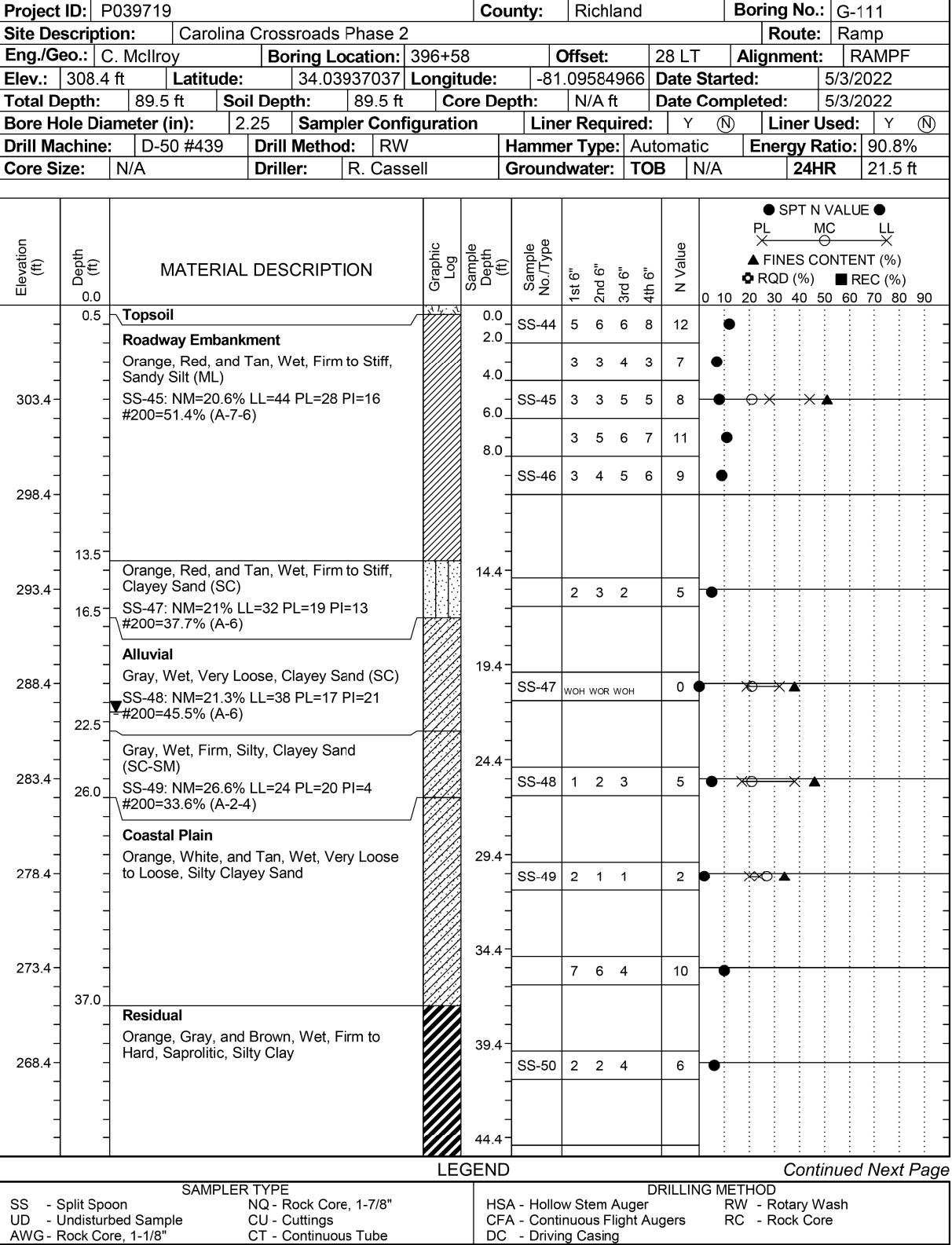
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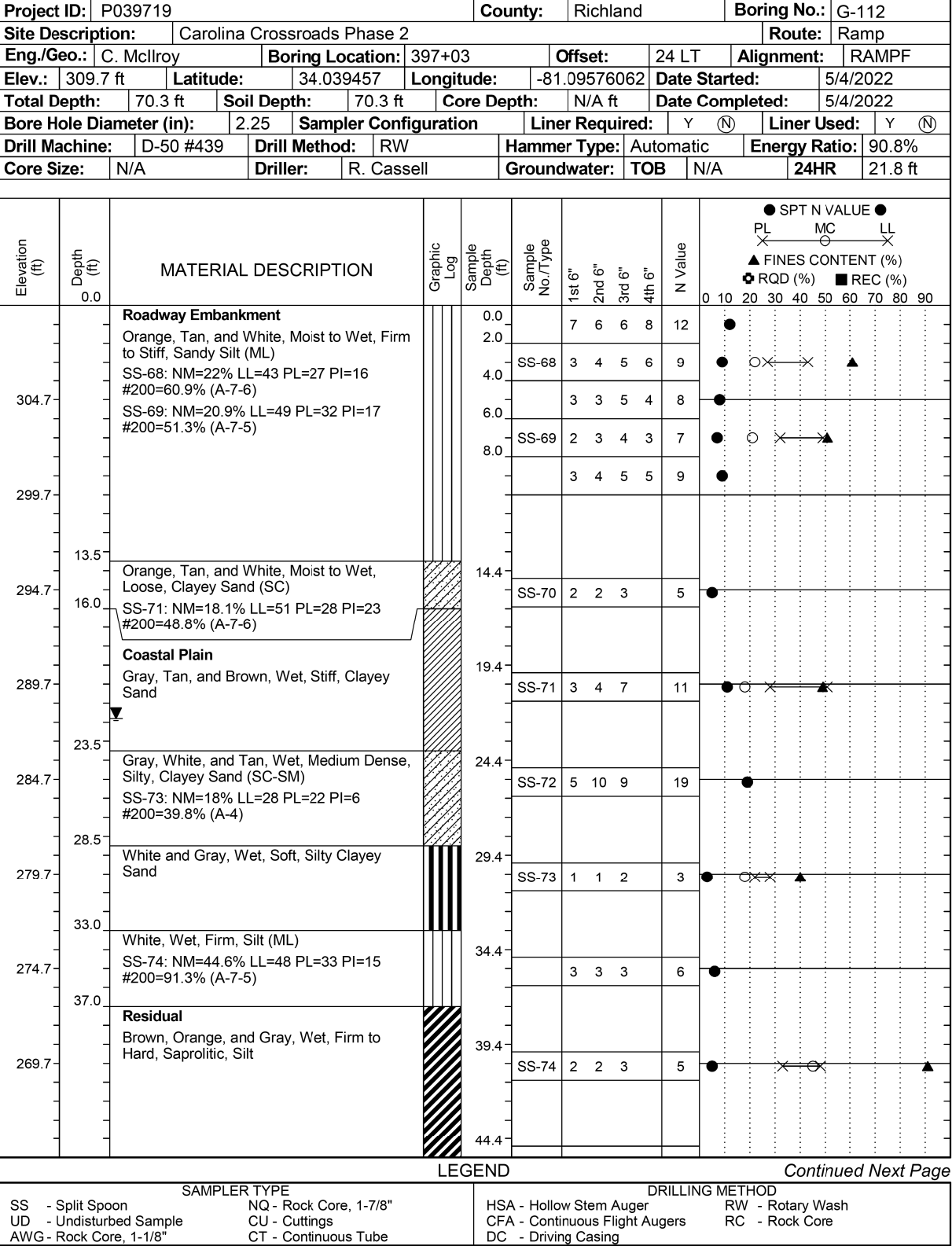
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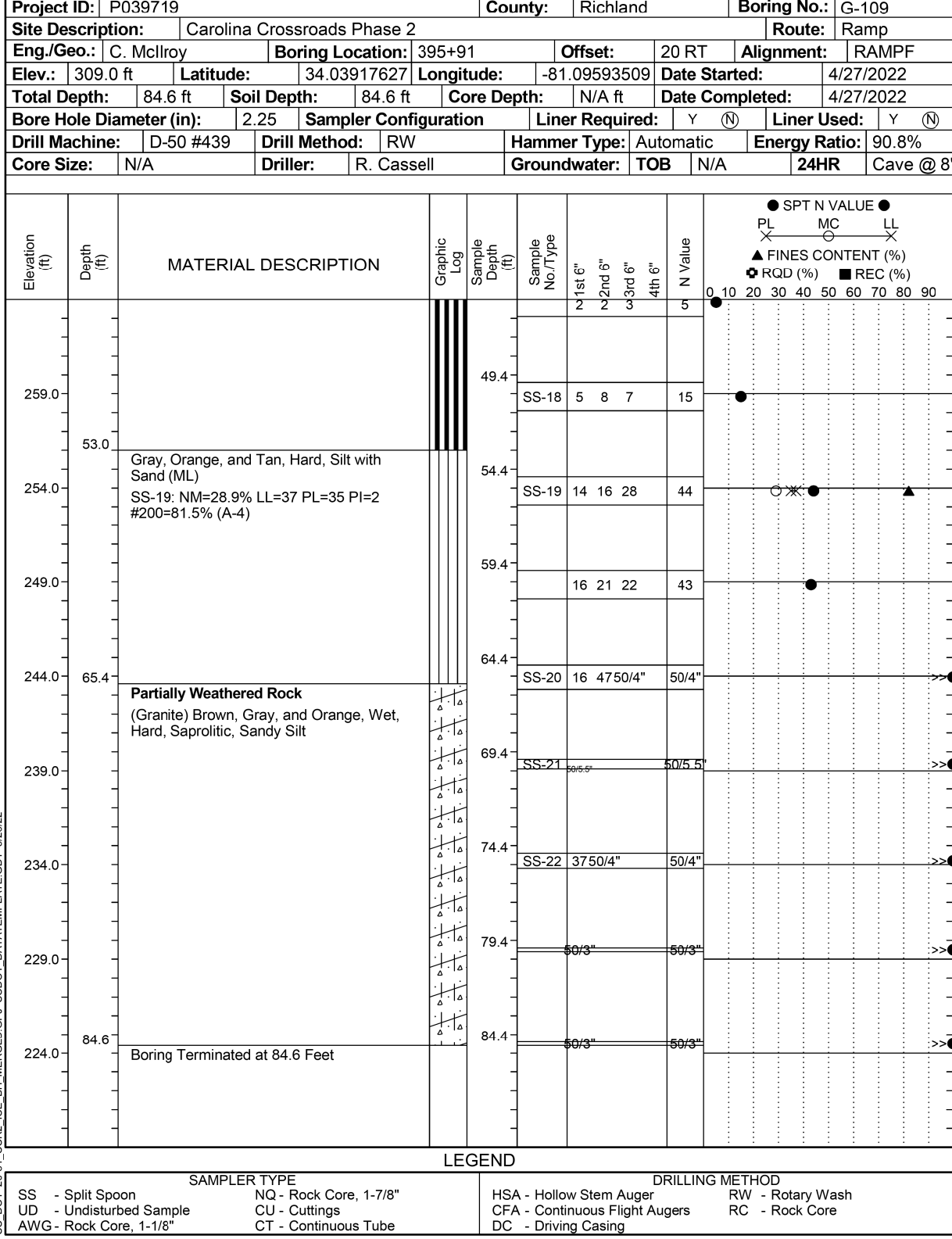
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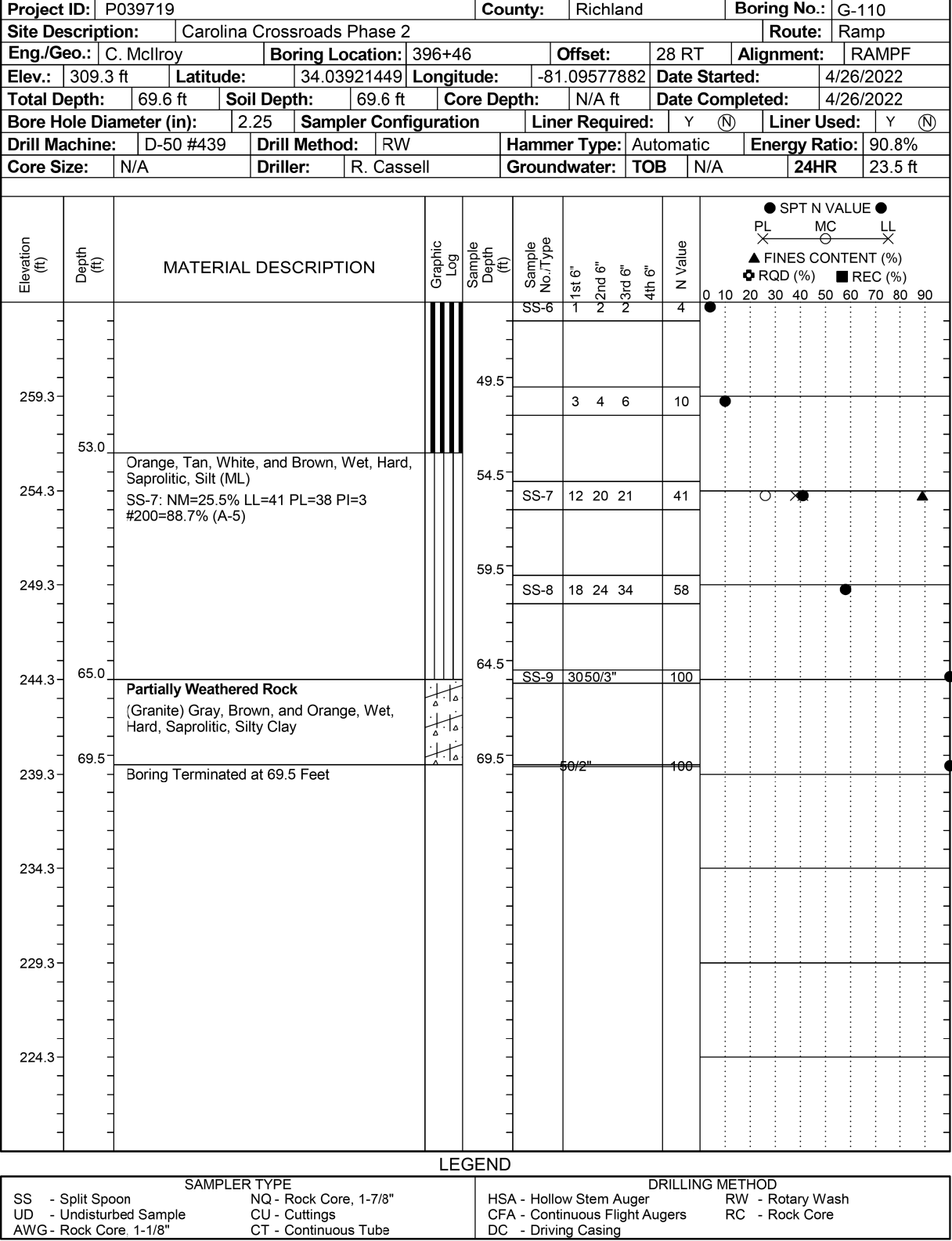
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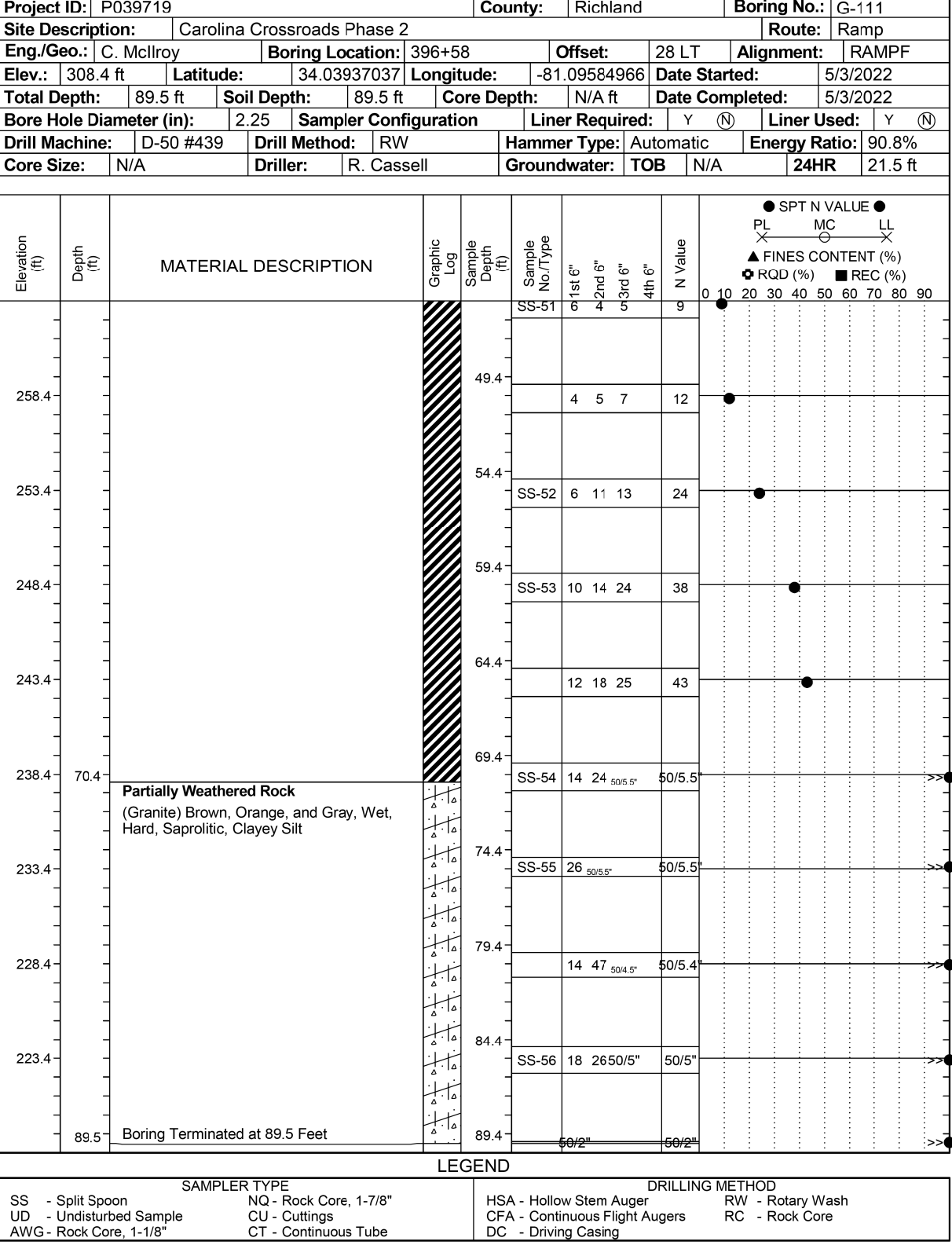
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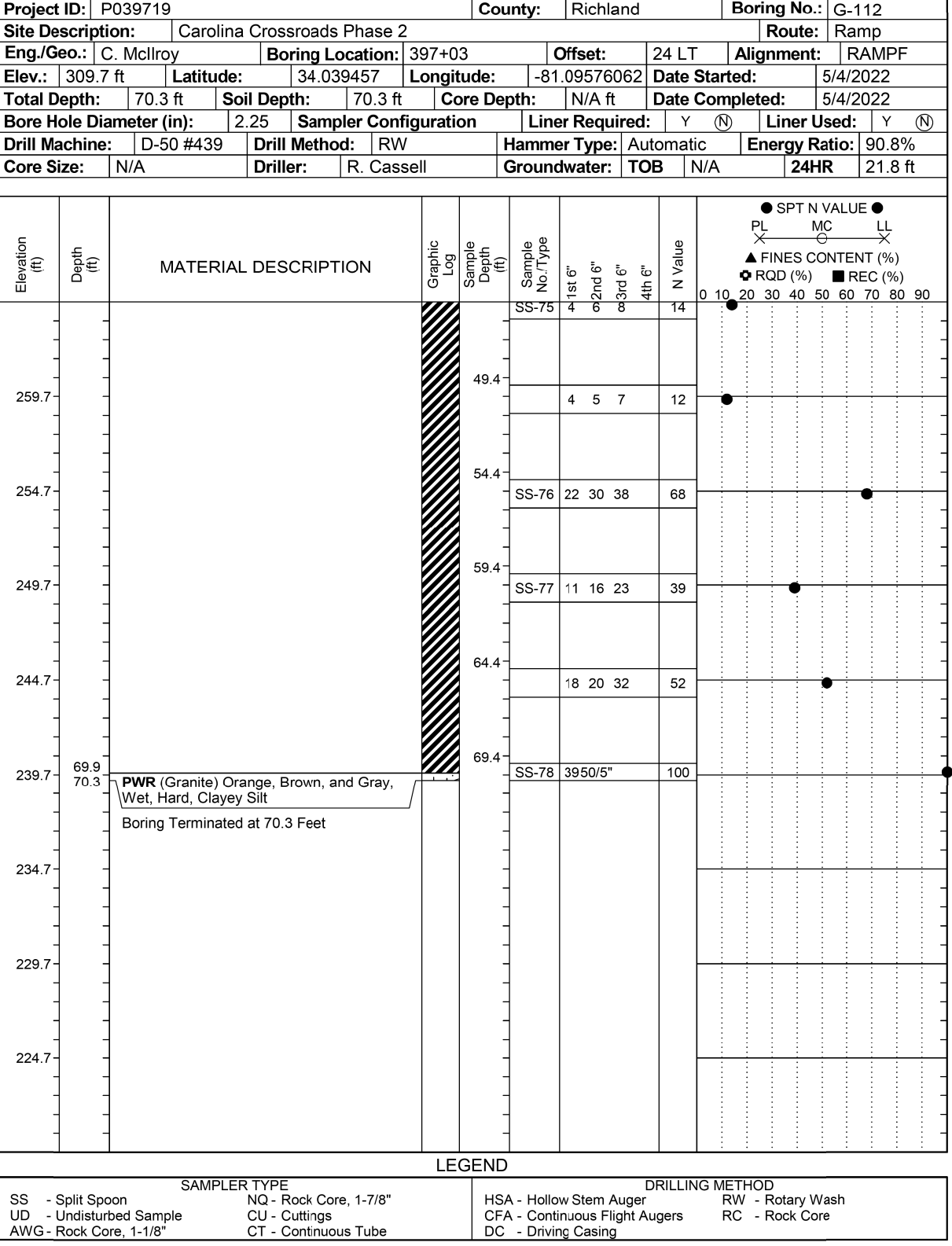
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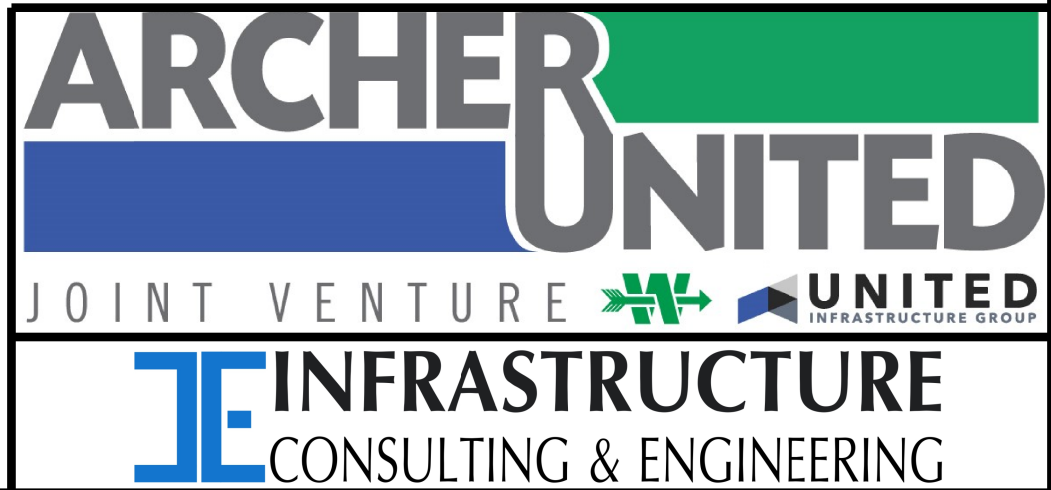
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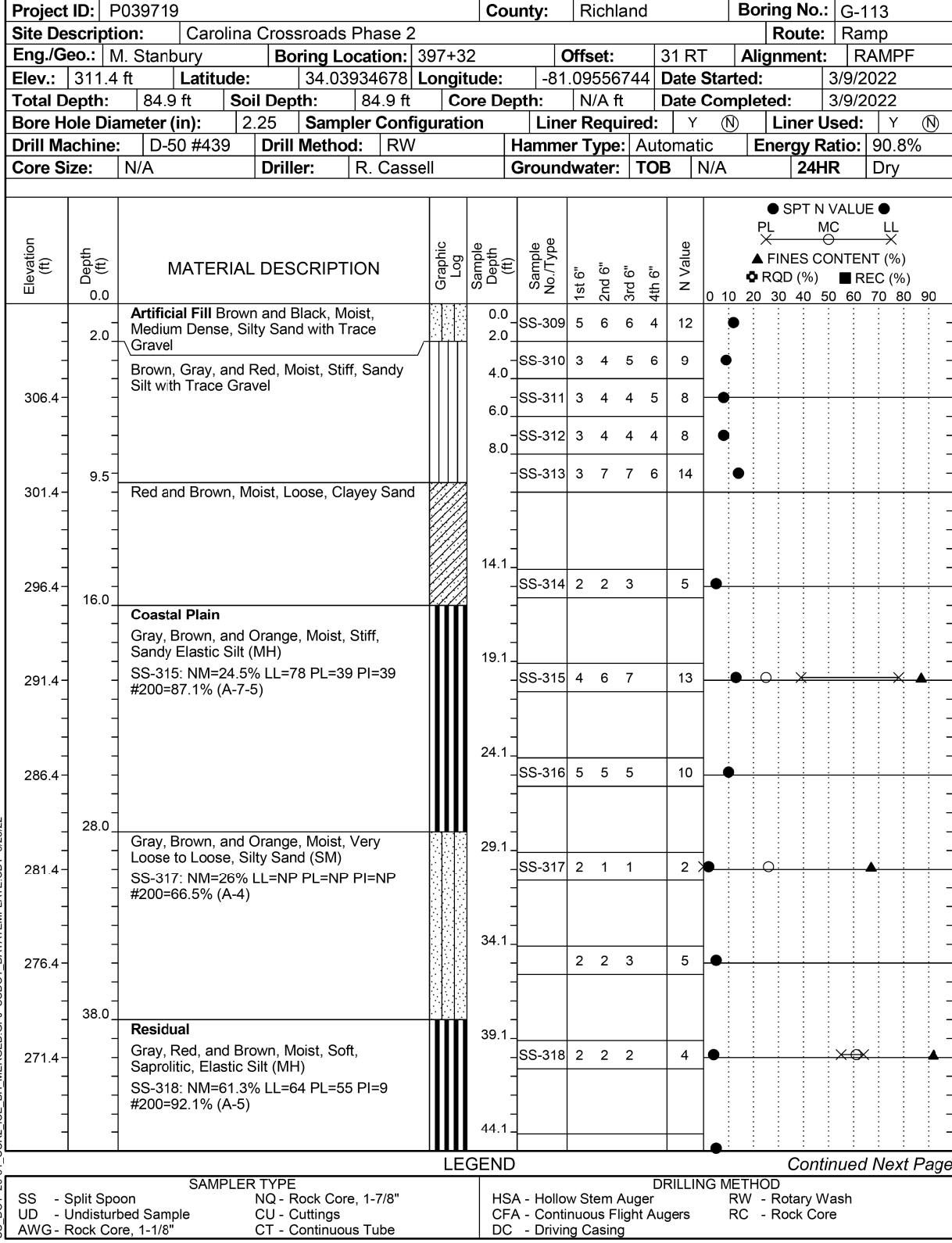
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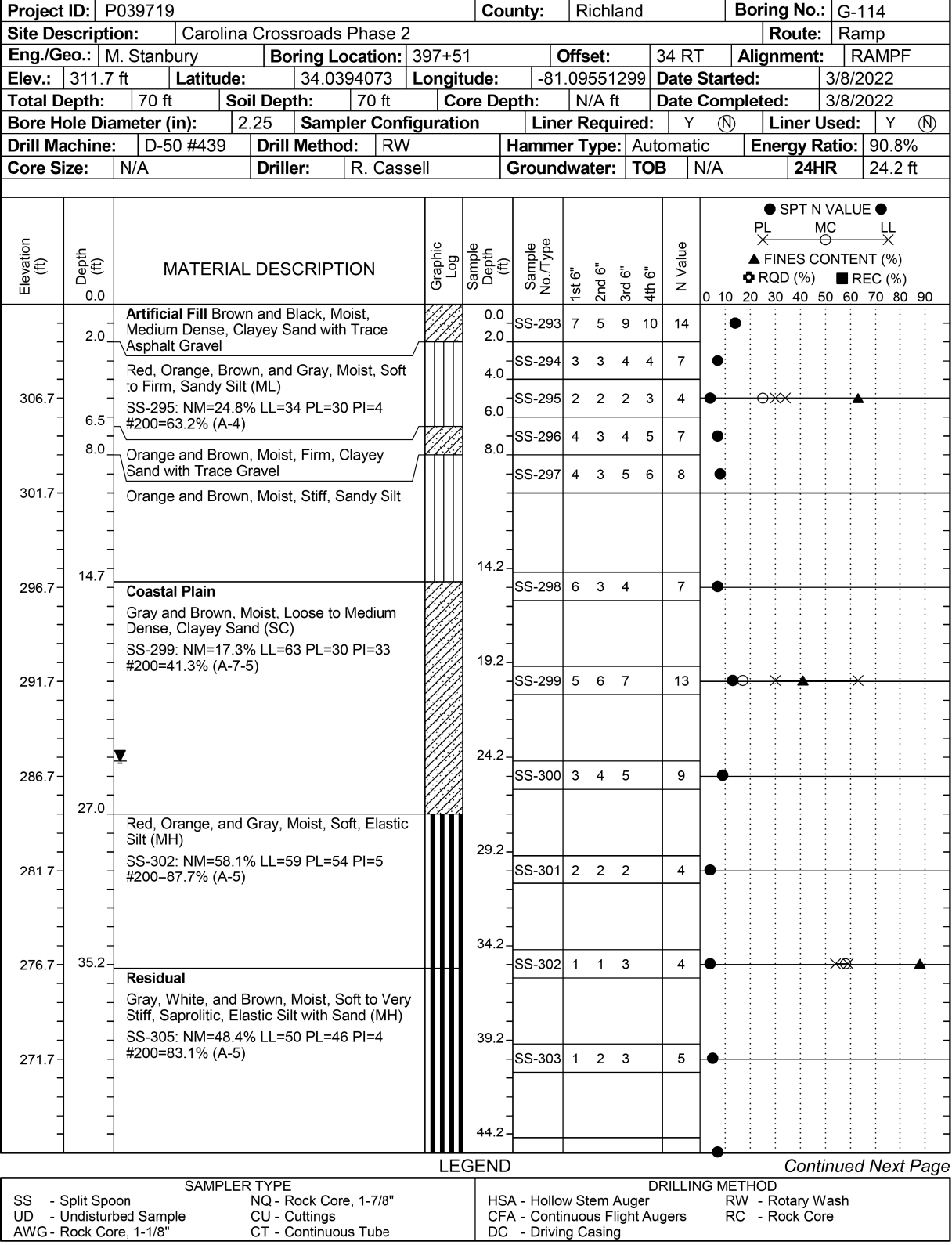
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BY	CHK. DATE	
COUNTY		RICHLAND
ROUTE		RAMP F

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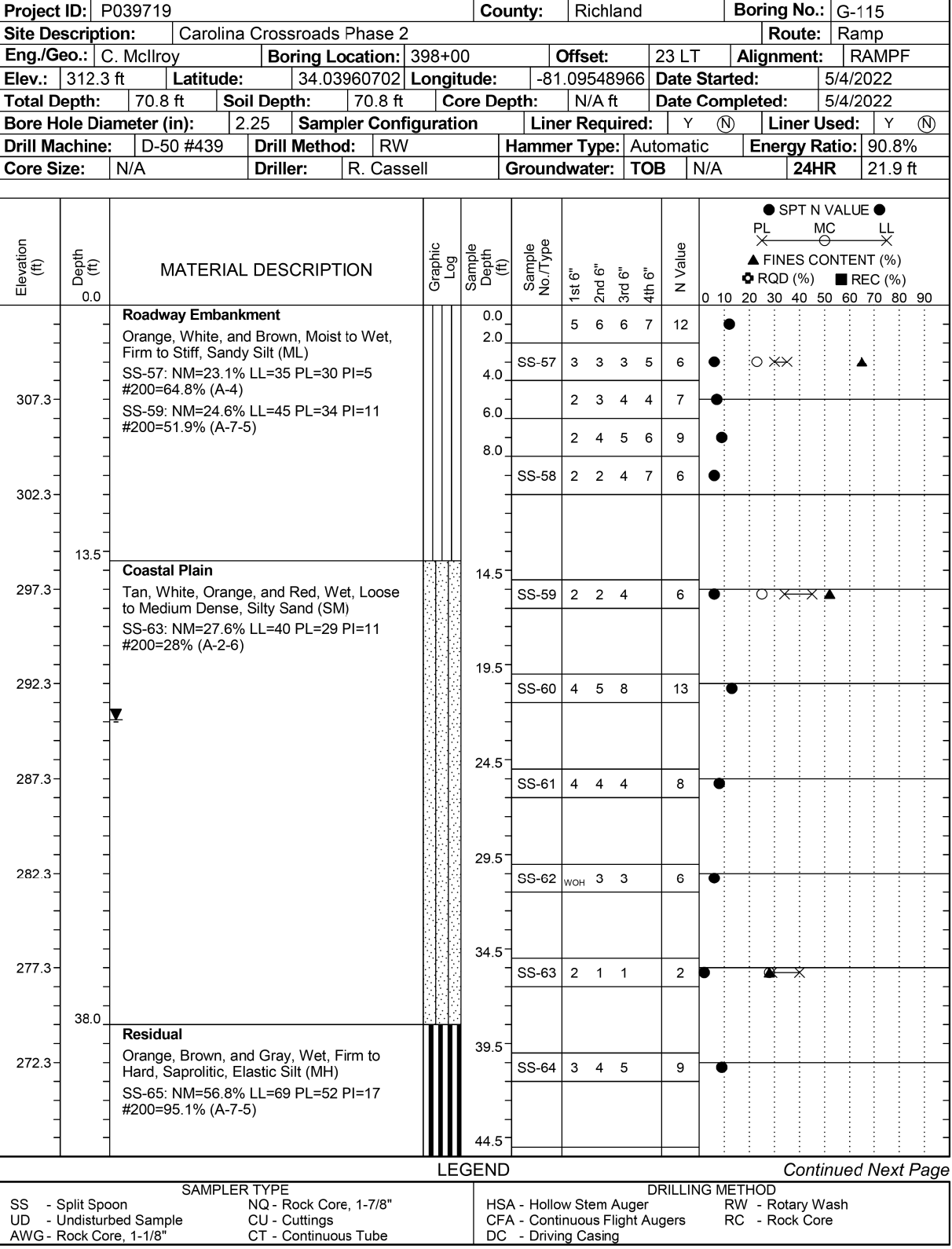
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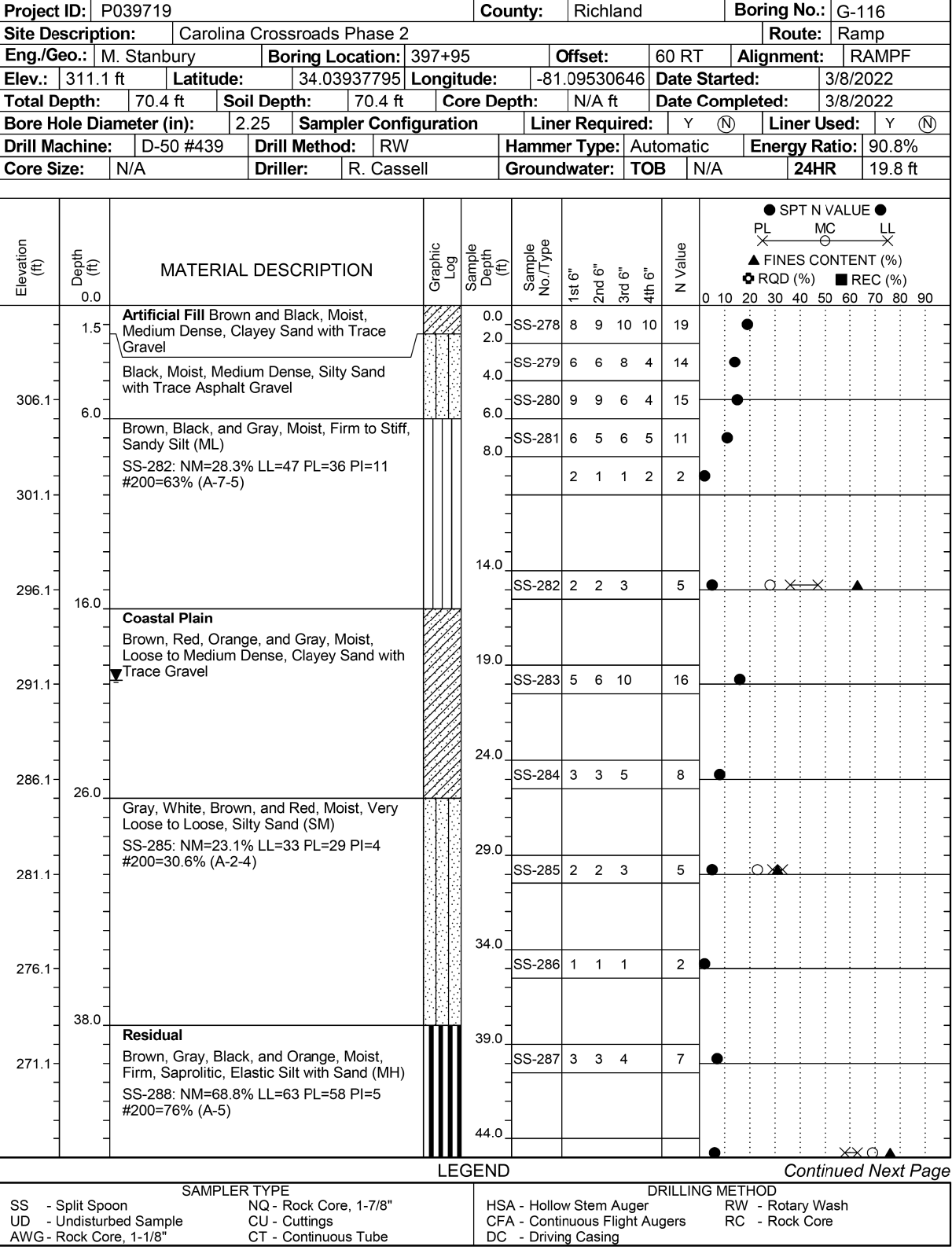
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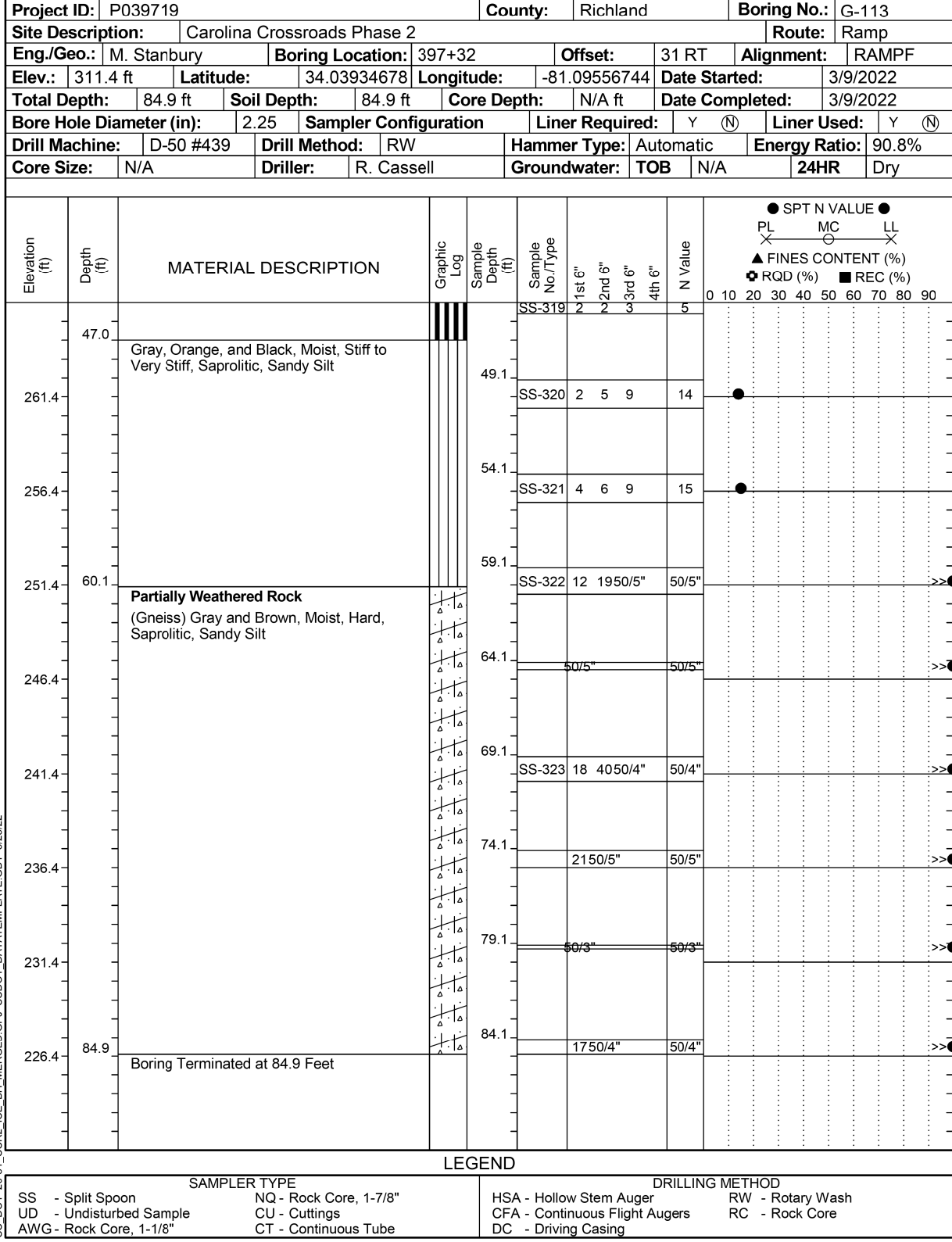
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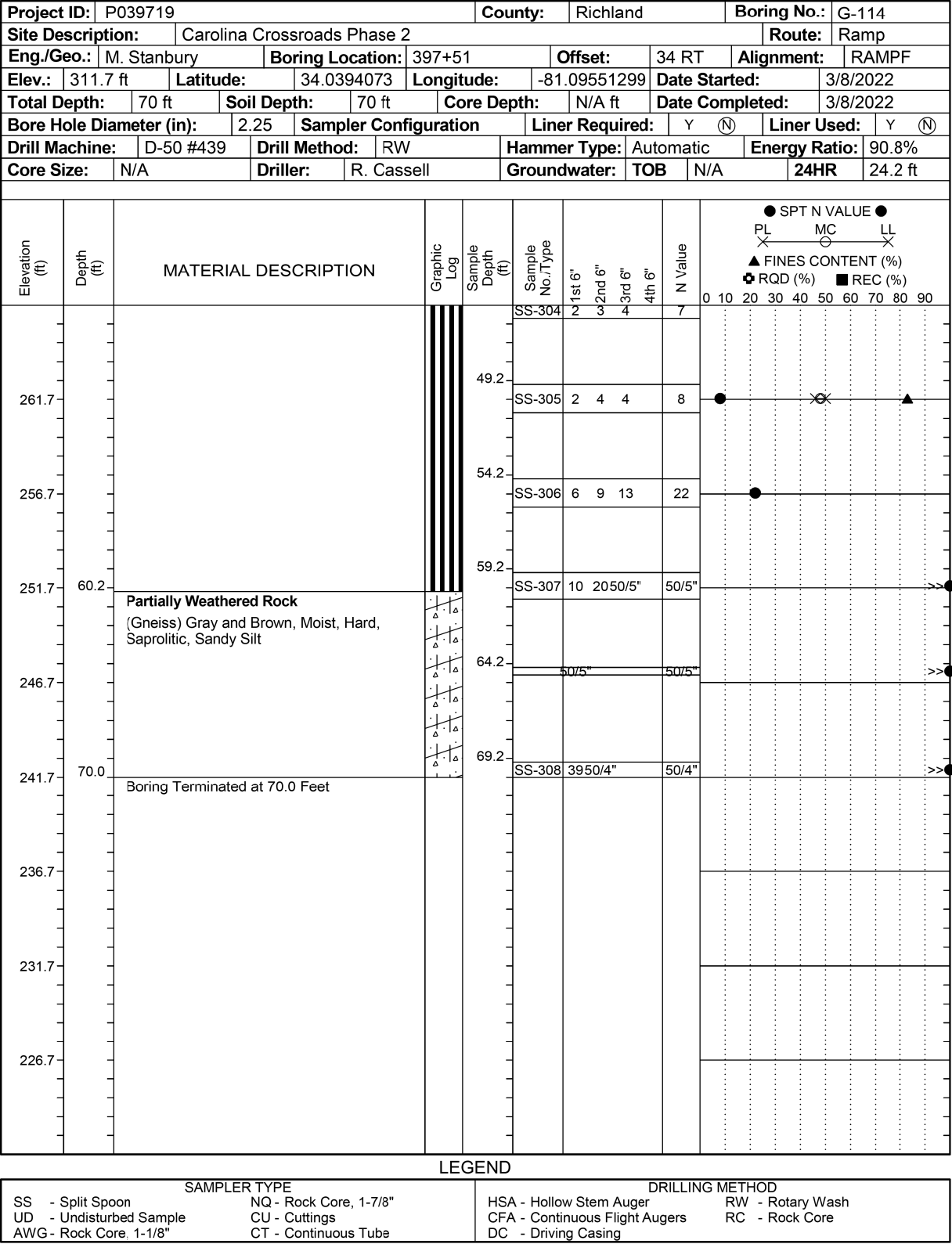
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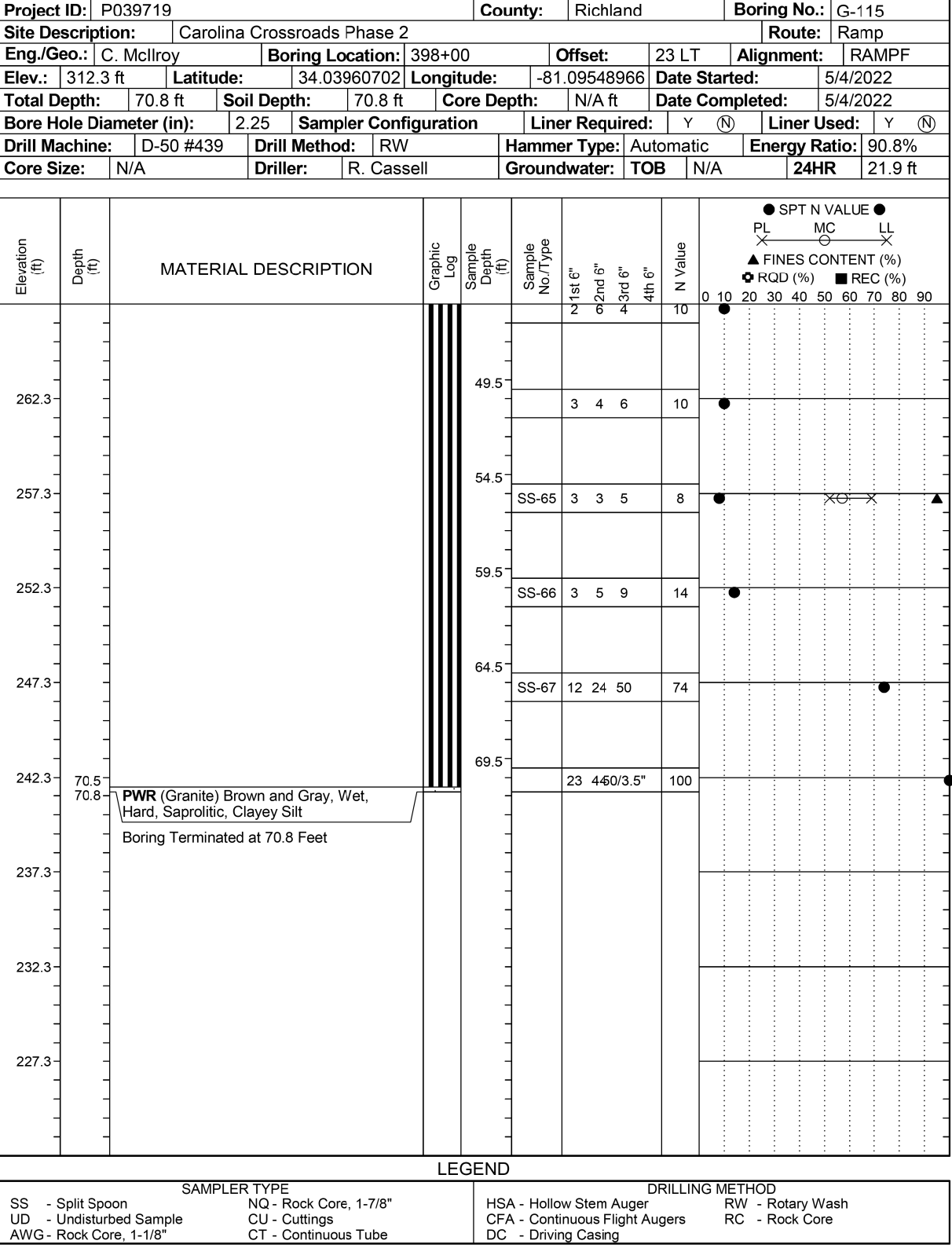
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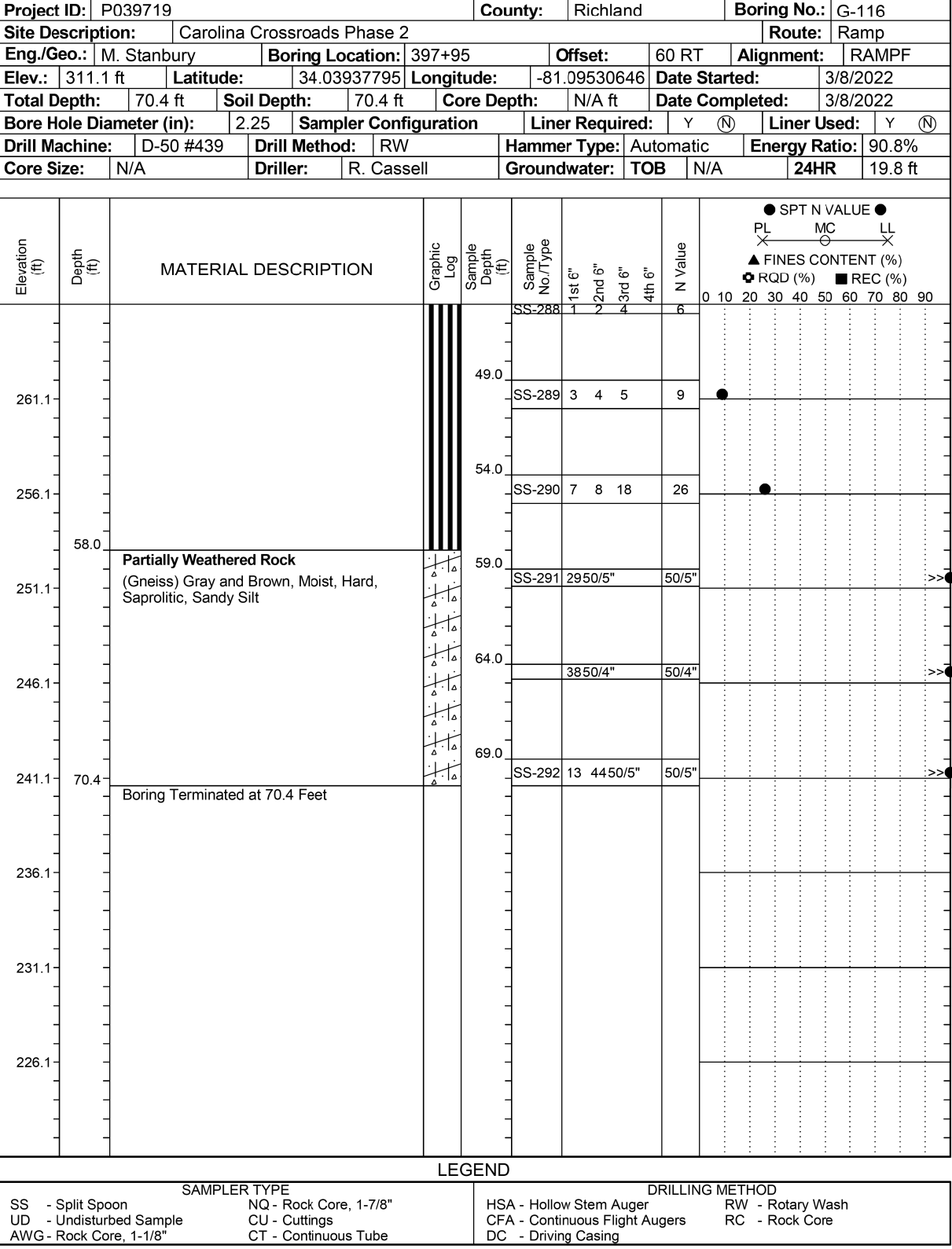
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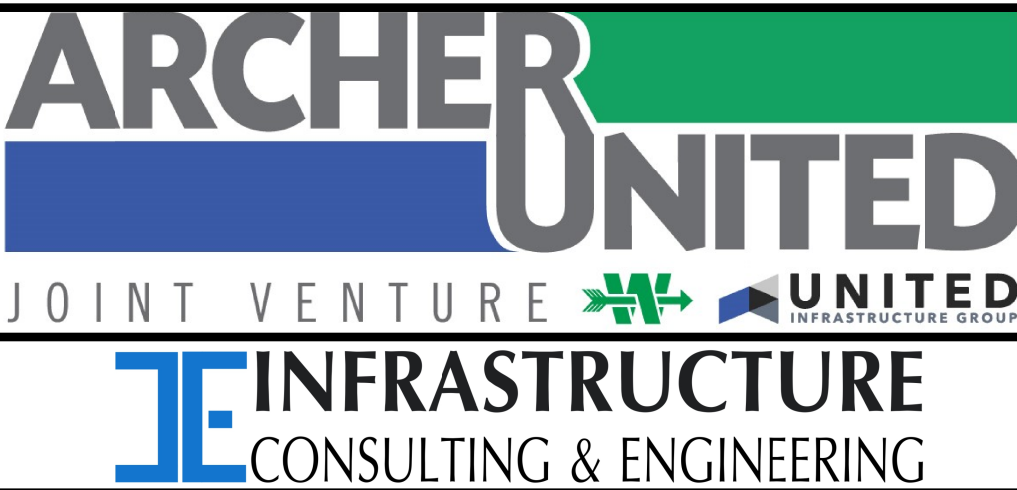
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P039719-B44	15

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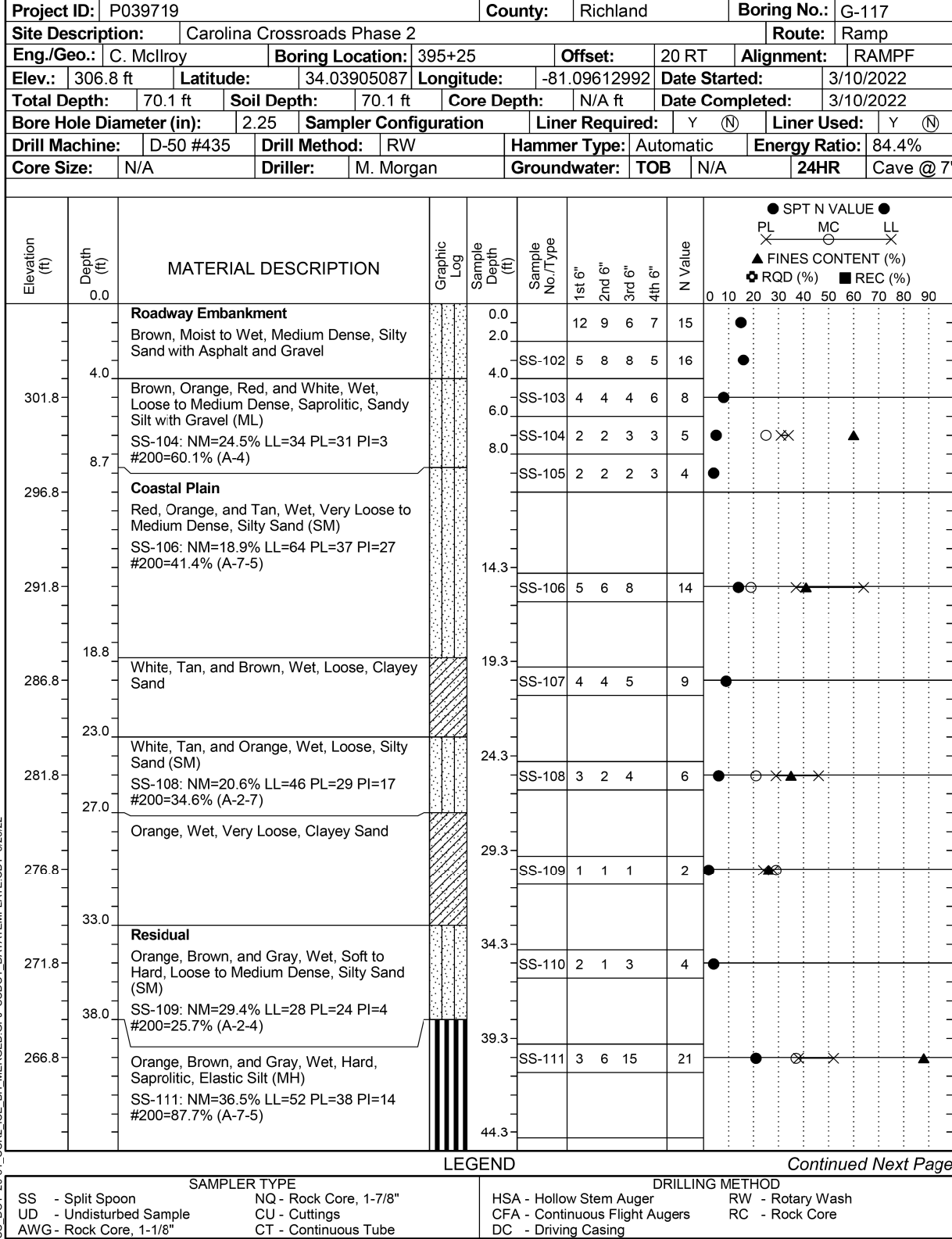
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BY	CHK.	DATE	



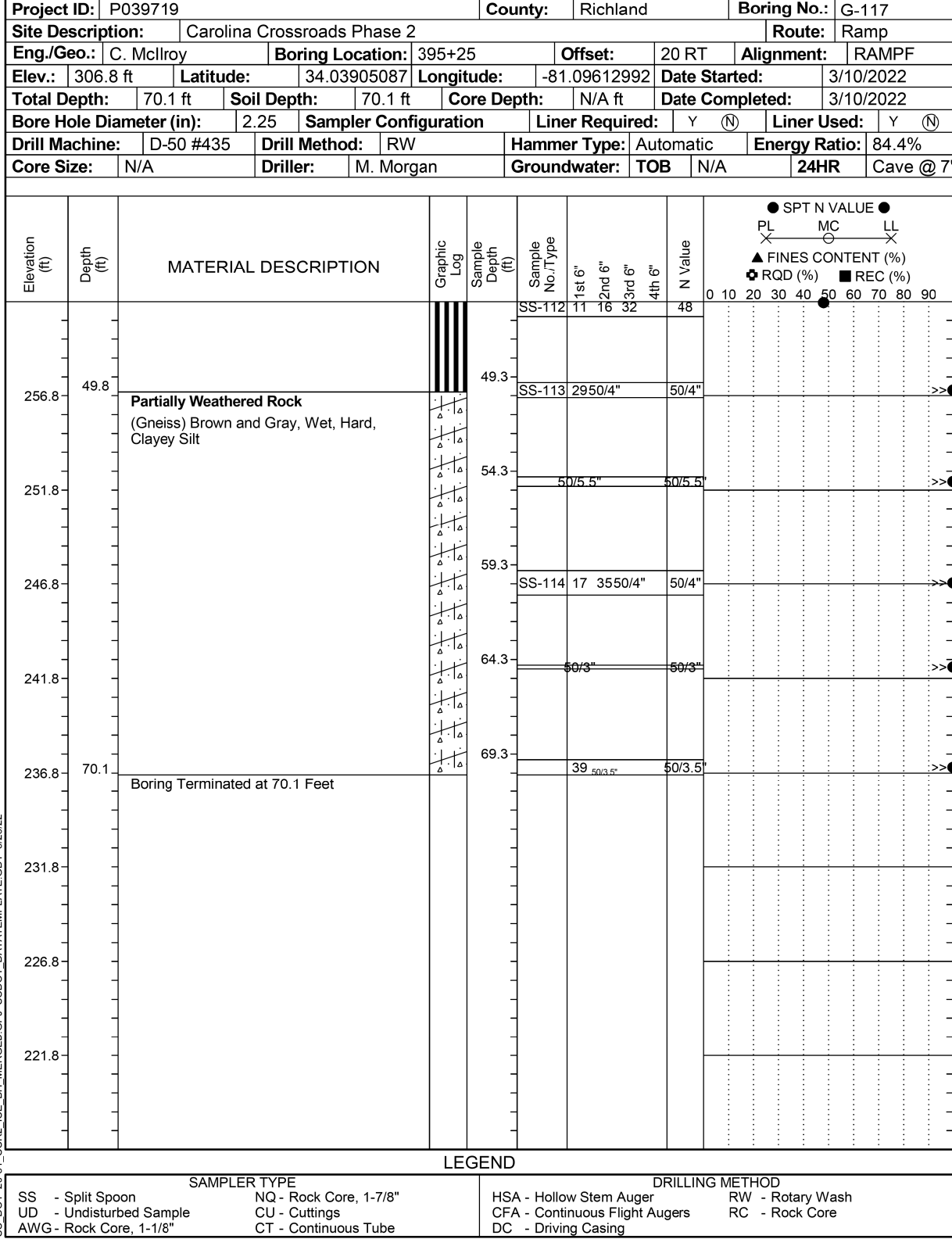
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COUNTY	ROUTE
RICHLAND	RAMP F

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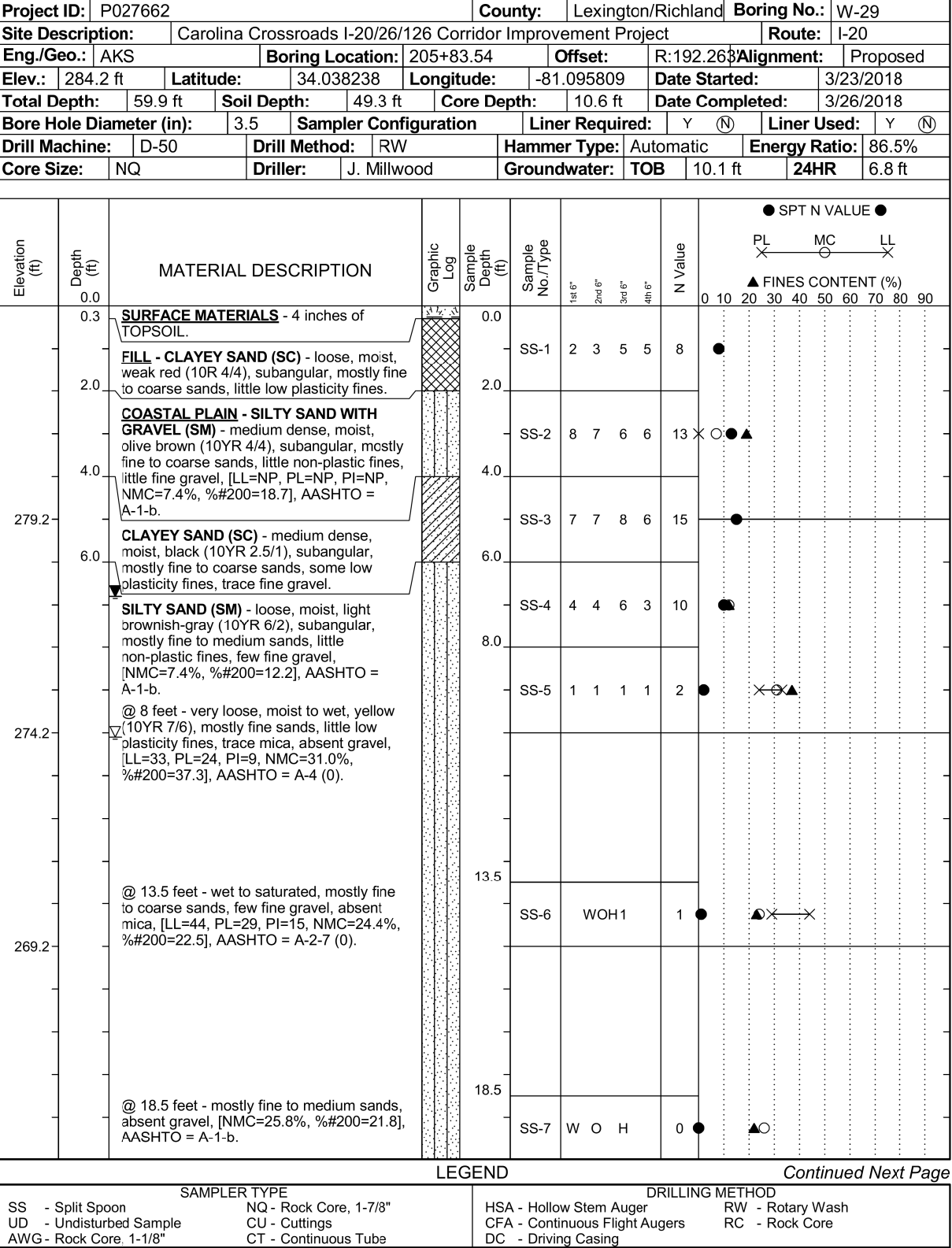
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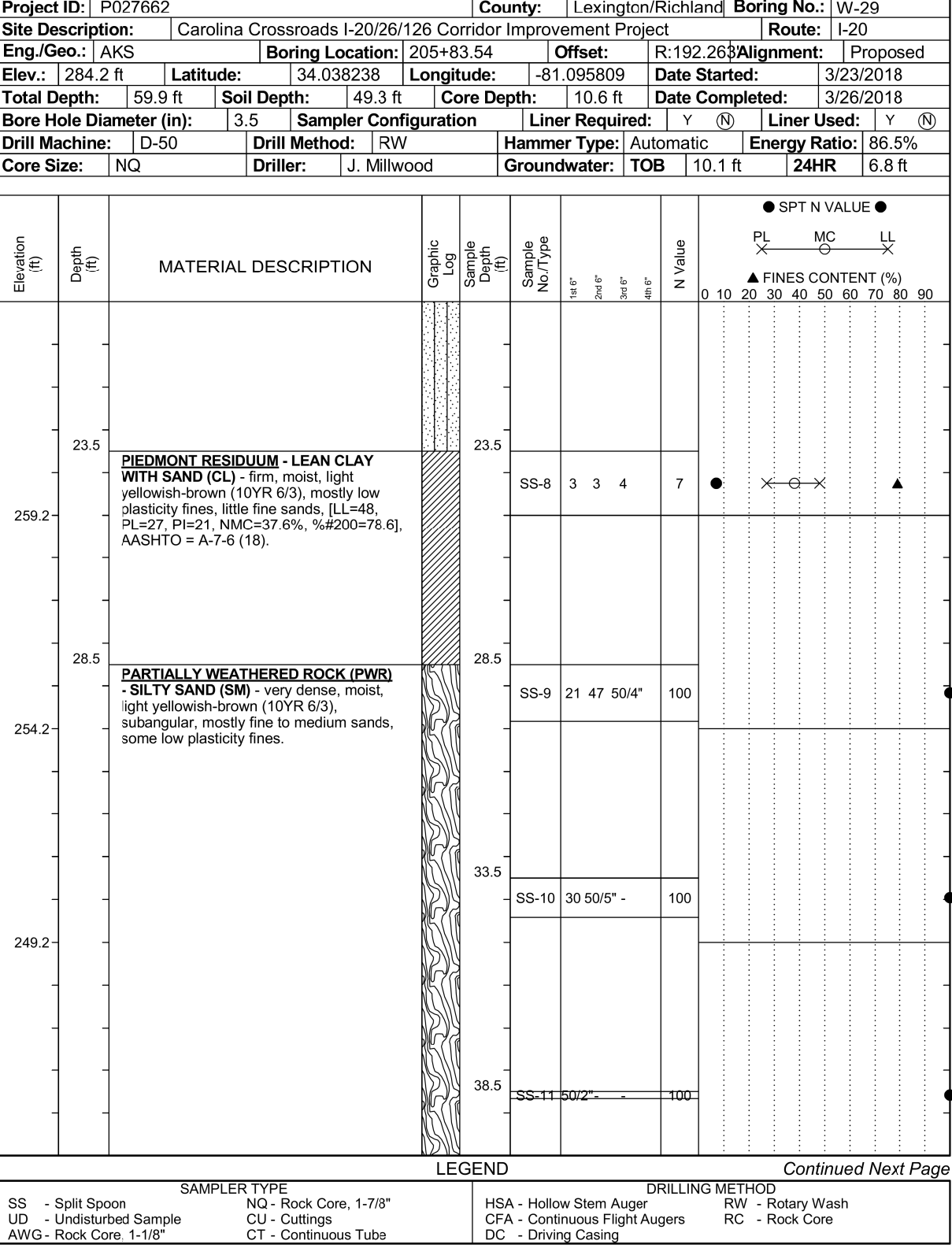
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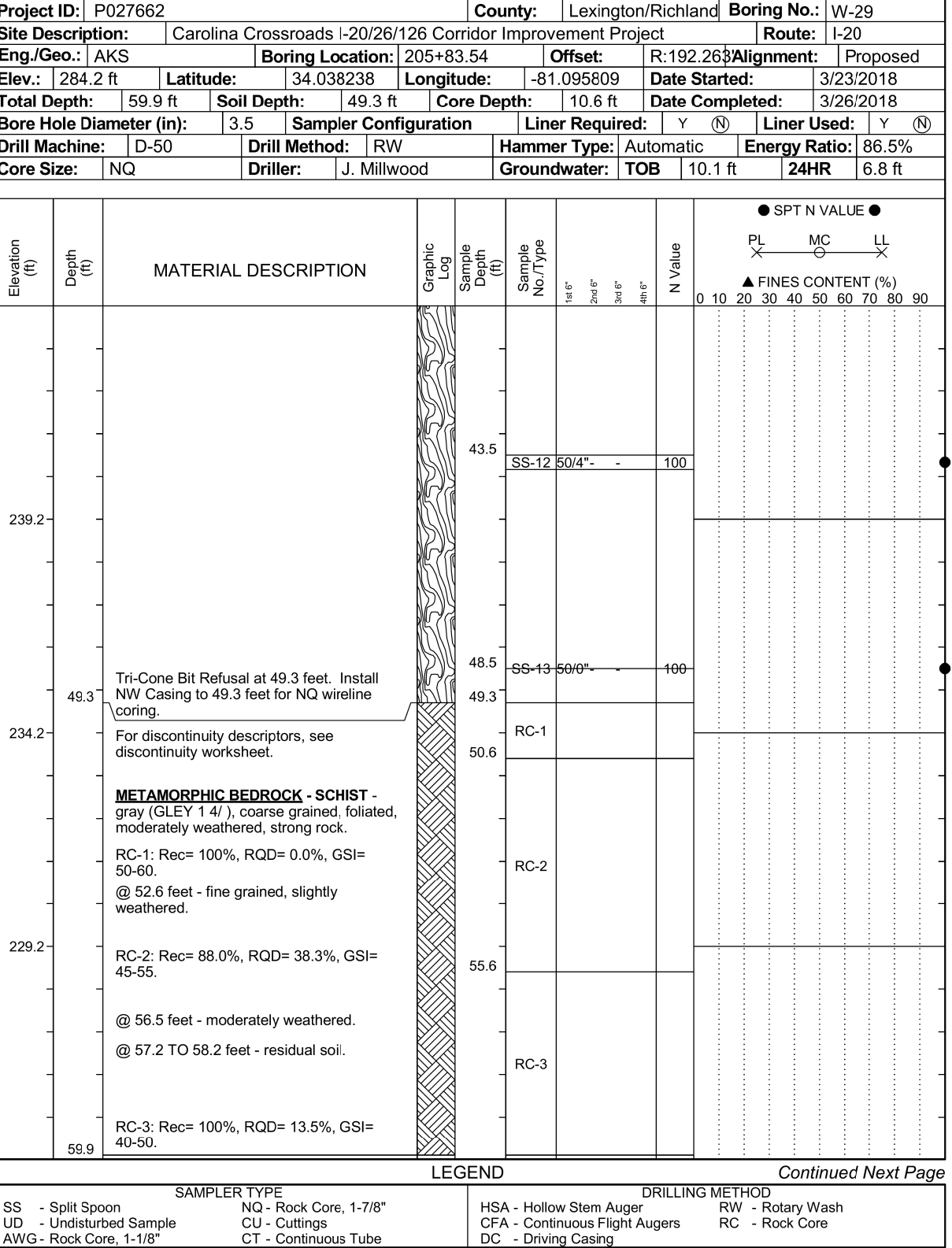
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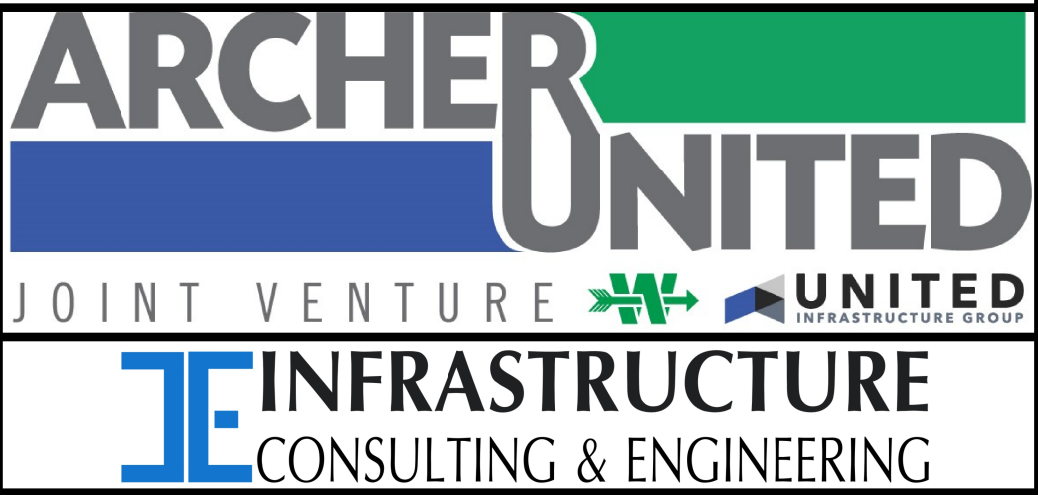
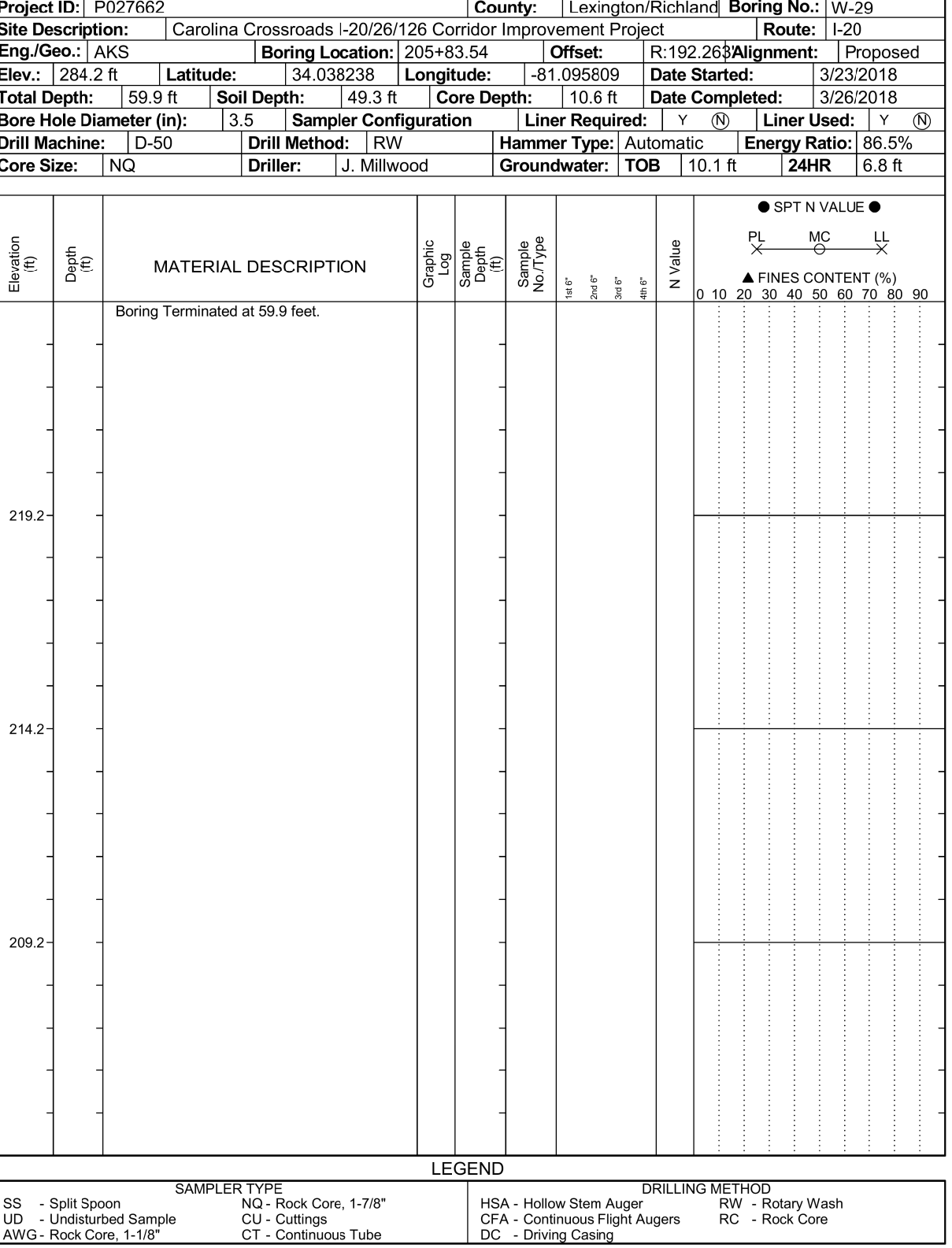
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SCDOT Soil Test Log



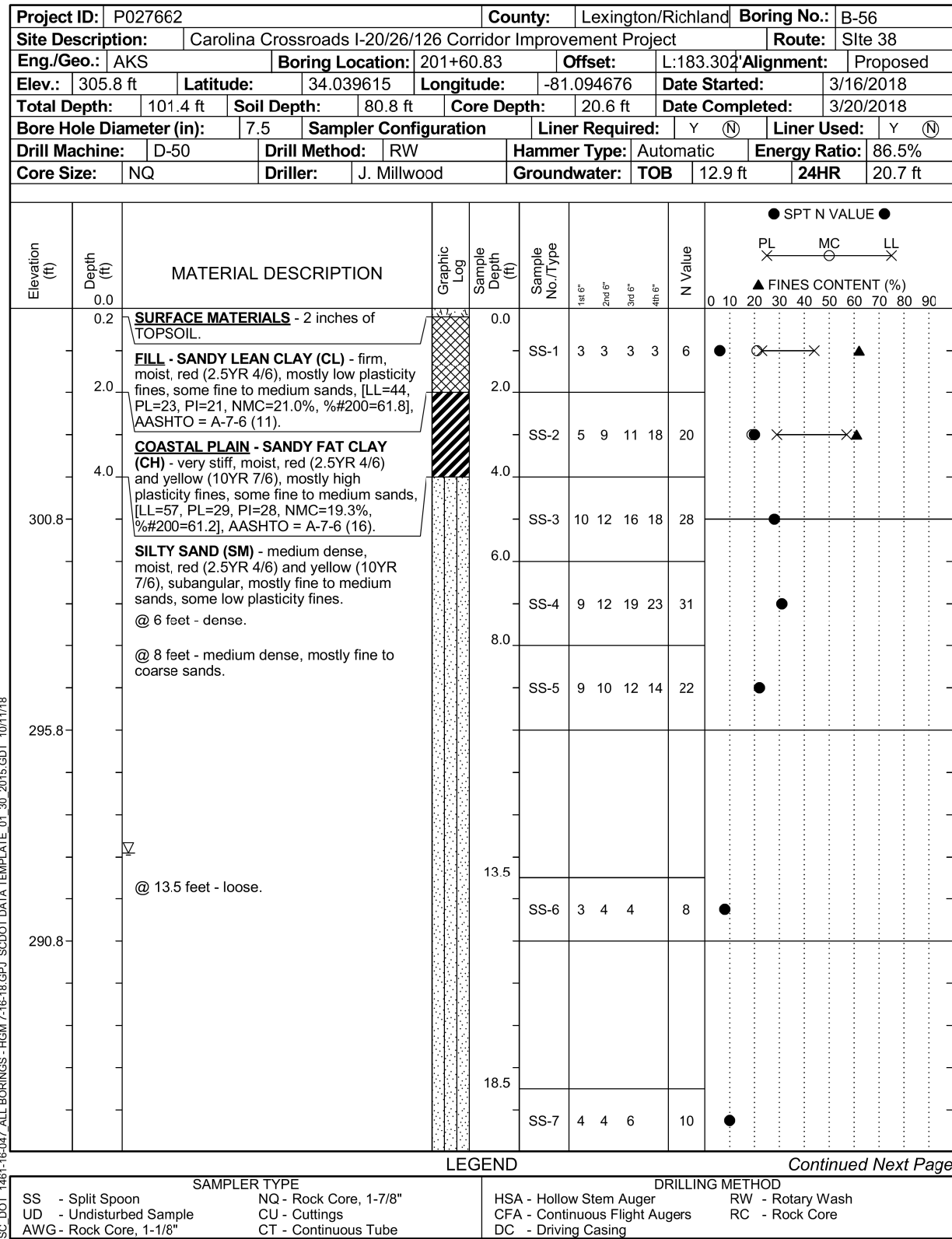
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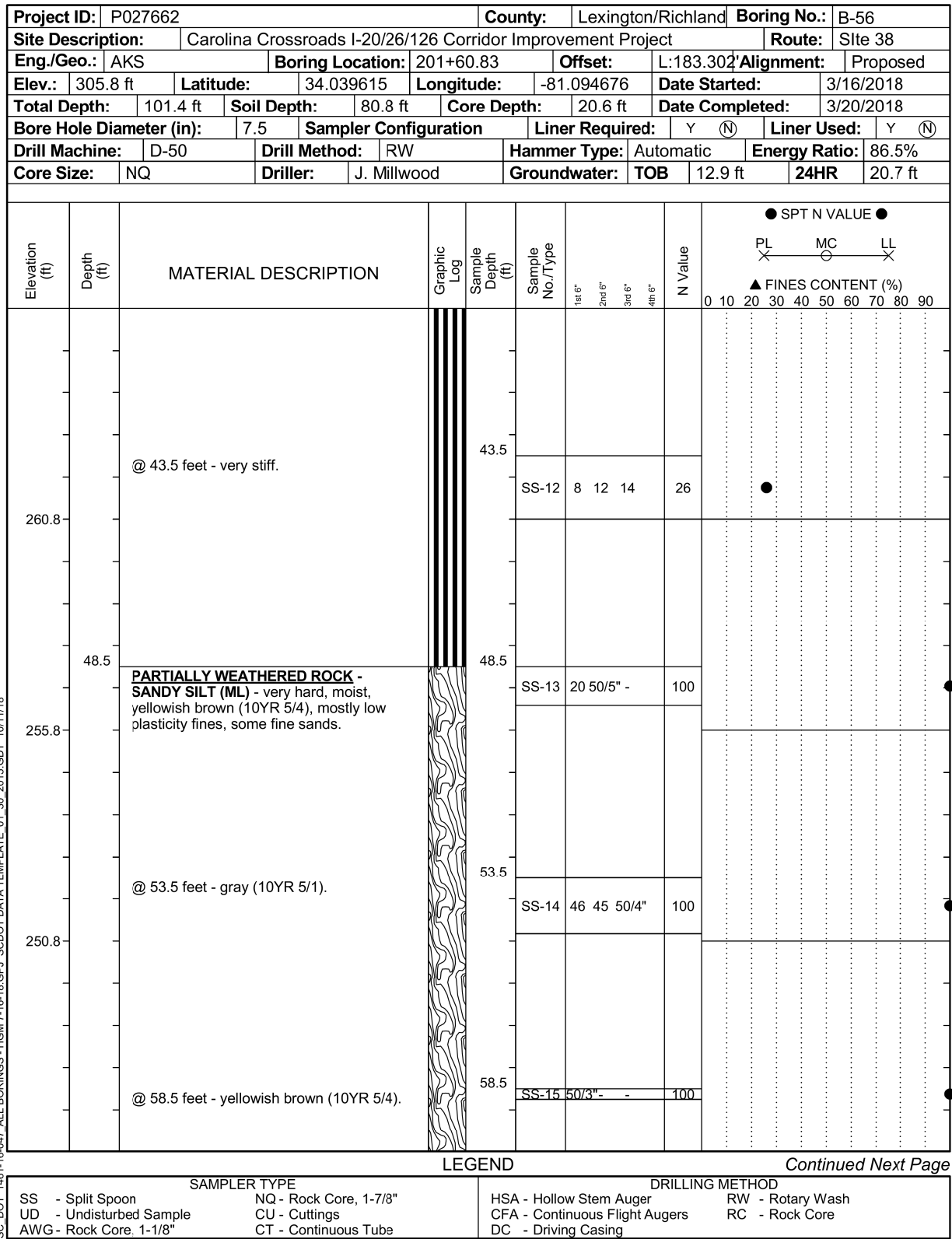
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ROUTE		RAMP F

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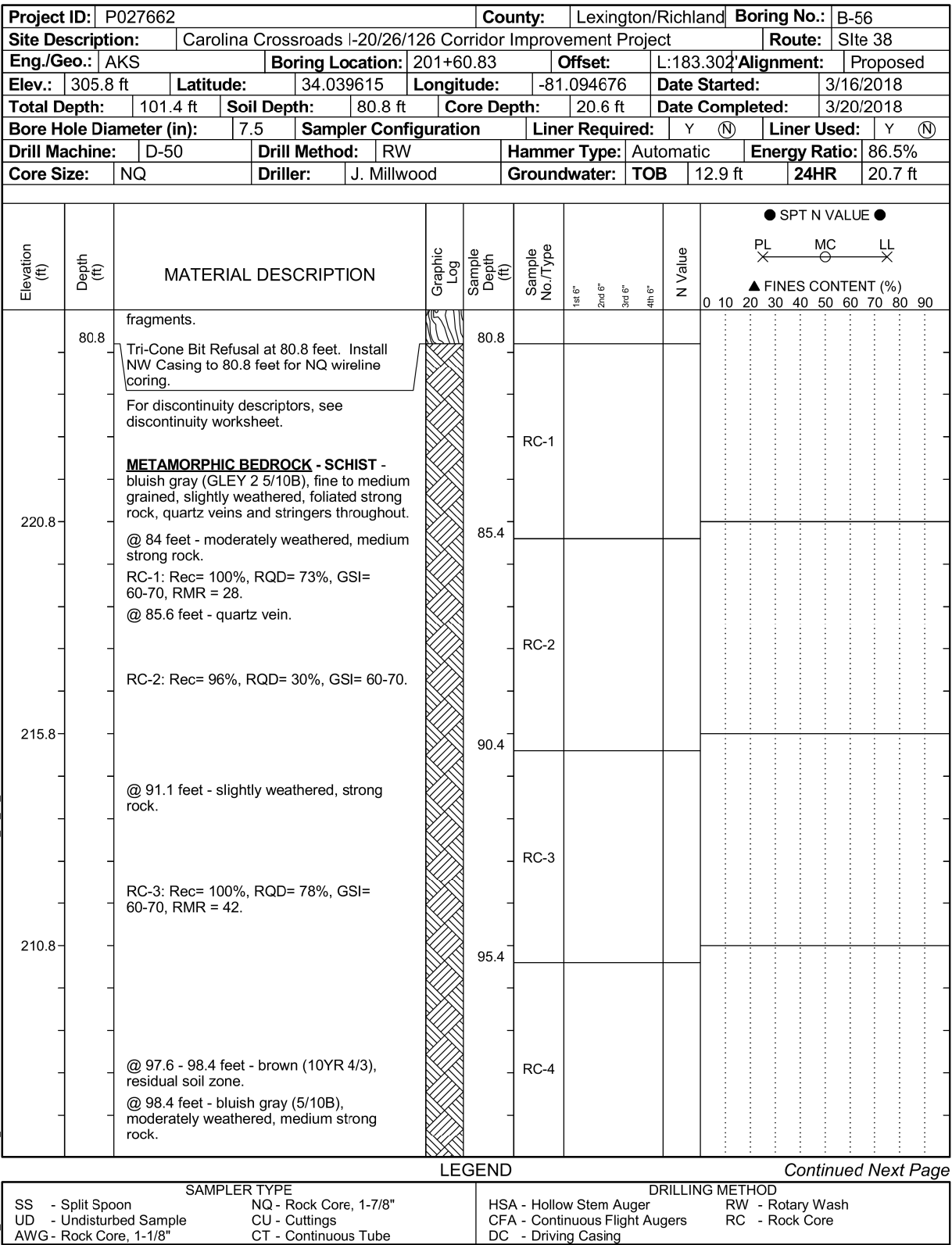
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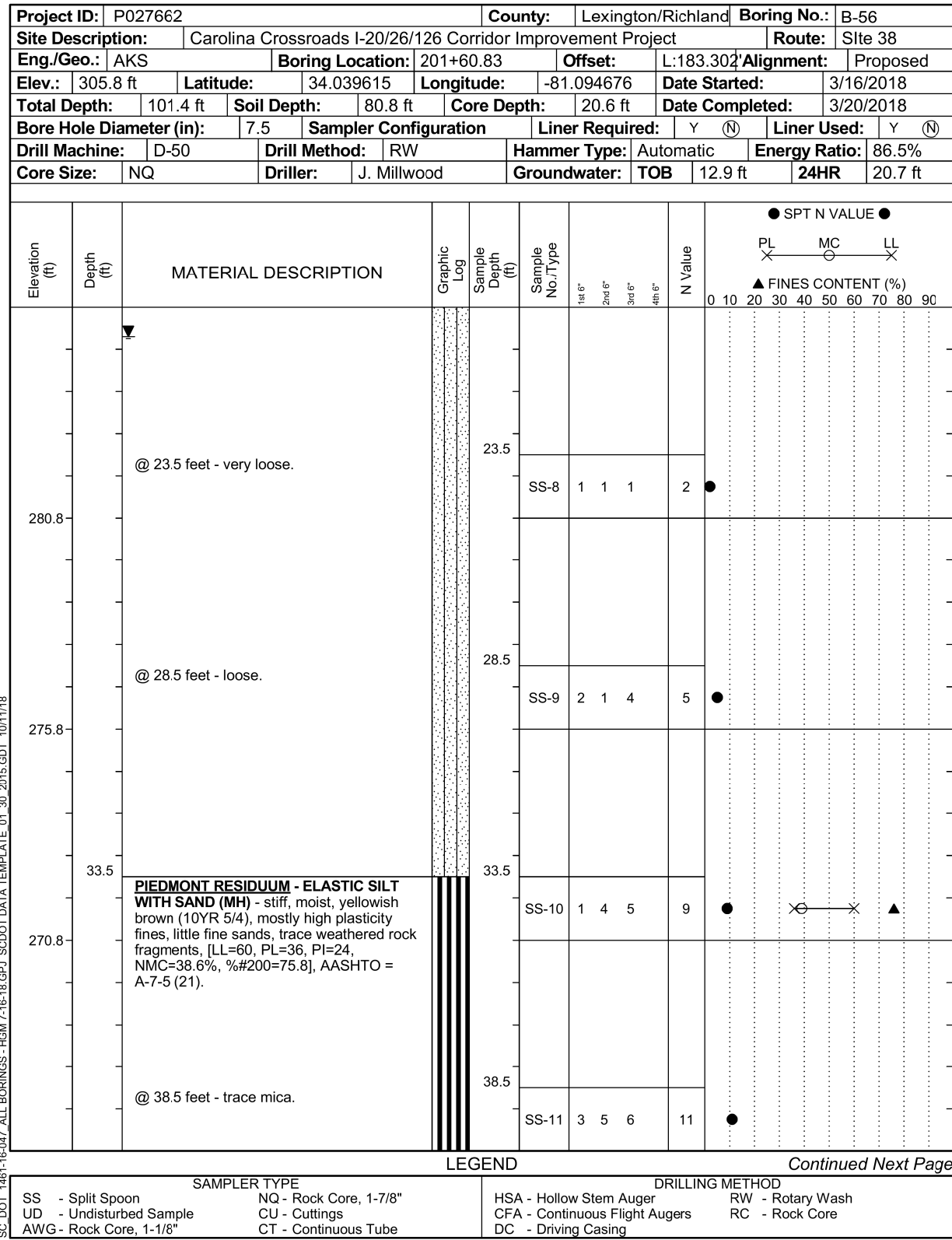
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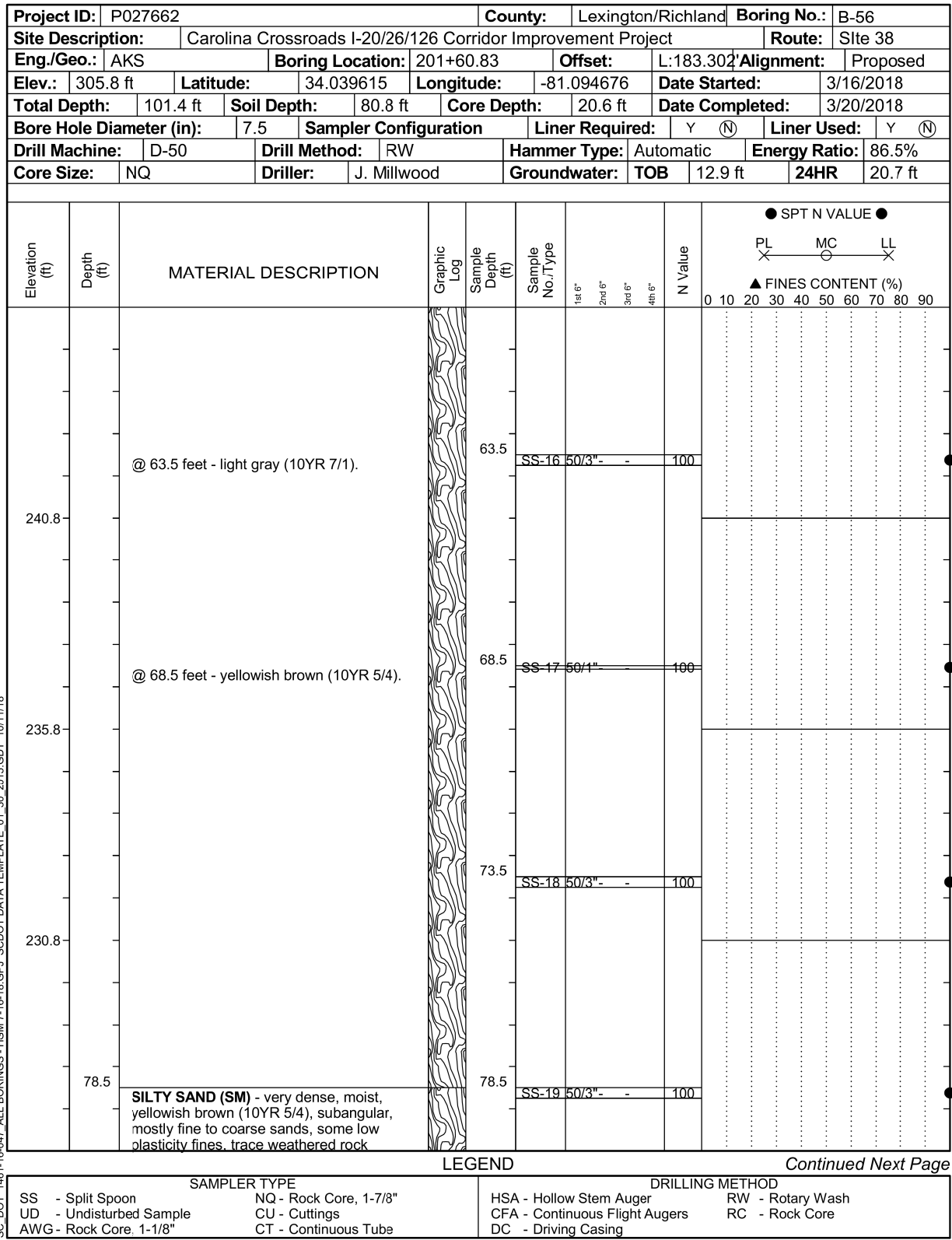
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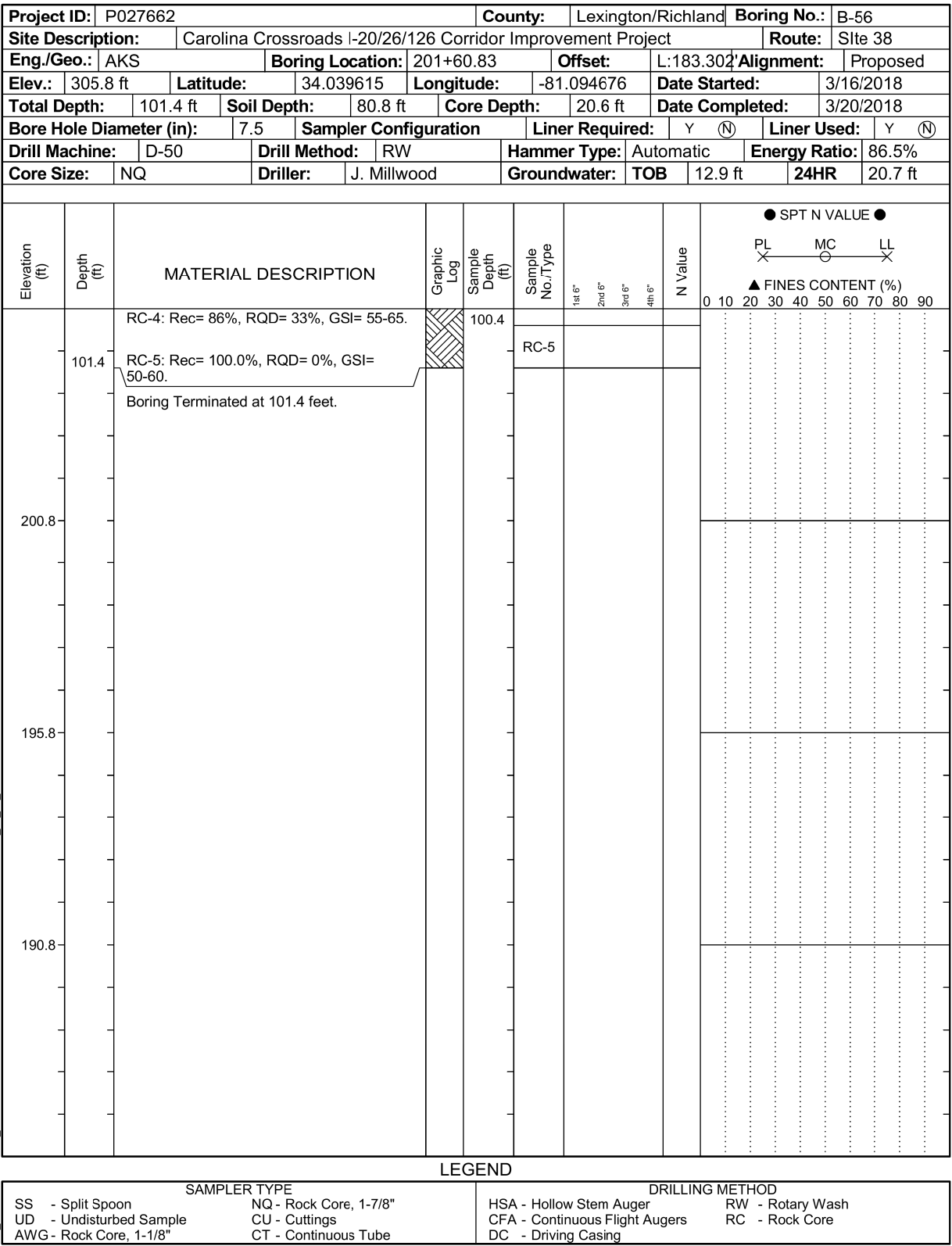
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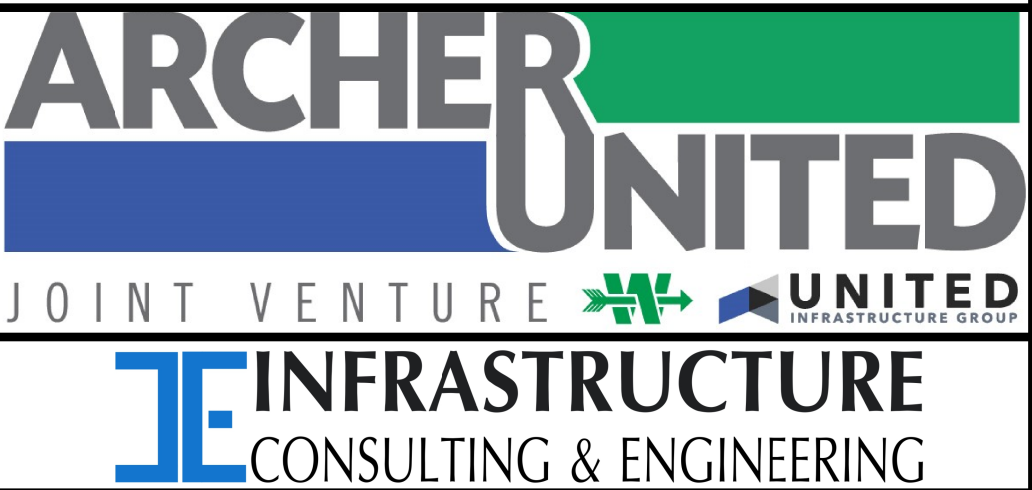


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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BORING LOGS (5)

RAMP F BRIDGE OVER
I-20 CD

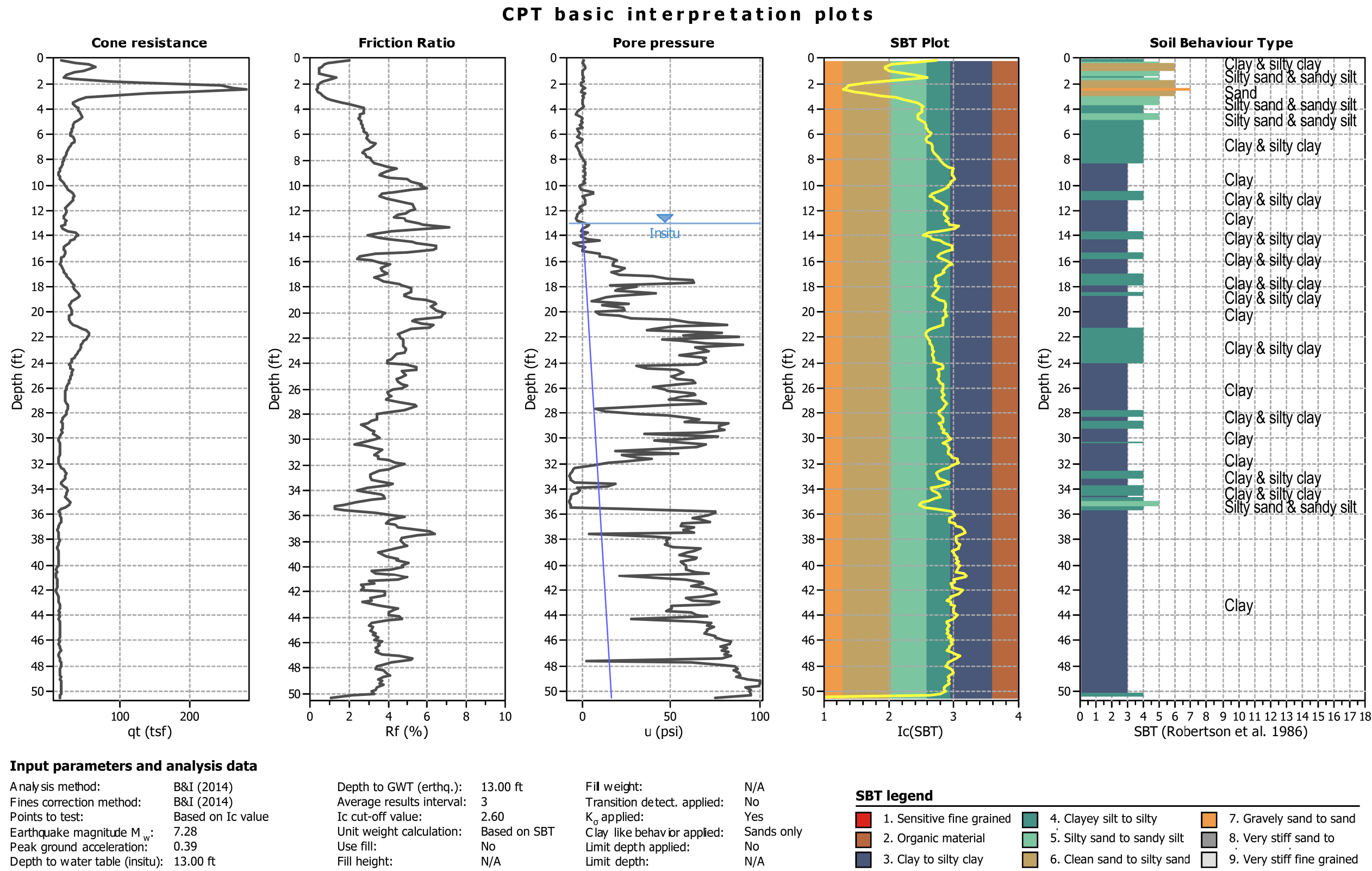
COUNTY RICHLAND

ROUTE RAMP F

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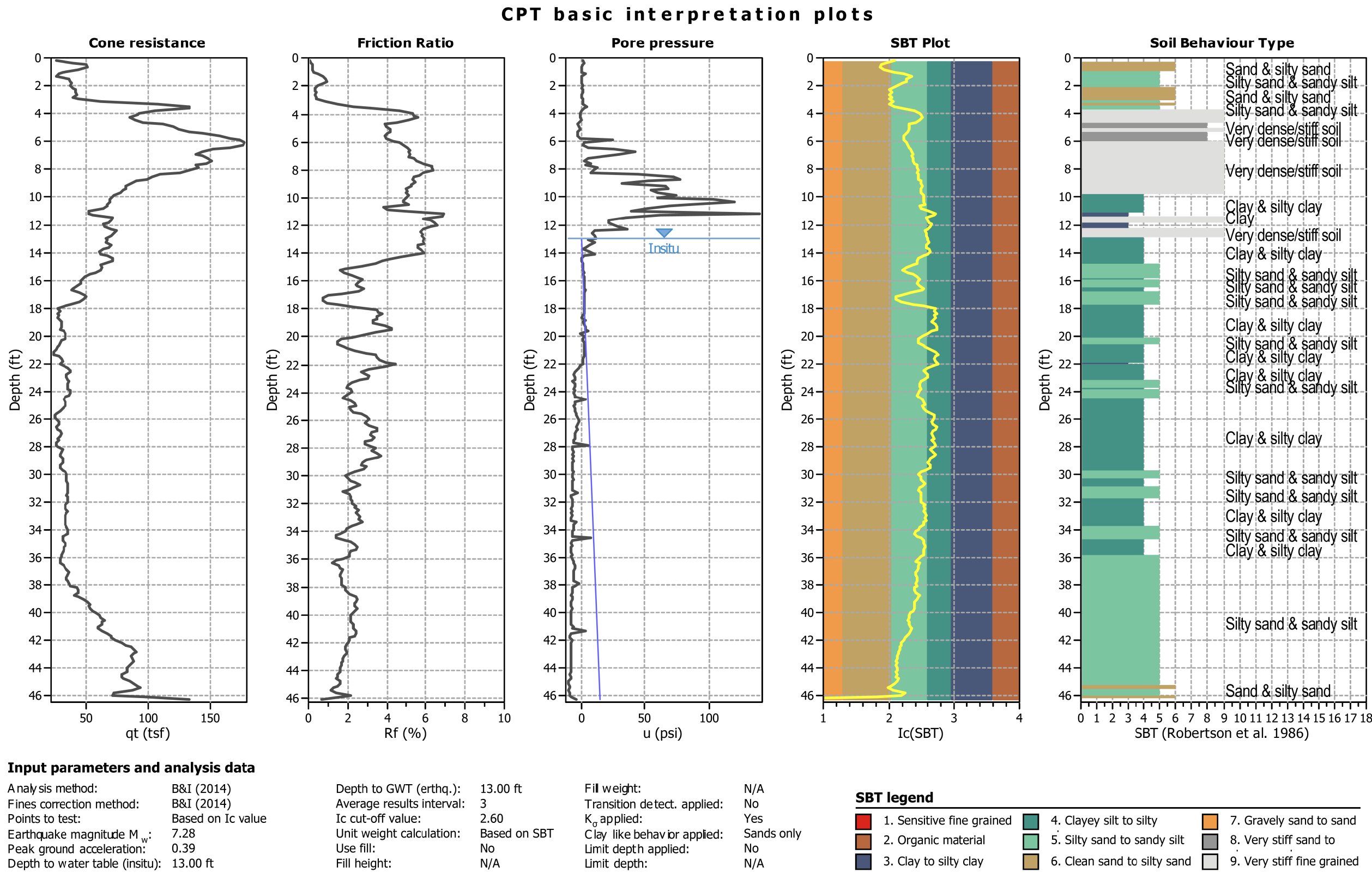
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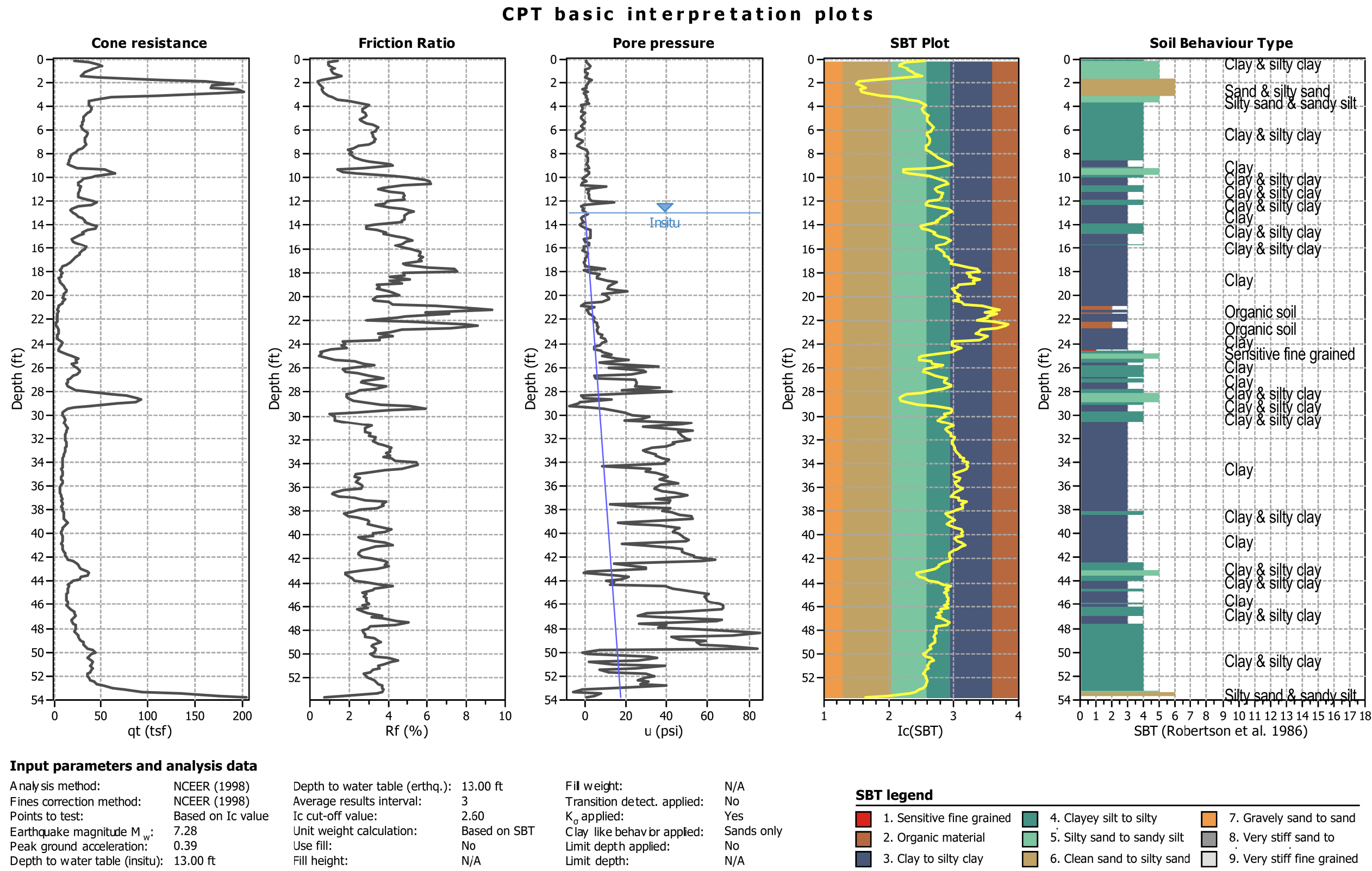
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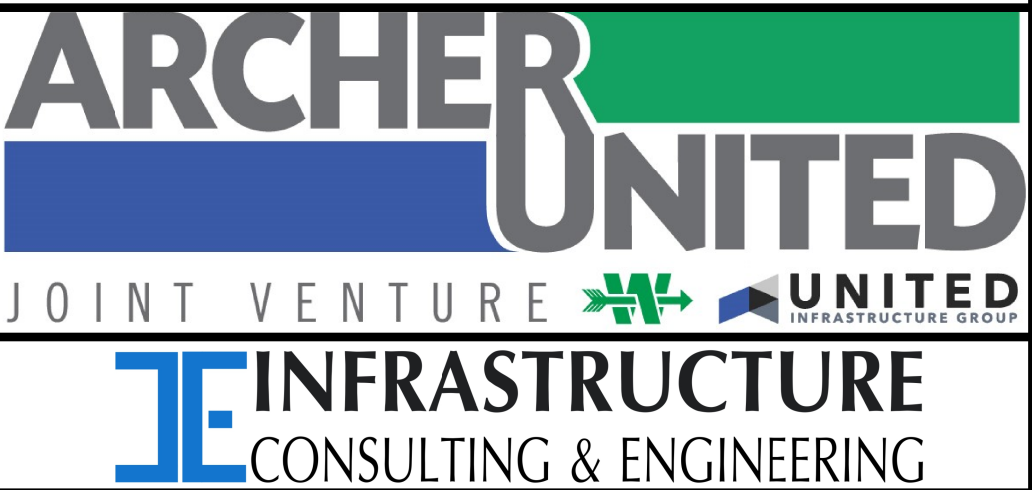
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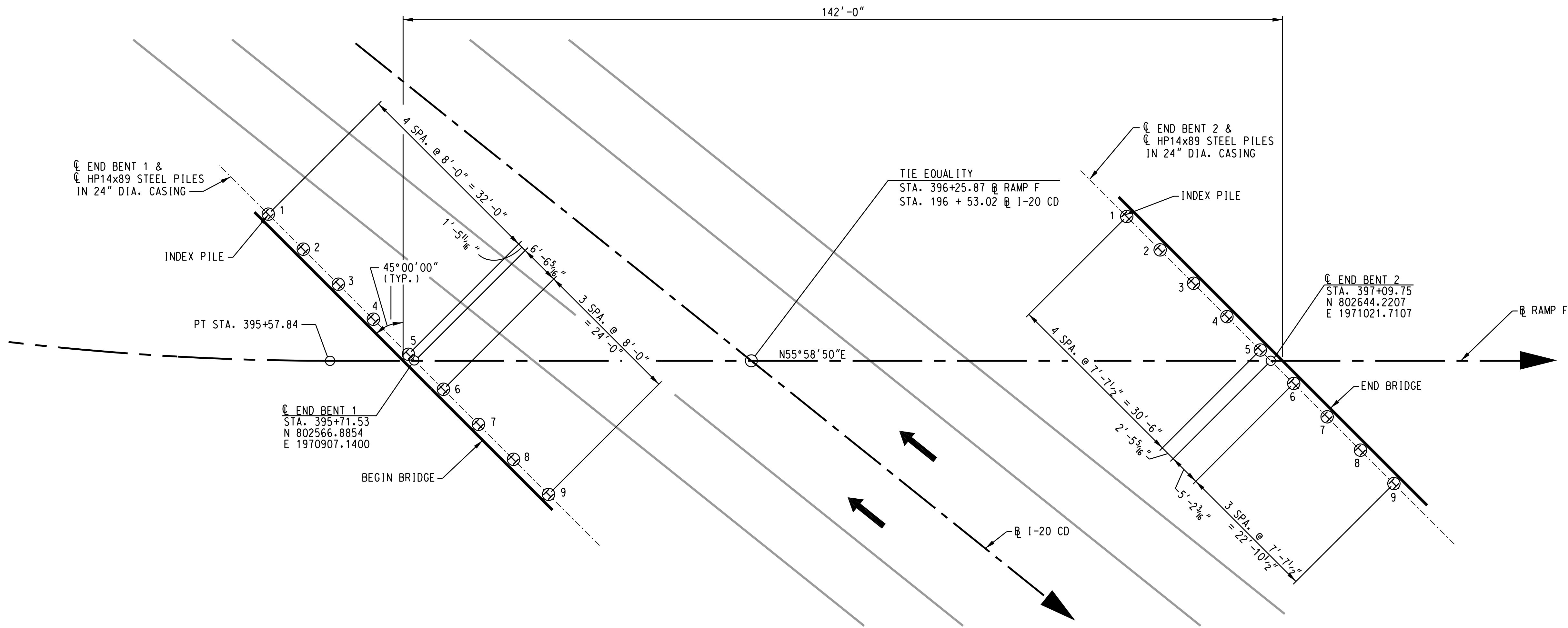
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SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
BORING LOGS (6)	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F

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FOUNDATION LAYOUT

General Notes – Driven Piles

- If bridge end bent piles are driven before MSE wall and embankment construction, the piles shall be stopped approximately 10 feet above the estimated tip elevation during initial driving. Settlement monitoring shall be completed during MSE wall and embankment construction in accordance with SCDOT supplemental technical specification SC-M-203-4 by installing one settlement plate within each bridge abutment footprint. The results of this monitoring shall be used by the geotechnical engineer of record (EOR) to determine when the piles may be driven to the final tip elevation. We estimate that a wait time of one month may be required prior to final pile installation.
- On initial drive, piles shall be stopped at the highest allowable finished grade on the plans to accommodate a restrike while still remaining within an allowable plan finished grade elevation.
- The top of partially weathered rock elevation may vary across the each bent and result in varying pile lengths. Practical refusal of a pile is defined as 20 blows per inch.
- Each production pile is to be installed in one continuous operation. Details of any anticipated temporary driving discontinuances, including anticipated time intervals in the Pile Installation Plan, shall be included.
- Method of controlling installation of piles and verifying their capacity: Capacity will be verified by pile driving analyzer (PDA) and Case Pile Wave Analysis Program (CAPWAP) analysis on one production index pile at Bents 1 and 2 during initial driving. The results of the PDA and CAPWAP analysis will be used to develop pile driving criteria that relate pile capacity versus driving blow count.
- Pile capacity analysis should be performed on the indicated index piles during initial driving before other production piles at that pile bent are driven. If a CAPWAP analysis determines that the required capacity has not been achieved, wait 3 days and re-strike the production pile exhibiting the least blows per foot of driving with CAPWAP analysis to verify capacity.
- The minimum tip elevation to achieve lateral stability and the estimated tip elevation for the bridge bent driven piles on site are presented in the following tables. All piles are HP 14x89 steel piles.

PILE GOVERNING CONDITIONS

Bent	Loading Type	Loading Direction	Minimum Tip Elevation ¹ (feet)	Estimated Tip Elevation ² (feet)
1	Static (Strength)	Axial (Compression)	284	242
2	Static (Strength)	Axial (Compression)	287	246

Notes:

- ¹ Minimum Tip Elevation based on Lateral Pile Analysis
² Estimated Tip Elevation Based on Axial Pile Analysis

PILE BEARING

	Bent 1	Bent 2
Factored Design Load	371 kips	381 kips
Geotechnical Resistance Factor	0.65	0.65
Nominal Resistance	571 kips	587 kips
Estimated Scour	-	-
Downdrag	-	-
Required Driving Resistance	571 kips	587 kips

- 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 Bents 1 and 2:

DRIVABILITY ANALYSIS BENTS 1 AND 2 - WAVE EQUATION ANALYSIS INPUT PARAMETERS

Description	WEAP Parameter
Pile Type	HP 14x89
Skin Quake (in)	0.1
Toe Quake (in)	0.1
Skin Damping (s/ft)	0.05
Toe Damping (s/ft)	0.15
% Skin Friction	30
% End Bearing	70
Distribution Shape	Variable
Pile Penetration	70%
Hammer Rated Energy ¹	46 ft-kips/kW
Hammer Enthru Energy ²	20 to 30 ft-kips

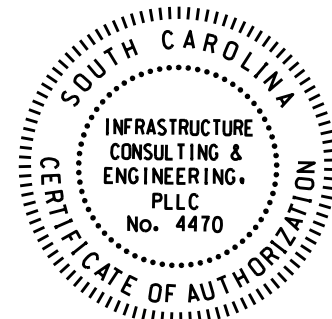
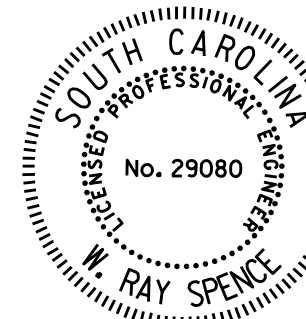
Notes:

- ¹ Hammer rated energy is based on GRLWEAP maximum rated energy database for diesel hammers.
² Hammer energy is based on wave equation transferred energy (Enthru).
GRLWEAP (2005) was used to perform wave equation analysis.

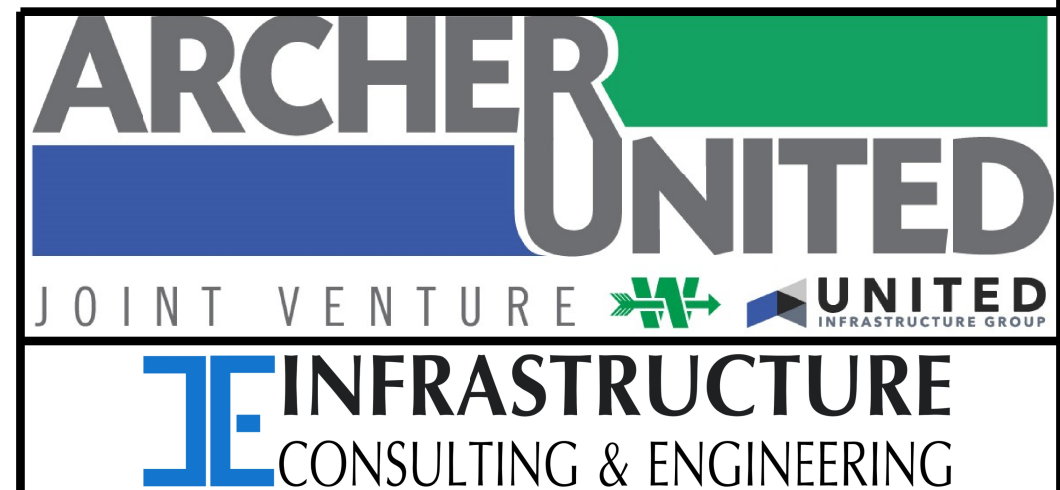
- A pile hammer having the rated energy as indicated above is considered suitable for driven pile installation. If the Contractor conducts his own Wave Equation Analysis, the Enthru energy provided above may be used to propose a pile driving hammer. However, final hammer approval is based on a wave equation analysis that accurately reflects the Contractor's proposed driving system.

End Bent Pile Installation Sequencing

- The end bent piles are to be located within or immediately adjacent to the reinforced areas of the MSE abutments. SCDOT specifies the construction sequence in supplemental technical specification SC-M-713 (May 2014). Section 411 of this document stipulates that abutment piles placed within reinforced zone are to be cased through the reinforced backfill, and that the construction sequence will be as follows:
 - Drive all piles within the reinforced zone prior to MSE wall construction. Piles should be driven to the initial estimated tip elevation.
 - Encase each pile in a smooth wall or corrugated galvanized steel (SWCGS) pipe of sufficient thickness to prevent buckling or distortion during placement and compaction of wall backfill.
 - Externally stabilize the SWCGS pipe to prevent the pipe from coming in contact with the pile during backfilling of the wall.
 - Extend the SWCGS pipe from the bottom of the backfill to 2 inches min. to 6 inches max. below the bottom of the bridge abutment cap.
 - After positioning, seal the top of the SWCGS pipe to prevent debris accumulation during placement of wall backfill, and keep the pipe sealed until the pipe is filled with granular material.
 - Unseal the pipe and fill the SWCGS pipe loosely with granular material after completion of the wall construction.



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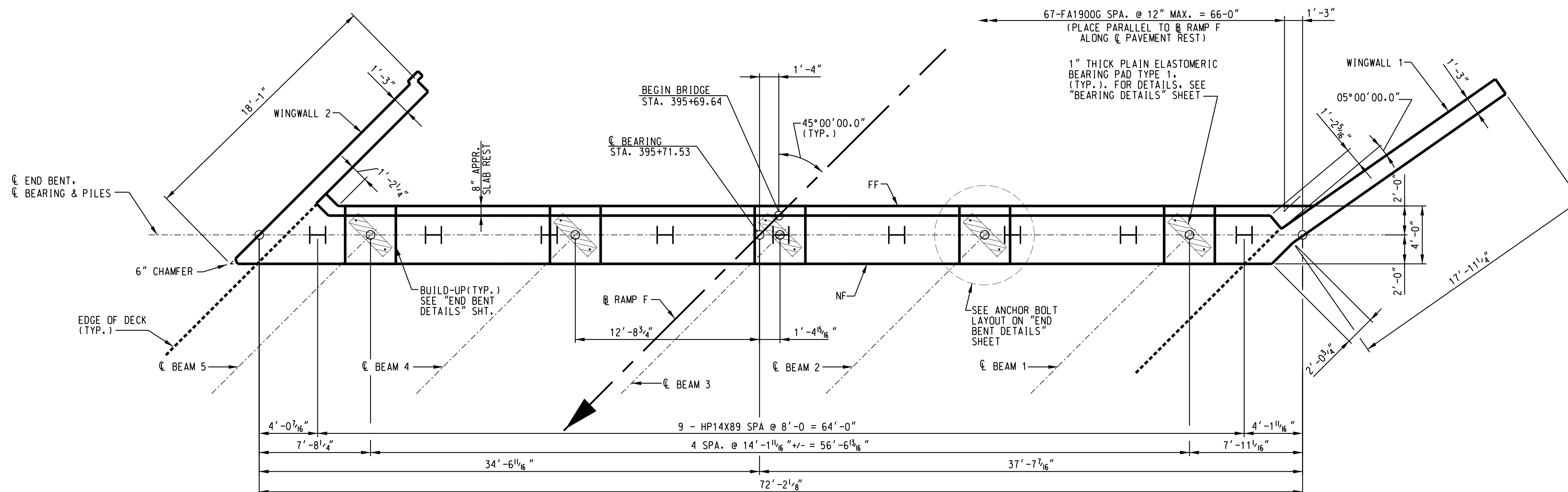


**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

FOUNDATION LAYOUT

**RAMP F BRIDGE OVER
I-20 CD**

COUNTY	RICHLAND	ROUTE	RAMP F
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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 C END BENT.

PILE CUT-OFF ELEVATION IS BASED ON 2'-0" PILE EMBEDMENT.

(FF) - DENOTES FAR FACE

(EF) - DENOTES EACH FACE

(NF) - DENOTES NEAR FACE

PLACE BAR GROUP (C), J1600 AND C1900G PARALLEL TO BEAMS.

BAR GROUP (C) CONSISTS OF 3-B1640, 1-J1601 AND 1-N1600.

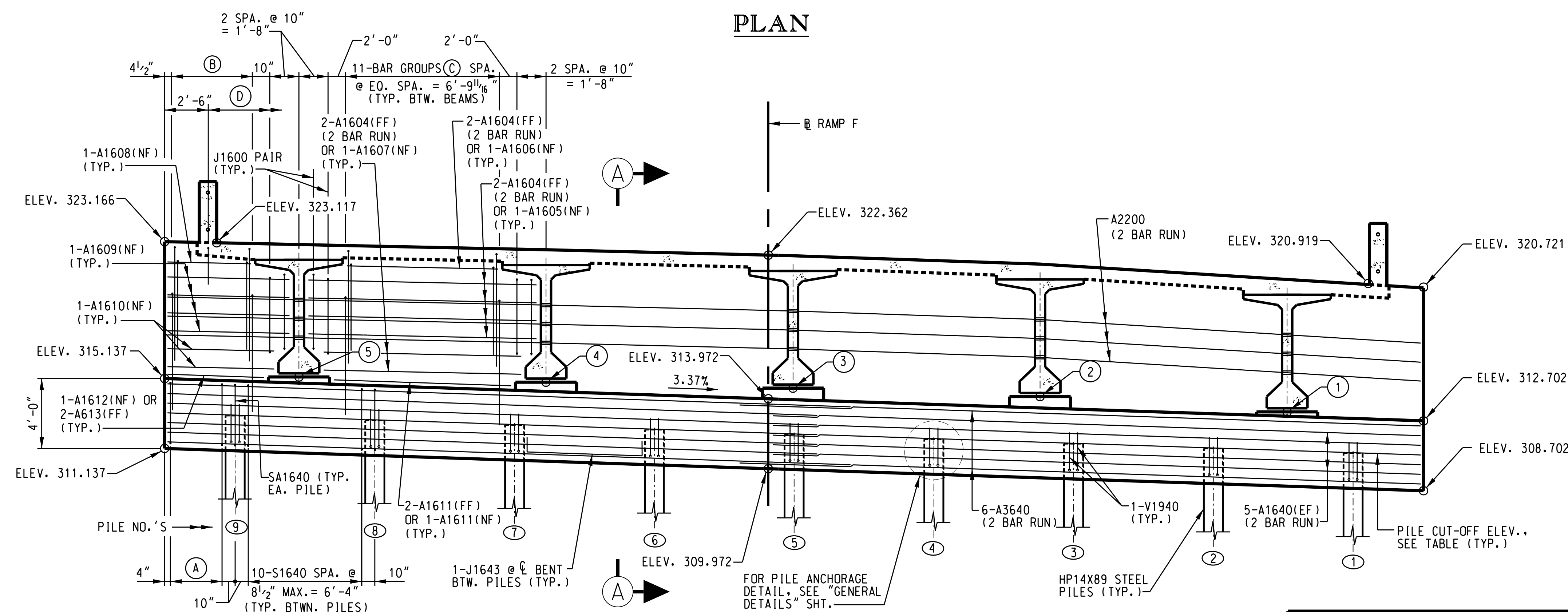
④ 4-"S16" BARS(TYP. EACH OVERHANG) SEE CORNER DETAILS ON "WINGWALL DETAILS (2)" SHEET.

(B) 6-BAR GROUPS (C) @ EQ. SPA. (TYP. EA. OVERHANG)

(D) 52-C1900G SPA. WITH BAR GROUP (C)

PILE CASING NOT SHOWN FOR CLARITY.

PLAN



SECTION ALONG C END BENT

(LOOKING BACK ON STATIONING)

BUILD-UP ELEVATIONS	
LOCATION	ELEVATION
1	313.303
2	313.951
3	314.481
4	314.901
5	315.211

PILE CUT-OFF ELEVATIONS	
PILE	ELEVATION
①	310.842
②	311.112
③	311.382
④	311.652
⑤	311.922
⑥	312.191
⑦	312.461
⑧	312.731
⑨	313.001

SPLICE LENGTHS:
#16 = 2'-7" MIN.
#22 = 3'-7" MIN.
#36 = 7'-6" MIN.



**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

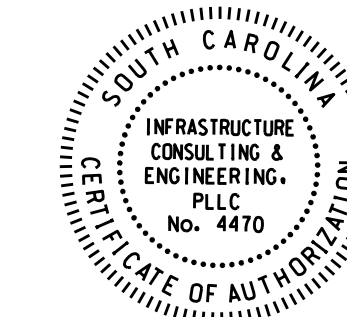
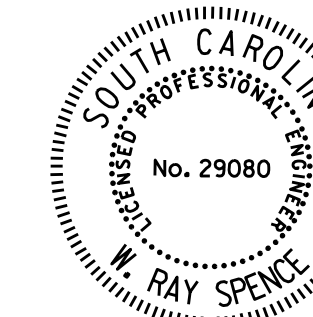
END BENT 1

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND

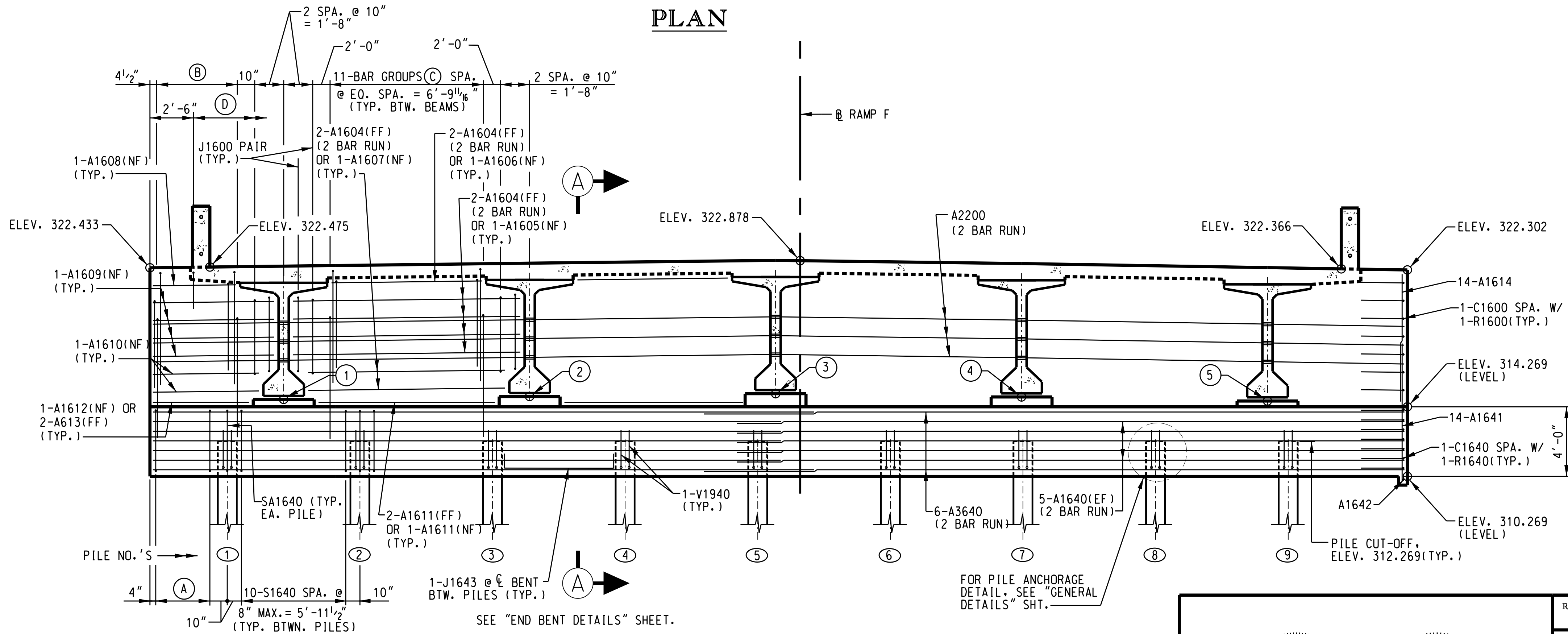
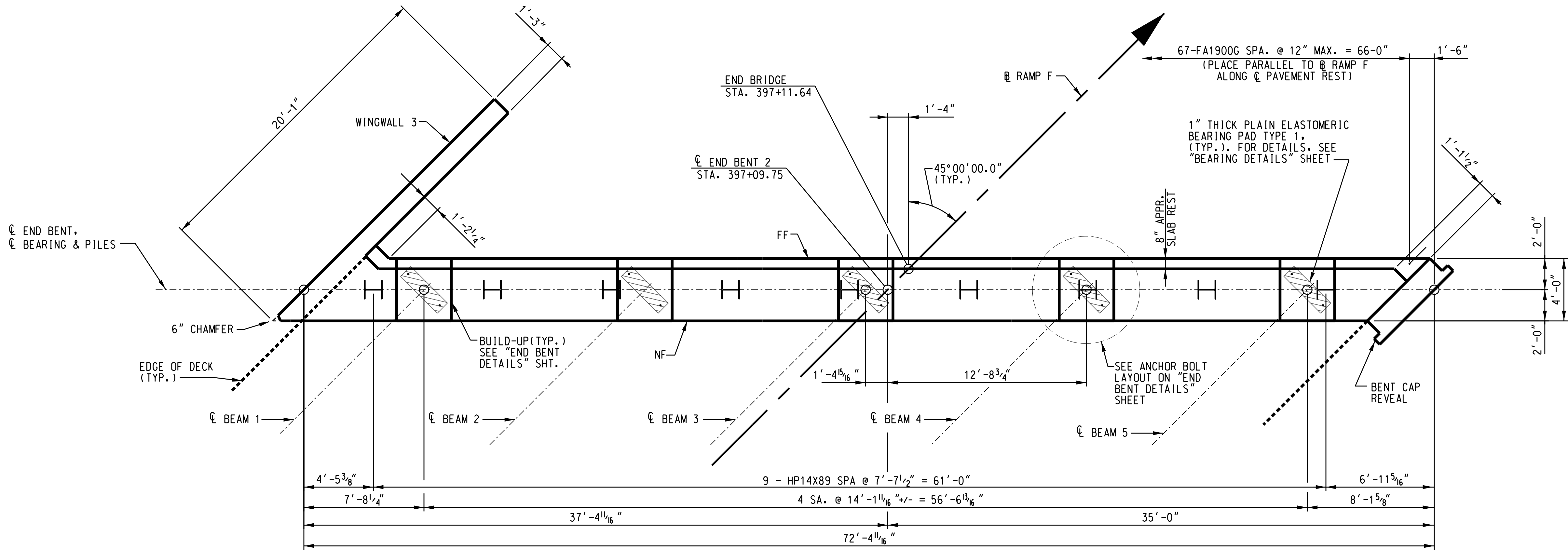
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89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

REV.	WRS	09-22-21
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QUAN.		
DR.	RMH	WRS 05-2
DES.	ALP	WRS 05-2
	BY	CHK DAT



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BRIDGE PLANS ID	SHEET NO.
P039719-B44	21



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 2'-0" PILE EMBEDMENT.

(FF) - DENOTES FAR FACE

(EF) - DENOTES EACH FACE

(NF) - DENOTES NEAR FACE

PLACE BAR GROUP (C), J1600 AND C1900G PARALLEL TO BEAMS.

BAR GROUP (C) CONSISTS OF 3-B1640, 1-J1601 AND 1-N1600.

(A) 4-"S16" BARS @ WINGWALL 3
8-"S16" BARS @ BT. CAP REVEAL (SEE CORNER DETAILS ON "WINGWALL DETAILS (2)" SHEET.

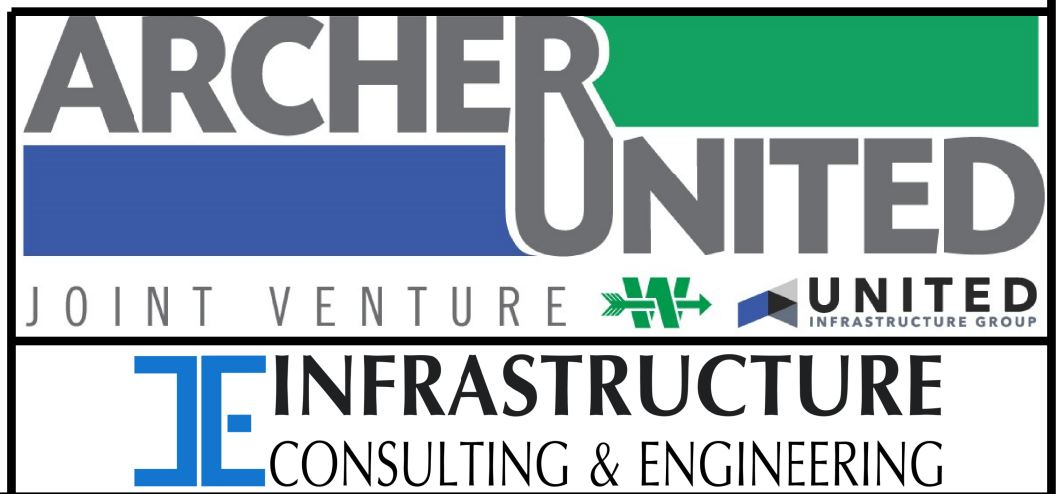
(B) 6-BAR GROUPS (C) @ EQ. SPA. (TYP. EA. OVERHANG)

(D) 52-C1900G SPA. WITH BAR GROUP (C)

PILE CASING NOT SHOWN FOR CLARITY.

BUILD-UP ELEVATIONS	
LOCATION	ELEVATION
(1)	314.693
(2)	314.861
(3)	315.028
(4)	314.835
(5)	314.603

SPLICE LENGTHS:
#16 = 2'-7" MIN.
#22 = 3'-7" MIN.
#36 = 7'-6" MIN.

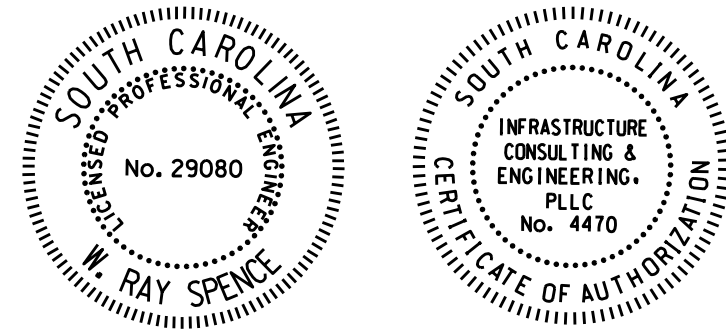


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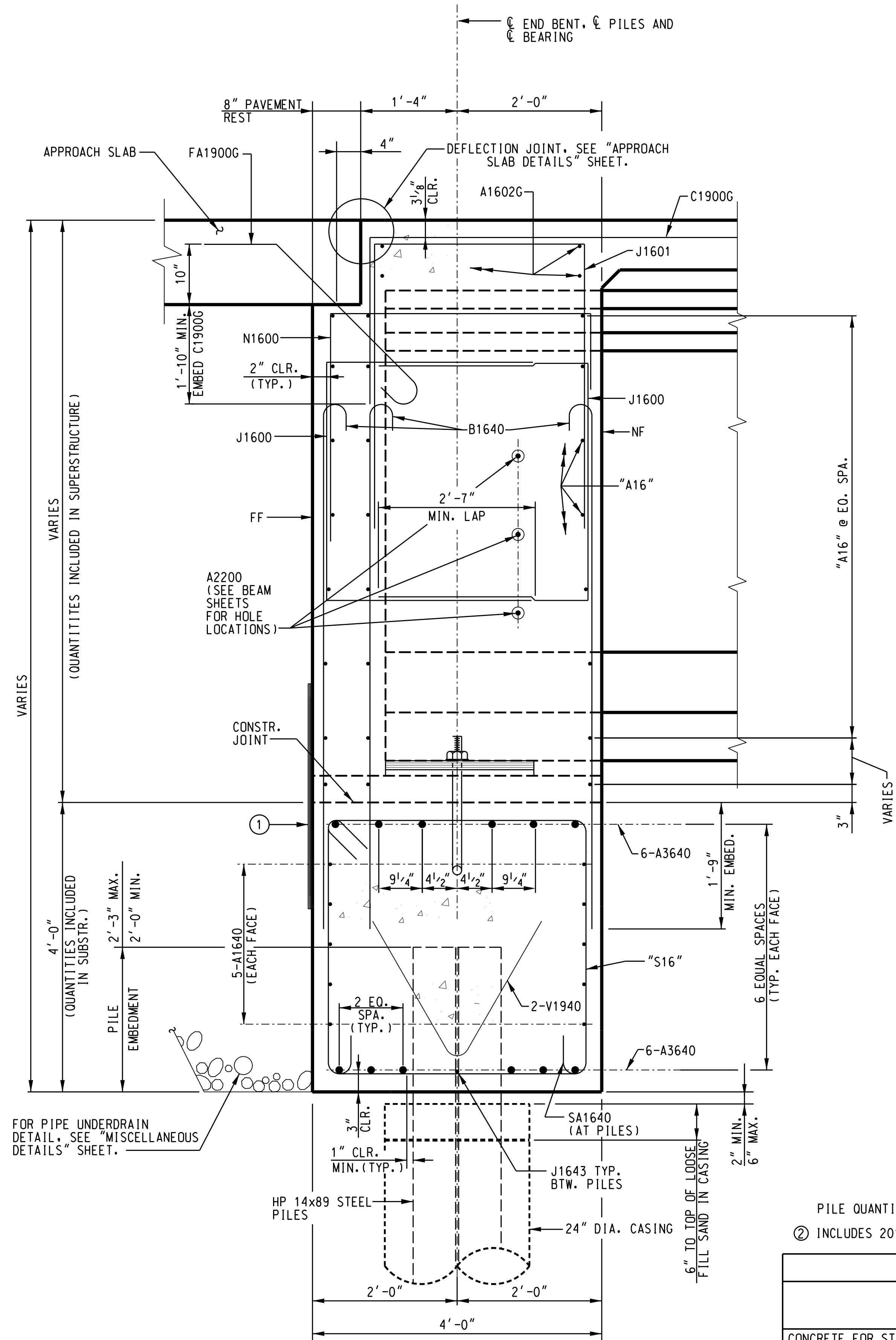
END BENT 2

RAMP F BRIDGE OVER
I-20 CD

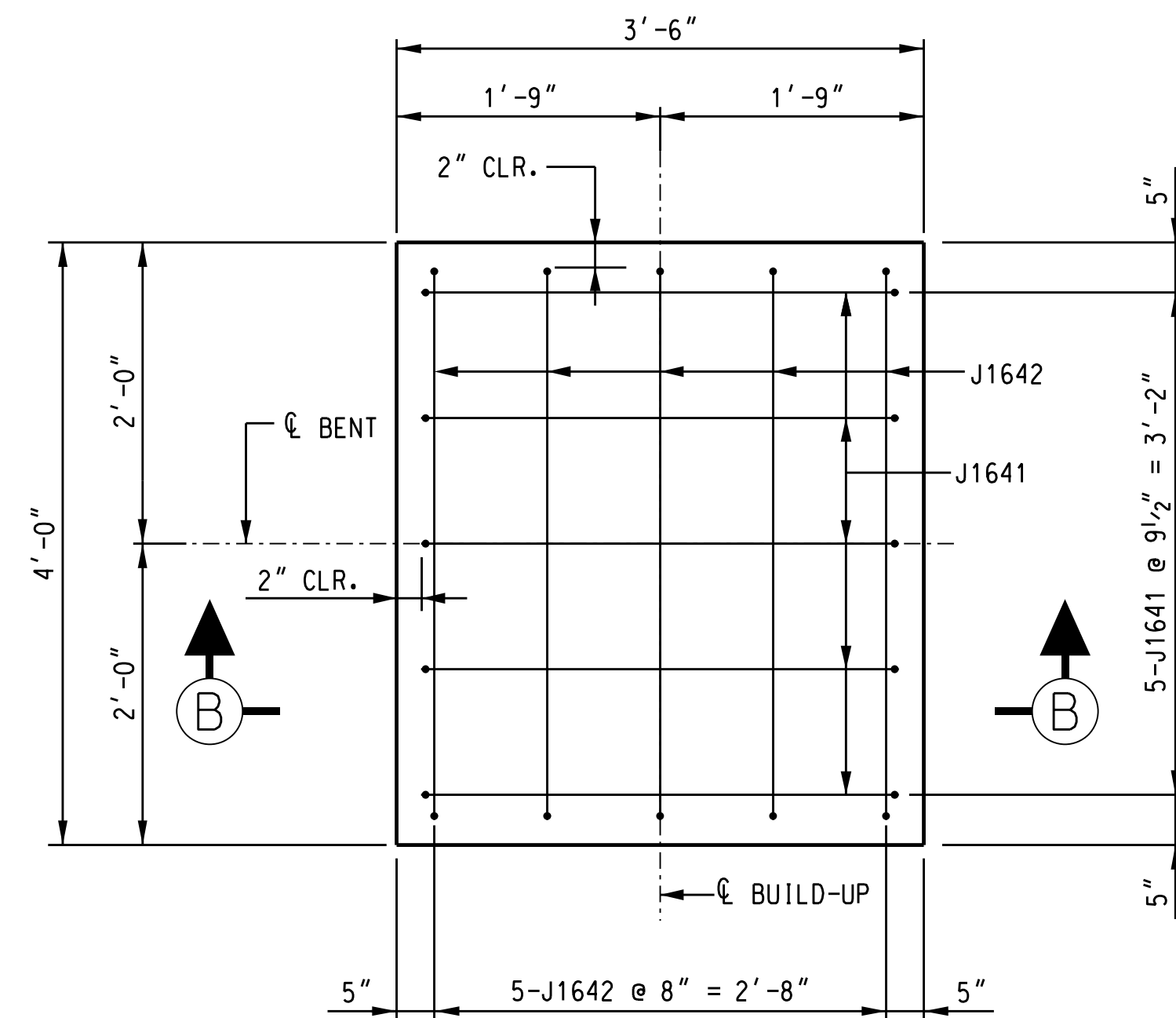
COUNTY RICHLAND ROUTE RAMP F



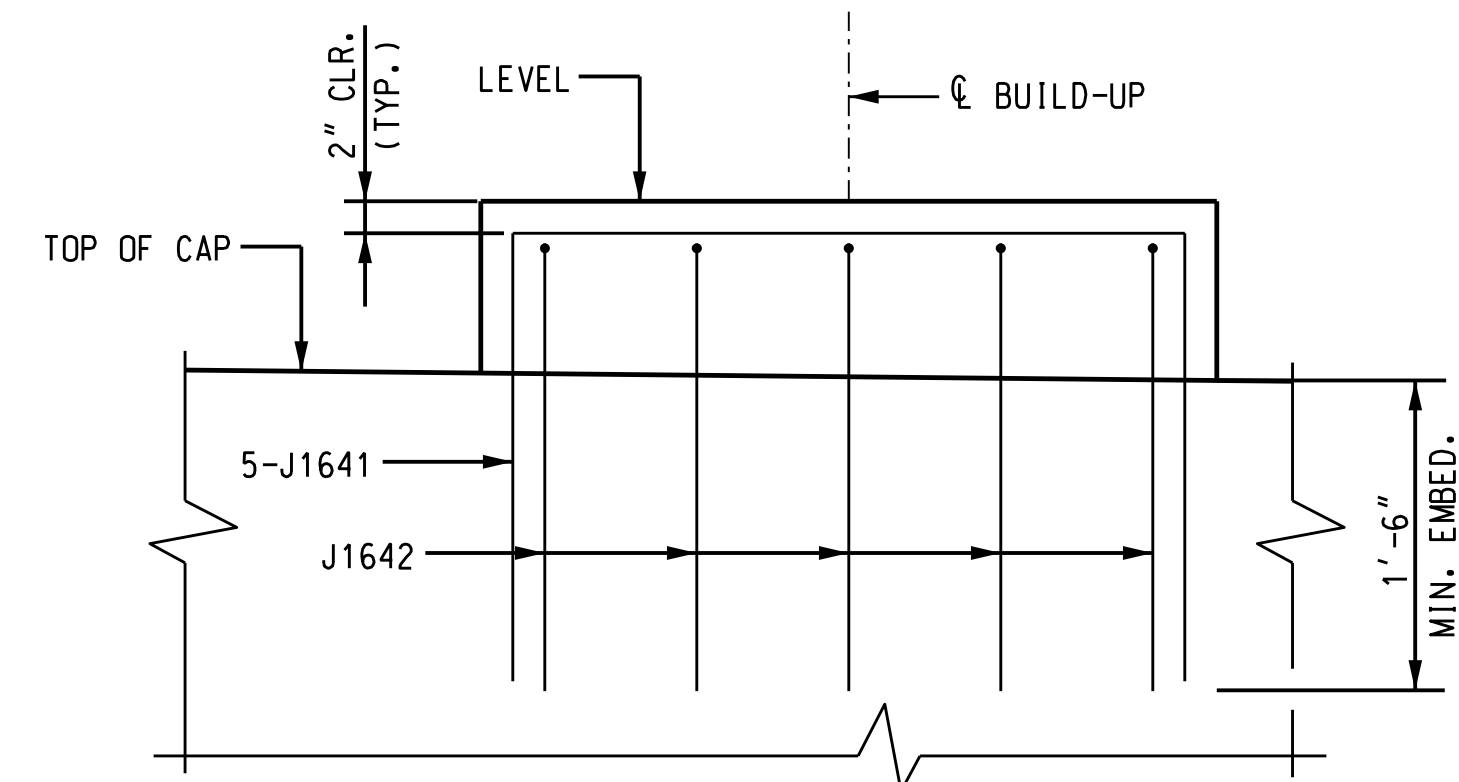
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		RFC	PLANS
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REVIEWED	WRS	06-22	
QUAN.			
DR.	RMH	WRS	05-22
DES.	ALP	WRS	05-22
BY	CHK.	DATE	



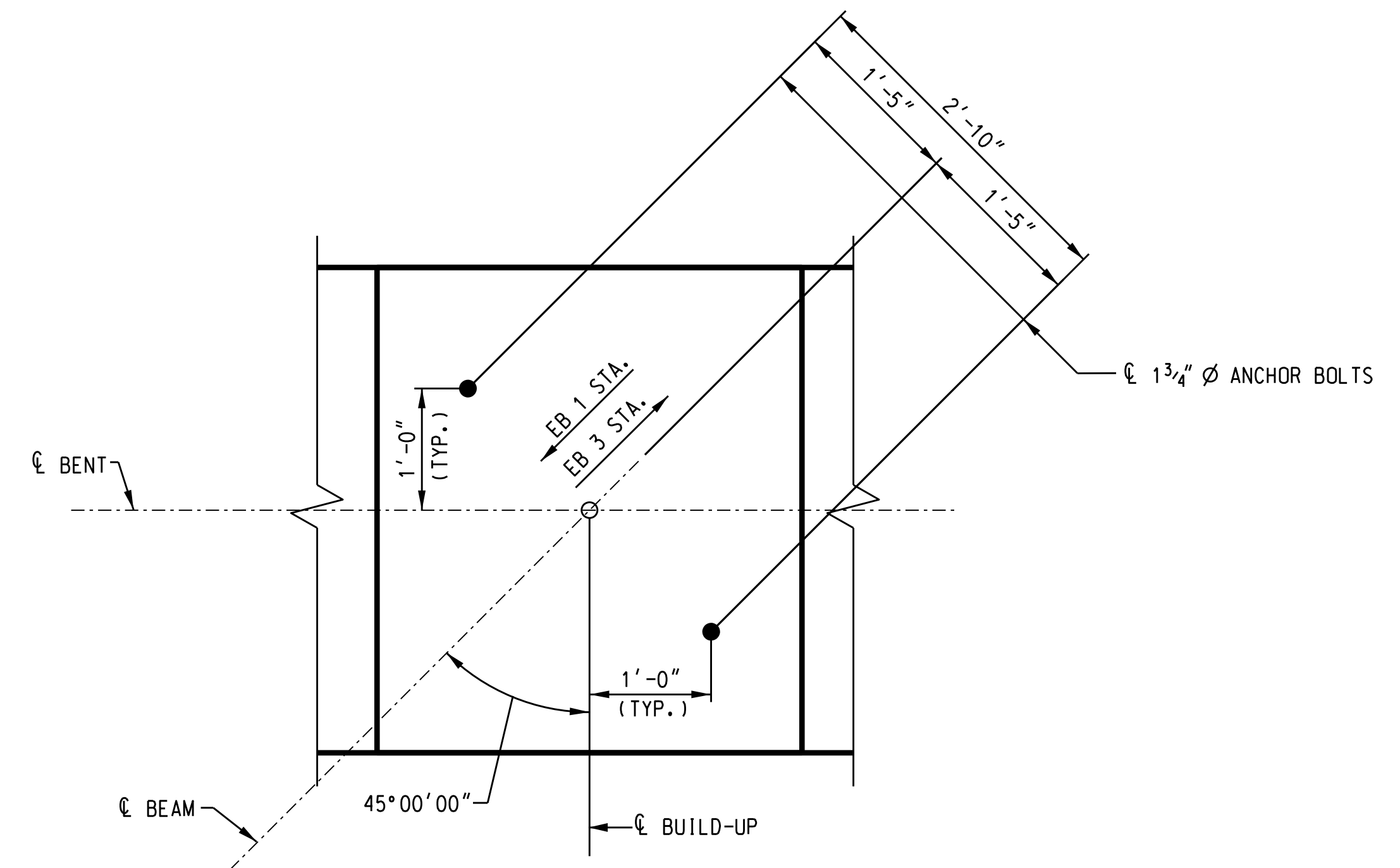
SECTION A-A



PLAN OF BUILD-UP
(TYP. AT ALL BEAMS)



SECTION B-B



ANCHOR BOLT LAYOUT

NOTES:

① "SECOND-METHOD" WATERPROOFING ENTIRE LENGTH OF CONSTRUCTION JOINT.

BARS MAY BE SHIFTED SLIGHTLY TO CLEAR
ANCHOR BOLTS.

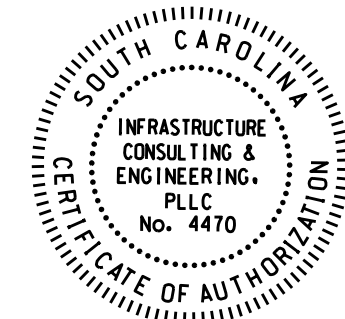
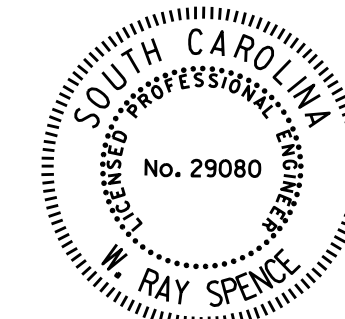
(FF) - DENOTES FAR FACE

(NF) - DENOTES NEAR FACE

PILE QUANTITY IS BASED ON 2'-0" PILE EMBEDMENT.

② INCLUDES 201 LBS. FOR ANCHOR BOLT ASSEMBLIES

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		END BENT 1	END BENT 2
CONCRETE FOR STRUCTURES - CLASS 4000	CY	48.5	46.5
REINFORCING STEEL FOR STRUCTURES (BRIDGE) ②	LBS.	11,600	10,989
DYNAMIC PILE ANALYZER TEST SET-UP	EACH	1	1
PILE DRIVING SET - UP	EACH	9	9
STEEL H BEARING PILING (HP14x89)	LF	560	531
STEEL H BEARING INDEX PILING (HP14x89)	LF	72	69
ELASTOMERIC BEARING	EACH	5	5
AGG. UNDERDRAIN #789 W/4" PERF. PIPE FOR STRUCTURES	TON	200	200
WATERPROOFING (SUBSTRUCTURE SECOND-METHOD)	SY	20.8	18.1



REV. 0	WRS	09-22-22
	RFC PLANS	
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REVIEWED WRS 06-22		
QUAN.	RMH	WRS 05-22
DR.	RMH	WRS 05-22
DES.	ALP	WRS 05-22
	BY	CHK. DATE

ARCHER 
 **UNITED**
JOINT VENTURE   **UNITED**
INFRASTRUCTURE GROUP

IE INFRASTRUCTURE
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END BENT DETAILS

RAMP F BRIDGE OVER
I-20 CD

COUNTY	RICHLAND	ROUTE	RAMP F
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END BENT 1								
REINFORCING STEEL SCHEDULE								
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
CAP	A1640	20	37'-3"	-----	-----	-----	-----	37'-3"
			-----	-----	-----	-----	-----	-----
CAP	A3640	24	39'-9"	-----	-----	-----	-----	39'-9"
			-----	-----	-----	-----	-----	-----
CAP	B1640	168	7'-7"	0'-7"	-----	-----	-----	8'-2"
			-----	-----	-----	-----	-----	-----
WINGWALL 2	C1340	9	1'-2"	0'-8"	-----	-----	-----	1'-10"
			-----	-----	-----	-----	-----	-----
WINGWALL 2	C1641	9	3'-9"	1'-6"	-----	-----	-----	5'-3"
			-----	-----	-----	-----	-----	-----
WINGWALL 1	F1640	9	17'-8 1/2"	2'-2 7/8"	2'-2 3/8"	0'-4 5/8"	-----	19'-11"
			-----	-----	-----	-----	-----	-----
WINGWALL 1	F2540	9	17'-9 1/2"	2'-11 1/8"	2'-10 5/8"	0'-6 1/8"	-----	20'-9"
			-----	-----	-----	-----	-----	-----
WINGWALL 2	FB1640	9	17'-4 1/2"	0'-10"	0'-7 1/8"	0'-7 1/8"	-----	18'-2"
			-----	-----	-----	-----	-----	-----
WINGWALL 2	FB2540	9	16'-6"	1'-7"	1'-1 1/2"	1'-1 1/2"	-----	18'-1"
			-----	-----	-----	-----	-----	-----
WINGWALLS	J1640	38	0'-11"	7'-2"	-----	-----	-----	15'-3"
BUILD-UP	J1641	25	3'-2"	2'-2"	-----	-----	-----	7'-6"
BUILD-UP	J1642	25	3'-8"	2'-2"	-----	-----	-----	8'-0"
CAP	J1643	8	6'-6"	0'-11"	-----	-----	-----	8'-4"
			-----	-----	-----	-----	-----	-----
CAP	S1640	82	3'-8"	3'-7"	0'-8"	-----	-----	15'-10"
CAP	S1641	2	3'-10 3/8"	3'-7"	0'-8"	-----	-----	16'-3"
CAP	S1642	2	4'-4 7/8"	3'-7"	0'-8"	-----	-----	17'-4"
CAP	S1643	1	5'-0 7/8"	3'-7"	0'-8"	-----	-----	18'-8"
CAP	S1644	1	5'-2 1/4"	3'-7"	0'-8"	-----	-----	18'-11"
			-----	-----	-----	-----	-----	-----
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	10	-----	-----	-----	-----	-----	2'-5 1/4"

END BENT 2								
REINFORCING STEEL SCHEDULE								
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
CAP	A1640	20	37'-4"	-----	-----	-----	-----	37'-4"
CAP	A1641	14	6'-8"	-----	-----	-----	-----	6'-8"
CAP	A1642	1	6'-4"	-----	-----	-----	-----	6'-4"
			-----	-----	-----	-----	-----	-----
CAP	A3640	24	39'-10"	-----	-----	-----	-----	39'-10"
			-----	-----	-----	-----	-----	-----
CAP	B1640	168	7'-7"	0'-7"	-----	-----	-----	8'-2"
			-----	-----	-----	-----	-----	-----
CAP	C1640	8	5'-9 7/8"	2'-0"	-----	-----	-----	7'-10"
WINGWALL 3	C1641	9	3'-9"	1'-6"	-----	-----	-----	5'-3"
			-----	-----	-----	-----	-----	-----
WINGWALL 3	FB1641	9	19'-4 1/2"	0'-10"	0'-7 1/8"	0'-7 1/8"	-----	20'-2"
			-----	-----	-----	-----	-----	-----
WINGWALL 3	FB2541	9	18'-6"	1'-7"	1'-1 1/2"	1'-1 1/2"	-----	20'-1"
			-----	-----	-----	-----	-----	-----
WINGWALL 3	J1640	19	0'-11"	7'-2"	-----	-----	-----	15'-3"
BUILD-UP	J1641	25	3'-2"	2'-2"	-----	-----	-----	7'-6"
BUILD-UP	J1642	25	3'-8"	2'-2"	-----	-----	-----	8'-0"
CAP	J1643	8	6'-2"	0'-11"	-----	-----	-----	8'-0"
			-----	-----	-----	-----	-----	-----
CAP	R1640	8	5'-9 7/8"	1'-4 5/8"	0'-11"	0'-7 3/4"	-----	8'-2"
			-----	-----	-----	-----	-----	-----
CAP	S1640	83	3'-8"	3'-7"	0'-8"	-----	-----	15'-10"
CAP	S1641	1	3'-10 3/8"	3'-7"	0'-8"	-----	-----	16'-3"
CAP	S1642	1	4'-4 7/8"	3'-7"	0'-8"	-----	-----	17'-4"
CAP	S1643	1	5'-0 7/8"	3'-7"	0'-8"	-----	-----	18'-8"
CAP	S1645	1	3'-9"	3'-7"	0'-8"	-----	-----	16'-0"
CAP	S1646	1	4'-0 1/4"	3'-7"	0'-8"	-----	-----	16'-6"
CAP	S1647	1	4'-6 1/4"	3'-7"	0'-8"	-----	-----	17'-6"
CAP	S1648	1	5'-3 1/8"	3'-7"	0'-8"	-----	-----	19'-0"
CAP	S1649	2	5'-3 7/8"	3'-7"	0'-8"	-----	-----	19'-2"
			-----	-----	-----	-----	-----	-----
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	10	-----	-----	-----	-----	-----	2'-5 1/4"

BRIDGE PLANS ID	SHEET NO.
P039719-B44	25



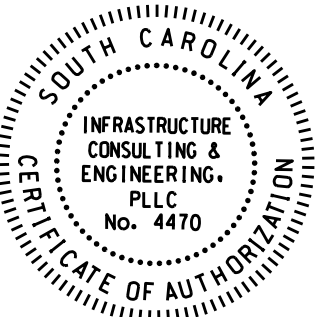
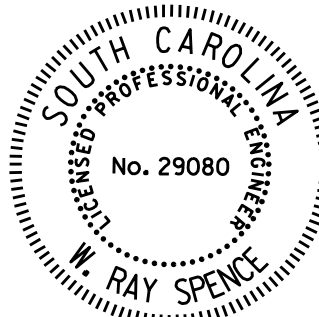
INFRASTRUCTURE
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SUBSTRUCTURE
REINFORCEMENT SCHEDULE

RAMP F BRIDGE OVER
I-20 CD

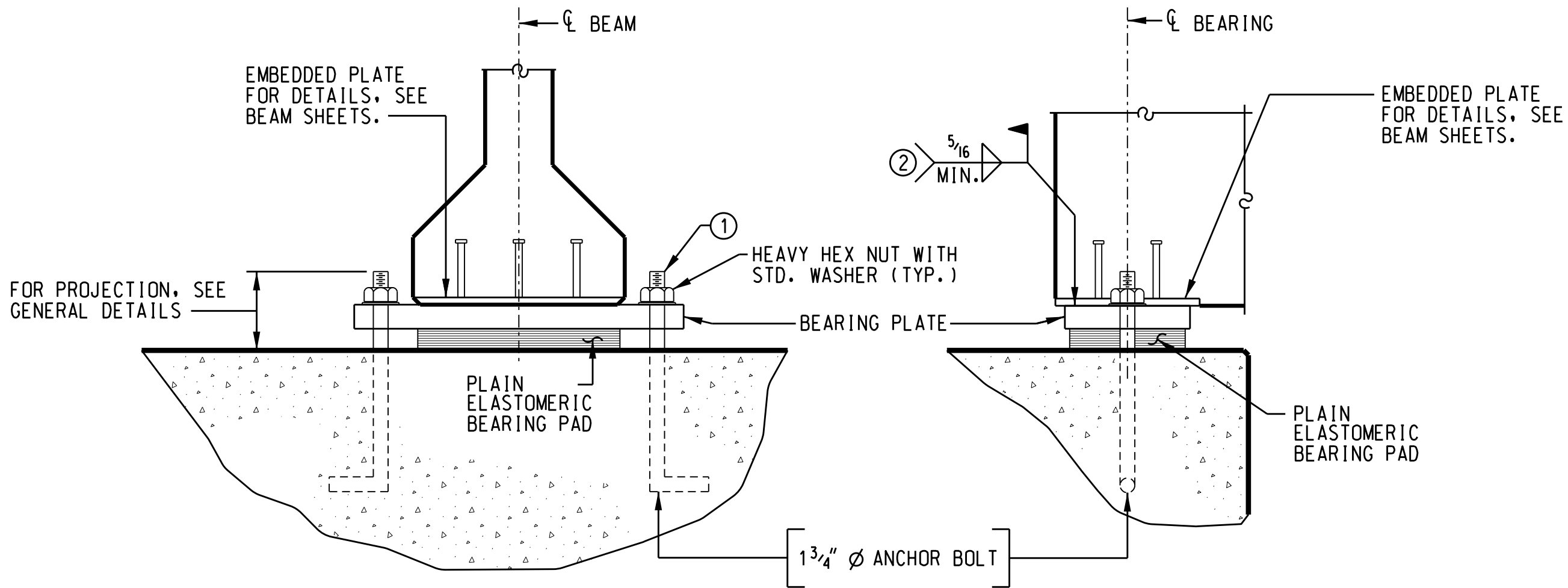
COUNTY RICHLAND ROUTE RAMP F



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REVIEWED	WRS	06-22
QUAN.		
DR.	BFS	05-22
DES.		
	BY	CHK. DATE

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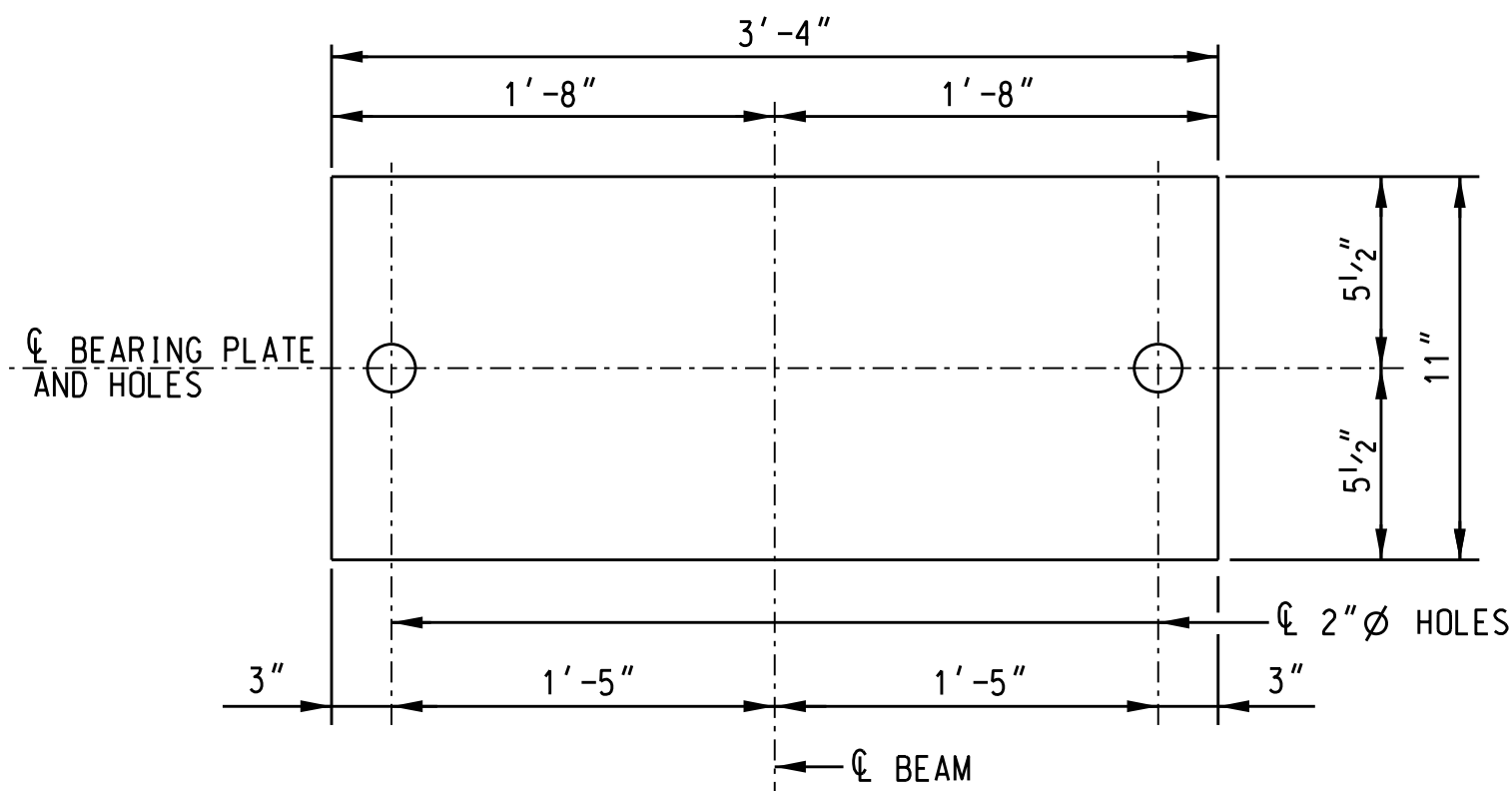
BRIDGE PLANS ID	SHEET NO.
P039719-B44	26



END ELEVATION

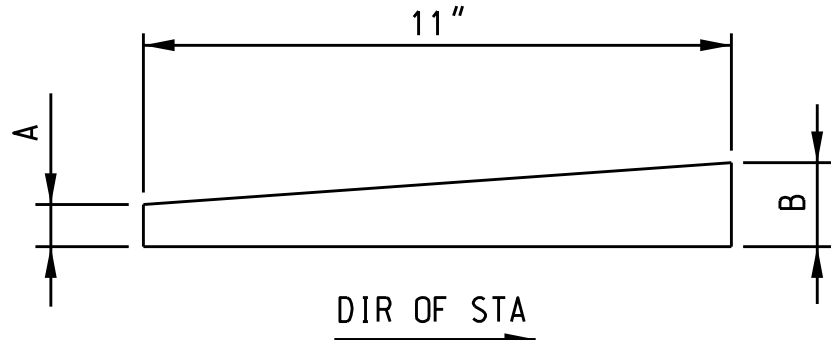
SIDE ELEVATION

BEARING ASSEMBLY



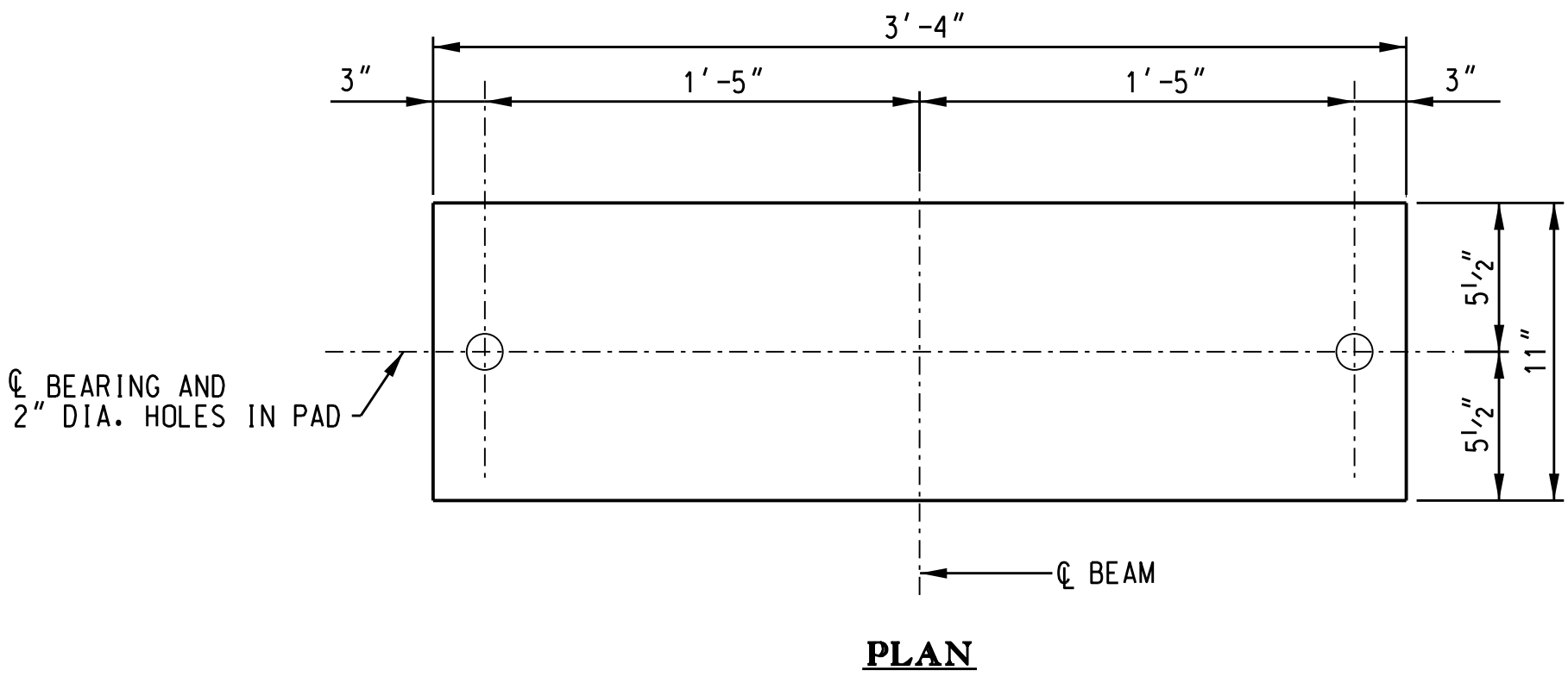
PLAN OF FIXED BEARING PLATE - TYPE 1

(10 REQ'D)
(END BENTS 1 & 2)

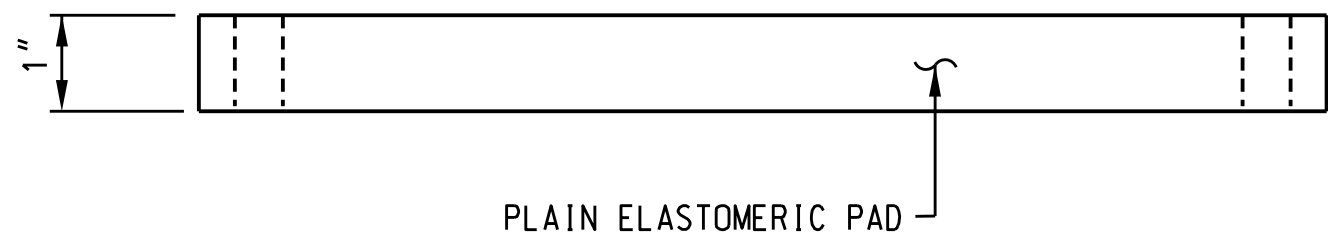


END ELEVATION

LOCATION	A	B
EB1 & EB2 (BEAMS 1 & 2)	1 7/16"	1 9/16"
EB 1 & EB2 (BEAMS 3-5)	1 1/2"	1 1/2"



PLAN



SECTION

BEARING PAD DETAILS - TYPE 1

(10 REQ'D)
END BENTS 1 & 2

NOTES:

- 1 TIGHTEN NUTS FOR ANCHOR BOLTS FINGER TIGHT AND THEN BACK OFF 1/4 TURN. THE THREAD OF THE BOLT SHALL THEN BE BURR WITH A SHARP POINTED TOOL.
- 2 CAUTION SHALL BE EXERCISED WHERE A FIELD WELD OR SHOP WELD WILL BE MADE WHILE ELASTOMER IS IN CONTACT WITH METAL. IN NO CASE SHALL THE ELASTOMER OR ELASTOMERIC BOND BE EXPOSED TO INSTANTANEOUS TEMPS. GREATER THAN 400° F OR ANY TEMPERATURE LIMIT SET BY THE FABRICATOR WHICHEVER IS LOWER. 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.

FOR ELASTOMERIC BEARING SPECIFICATIONS, SEE SCDDT STANDARD SPECIFICATIONS.

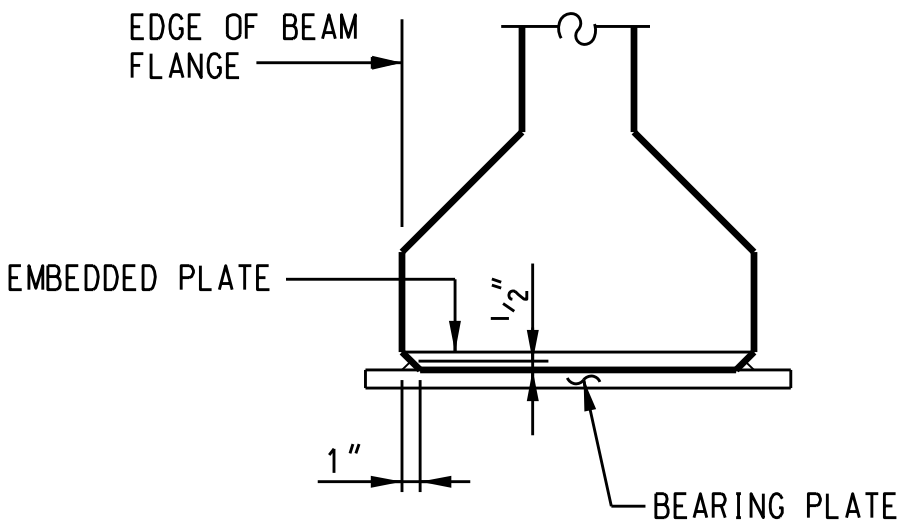
PADS WERE DESIGNED USING AASHTO METHOD A. PAD MATERIAL SHALL BE ELASTOMER GRADE 2.

TYPE 1 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. = 210.5k



2 WELD DETAIL FOR CONCRETE BEAMS



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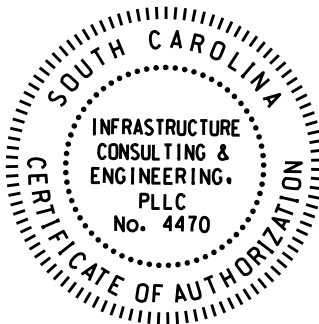
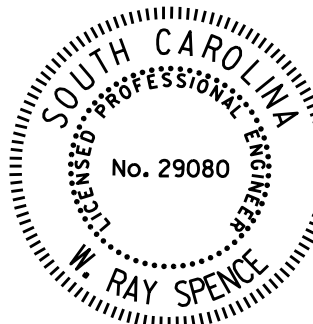
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEARING DETAILS

RAMP F BRIDGE OVER
I-20 CD

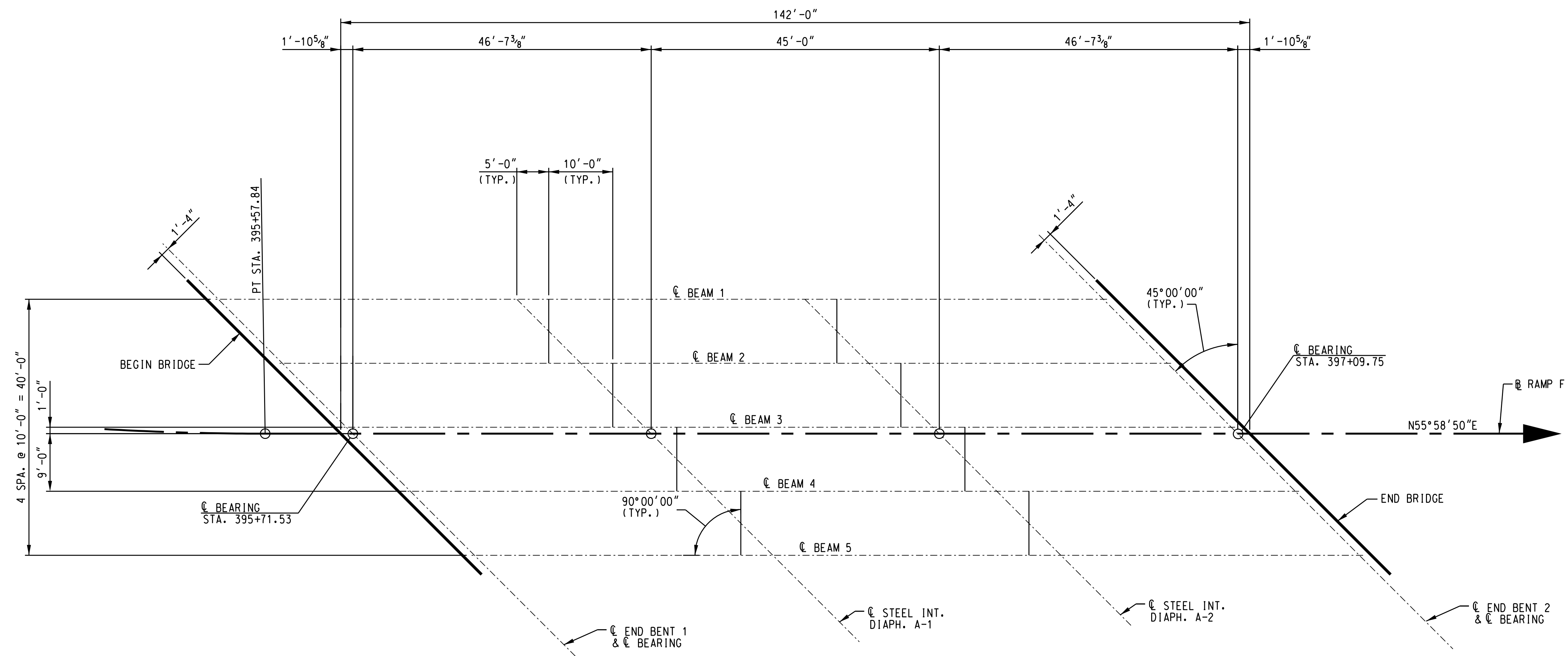
COUNTY RICHLAND

ROUTE RAMP F



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REV.		
REV.		
REVIEWED	WRS	06-22
QUAN.		
DR.	BFS	WRS 05-22
DES.	ALP	WRS 05-22
BY	CHK.	DATE

NOTE:
ALL BEAMS ARE FL-BT-78.



FRAMING PLAN



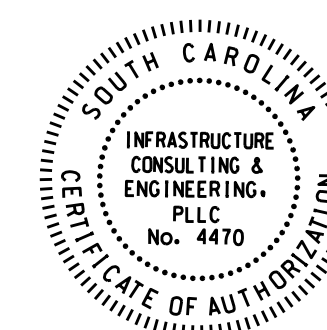
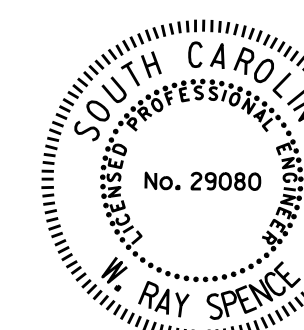
**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

FRAMING PLAN

RAMP F BRIDGE OVER
I-20 CD

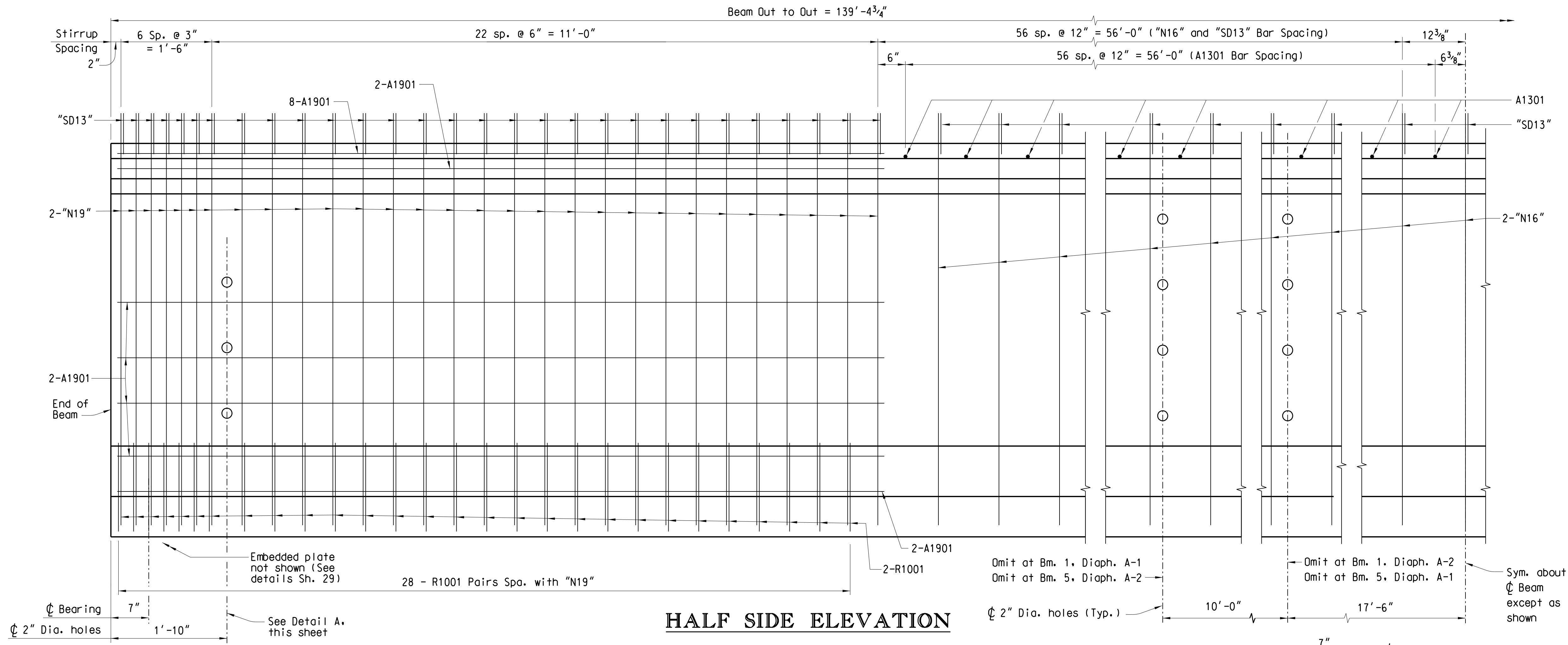
COUNTY RICHLAND

ROUTE RAMP F

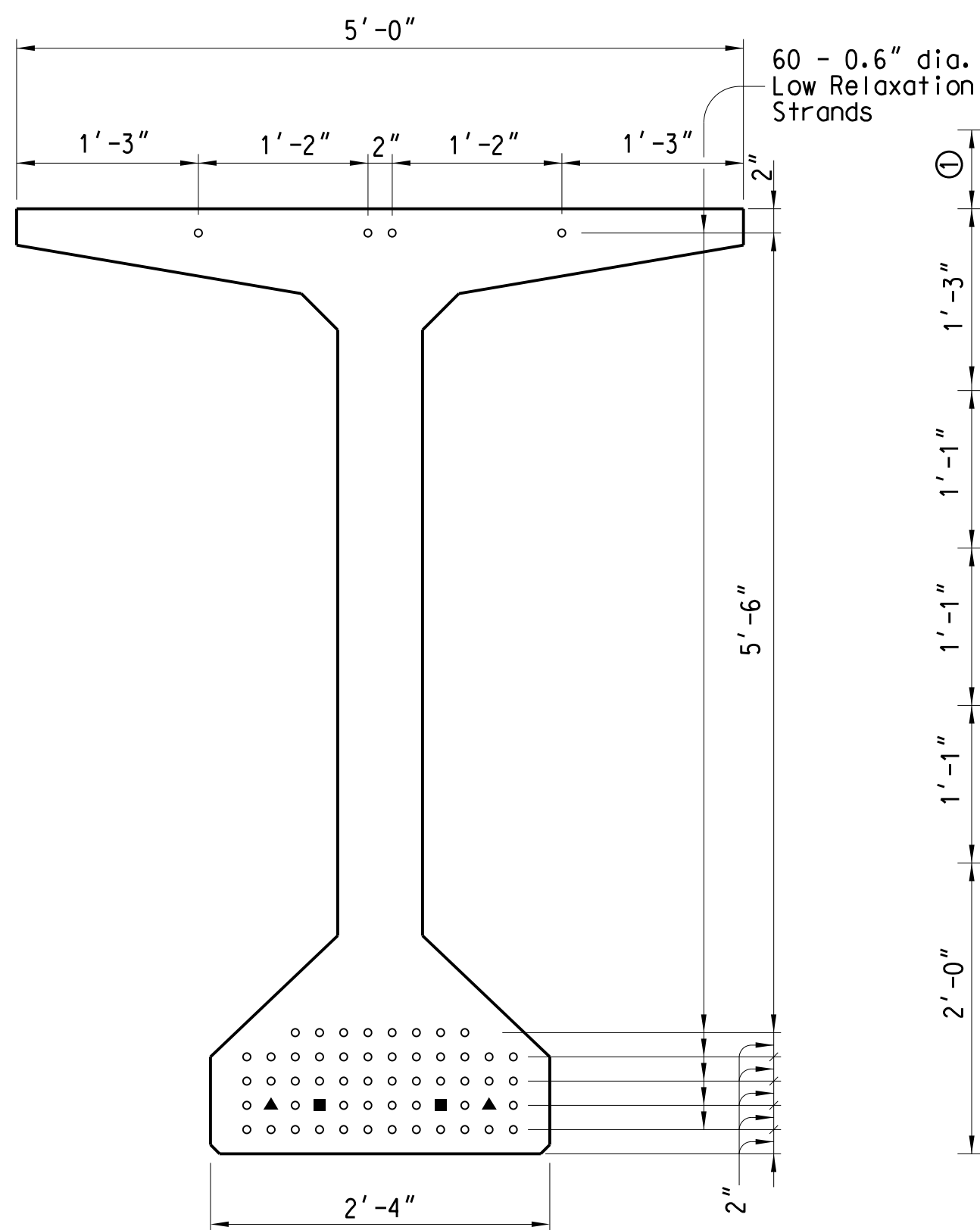


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	RFC PLANS		
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REVIEWED		WRS	06-22
QUAN.			
DR.	RMH	WRS	05-22
DES.	ALP	WRS	05-22
	BY	CHK.	DATE

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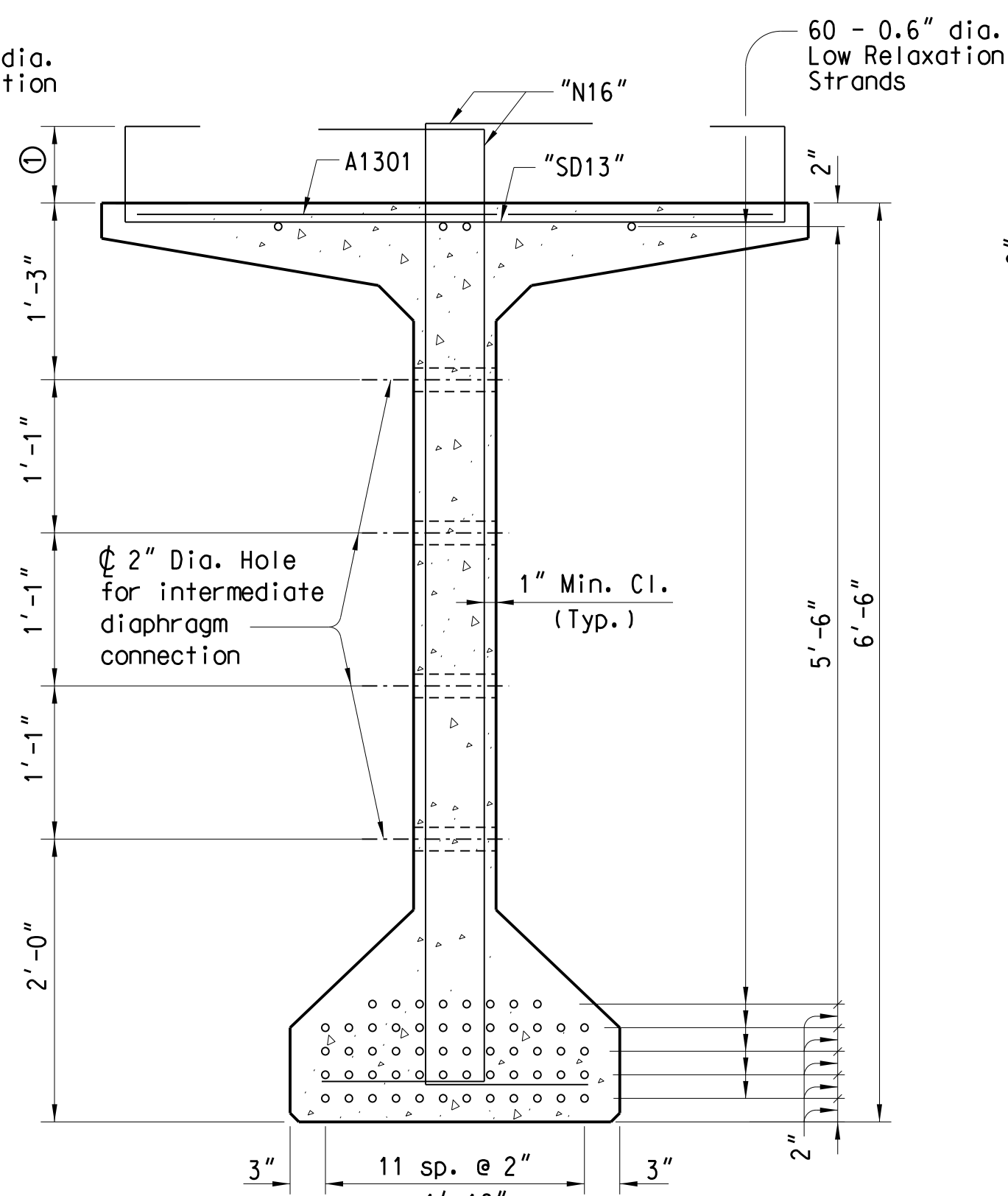


HALF SIDE ELEVATION

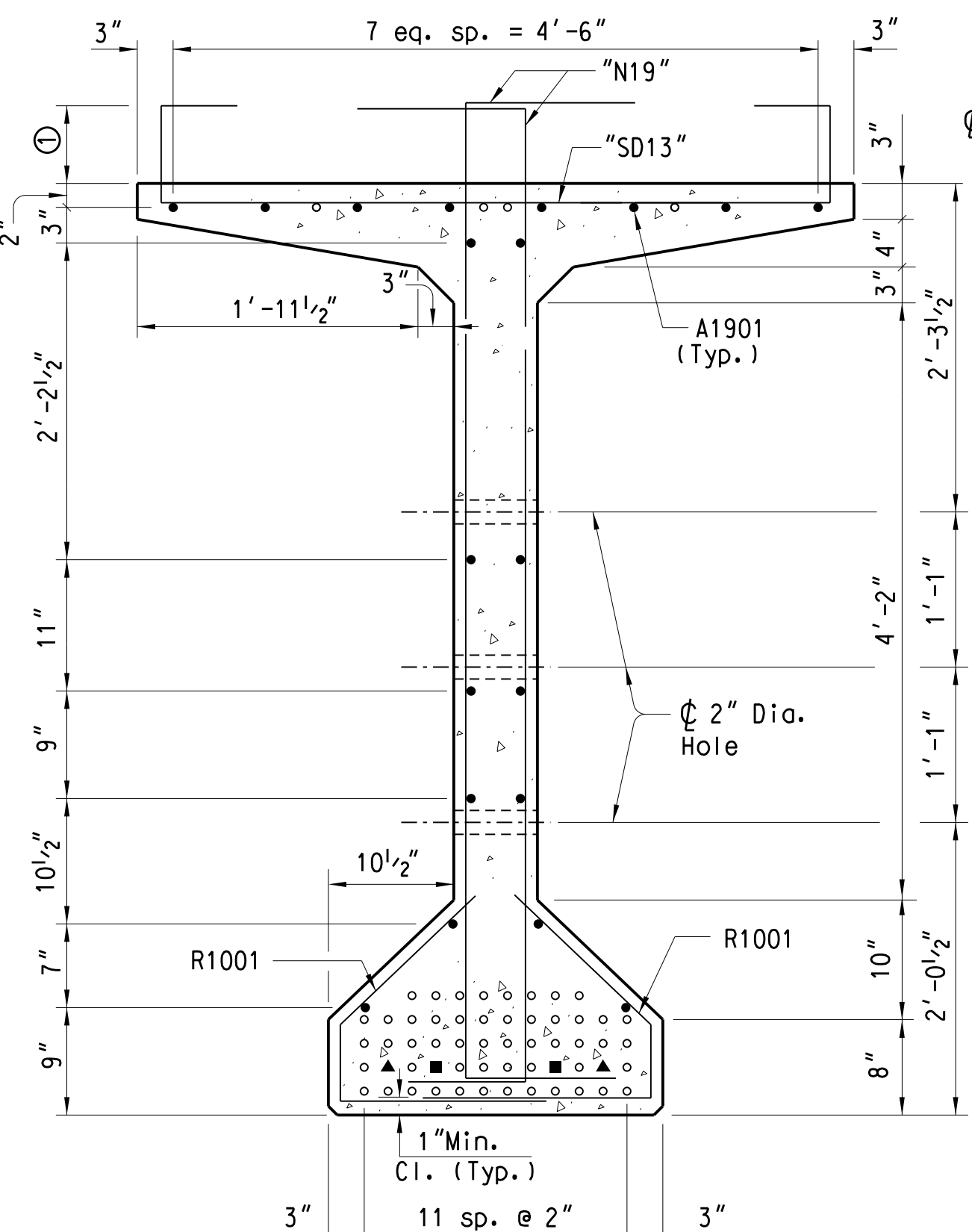


END ELEV.

- ▲ DEBOND LENGTH = 12'-0"
- DEBOND LENGTH = 14'-0"

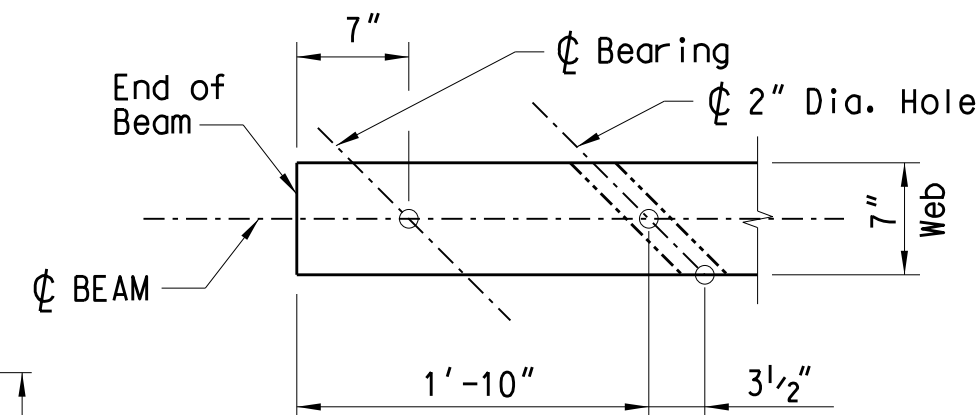


AT CENTER OF BEAM



AT END OF BEAM

SECTIONS THRU BEAM



DETAIL A

DESIGN DATA

Low Relaxation Strands

Tensile Strength (fpu) = 270 ksi

Initial Prestress (0.75 fpu) = 202.5 ksi

Class 9,000 Concrete

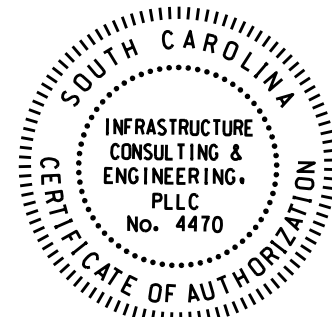
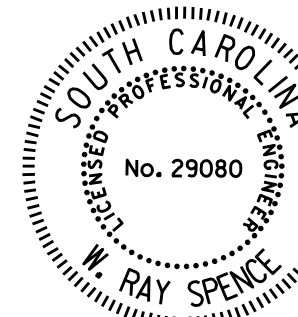
f'c = 9 ksi

f'ci = 7.5 ksi

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 bulb-tee top flanges.

For additional notes and details see "Prestressed Concrete Beam Details FL-BT-78 (2)" Sheet.



REV.	0	WRS	09-22-22
		RFC	PLANS
REV.			
REV.			
REVIEWED	WRS	06-22	
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DR.	ALP	WRS	05-22
DES.	ALP	OPC	05-22
BY	CHK.	DATE	

REINF. STEEL SCHED.

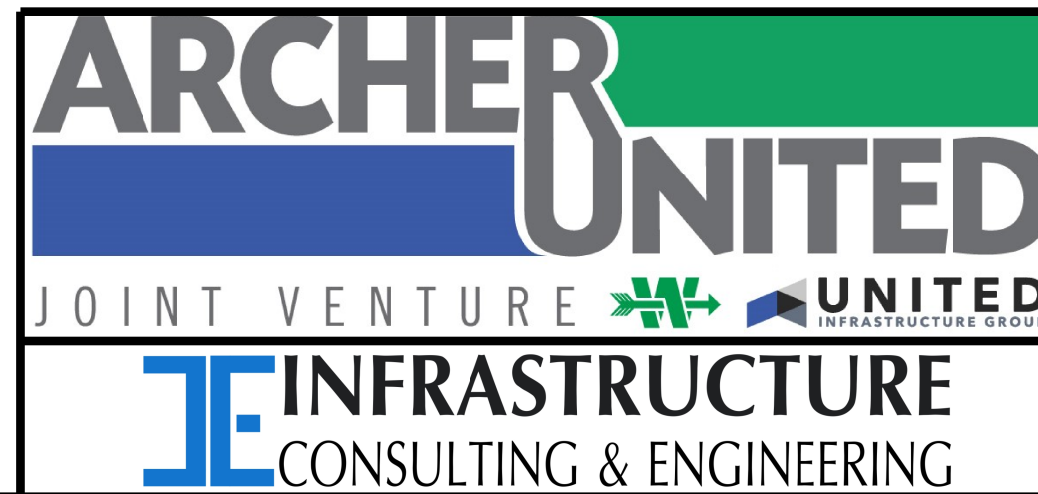
MARK	①	NO. REQ'D	DIMENSION				LENGTH
			"a"	"b"	"c"	"d"	
A1301		114	4'-8"				4'-8"
A1901		40	12'-8"				12'-8"
R1001		112	1'-8"	6 $\frac{1}{2}$ "	1'-4"	11"	3'-7"
N1609	10"	56	10"	7'-1"	1'-0"		8'-11"
N1611	11"	56	10"	7'-2"	1'-0"		9'-0"
N1613	1'-0"	114	10"	7'-3"	1'-0"		9'-1"
N1903	9"	116	1'-0"	7'-0"	1'-0"		9'-0"
SD1307	9"	58	4'-8"	10 $\frac{1}{2}$ "	8"		7'-9"
SD1309	10"	28	4'-8"	11 $\frac{1}{2}$ "	8"		7'-11"
SD1311	11"	28	4'-8"	1'-0 $\frac{1}{2}$ "	8"		8'-1"
SD1313	1'-0"	57	4'-8"	1'-1 $\frac{1}{2}$ "	8"		8'-3"
N1607	9"	56	10"	7'-0"	1'-0"		8'-10"
N1609	10"	56	10"	7'-1"	1'-0"		8'-11"
N1610	10 $\frac{1}{2}$ "	114	10"	7'-1 $\frac{1}{2}$ "	1'-0"		8'-11 $\frac{1}{2}$ "
N1903	9"	116	1'-0"	7'-0"	1'-0"		9'-0"
SD1307	9"	86	4'-8"	10 $\frac{1}{2}$ "	8"		7'-9"
SD1309	10"	28	4'-8"	11 $\frac{1}{2}$ "	8"		7'-11"
SD1310	10 $\frac{1}{2}$ "	57	4'-8"	1'-0"	8"		8'-0"
N1607	9"	226	10"	7'-0"	1'-0"		8'-10"
N1903	9"	116	1'-0"	7'-0"	1'-0"		9'-0"
SD1307	9"	171	4'-8"	10 $\frac{1}{2}$ "	8"		7'-9"
N1605	8"	226	10"	6'-11"	1'-0"		8'-9"
N1901	8"	116	1'-0"	6'-11"	1'-0"		8'-11"
SD1305	8"	171	4'-8"	9 $\frac{1}{2}$ "	8"		7'-7"
N1600	5 $\frac{1}{2}$ "	84	10"	6'-8 $\frac{1}{2}$ "	1'-0"		8'-6 $\frac{1}{2}$ "
N1601	6"	58	10"	6'-9"	1'-0"		8'-7"
N1602	6 $\frac{1}{2}$ "	28	10"	6'-9 $\frac{1}{2}$ "	1'-0"		8'-7 $\frac{1}{2}$ "
N1603	7"	56	10"	6'-10"	1'-0"		8'-8"
N1900	7 $\frac{1}{2}$ "	88	1'-0"	6'-10 $\frac{1}{2}$ "	1'-0"		8'-10 $\frac{1}{2}$ "
N1901	8"	28	1'-0"	6'-11"	1'-0"		8'-11"
SD1300	5 $\frac{1}{2}$ "	42	4'-8"	7"	8"		7'-2"
SD1301	6"	29	4'-8"	7 $\frac{1}{2}$ "	8"		7'-3"
SD1302	6 $\frac{1}{2}$ "	14	4'-8"	8"	8"		7'-4"
SD1303	7"	28	4'-8"	8 $\frac{1}{2}$ "	8"		7'-5"
SD1304	7 $\frac{1}{2}$ "	44	4'-8"	9"	8"		7'-6"
SD1305	8"	14	4'-8"	9 $\frac{1}{2}$ "	8"		7'-7"

QUANTITIES

ITEM	UNIT	ONE BEAM
Concrete, Class 9,000	CY	39.6
Reinforcing Steel	LB	(A)
Prestressing Strands	LF	8,370
Structural Steel	LB	As Necessary

REINFORCING STEEL QUANTITY

	Beam 1	Beam 2	Beam 3	Beam 4	Beam 5
(A)	5,872	5,837	5,799	5,746	5,681



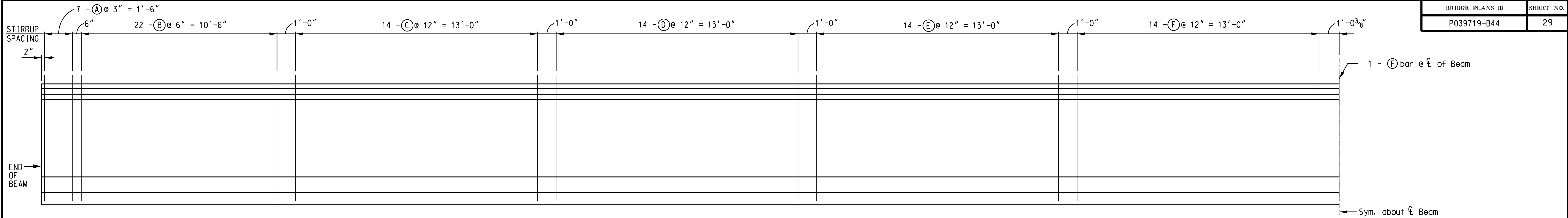
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PRESTRESSED CONCRETE BEAM
DETAILS FL-BT-78 (1)

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND ROUTE RAMP F

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BEAM ELEVATION SHOWING STIRRUP LAYOUT

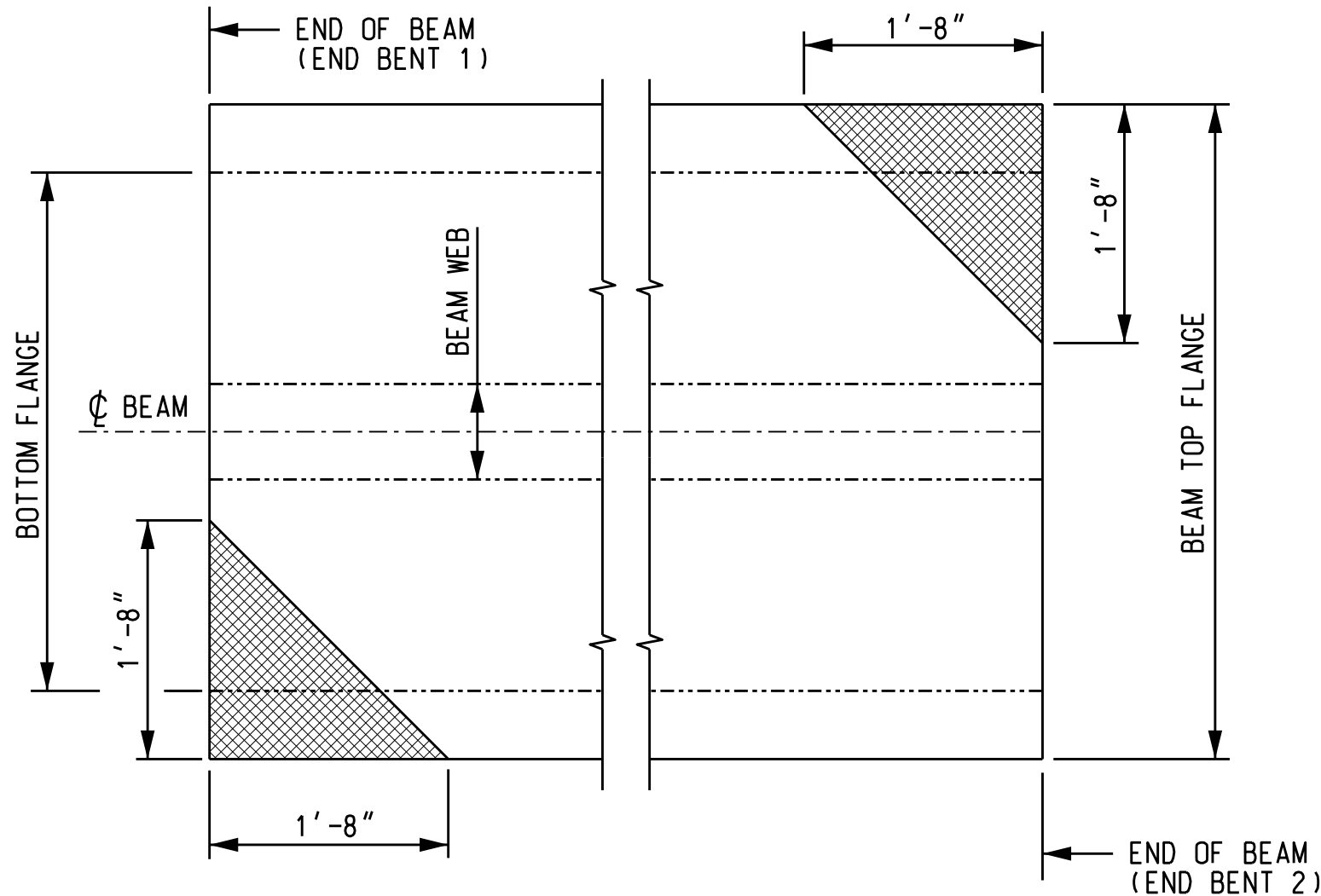
TABLE OF BAR MARKS						
	(A)	(B)	(C)	(D)	(E)	(F)
BEAM 1	N1903 & SD1307	N1903 & SD1307	N1609 & SD1309	N1611 & SD1311	N1613 & SD1313	N1613 & SD1313
BEAM 2	N1903 & SD1307	N1903 & SD1307	N1607 & SD1307	N1609 & SD1309	N1610 & SD1310	N1610 & SD1310
BEAM 3	N1903 & SD1307	N1903 & SD1307	N1607 & SD1307	N1607 & SD1307	N1607 & SD1307	N1607 & SD1307
BEAM 4	N1901 & SD1305	N1901 & SD1305	N1605 & SD1305	N1605 & SD1305	N1605 & SD1305	N1605 & SD1305
BEAM 5 (D.S.)	N1901 & SD1305	N1900 & SD1304	N1603 & SD1303	N1603 & SD1303	N1602 & SD1302	N1601 & SD1301
BEAM 5 (U.S.)	N1901 & SD1305	N1900 & SD1304	N1601 & SD1301	N1600 & SD1300	N1600 & SD1300	N1600 & SD1300

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

* 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.

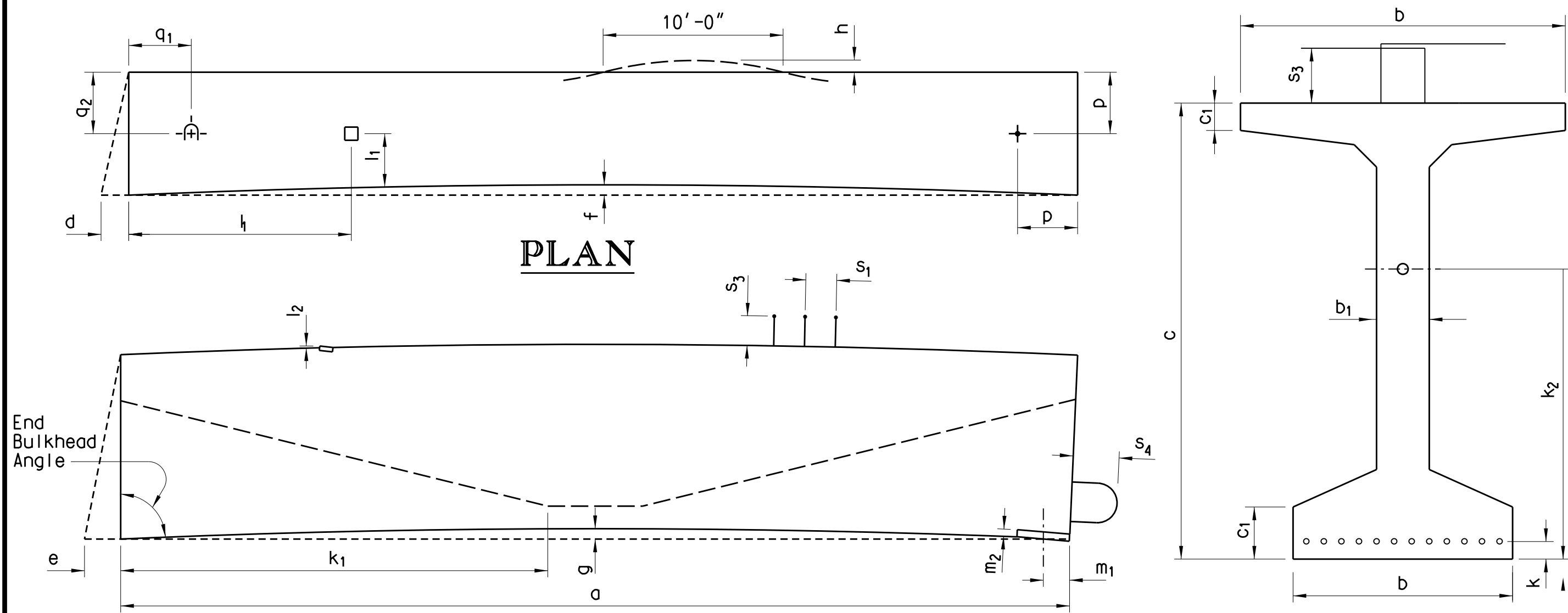
"+" indicates upward movement
"-" indicates downward movement



TOP FLANGE CLIP DETAIL

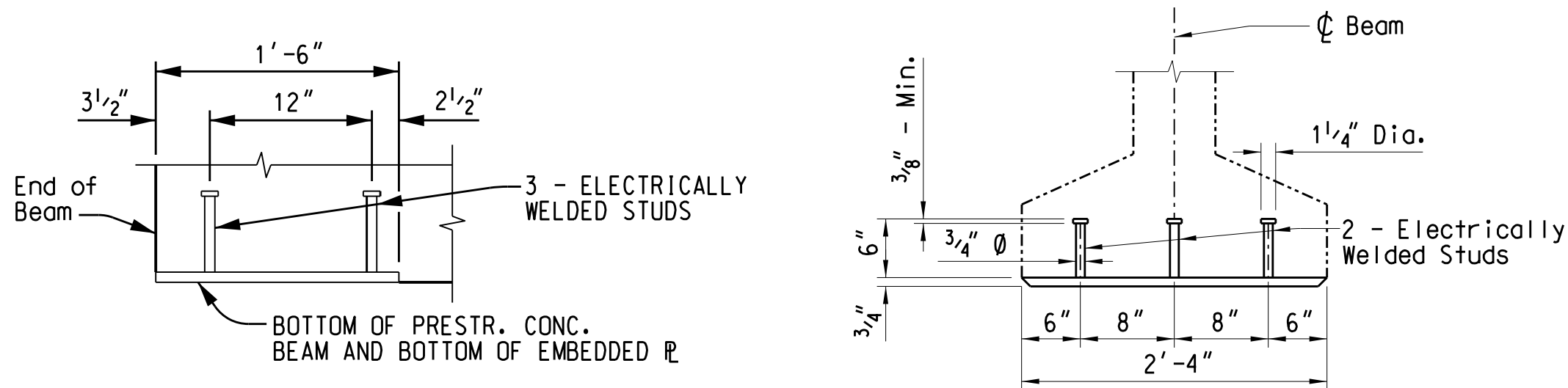
(TYP. EACH BEAM)

TOLERANCES



ELEVATION

CROSS SECTION



ELEV. AT SIDE OF BEAM

ELEV. AT END OF BEAM

EMBEDDED PLATE DETAIL

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 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 60 - 0.6" Dia. low relaxation strands 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 tie bars as shown on this drawing. Form holes with 2" inside dia. pipe and prevent movement during casting by securely fastening the pipe.

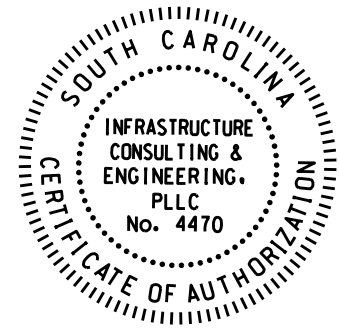
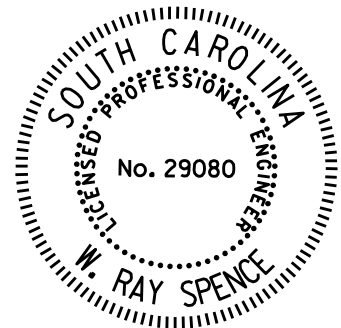
Debonding:

1) For all debonding material, use tubular conduit capable of resisting the pressure exerted by the concrete. When using slit conduit, use two conduits with the slits located on opposite sides of the strand. Use conduit made of high density polyethylene or polypropylene with a minimum thickness of 0.025". Use conduit with an inside diameter that will permit free movement of the encased strand, but no larger than the diameter of the strand plus 1/8". Place conduit on the strand at the location(s) shown on the plans (+/- 1") to prevent bonding of the concrete. Secure conduit to prevent any longitudinal movement along the strand. Prevent concrete from entering the conduit by sealing with tape. Use tape manufactured from a non-corrosive material that is compatible with the concrete, conduit, and steel.

2) Release strands in accordance with Section 704 of the Standard Specifications.

3) Within 48 hours of detensioning, seal the openings between the strands and the sheathing. Use an approved sealant that is made of either epoxy or silicone. If silicone sealant is provided, use a low modulus silicone sealant that is white in color.

a	Length	$\pm 1/4"$ per 25' length, $\pm 1"$ max.
b	Width (overall)	$\pm 3/8"$, $- 1/4"$
b1	Web Width	$\pm 3/8"$, $- 1/4"$
c	Depth (overall)	$\pm 1/2"$, $- 1/4"$
c1	Flange Depth	$\pm 1/4"$
d	Variation from Specified Plan End Squareness or Skew	$\pm 1/8"$ per 12" width, $\pm 1/2"$ max.
e	Variation from Specified Elevation End Squareness or Skew	$\pm 3/16"$ per 12" depth, $\pm 1"$ max.
f	Sweep	$1/8"$ 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)	$\pm 1/8"$ per 10' $\pm 1/2"$ max. up to 80' length $\pm 1"$ max. for length greater than 80'
h	Local Smoothness of Any Surface	$1/4"$ in 10'
k	Location of Strand (Individual)	$\pm 1/4"$
k	Location of Strand (Bundled)	$\pm 1/2"$
k1	Location of Harp Points for Harped Strands from Design Location	$\pm 20"$
k2	Location of Post-Tensioning Duct	$\pm 1/4"$
l1	Location of Embedment	$\pm 1"$
l2	Tipping and Flushness of Embedment	$\pm 1/4"$
m1	Location of Bearing Assembly	$\pm 5/8"$
m2	Tipping and Flushness of Bearing Assembly	$\pm 1/8"$
p	Location of Inserts, Sleeves, or Holes for Structural Connections	$\pm 1/2"$
q1	Location of Handling Device Parallel to Length of Member	$\pm 6"$
q2	Location of Handling Device Transverse to Length of Member	$\pm 1"$
s1	Longitudinal Spacing of Stirrups	$\pm 2"$
s2	Longitudinal Spacing of Stirrups within Distance "c" from Member Ends	$\pm 1"$
s3	Stirrup Projection from Beam Surface	$\pm 1/4"$, $- 1/2"$
s4	Reinforcing Bar Projection from Beam End	$\pm 1/2"$



REV.	WRS	09-22-22
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REV.		
REV.		
REVIEWED	WRS	06-22
QUAN.		
DR.	ALP	WRS 05-22
DES.	ALP	OPC 05-22
BY	CHK.	DATE



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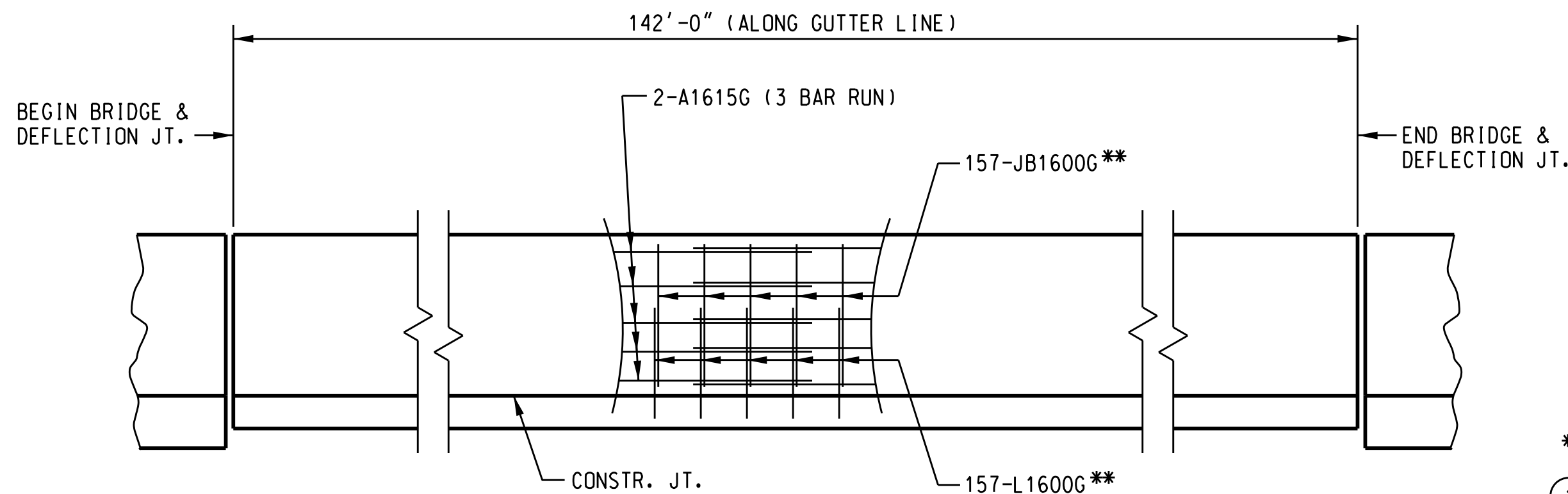
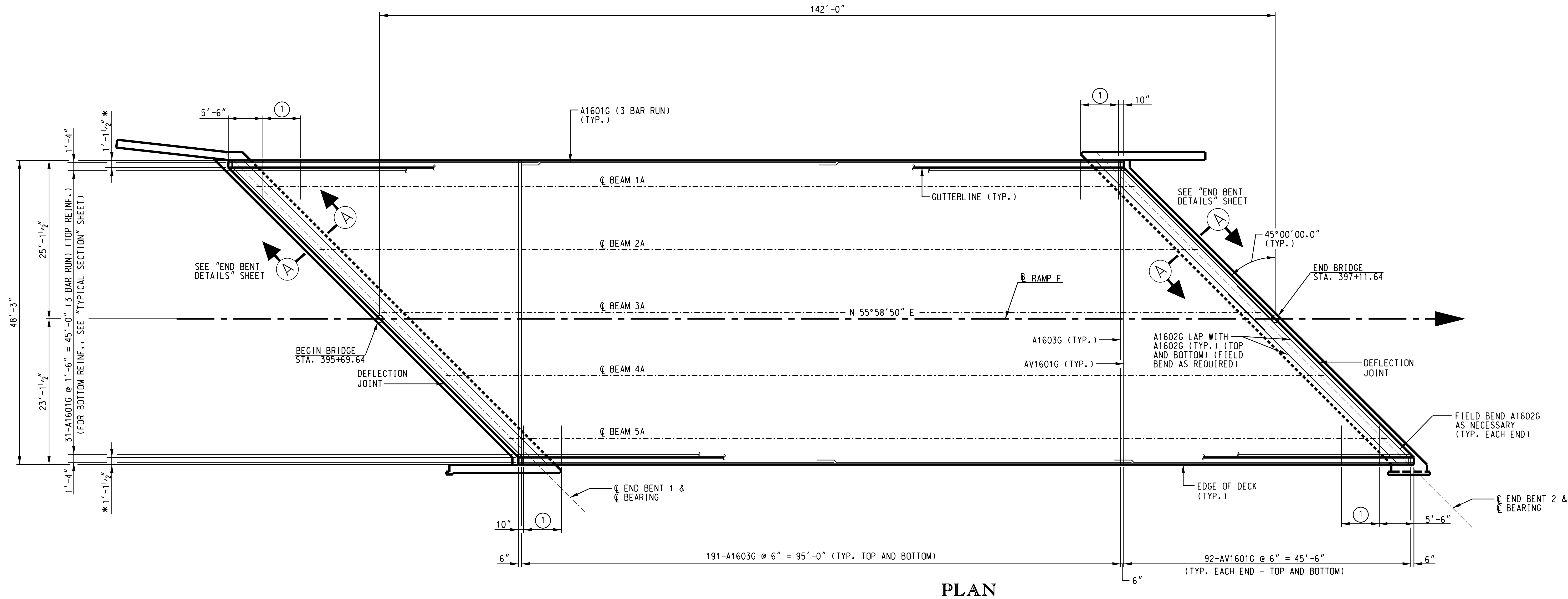
PRESTRESSED CONCRETE BEAM
DETAILS FL-BT-78 (2)

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND

ROUTE RAMP F

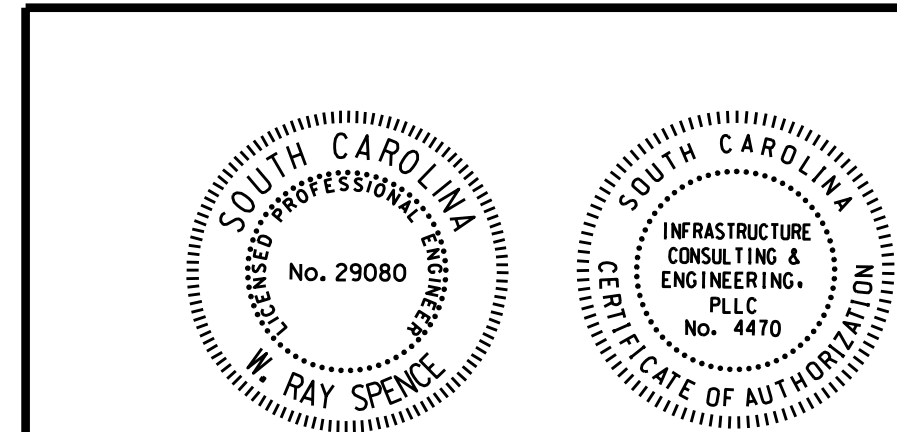
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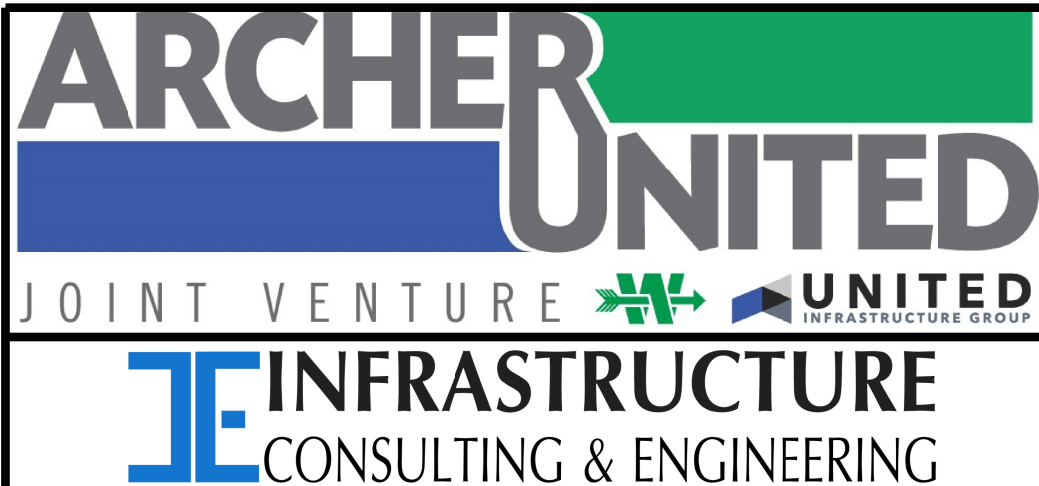
MASH BARRIER PARAPET ELEVATION

- NOTES:
- ALL BENTS ARE PARALLEL.
 - * INCLUDES 1'-0" MASH BARRIER PARAPET & 1 1/2" SLAB EXTENSION.
 - ** SEE MASH BARRIER SHEETS FOR SPACING.
 - ① 13-B1600G @ 6" = 6'-0" TOP

ESTIMATED QUANTITIES - SUPERSTRUCTURE		
ITEM	UNIT	QUANTITY
2.0" SCHEDULE 80 PVC CONDUIT	LF	568.0
CONCRETE FOR STRUCTURES - CLASS 4000	CY	393.7
GROOVED SURFACE FINISH	SY	708
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	13,929
GALVANIZED REINFORCING STEEL (BRIDGE)	LBS.	50,520
PRESTRESSED CONCRETE BULB TEE BEAM (FL-BT-78)	LF	697.0
42" MASH CONCRETE BARRIER PARAPET	LF	284.0

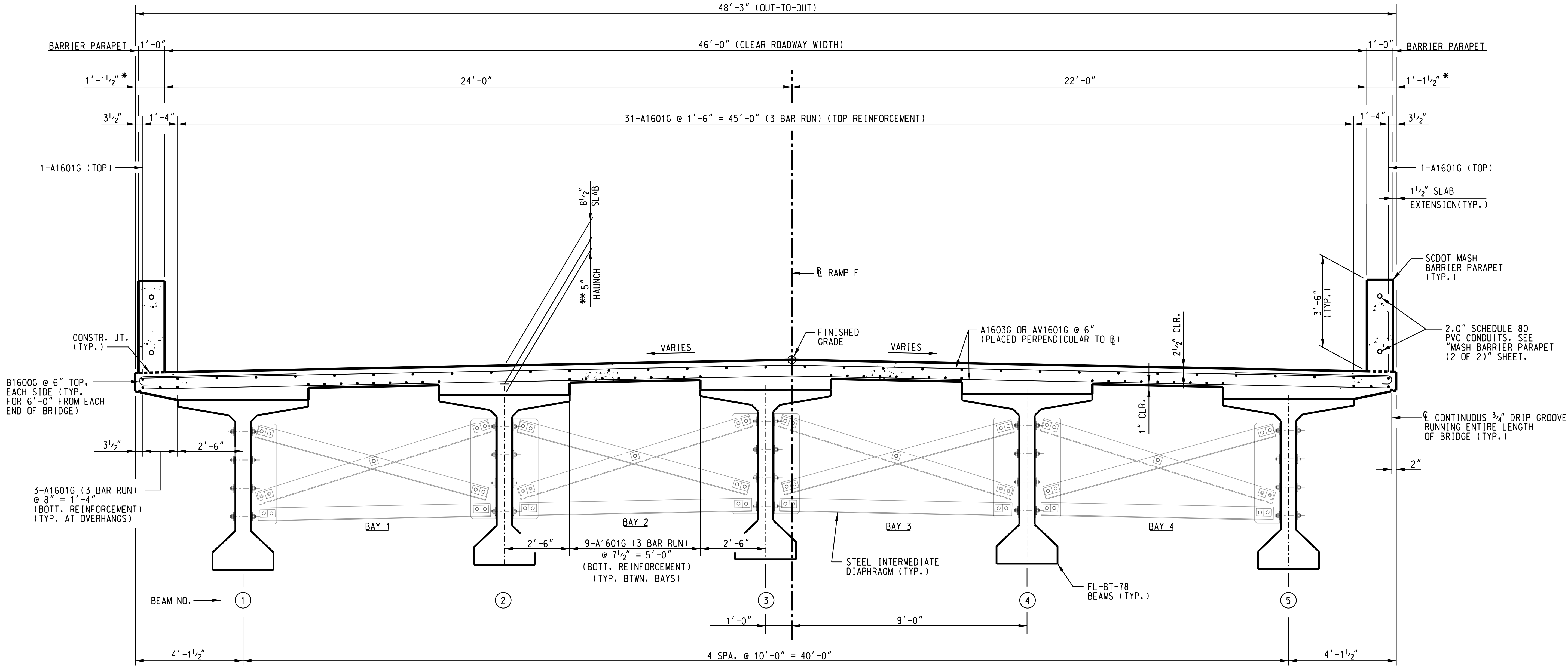


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REVIEWED	WRS	06-22	
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DR.	BFS	WRS	05-22
DES.	ALP	WRS	05-22
BY	CHK.	DATE	

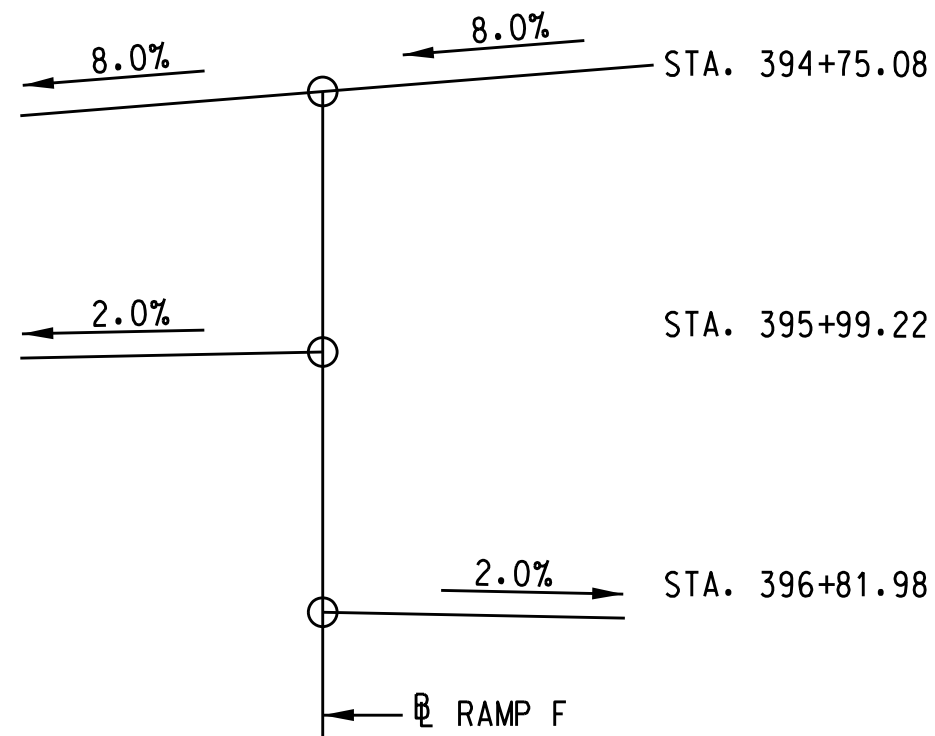


SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PLAN OF SPANS	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F

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TYPICAL SECTION
(LOOKING IN DIRECTION OF STATIONING)

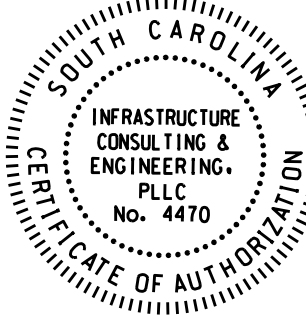


SUPERELEVATION TRANSITION DATA

NOTE:
REINFORCING STEEL IN DECK AND BARRIERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE RFP.

* 1'-0" MASH BARRIER PARAPET WITH 1 1/2" SLAB EXTENSION

** MEASURED AT \bar{C} BEARING. VARIES THROUGHOUT SPAN TO COMPENSATE FOR VARIATIONS IN CAMBER.



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QUAN.			
DR.	BFS	WRS	05-22
DES.	ALP	WRS	05-22
BY	CHK.	DATE	



INFRASTRUCTURE
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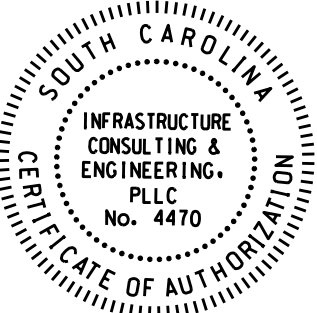
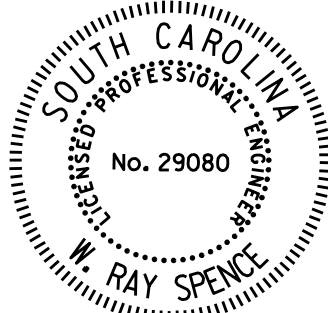
TYPICAL SECTION

RAMP F BRIDGE OVER
I-20 CD

COUNTY	RICHLAND	ROUTE	RAMP F
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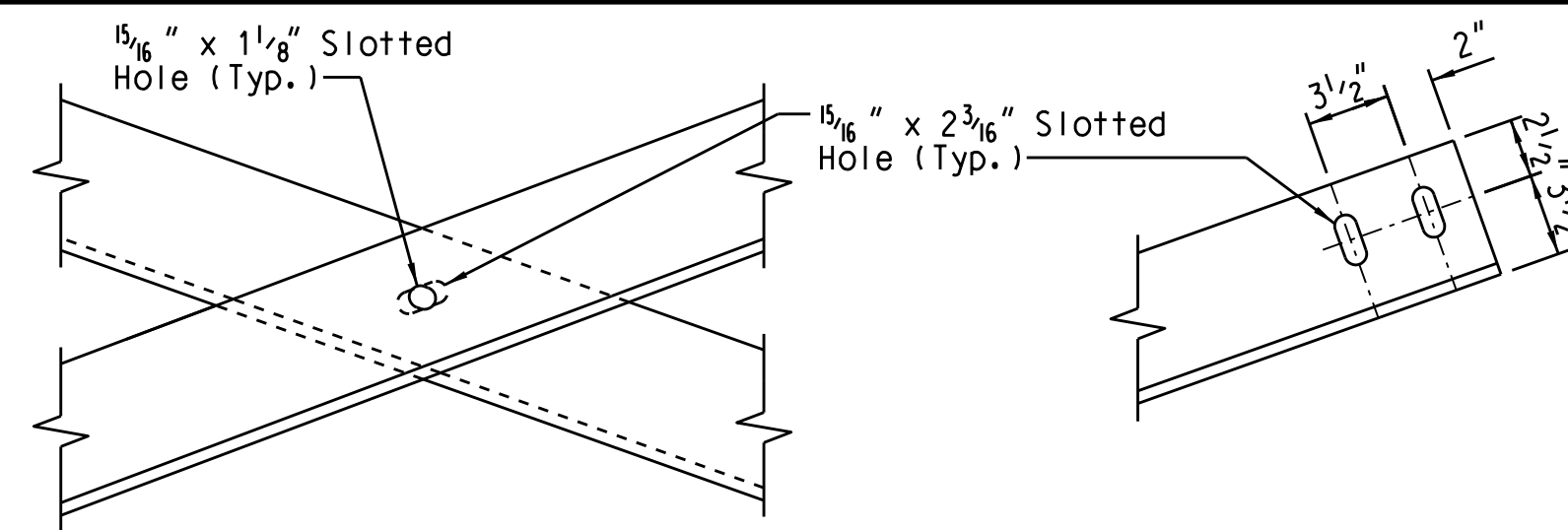
SUPERSTRUCTURE								
REINFORCING STEEL SCHEDULE								
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
SLAB	A1601G	225	48'-10"	-----	-----	-----	-----	48'-10"
END BENT	A1602G	16	37'-11"	-----	-----	-----	-----	37'-11"
SLAB	A1603G	382	47'-9"	-----	-----	-----	-----	47'-9"
END BENT	A1604	56	37'-11"	-----	-----	-----	-----	37'-11"
END BENT	A1605	32	12'-10"	-----	-----	-----	-----	12'-10"
END BENT	A1606	8	6'-7"	-----	-----	-----	-----	6'-7"
END BENT	A1607	16	10'-4"	-----	-----	-----	-----	10'-4"
END BENT	A1608	4	3'-6"	-----	-----	-----	-----	3'-6"
END BENT	A1609	16	6'-6"	-----	-----	-----	-----	6'-6"
END BENT	A1610	8	5'-4"	-----	-----	-----	-----	5'-4"
END BENT	A1611	24	10'-3"	-----	-----	-----	-----	10'-3"
END BENT	A1612	4	7'-2"	-----	-----	-----	-----	7'-2"
END BENT	A1613	8	3'-8"	-----	-----	-----	-----	3'-8"
END BENT	A1614	14	7'-5"	-----	-----	-----	-----	7'-5"
BARRIER	A1615G	60	49'-0"	-----	-----	-----	-----	49'-0"
END BENT	A2200	12	37'-4"	-----	-----	-----	-----	37'-4"
SLAB	AV1601G	368	24'-0"	1'-3"	46'-9"	0'-6"	-----	24'-0"
SLAB	B1600G	52	6'-0"	0'-7"	-----	-----	-----	6'-7"
WINGWALL 2	C1301	19	1'-2"	0'-8"	-----	-----	-----	1'-10"
END BENT	C1600	14	5'-9 7/8"	2'-0"	-----	-----	-----	7'-10"
WINGWALL 2 & 3	C1601	33	3'-9"	1'-6"	-----	-----	-----	5'-3"
END BENT	C1900G	104	6'-0"	2'-10"	-----	-----	-----	8'-10"
WINGWALL 1	F1600	18	17'-8 1/2"	2'-2 7/8"	2'-2 3/8"	0'-4 5/8"	-----	19'-11"
WINGWALL 1	F2500	18	17'-9 1/2"	2'-11 1/8"	2'-10 5/8"	0'-6 1/8"	-----	20'-9"
END BENT	FA1900G	134	3'-0"	1'-0"	0'-8 1/2"	0'-8 1/2"	0'-8"	4'-8"
WINGWALL 2	FB1600	19	17'-4 1/2"	0'-10"	0'-7 1/8"	0'-7 1/8"	-----	18'-2"
WINGWALL 3	FB1601	19	19'-4 1/2"	0'-10"	0'-7 1/8"	0'-7 1/8"	-----	20'-2"
WINGWALL 2	FB2500	19	16'-6"	1'-7"	1'-1 1/2"	1'-1 1/2"	-----	18'-1"
WINGWALL 3	FB2501	19	18'-6"	1'-7"	1'-1 1/2"	1'-1 1/2"	-----	20'-1"
END BENT	J1600	80	4'-4"	3'-11"	-----	-----	-----	12'-2"
END BENT	J1601	112	4'-2"	6'-3"	-----	-----	-----	16'-8"
WINGWALLS	J1602	57	0'-11"	6'-9"	-----	-----	-----	14'-5"
BARRIER	JB1600G	314	0'-5 3/4"	3'-2"	0'-7 1/4"	-----	-----	6'-10"
BARRIER	L1600G	314	1'-0"	2'-7"	0'-6 1/2"	2'-7"	-----	6'-9"
END BENT	N1600	112	0'-10"	5'-2 1/4"	4'-6"	-----	-----	10'-6"
END BENT	R1600	14	5'-9 7/8"	1'-4 5/8"	0'-11"	0'-7 3/4"	-----	8'-2"
SBU 1" AS NECESSARY								
BBU 2 1/2" AS NECESSARY								



REV.	WRS	09-22-22
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REV.		
REVIEWED	WRS	06-22
QUAN.		
DR.	RMH	WRS 04-22
DES.		
	BY	CHK. DATE



SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
SUPERSTRUCTURE REINFORCEMENT SCHEDULE	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F



Note: Bolts, nuts, and washers not shown for clarity.



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

Technical drawing of a vertical plate with the following dimensions and labels:

- Top width: 6"
- Left side height: 3'-10"
- Right side height segments: 2 1/2", 1'-4", 1'-4", 1'-4", 2 1/2"
- Bottom width segments: 2 1/2", 3 1/2"
- Labels:
 - $1/2'' \times 1'-0'' \times 6''$ Bent PL (pointing to the top flange)
 - $\phi 1 1/16'' \times 2 1/2''$ Slotted hole (Typ.) (pointing to one of the four slots)

Technical drawing of a bent plate. The plate has a total width of 1'-0" and a total height of 3'-10". The width is divided into three sections: 5" on the left, 3 1/2" in the middle, and 3 1/2" on the right. The height is divided into three sections: 1" at the top, 27" in the middle, and 1" at the bottom. A force vector **B** is applied to the left edge, pointing downwards. The plate is labeled "Bent PL" with a dimension of 1/2" x 1'-0" x 6".

Technical drawing of a bent plate with dimensions and labels:

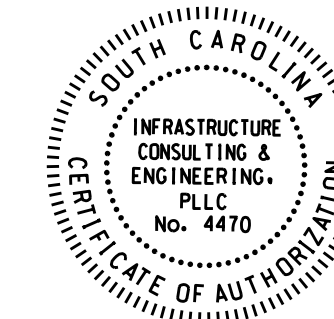
- Top Left:** $\phi \frac{15}{16}'' \times 1\frac{1}{8}''$ Slotted hole (Typ.)
- Top Center:** $\phi \frac{15}{16}'' \times 1\frac{1}{8}''$ Slotted hole (Typ.)
- Top Right:** $\frac{1}{2}'' \times 1'-0'' \times 6''$ Bent PL
- Dimensions:**
 - Top width: $1'-0''$ (total), $3\frac{1}{2}''$ (left), $3\frac{1}{2}''$ (right), $5''$ (center gap)
 - Left side height: $4\frac{3}{4}''$ (top), $2'-3\frac{7}{8}''$ (middle), $7\frac{7}{8}''$ (bottom), $4\frac{1}{2}''$ (bottom)
 - Right side height: $3'-10''$
 - Bottom width: $2\frac{1}{2}''$ (left), $3\frac{1}{2}''$ (center), $6''$ (right)
 - Internal offsets: $1''$ (multiple locations)
- Labels:** **B** (multiple locations, indicating bending direction)


Ø 1 $\frac{1}{16}$ " x 2 $\frac{1}{2}$ "
Slotted hole (Typ.)

Technical drawings of two square plates:

- Left Plate:** A square plate with a side length of 4". It has a central hole with a diameter of $\phi 1\frac{1}{16}$ " Dia. The plate is $\frac{1}{2}$ " thick. The hole is centered, with 2" dimensions shown from the center to the edges.
- Right Plate:** A square plate with a side length of $3\frac{1}{2}$ ". It has a central hole with a diameter of $\phi 1\frac{5}{16}$ " Dia. The plate is $\frac{1}{2}$ " thick. The hole is centered, with $1\frac{3}{4}$ " dimensions shown from the center to the edges.

$\frac{1}{2}$ " Bent Cross
Frame Connection

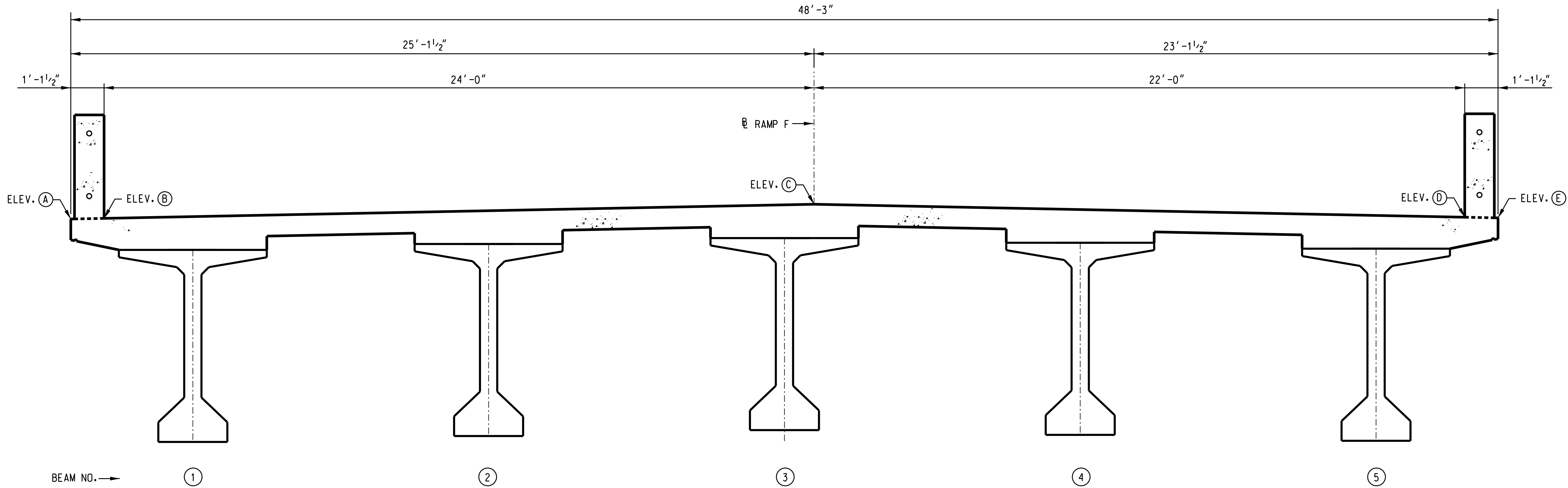


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	COUNTY	RICHLAND	ROUTE	RAMP F
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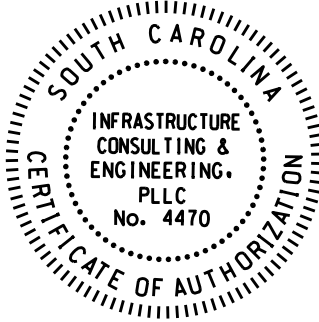


TOP OF SLAB ELEVATIONS
(LOOKING IN DIRECTION OF STATIONING)

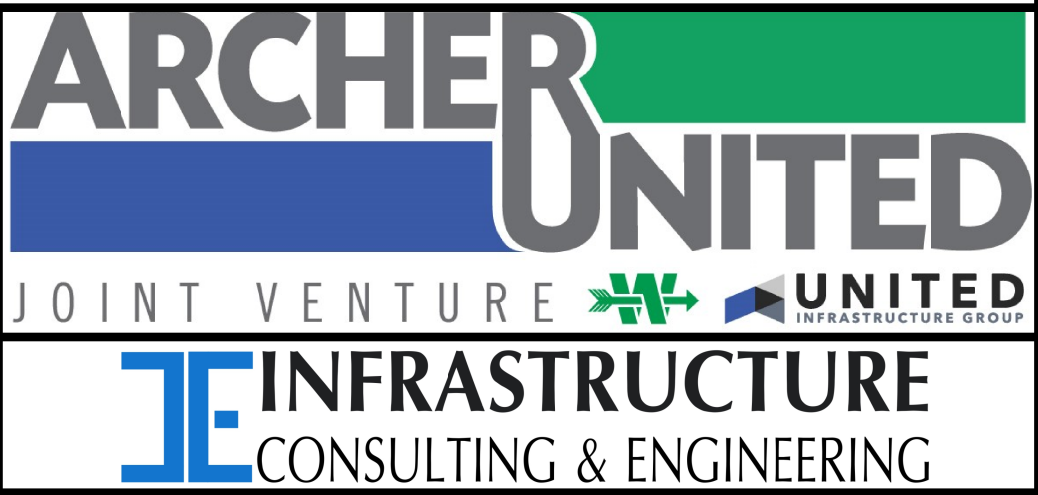
TOP OF SLAB ELEVATIONS					
STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E
395+45.00	320.806	320.857	—	—	—
395+50.00	320.948	320.997	—	—	—
395+55.00	321.087	321.134	—	—	—
395+60.00	321.223	321.267	—	—	—
395+65.00	321.355	321.397	—	—	—
395+69.64	321.475	321.514	322.337	—	—
395+70.00	321.484	321.523	322.342	—	—
395+75.00	321.610	321.645	322.406	—	—
395+80.00	321.732	321.765	322.468	—	—
395+85.00	321.850	321.880	322.525	—	—
395+90.00	321.965	321.993	322.580	—	—
395+95.00	322.077	322.102	322.631	323.116	323.140
396+00.00	322.176	322.198	322.678	323.110	323.132
396+05.00	322.220	322.242	322.722	323.101	323.120
396+10.00	322.260	322.283	322.763	323.088	323.105
396+15.00	322.297	322.320	322.800	323.072	323.086
396+20.00	322.331	322.353	322.833	323.052	323.064
396+25.00	322.361	322.384	322.864	323.030	323.038
396+30.00	322.388	322.410	322.890	323.003	323.009
396+35.00	322.411	322.434	322.914	322.973	322.976
396+40.00	322.431	322.454	322.934	322.940	322.940
396+45.00	322.448	322.470	322.950	322.903	322.901
396+50.00	322.460	322.483	322.963	322.863	322.858

STATIONS IN TABLE ARE ALONG RAMP F

TOP OF SLAB ELEVATIONS					
STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E
396+55.00	322.470	322.493	322.973	322.819	322.812
396+60.00	322.476	322.499	322.979	322.772	322.762
396+65.00	322.479	322.501	322.981	322.722	322.709
396+70.00	322.478	322.500	322.980	322.668	322.652
396+75.00	322.474	322.496	322.976	322.610	322.592
396+80.00	322.466	322.488	322.968	322.549	322.528
396+85.00	322.455	322.477	322.957	322.517	322.495
396+90.00	—	—	322.943	322.503	322.480
396+95.00	—	—	322.926	322.486	322.464
397+00.00	—	—	322.910	322.470	322.448
397+05.00	—	—	322.894	322.454	322.431
397+10.00	—	—	322.877	322.437	322.415
397+11.64	—	—	322.872	322.432	322.409
397+15.00	—	—	—	322.421	322.399
397+20.00	—	—	—	322.405	322.382
397+25.00	—	—	—	322.388	322.366
397+30.00	—	—	—	322.372	322.350



REV.	0	WRS	09-22-22
REV.		RFC	PLANS
REV.			
REV.			
REVIEWED	WRS	06-22	
QUAN.			
DR.	ALP	WRS	05-22
DES.			
BY	CHK.	DATE	

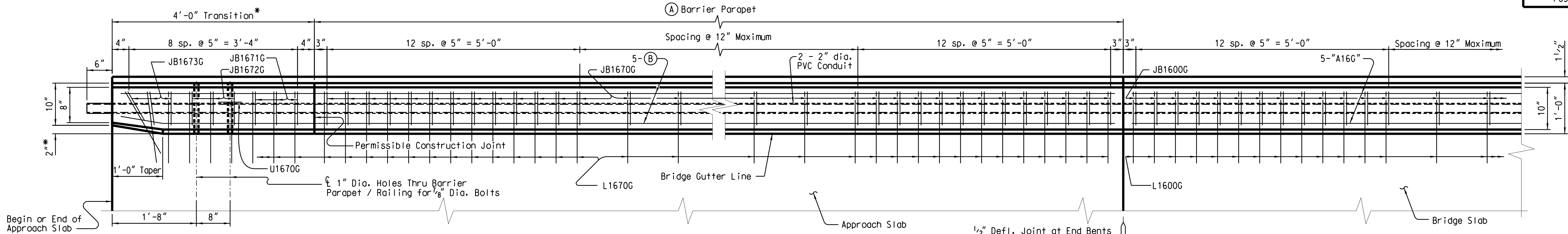


SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

TOP OF SLAB ELEVATIONS

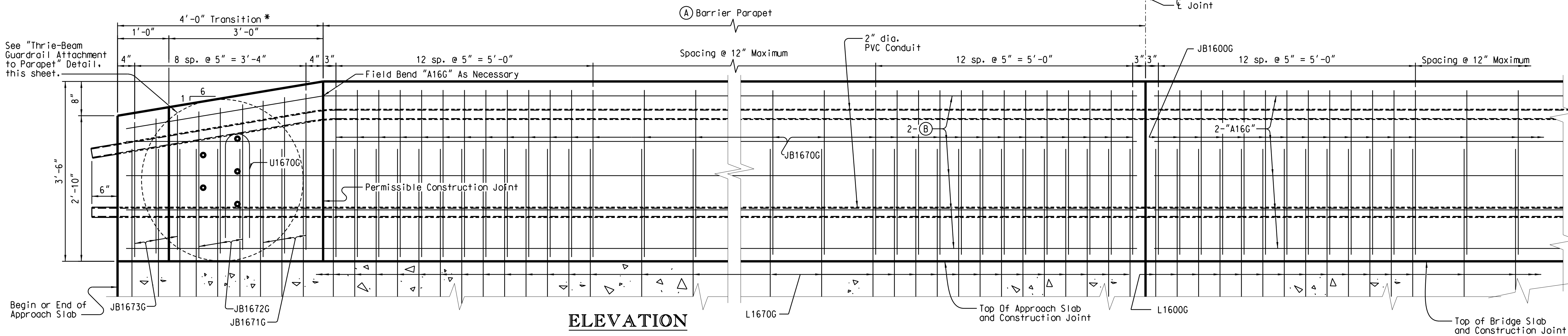
RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND ROUTE RAMP F

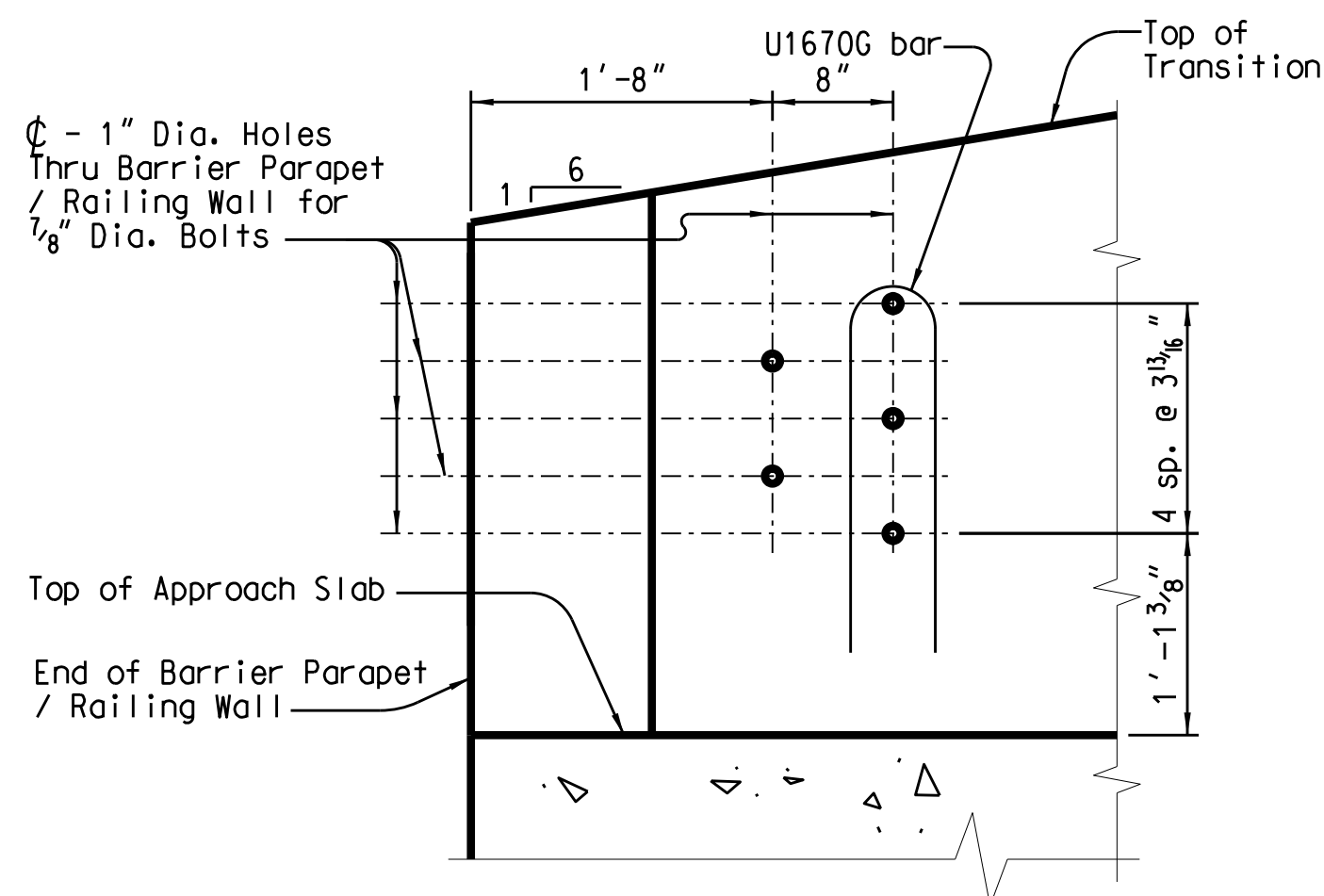


* Downward Taper and Guardrail Attachment Details shall only be provided at Proposed Guardrail Location (Approach Slabs 1 and 2 Left). Omit Guardrail Attachment Details and provide Upward Taper at Barrier / Moment Slab Locations (Approach Slabs 1 and 2 Right). See "Transition to Barrier with Moment Slab" Detail, this sheet.

PLAN



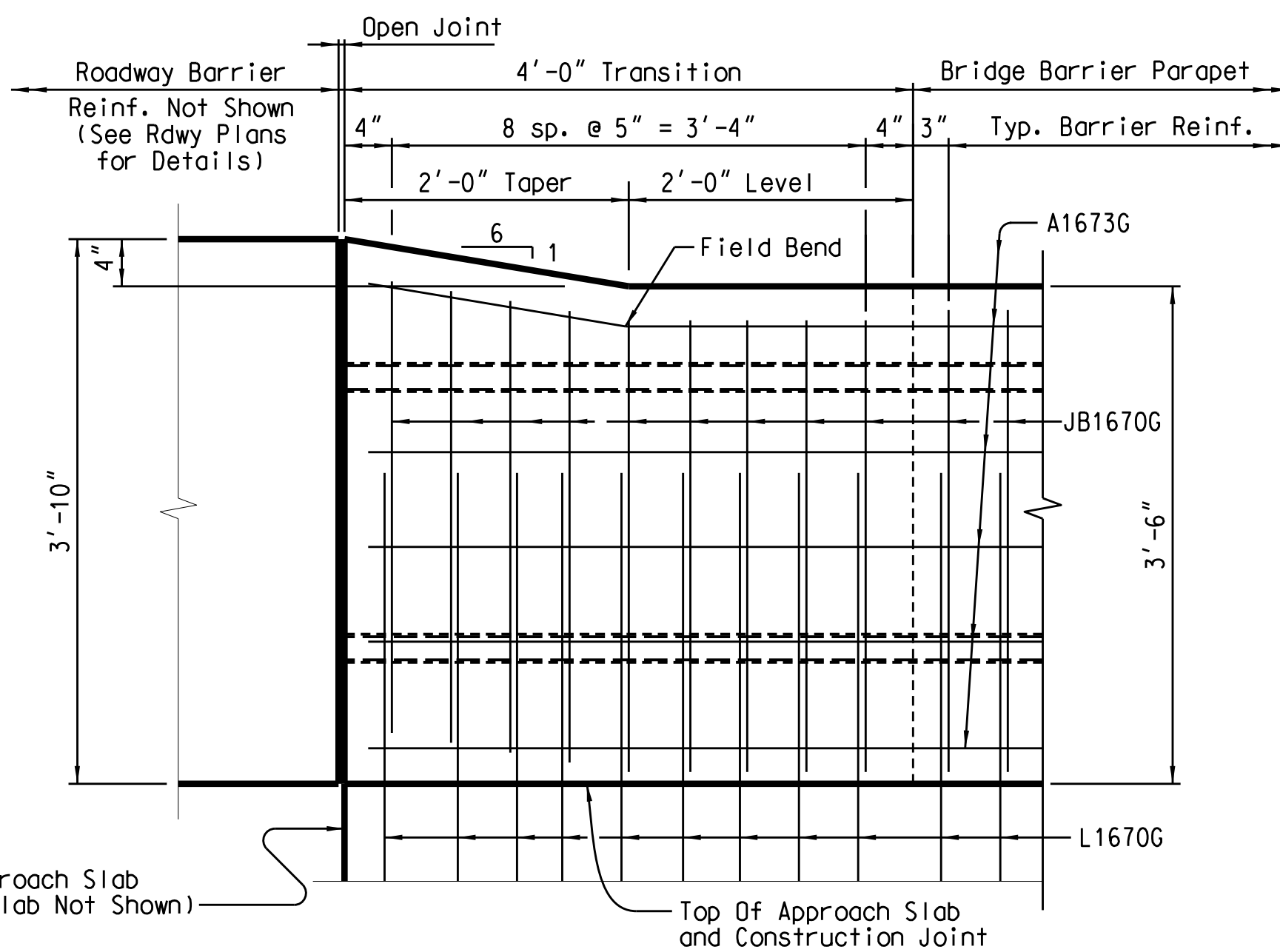
ELEVATION



THRIE-BEAM GUARDRAIL
ATTACHMENT TO PARAPET*

Required at Approach Slabs 1 and 2 (Left)

Form the 1" dia. holes with plastic pipe, PVC pipe, or galvanized standard weight steel pipe having an I.D. of 1". All pipe to remain in place when forms are removed. RCE to verify location of the holes to insure that the guardrail shoe will fit properly when installed.



TRANSITION TO BARRIER WITH MOMENT SLAB

Required at Approach Slabs 1 and 2 (Right)

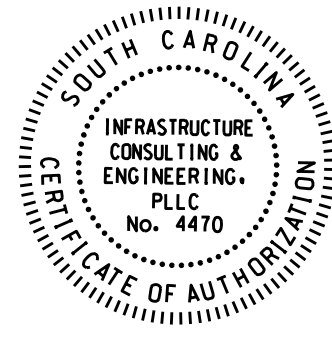
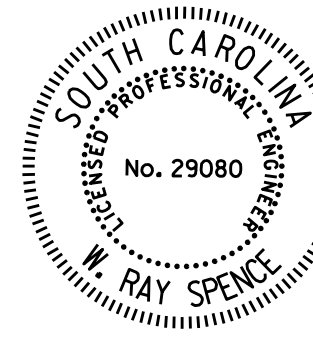
Location	(A)	(B)
Appr. Slab 1 (Left)	20'-6 3/4" **	A1672G
Appr. Slab 1 (Right)	20'-9 1/16"	A1673G
Appr. Slab 2 (Left)	16'-0"	A1672G
Appr. Slab 2 (Right)	11'-1 1/2"	A1673G

** Along Gutter Line

Notes:

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.

Splice "A16G" bars 2'-7" Min. where necessary.



REV.	WRS	09-22-22
0	RFC	PLANS
REV.		
REV.		
REVIEWED	WRS	06-22
QUAN.		
DR.	PCW	HL 10-19
DES.	PCW	MCCA 10-19
BY	CHK.	DATE



INFRASTRUCTURE
CONSULTING & ENGINEERING

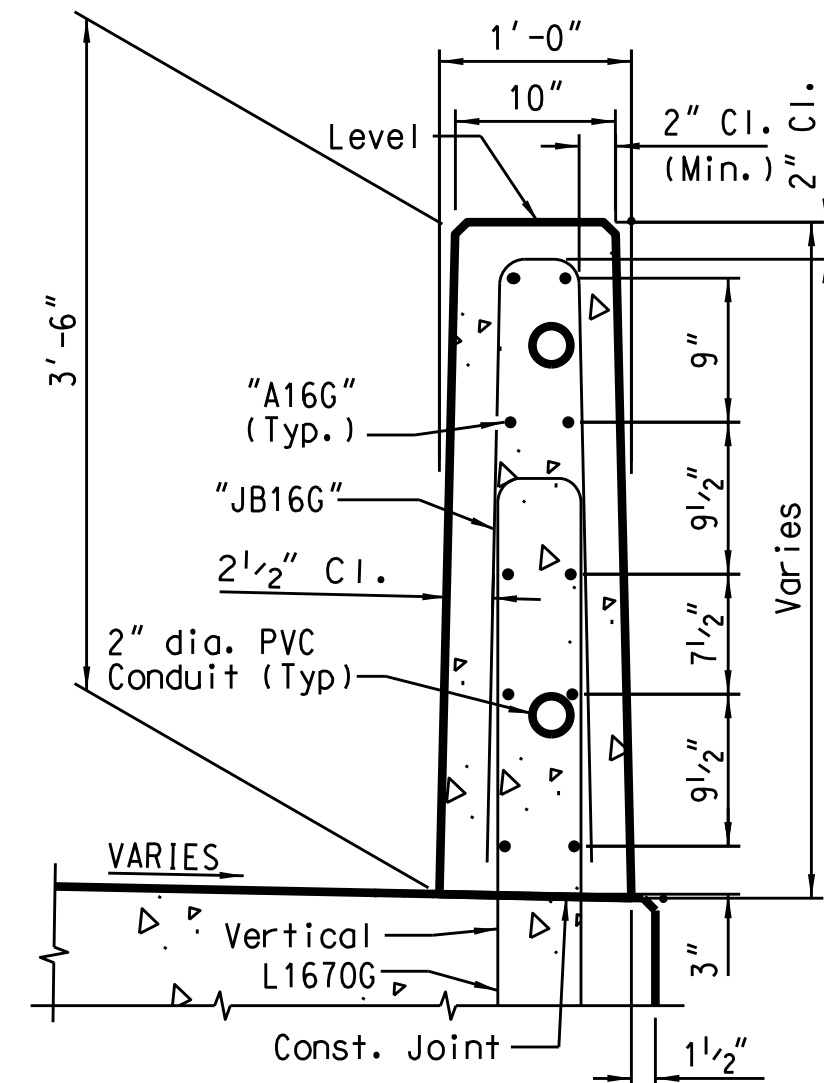
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MASH BARRIER PARAPET (1 OF 2)

RAMP F BRIDGE OVER
I-20 CD

COUNTY
RICHLAND

ROUTE
RAMP F

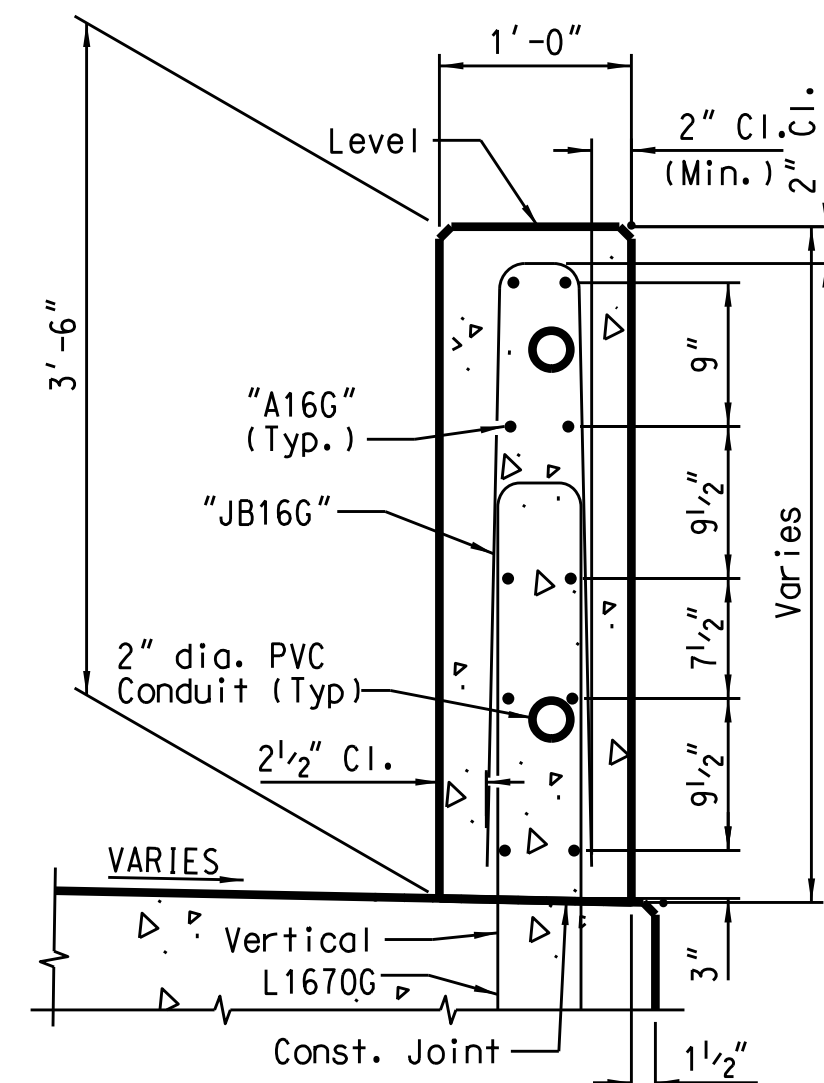


SECTION THRU BARRIER

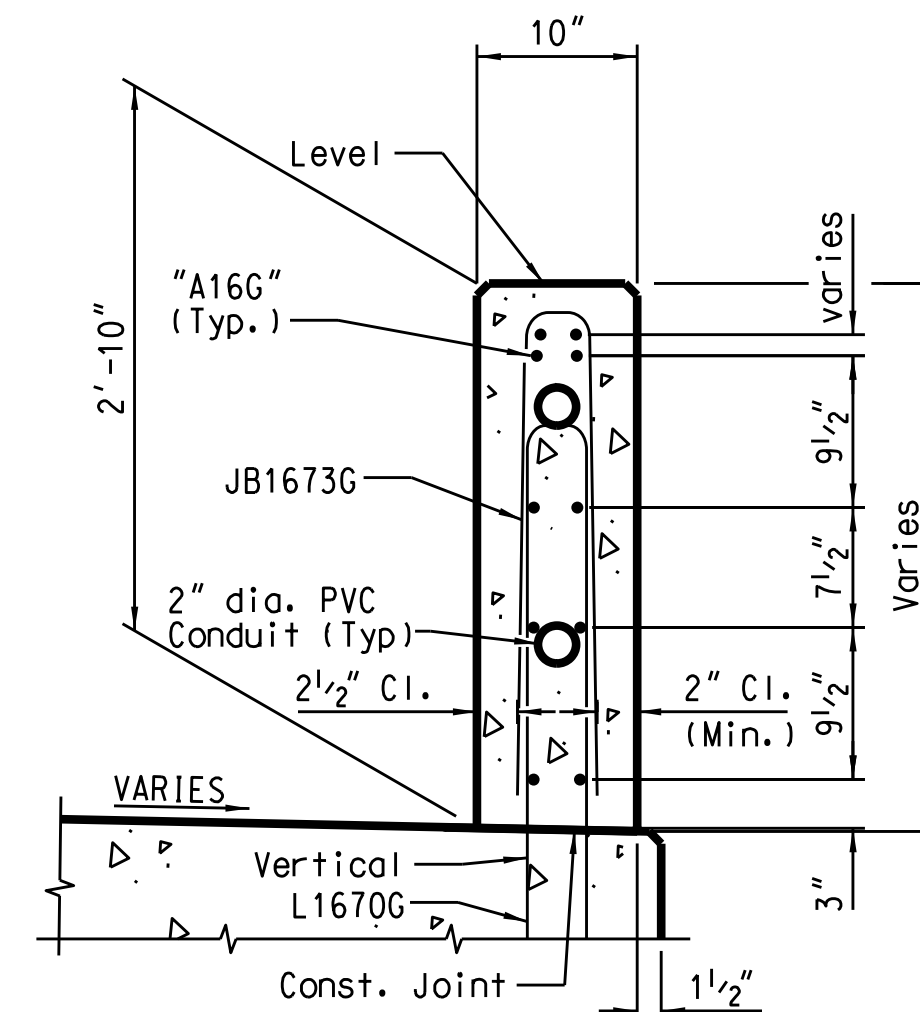
Technical drawing of a vertical L1670G conduit assembly. The drawing shows a cross-section of a 2-inch diameter PVC conduit with two 1/2-inch diameter holes. The conduit is labeled "JB1673G" and "2 inch dia. PVC Conduit (Typ)". The holes are labeled "2 1/2 inch C.I." and "1 inch C.I.". The conduit is shown with a "Level" line and a "Const. Joint" line. The overall height is "2'-10 inch" and the width is "10 inch". The conduit is shown with a "3 inch" offset and a "1 1/2 inch" offset. The drawing is labeled "VARIES" and "Vertical L1670G".

SECTION AT END
(Slab Reinforcing and Asphalt Inlay not Shown)

SECTIONS USED FOR SLIP FORMING
BARRIER PARAPET / RAILING WALL

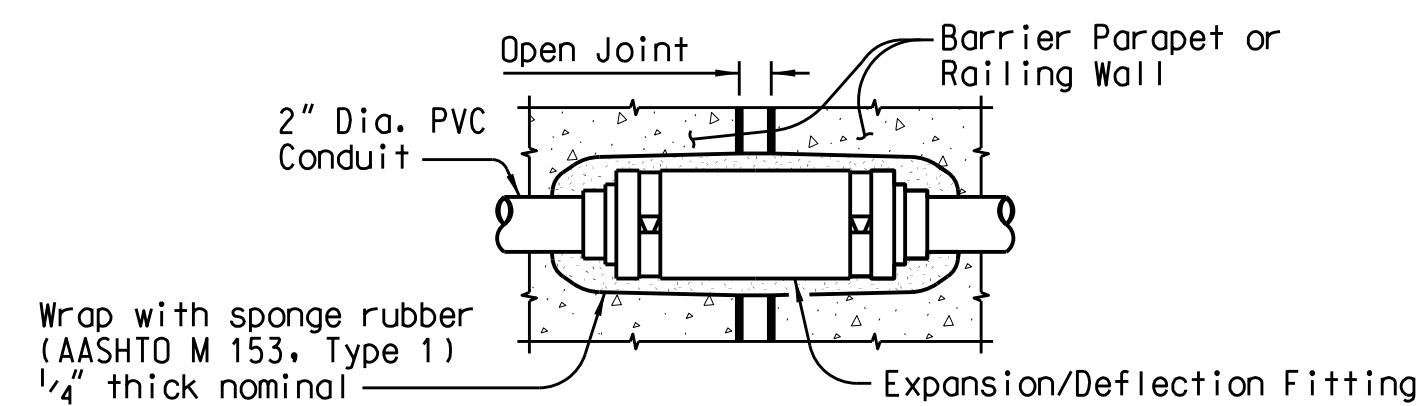


SECTION THRU
VERTICAL BARRIER
(Slab Reinforcing and Asphalt Inlay not Shown)

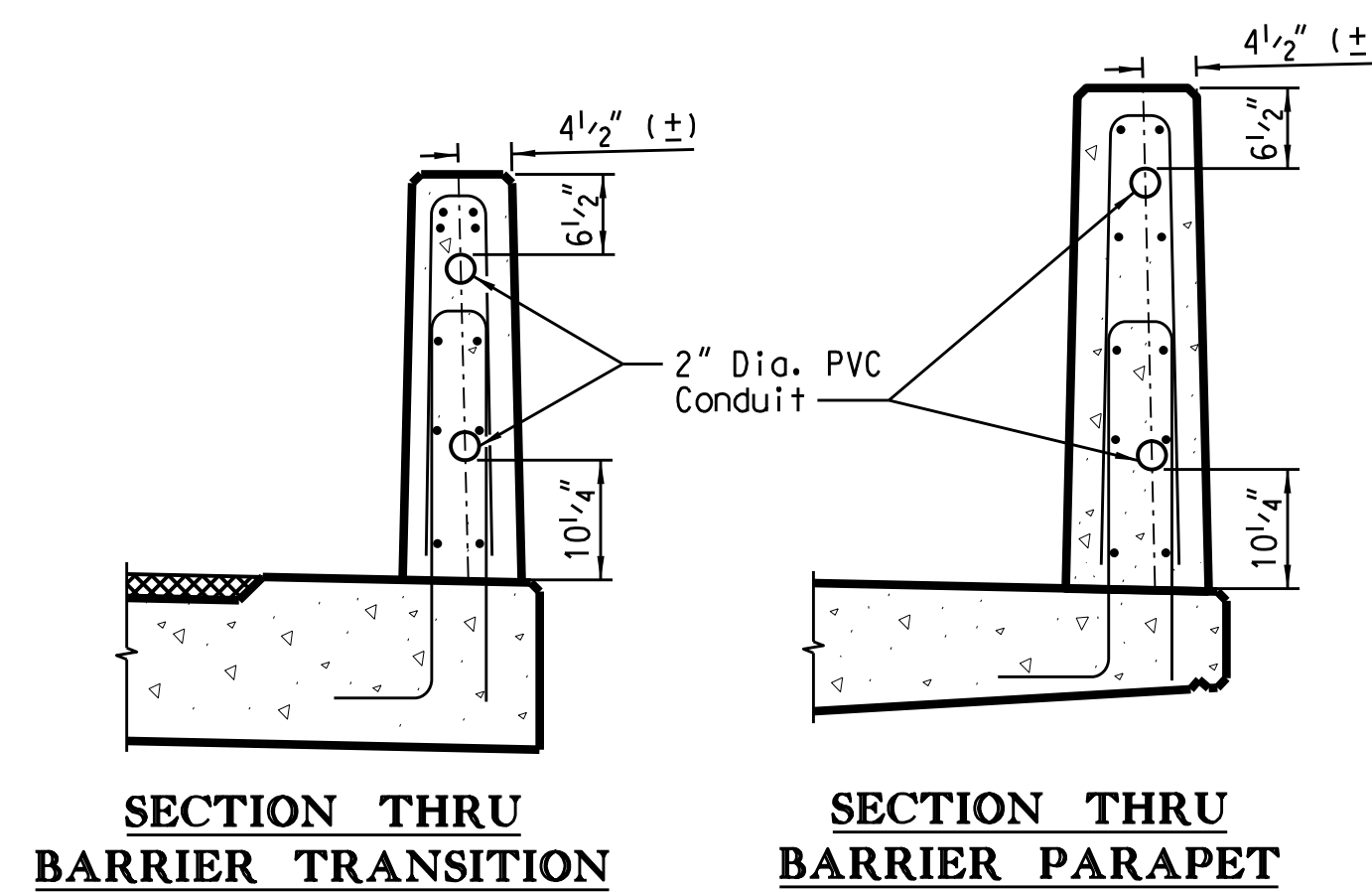


SECTION AT END
VERTICAL BARRIER
(Slab Reinforcing and Asphalt Inlay not Shown)

SECTIONS USED FOR HAND FORMING
BARRIER PARAPET / RAILING WALL



EXPANSION / DEFLECTION FITTING DETAIL



DETAILS OF CONDUIT IN BARRIER PARAPET

(Typ. left side of bridge)

Use Schedule 80 PVC nonmetallic pipe for conduit.

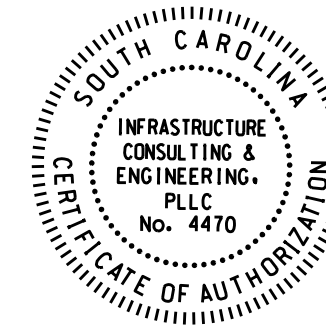
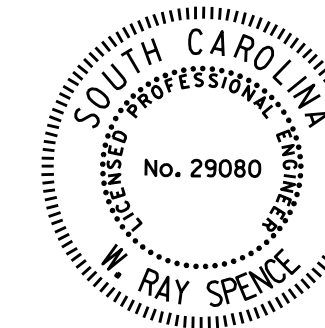
Extend conduits 6" beyond each end of the barrier parapet or barrier parapet transition and cap with watertight covers.

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





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.



REV.	WRS	09-22-22		
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REV.				
REV.				
REVIEWED	WRS 06-22			
QUAN.				
DR.	WLH	ALP	05-22	
DES.	WRS	ALP	05-22	
	BY	CHK.	DATE	

	
JOINT VENTURE   UNITED <small>INFRASTRUCTURE GROUP</small>	
	
SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
<u>MASH BARRIER PARAPET (2 OF 2)</u>	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	ROUTE
RICHLAND	RAMP F

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APPROACH SLAB NO. 1

REINFORCING STEEL SCHEDULE

LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
SLAB	A1670	42	19'-5"	-----	-----	-----	-----	19'-5"
SLAB	A1671	16	36'-8"	-----	-----	-----	-----	36'-8"
LEFT BARRIER	A1672G	10	24'-2"	-----	-----	-----	-----	24'-2"
RIGHT BARRIER	A1673G	10	24'-5"	-----	-----	-----	-----	24'-5"
SLAB	A1674	24	10'-0"	-----	-----	-----	-----	10'-0"
SLAB	A2270	41	19'-5"	-----	-----	-----	-----	19'-5"
SLAB	A2271G	3	24'-1"	-----	-----	-----	-----	24'-1"
SLAB	A2272G	1	23'-11"	-----	-----	-----	-----	23'-11"
SLAB	A2273G	3	24'-4"	-----	-----	-----	-----	24'-4"
SLAB	A2274G	1	23'-10"	-----	-----	-----	-----	23'-10"
SLAB	A2970	81	19'-5"	-----	-----	-----	-----	19'-5"
SLAB	A2971G	3	24'-1"	-----	-----	-----	-----	24'-1"
SLAB	A2972G	1	23'-11"	-----	-----	-----	-----	23'-11"
SLAB	A2973G	3	24'-4"	-----	-----	-----	-----	24'-4"
SLAB	A2974G	1	23'-10"	-----	-----	-----	-----	23'-10"
SLAB	AV1670	50	13'-8"	1'-2"	25'-2"	1'-0"		13'-8"
SLAB	AV1671	48	10'-8 1/2"	1'-3"	20'-2"	0'-9 7/8"		10'-9"
SLAB	AV1672	22	5'-9 1/2"	1'-8"	9'-11"	0'-9 7/8"		5'-10"
SLAB	AV1673	22	6'-8"	1'-8"	11'-8"	1'-0"		6'-8"
SLAB	AV2270	4	21'-4"	19'-10"	22'-10"	1'-0"		21'-4"
SLAB	AV2271	7	9'-3 1/2"	2'-3"	16'-4"	2'-4 1/8"		9'-3"
SLAB	AV2970	9	21'-4 1/2"	19'-5"	23'-4"	0'-5 7/8"		21'-5"
SLAB	AV2971	7	9'-3 1/2"	2'-3"	16'-4"	2'-4 1/8"		9'-3"
BARRIER	JB1670G	81	0'-5 3/4"	3'-2"	0'-7 1/4"			6'-10"
LEFT BARRIER	JB1671G	3	0'-5 3/4"	3'-0"	0'-7 1/4"			6'-6"
LEFT BARRIER	JB1672G	3	0'-5 3/4"	2'-10"	0'-7 1/4"			6'-2"
LEFT BARRIER	JB1673G	3	0'-5 3/4"	2'-7"	0'-7 1/4"			5'-8"
BARRIER	L1670G	90	1'-0"	2'-7"	0'-6 1/2"	2'-7"		6'-9"
LEFT BARRIER	U1670G	1	2'-0"	0'-5"				4'-3"

CHCU	3 3/4"	AS NECESSARY
QUANTITIES		
ITEM	UNIT	APPROACH SLAB
2.0" SCHEDULE 80 PVC CONDUIT	L.F.	99.7
CONCRETE FOR STRUCTURES - CLASS 4000	C.Y.	38.7
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	11,407
GALVANIZED REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	2,830
42" MASH CONCRETE BARRIER PARAPET	L.F.	49.4

Notes:

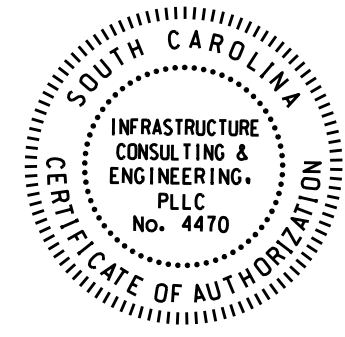
Construct approach slabs to the grades and elevations shown on the Bridge Plan and Profile drawing. Construct approach slabs to the same crown as the bridge deck.

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

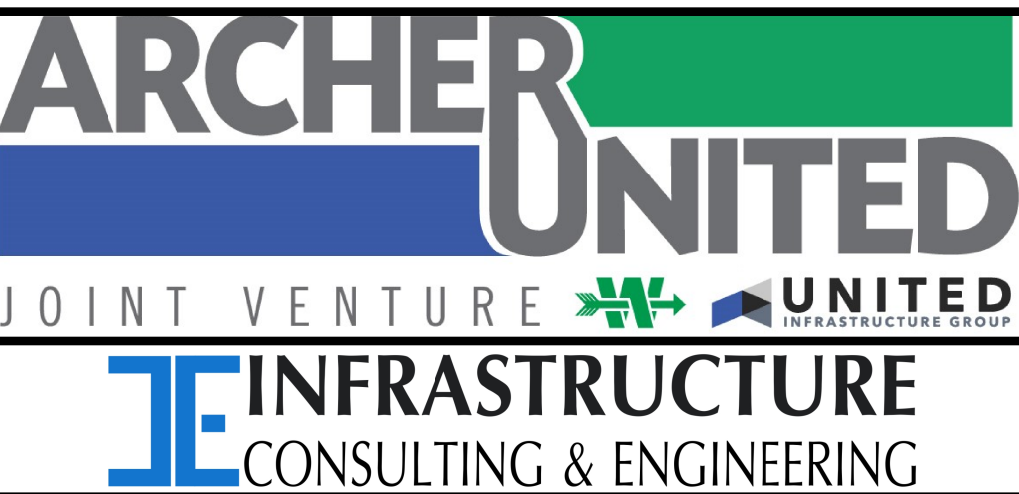
Support the bottom mat of reinforcing steel using concrete block or similar material. Provide a minimum concrete cover of 3" below the bottom reinforcing steel.

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

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

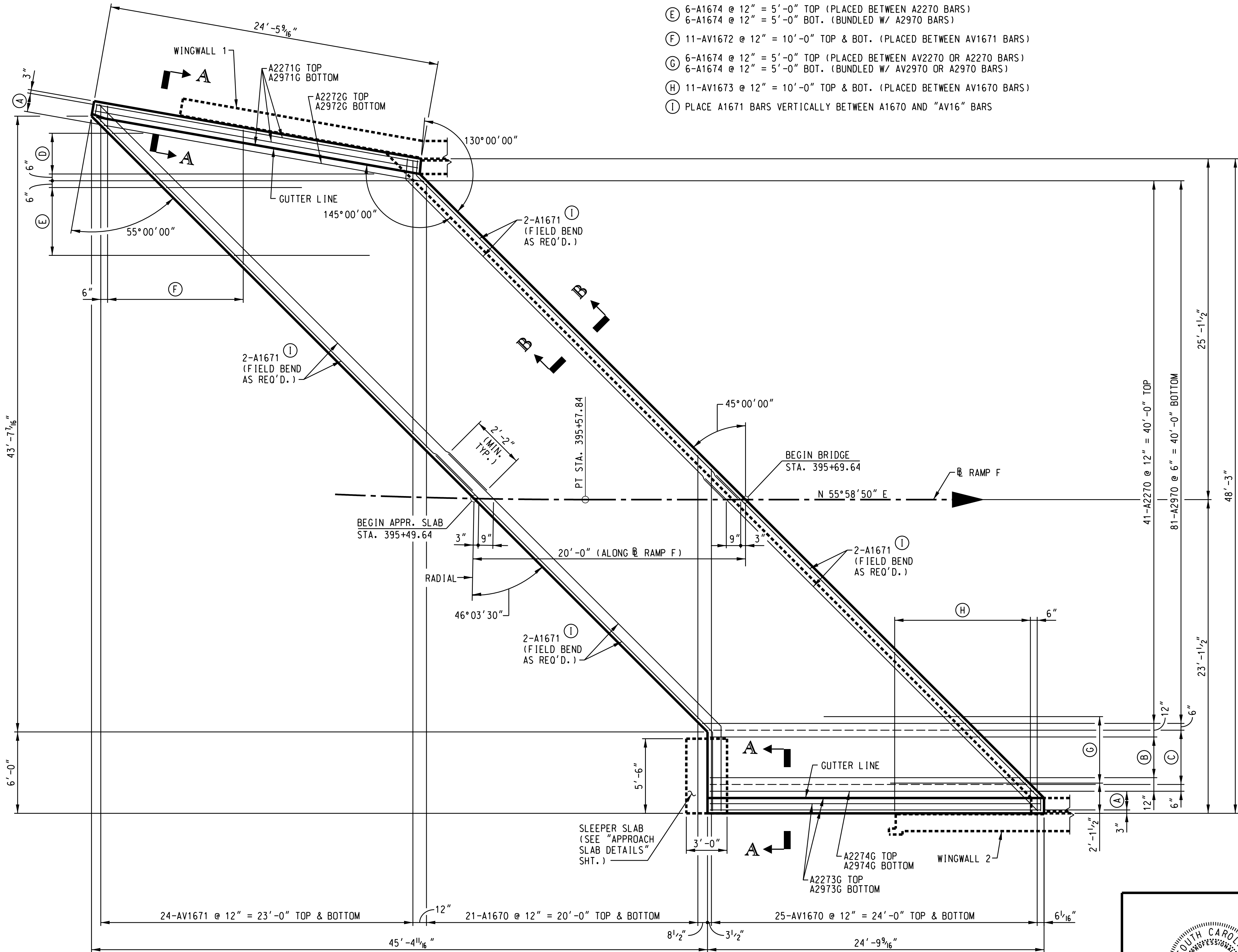


REV.	0	WRS	09-22-22
		RFC	PLANS
REV.			
REV.			
REVIEWED	WRS	06-22	
QUAN.	WLH	ALP	05-22
DR.	WLH	ALP	05-22
DES.	WRS	ALP	05-22
	BY	CHK.	DATE



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
APPROACH SLAB NO. 1	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F

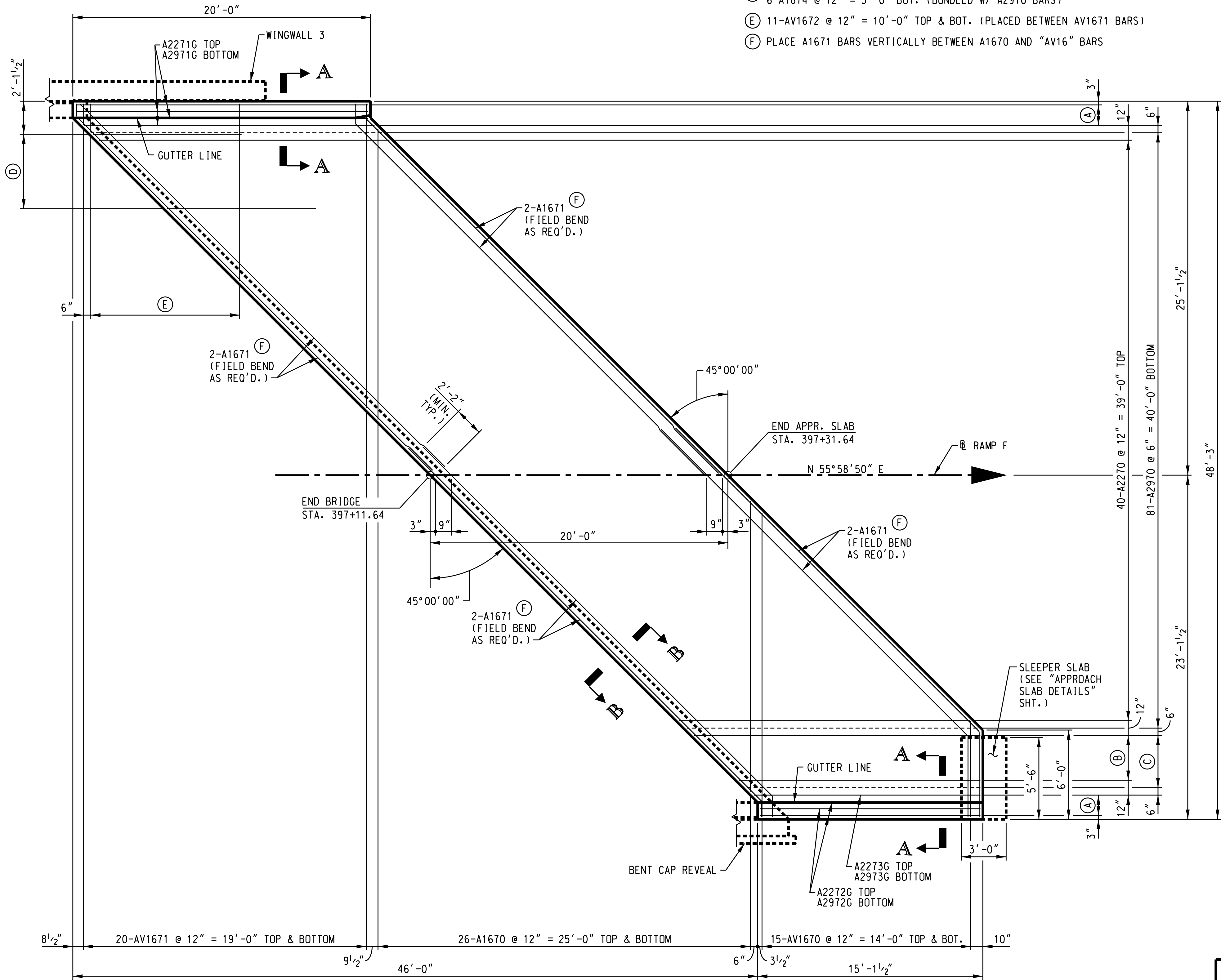
- (A) 3 SP. @ 5'1/2" = 1'-4 1/2"
(B) 4-AV2270 @ 12" = 3'-0" TOP
(C) 9-AV2970 @ 6" = 4'-0" BOTTOM
(D) 7-AV2271 @ 6" = 3'-0" TOP
7-AV2971 @ 6" = 3'-0" BOTTOM
(E) 6-A1674 @ 12" = 5'-0" TOP (PLACED BETWEEN A2270 BARS)
6-A1674 @ 12" = 5'-0" BOT. (BUNDLED W/ A2970 BARS)
(F) 11-AV1672 @ 12" = 10'-0" TOP & BOT. (PLACED BETWEEN AV1671 BARS)
(G) 6-A1674 @ 12" = 5'-0" TOP (PLACED BETWEEN AV2270 OR A2270 BARS)
6-A1674 @ 12" = 5'-0" BOT. (BUNDLED W/ AV2970 OR A2970 BARS)
(H) 11-AV1673 @ 12" = 10'-0" TOP & BOT. (PLACED BETWEEN AV1670 BARS)
(I) PLACE A1671 BARS VERTICALLY BETWEEN A1670 AND "AV16" BARS



PLAN

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- (A) 3 SP. @ 5' 1/2" = 1' - 4 1/2"
(B) 4-AV2270 @ 12" = 3' - 0" TOP
(C) 8-AV2970 @ 6" = 3' - 6" BOTTOM
(D) 6-A1674 @ 12" = 5' - 0" TOP (PLACED BETWEEN A2270 BARS)
6-A1674 @ 12" = 5' - 0" BOT. (BUNDLED W/ A2970 BARS)
(E) 11-AV1672 @ 12" = 10' - 0" TOP & BOT. (PLACED BETWEEN AV1671 BARS)
(F) PLACE A1671 BARS VERTICALLY BETWEEN A1670 AND "AV16" BARS

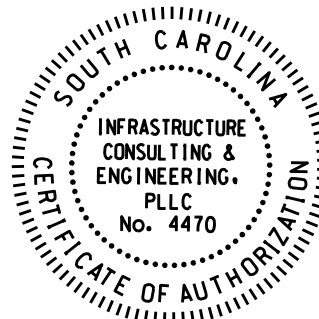
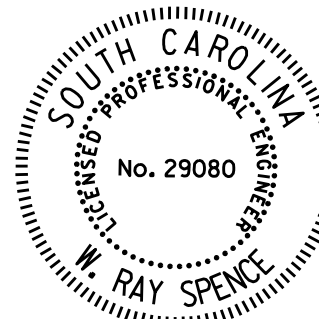


PLAN

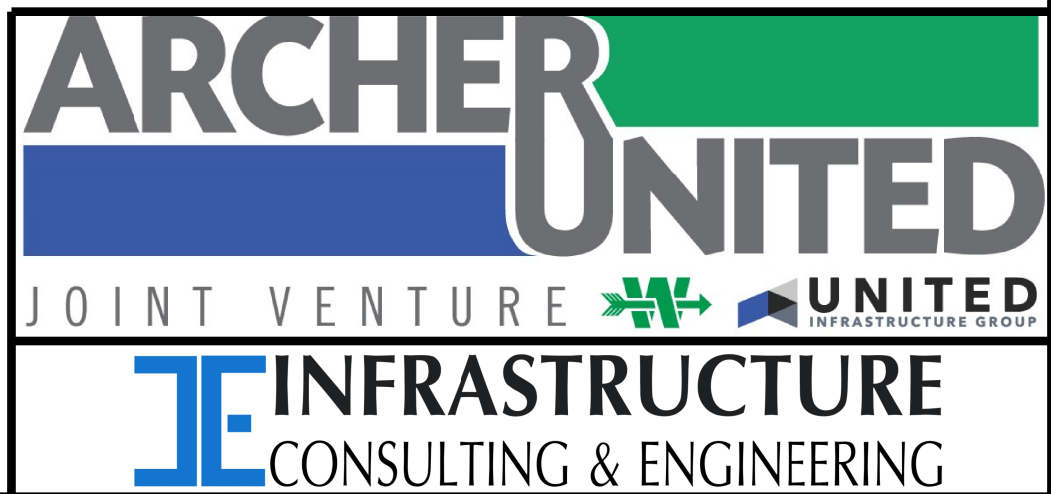
Notes:

For Approach Slab notes, See "Approach Slab No. 1" Sht.

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



REV.	0	WRS	09-22-22
REV.		RFC	PLANS
REV.			
REV.			
REVIEWED	WRS	06-22	
QUAN.	WLH	ALP	05-22
DR.	WLH	ALP	05-22
DES.	WRS	ALP	05-22
BY	CHK.	DATE	



SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

APPROACH SLAB NO. 2

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND ROUTE RAMP F

APPROACH SLAB NO. 2

REINFORCING STEEL SCHEDULE

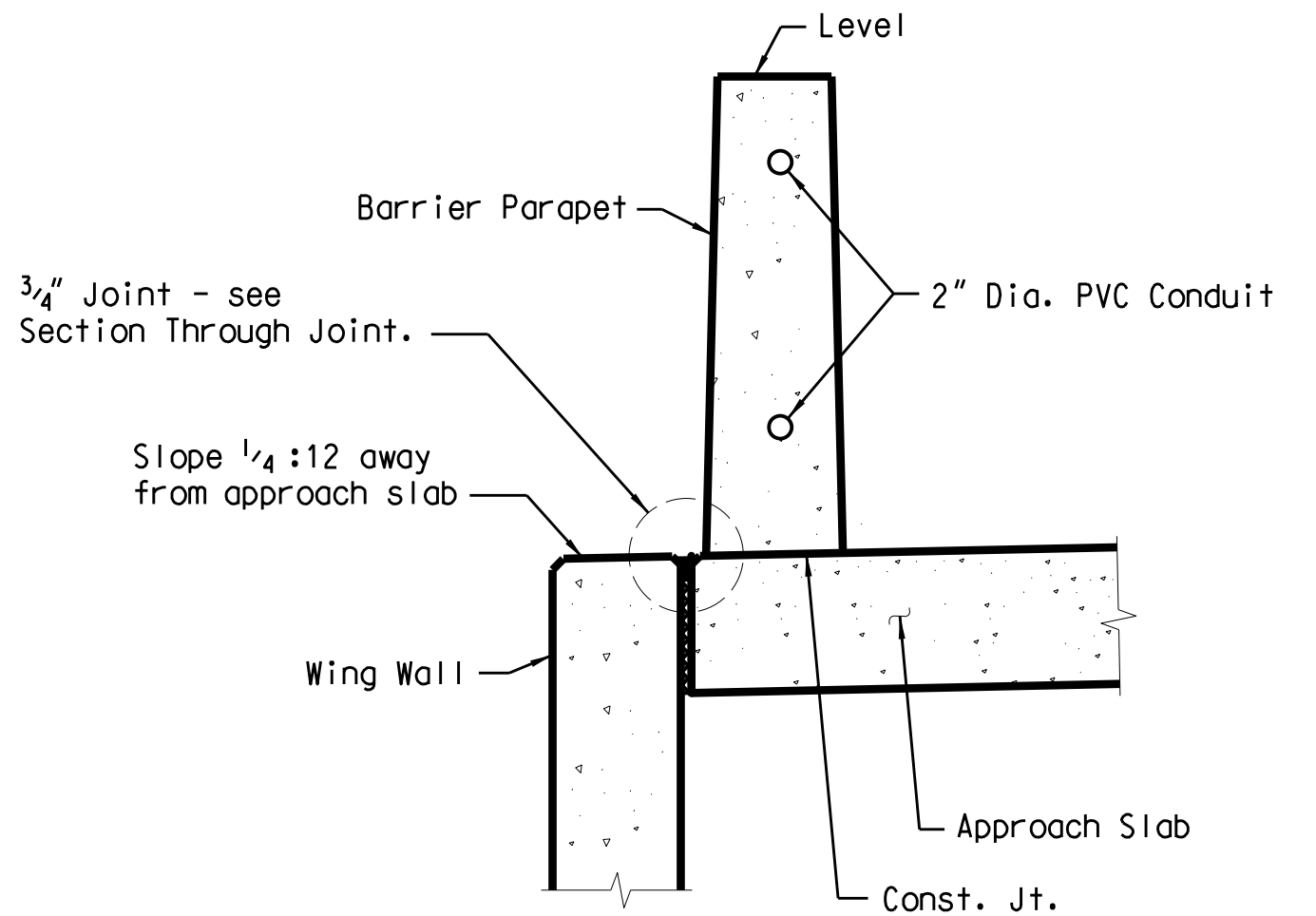
LOCATION	MARK	NO. REQ'D	DIMENSION					LENGTH
			"a"	"b"	"c"	"d"	"e"	
SLAB	A1670	52	19'-6"	-----	-----	-----	-----	19'-6"
SLAB	A1671	16	34'-7"	-----	-----	-----	-----	34'-7"
LEFT BARRIER	A1672G	10	19'-8"	-----	-----	-----	-----	19'-8"
RIGHT BARRIER	A1673G	10	14'-9"	-----	-----	-----	-----	14'-9"
SLAB	A1674	12	10'-0"	-----	-----	-----	-----	10'-0"
SLAB	A2270	40	19'-6"	-----	-----	-----	-----	19'-6"
SLAB	A2271G	4	19'-6"	-----	-----	-----	-----	19'-6"
SLAB	A2272G	3	14'-9"	-----	-----	-----	-----	14'-9"
SLAB	A2273G	1	15'-2"	-----	-----	-----	-----	15'-2"
SLAB	A2970	81	19'-6"	-----	-----	-----	-----	19'-6"
SLAB	A2971G	4	19'-6"	-----	-----	-----	-----	19'-6"
SLAB	A2972G	3	14'-9"	-----	-----	-----	-----	14'-9"
SLAB	A2973G	1	15'-2"	-----	-----	-----	-----	15'-2"
SLAB	AV1670	30	13'-5"	6'-5"	20'-5"	1'-0"	-----	13'-5"
SLAB	AV1671	40	10'-11"	1'-5"	20'-5"	1'-0"	-----	10'-11"
SLAB	AV1672	22	6'-11"	1'-11"	11'-11"	1'-0"	-----	6'-11"
SLAB	AV2270	4	17'-8"	16'-2"	19'-2"	1'-0"	-----	17'-8"
SLAB	AV2970	8	17'-5"	15'-8"	19'-2"	0'-6"	-----	17'-5"
BARRIER	JB1670G	66	0'-5 3/4"	3'-2"	0'-7 1/4"	-----	-----	6'-10"
LEFT BARRIER	JB1671G	3	0'-5 3/4"	3'-0"	0'-7 1/4"	-----	-----	6'-6"
LEFT BARRIER	JB1672G	3	0'-5 3/4"	2'-10"	0'-7 1/4"	-----	-----	6'-2"
LEFT BARRIER	JB1673G	3	0'-5 3/4"	2'-7"	0'-7 1/4"	-----	-----	5'-8"
BARRIER	L1670G	75	1'-0"	2'-7"	0'-6 1/2"	2'-7"	-----	6'-9"
LEFT BARRIER	U1670G	1	2'-0"	0'-5"	-----	-----	-----	4'-3"

CHCU 3 3/4" AS NECESSARY

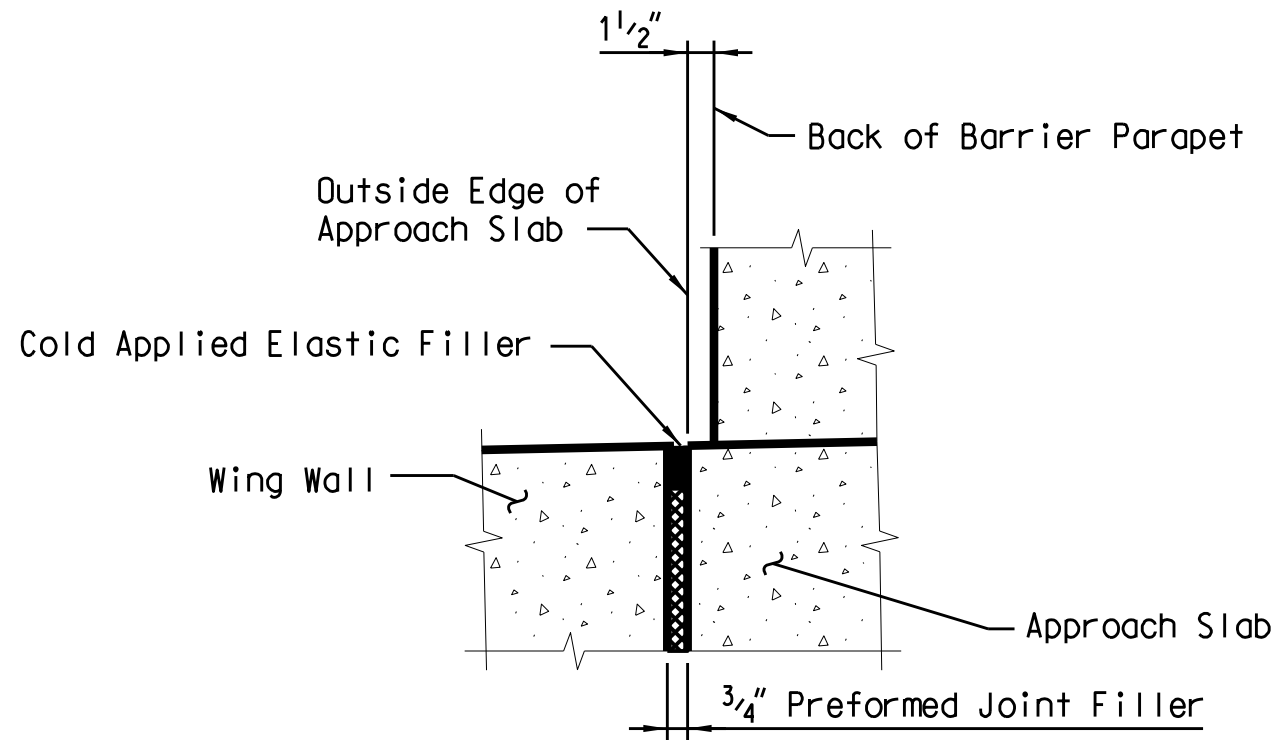
QUANTITIES

ITEM	UNIT	APPROACH SLAB
2.0" SCHEDULE 80 PVC CONDUIT	L.F.	71.3
CONCRETE FOR STRUCTURES - CLASS 4000	C.Y.	35.6
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	10,377
GALVANIZED REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	2,167
42" MASH CONCRETE BARRIER PARAPET	L.F.	35.1

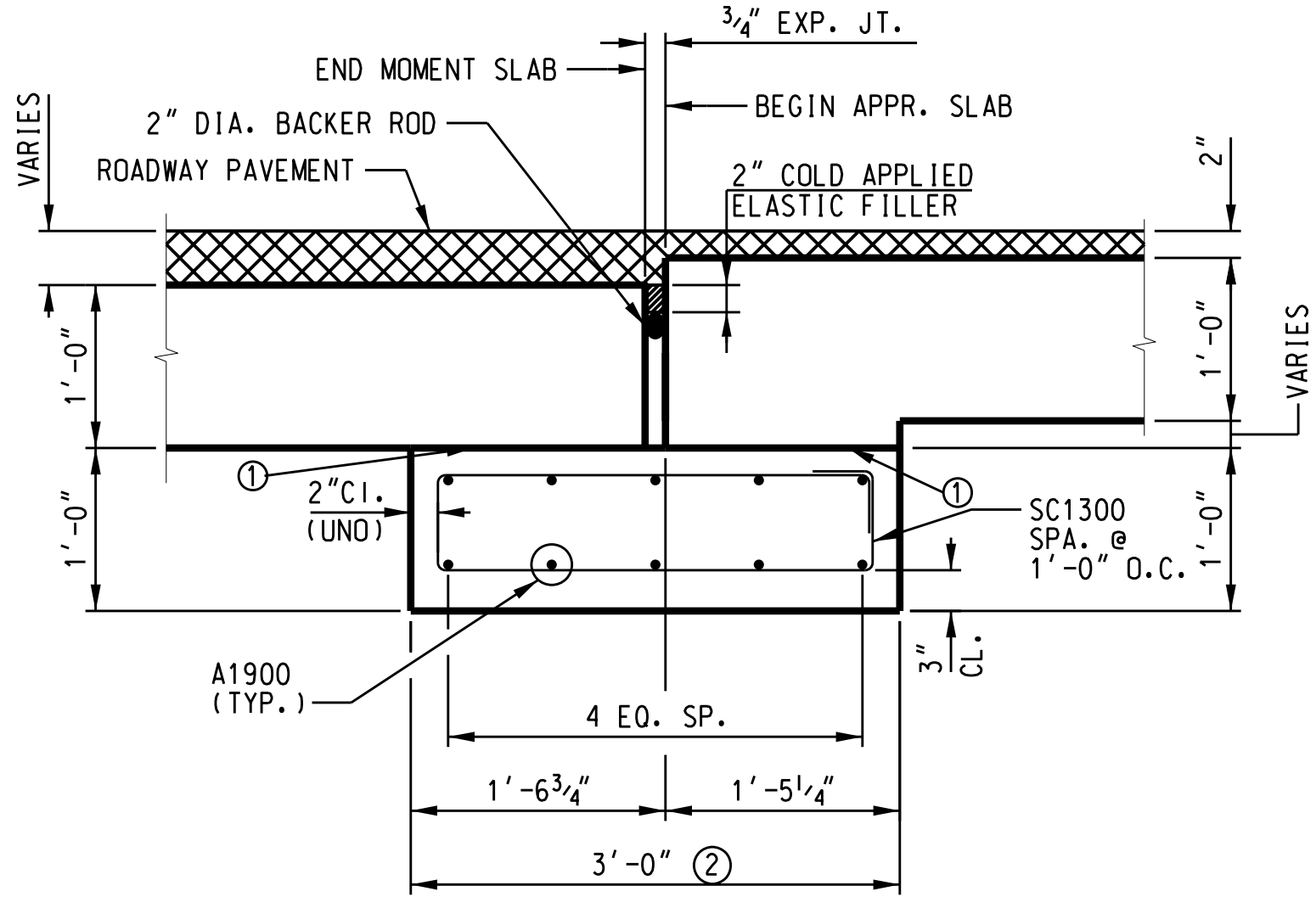
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**SECTION THROUGH
WING WALL / APPROACH SLAB**



SECTION THROUGH JOINT



SECTION THRU SLEEPER SLAB

		BRIDGE PLANS ID		SHEET NO.		
		P039719-B44		39		
SLEEPER SLAB (FOR ONE)						
REINF. STEEL SCHED.						
MARK	NO. REQ'D	DIMENSION				LENGTH
		"a"	"b"	"c"	"d"	
A1900	10	5'-2"	————	————	————	5'-2"
SC1300	6	2'-8"	7"	4 1/2"	————	7'-3"
CHCU	4 1/2" HT.		As Necessary			

NOTES:

LENGTH OF 2 SLEEPER SLAB'S 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.

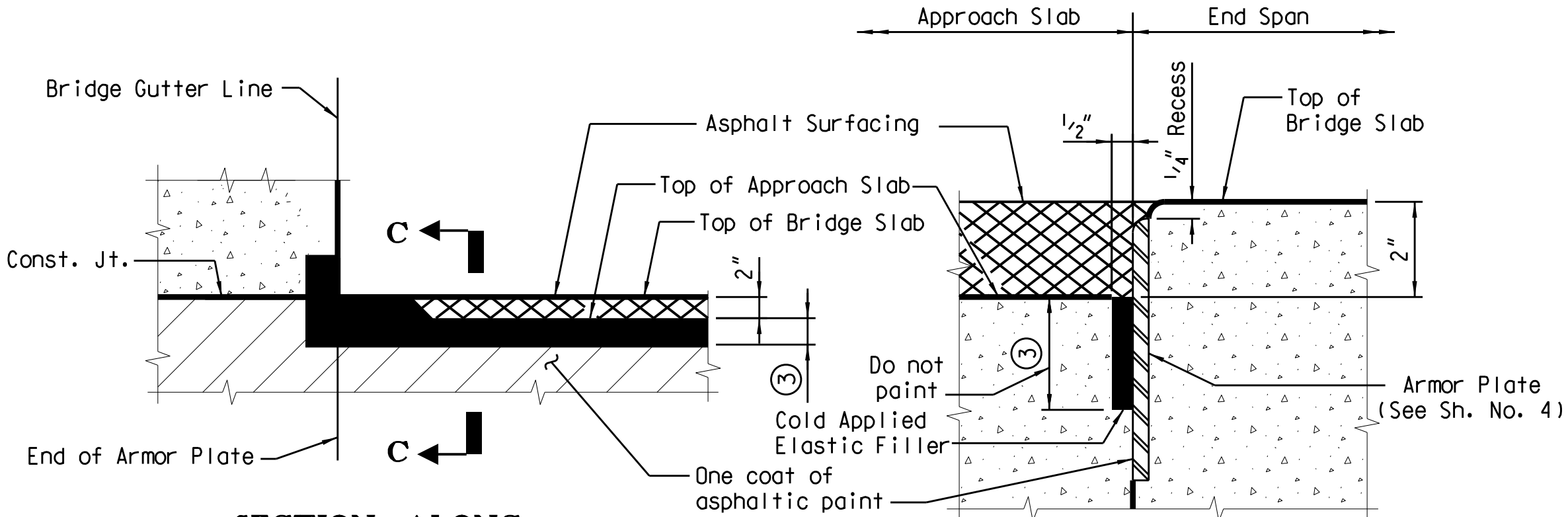
TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE SLEEPER SLAB FROM TEMPORARY LOADINGS OR ANY CONDITION WHICH COULD CAUSE MOVEMENTS OR UNEVEN SETTLEMENT OF THE SLEEPER SLAB.

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.
- SET THIS DIMENSION IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

SLEEPER SLAB QUANTITIES (FOR ONE)

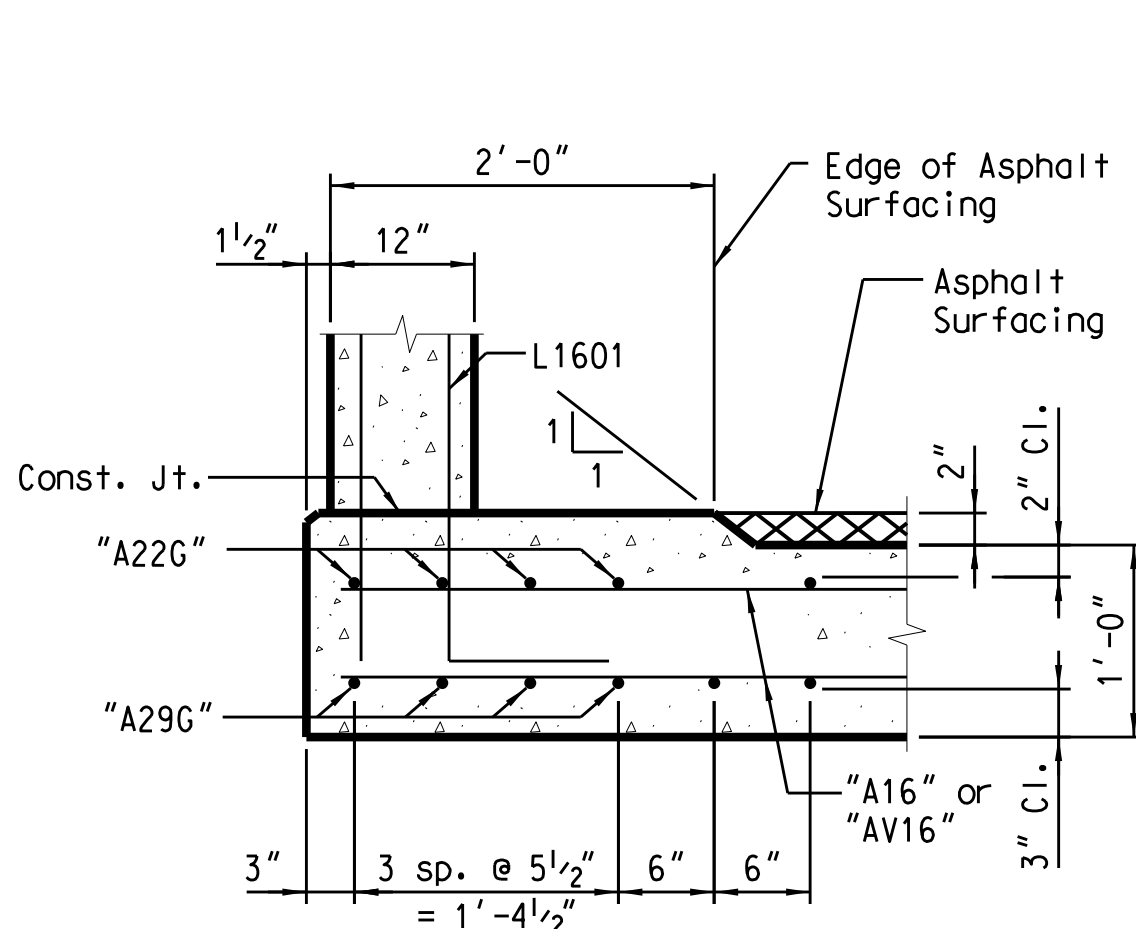
ITEM	UNIT	SLEEPER SLAB QUANTITY
CONCRETE FOR STRUCTURES - CLASS 4000	C.Y.	0.6
REINFORCING STEEL FOR STRUCTURES (BRIDGE)	LBS.	107



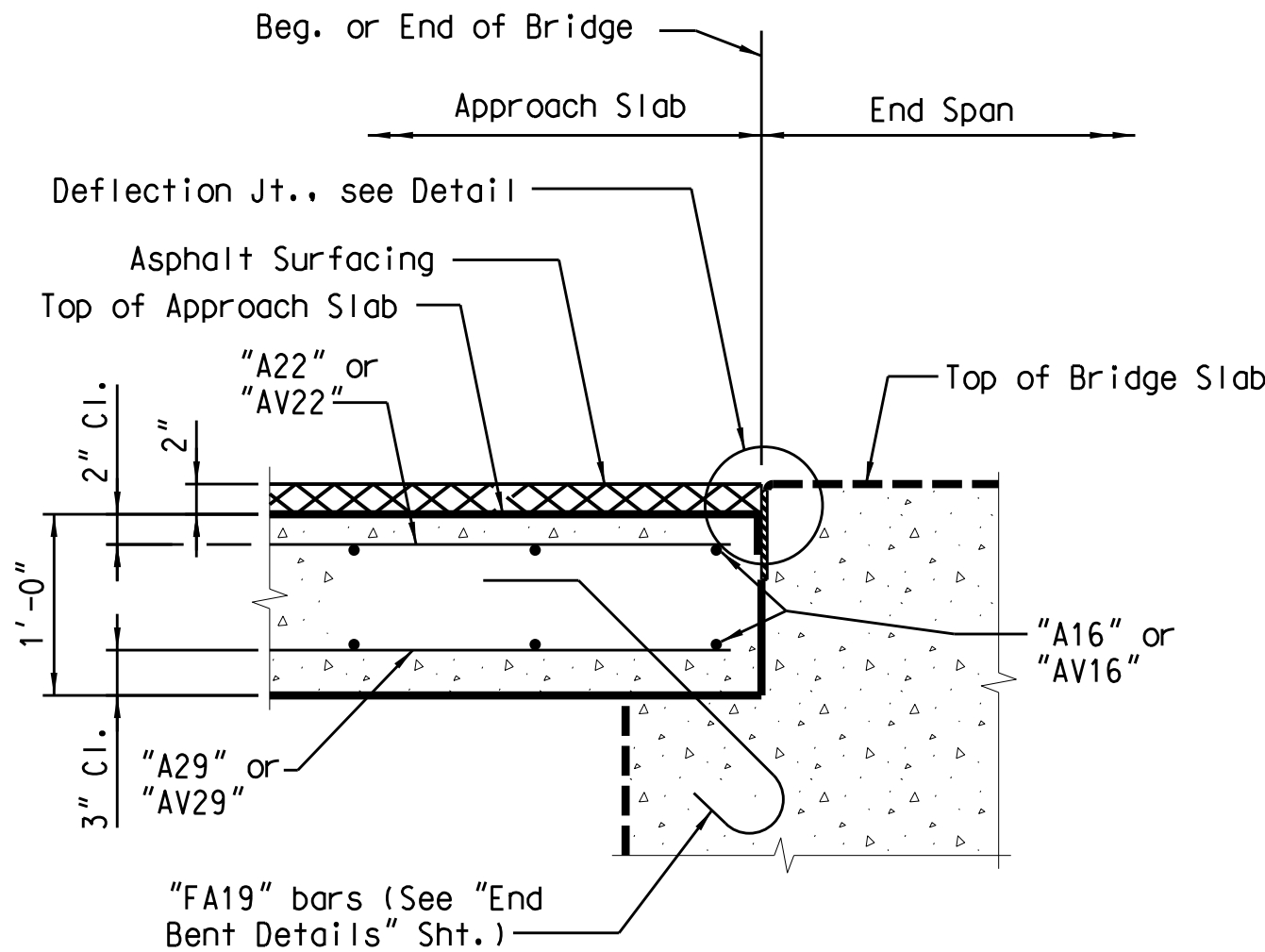
**SECTION C-C
DEFLECTION JOINT DETAIL**

Form or saw cut the deflection joint.

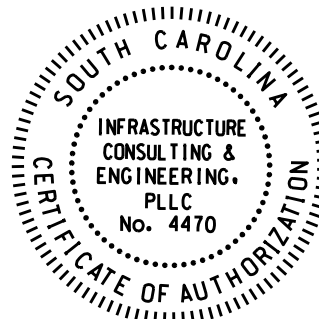
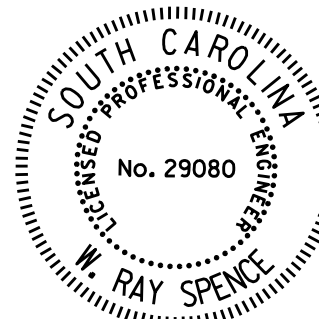
Apply one coat of asphaltic point to the joint to prevent bonding of end span and approach slab concrete. Alternate methods to prevent bonding may be proposed. Submit details of bond breaking method to RCE for approval.



SECTION A-A



SECTION B-B



REV.	WRS	09-22-22
0	RFC	PLANS
REV.		
REV.		
REVIEWED	WRS	06-22
QUAN.	WLH	ALP 05-22
DR.	WLH	ALP 05-22
DES.	WRS	ALP 05-22
BY	CHK.	DATE



INFRASTRUCTURE
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DEPARTMENT OF TRANSPORTATION

APPROACH SLAB DETAILS

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND

ROUTE RAMP F

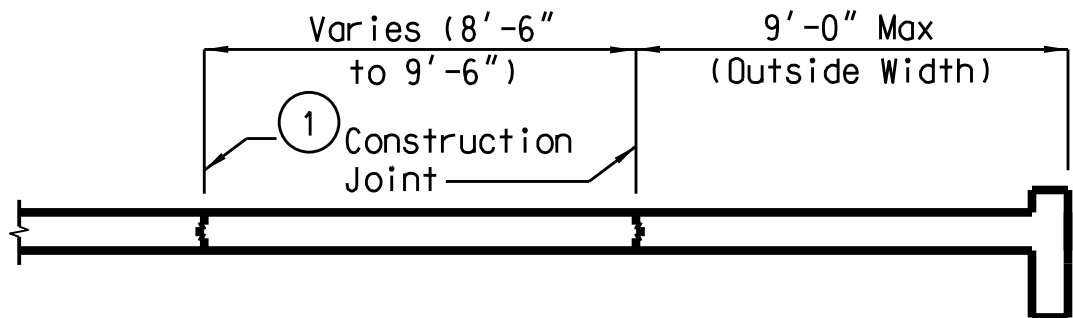
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Notes:

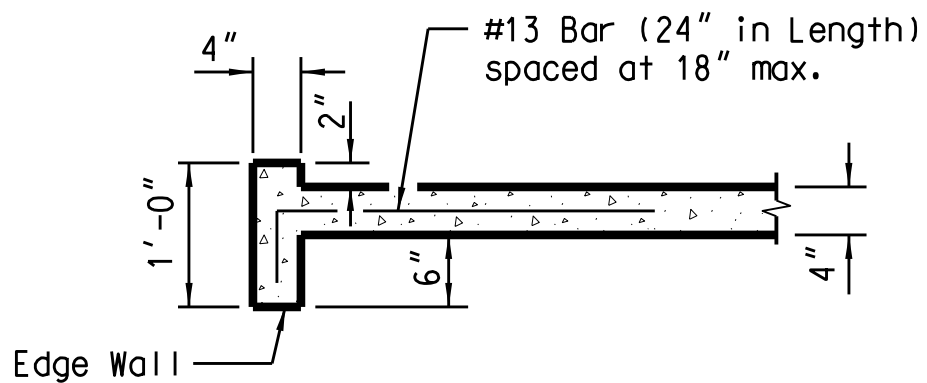
Shape and firmly compact the fill slopes immediately prior to placing the slope protection. Remove any organic material prior to placing concrete. Finish the surface of the paving in true planes where practical and as directed by the RCE. Select planes that result in minimum excavation and provide an 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.

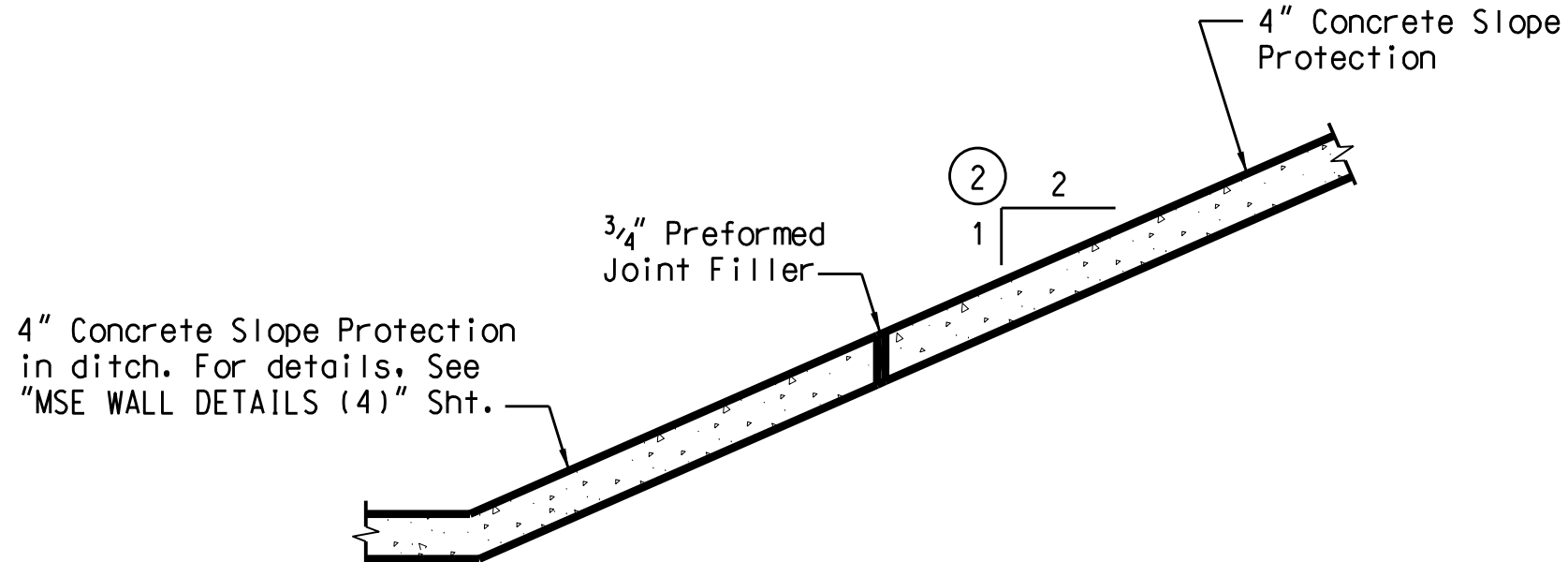
- ① Form construction joints using Key-Loc Joint system as manufactured by Form-A-Key Products or approved equivalent. A Minimum 24 hour interval is required between adjacent pours.
- ② Normal to End Bent



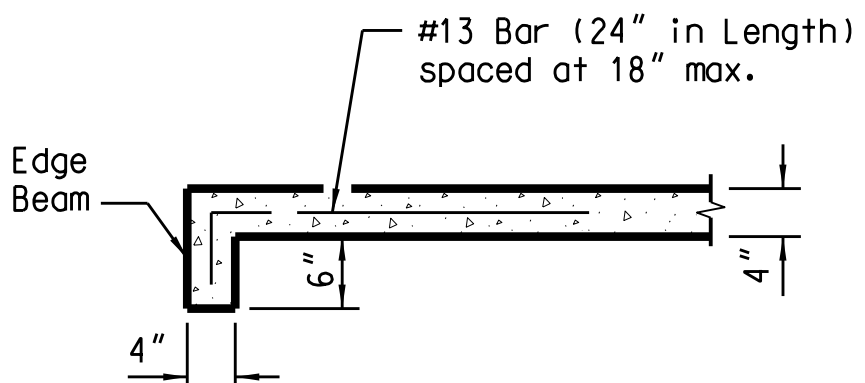
POURING DIAGRAM



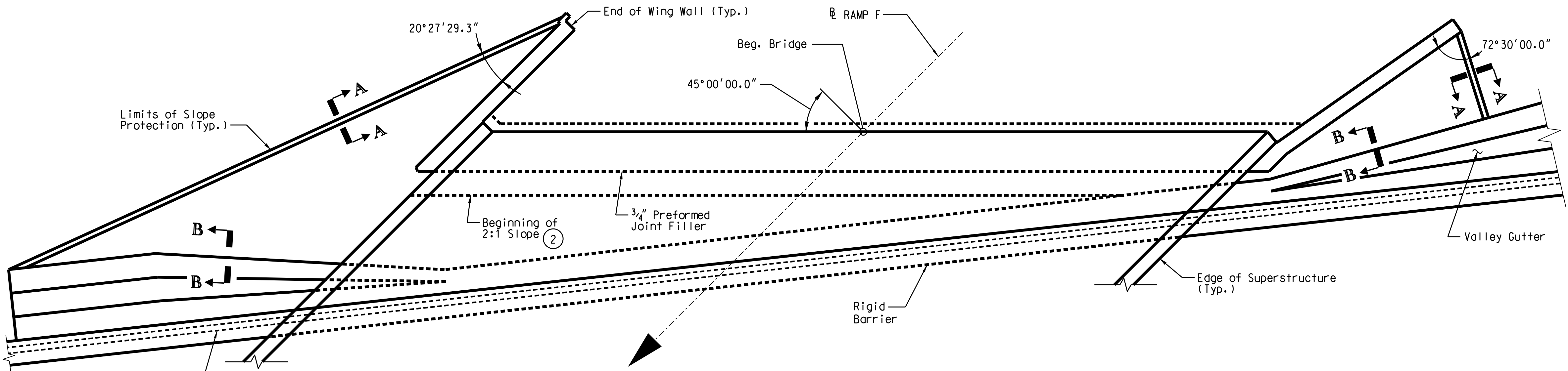
SECTION A-A



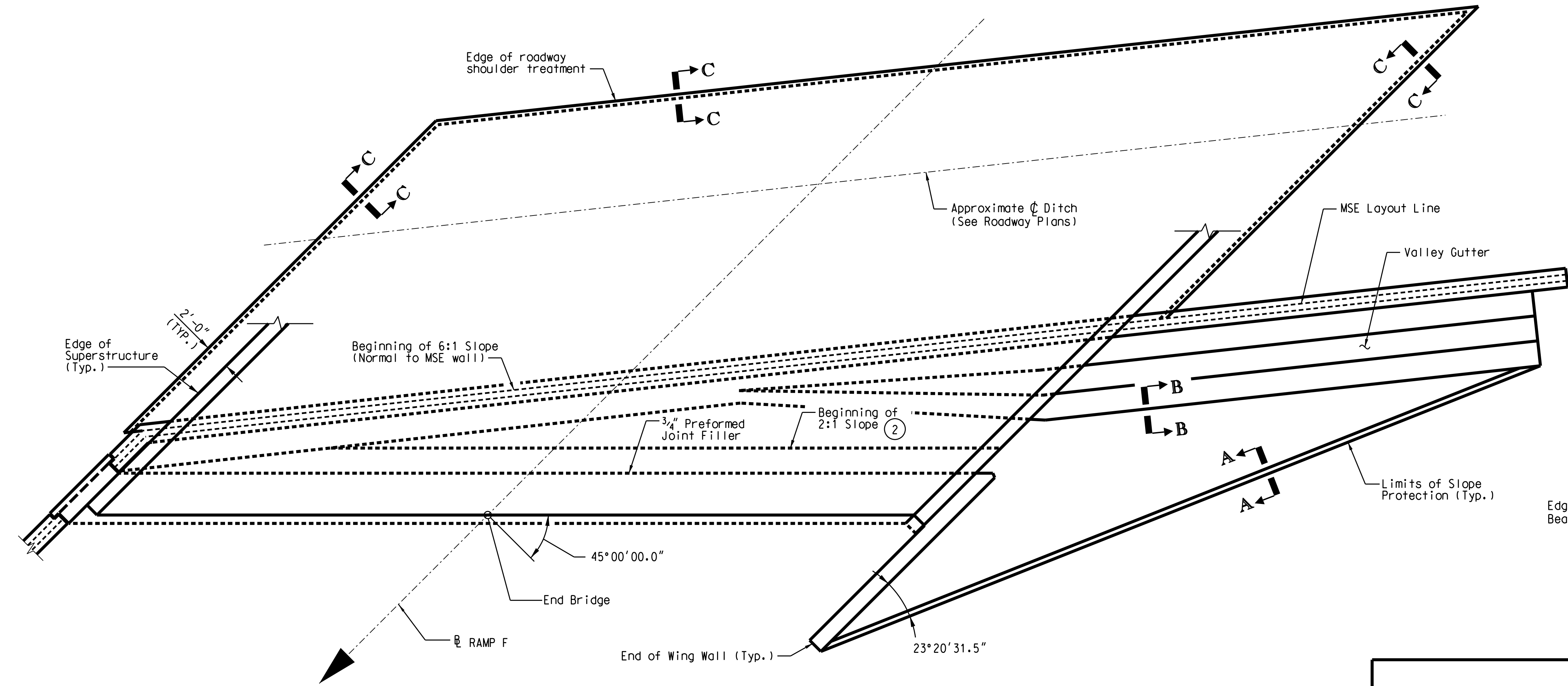
SECTION B-B



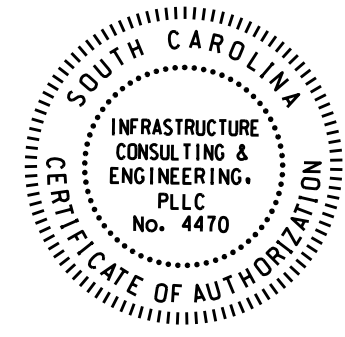
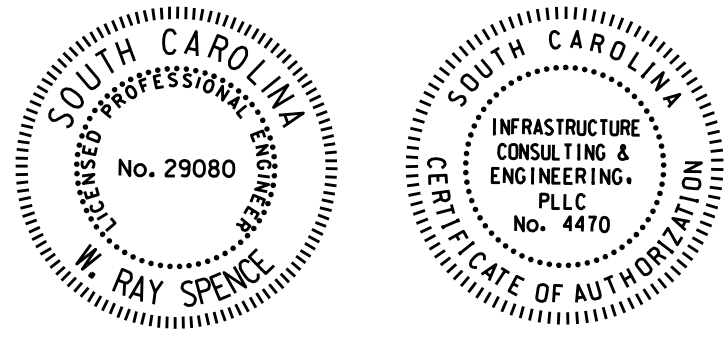
SECTION C-C



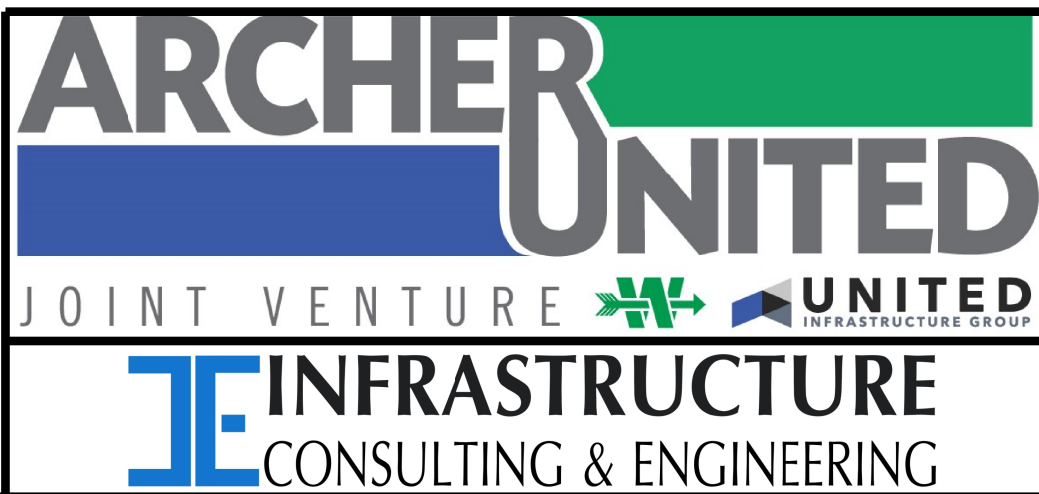
END BENT 1 PLAN
(LOOKING BACK ON STATIONING)



END BENT 2 PLAN
(LOOKING BACK ON STATIONING)

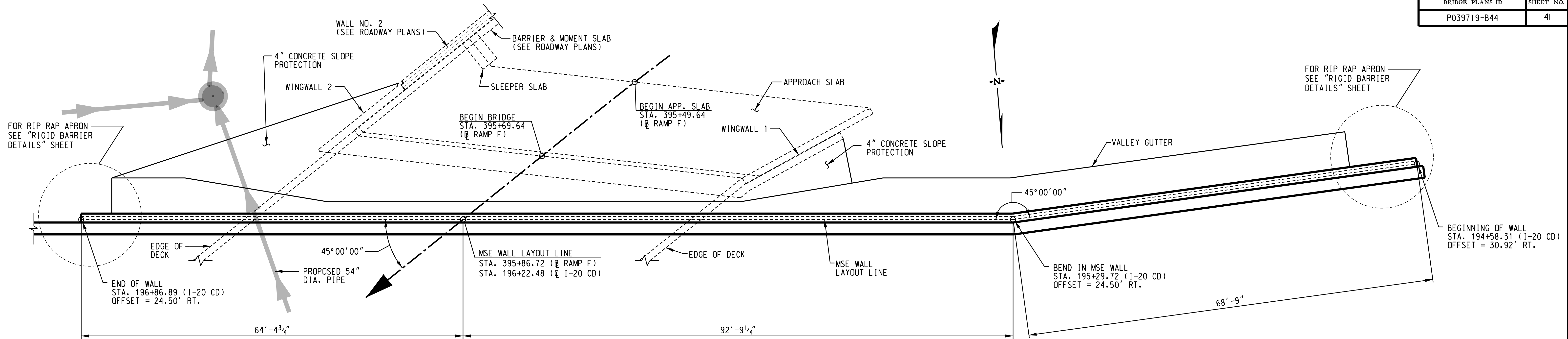


REV.	WRS	09-22-22
0	RFC	PLANS
REV.	BFS	WRS 05-22
	Updated for Bridge	
REV.	JXY	SAN 4-14
	New Border	
REVIEWED	WRS	06-22
QUAN.		
DR.	PNP	SAN 12-08
DES.	ALP	WRS 05-22
BY	CHK.	DATE

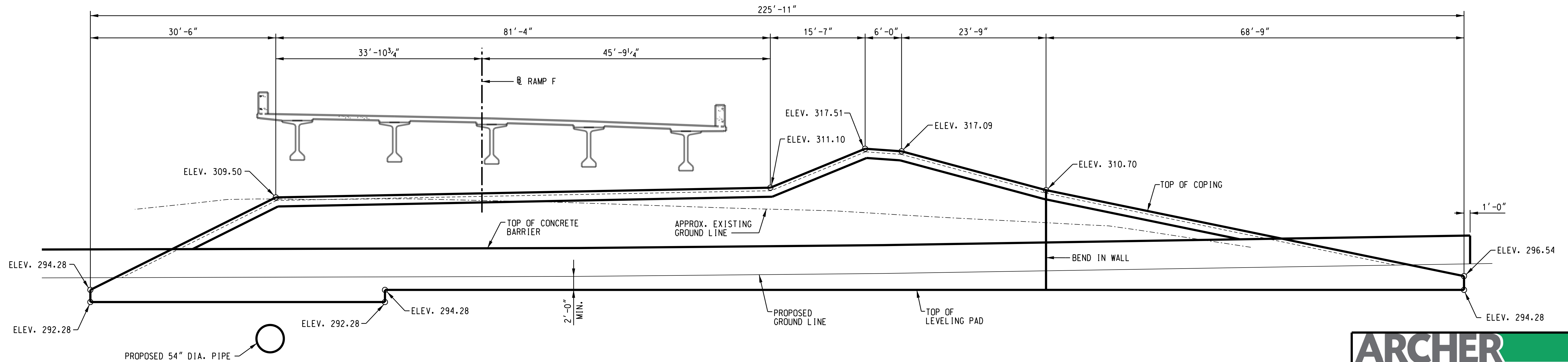


SOUTH CAROLINA	
DEPARTMENT OF TRANSPORTATION	
FIBER REINFORCED SLOPE PROTECTION DETAILS	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F

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PLAN



DEVELOPED ELEVATION ALONG LAYOUT LINE

(LOOKING BACK ON STATIONING)

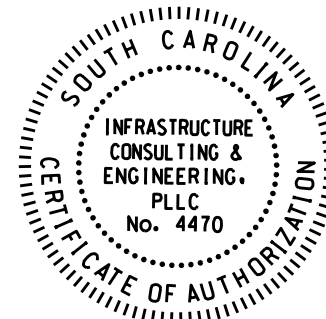
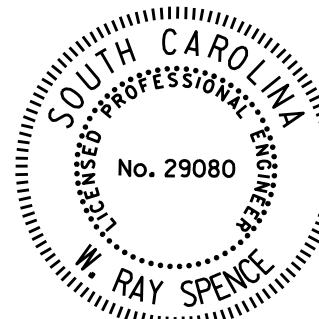
ESTIMATED QUANTITIES - MSE WALL NO. 1		
ITEM	UNIT	QUANTITY
STRUCTURE EXCAVATION FOR RETAINING WALL	CY	3.320
MSE RETAINING WALL BACKFILL (STONE)	CY	3.530
MSE RETAINING WALL (PANEL FACING) BRIDGE	SF	3.191
COPING FOR FOR MSE RETAINING WALL (BRIDGE)	LF	233
SLOPE PROTECTION 4" CONCRETE	SY	175 *

* INCLUDES 100 SY FOR VALLEY GUTTER.

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.



REV.	0	WRS	09-22-22
REV.		RFC	PLANS
REV.			
REV.			
REVIEWED	WRS	06-22	
QUAN.			
DR.	RMH	WRS	05-22
DES.	WRS	JPF	05-22
BY	CHK.	DATE	



INFRASTRUCTURE CONSULTING & ENGINEERING

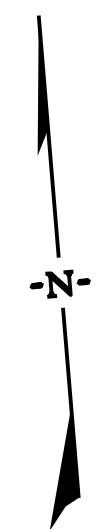
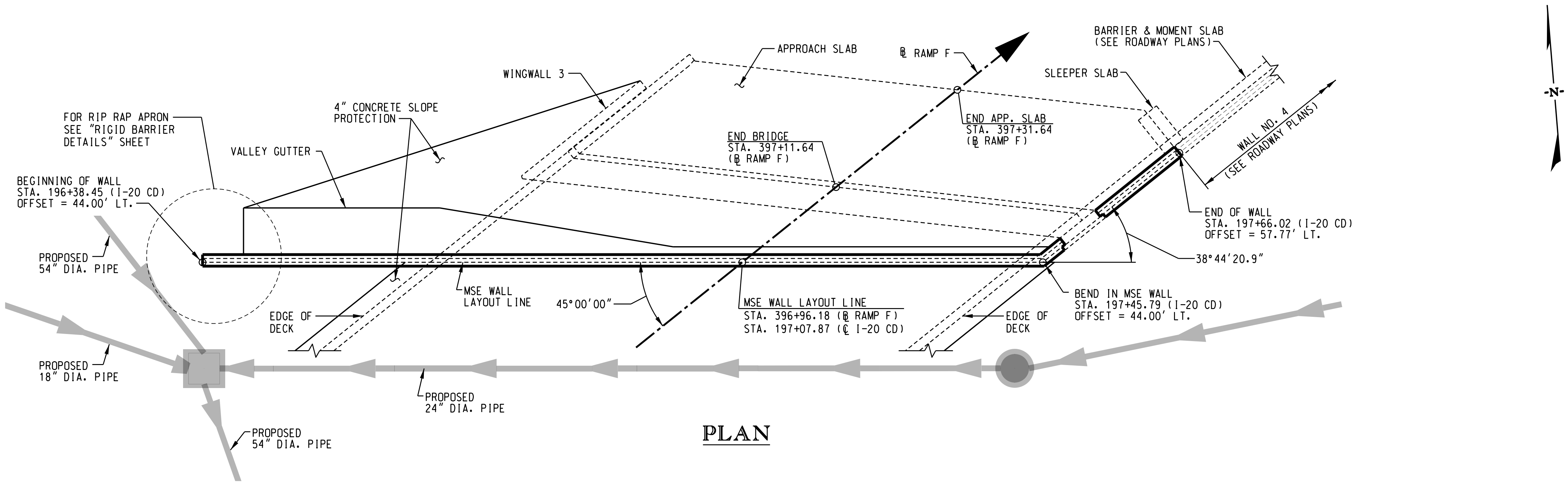
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

MSE WALL NO. 1
PLAN AND ELEVATION

RAMP F BRIDGE OVER I-20 CD

COUNTY RICHLAND ROUTE RAMP F

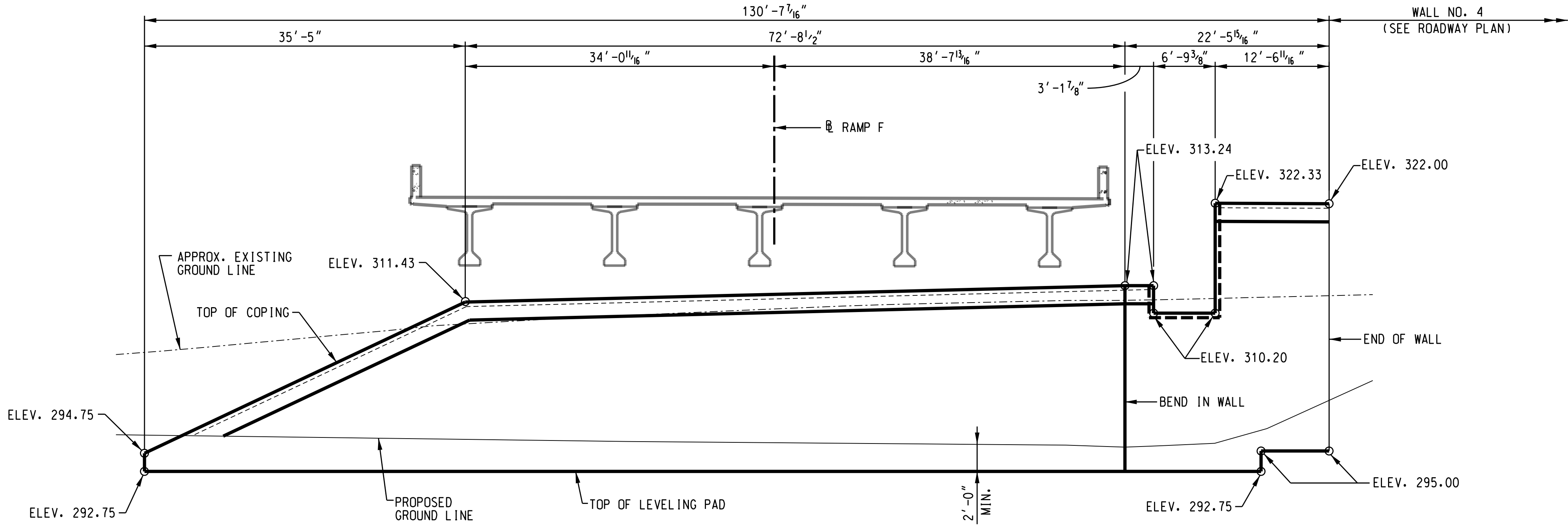
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NOTES:

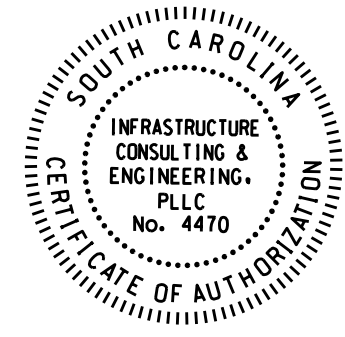
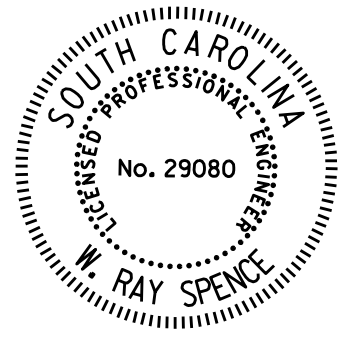
MSE WALL FACING SHALL BE A DEEP FRACTURED FIN FINISH IN ACCORDANCE WITH STANDARD DRAWING 701-950-01.

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

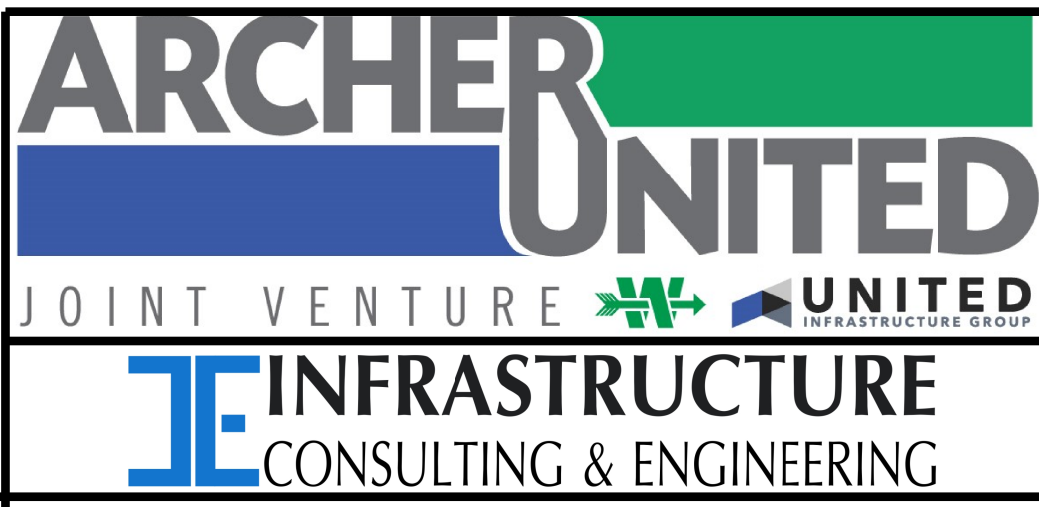


ESTIMATED QUANTITIES - MSE WALL NO. 2		
ITEM	UNIT	QUANTITY
STRUCTURE EXCAVATION FOR RETAINING WALL	CY	2,725
MSE RETAINING WALL BACKFILL (STONE)	CY	2,590
MSE RETAINING WALL (PANEL FACING) BRIDGE	SF	2,329
COPING FOR FOR MSE RETAINING WALL (BRIDGE)	LF	128
SLOPE PROTECTION 4" CONCRETE	SY	305 *

*INCLUDES 35 SY FOR VALLEY GUTTER.



REV.	0	WRS	09-22-22
REV.			RFC PLANS
REV.			
REV.			
REVIEWED	WRS	06-22	
QUAN.			
DR.	RMH	WRS	05-22
DES.	WRS	JPF	05-22
BY	CHK.	DATE	



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
MSE WALL NO. 2 PLAN AND ELEVATION RAMP F BRIDGE OVER I-20 CD	
COUNTY RICHLAND	ROUTE RAMP F

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MSE Wall Notes:	BRIDGE PLANS ID	SHEET NO.
	P039719-B44	43

Provide design in accordance with the SCDOT Supplemental Technical Specification for Mechanically Stabilized Earth (MSE) Walls (01/19) except as modified herein.

Design Methodology:
LRFD Design

Design Life:
Permanent structures = 100 years.
Temporary structures in service for 5 years or longer = 100 years.
Temporary structures in service for less than 5 years = 5 years.

Reinforced Backfill Material:
Stone Backfill:
Internal Friction Angle (deg) = 38
Total Unit Weight = 110 pcf

Foundation Soils:
Total - Internal Friction Angle (deg) 28 (End Bent 1), 30 (End Bent 2)
Total - Cohesion 0 psf
Effective - Internal Friction Angle (deg) 28 (End Bent 1), 30 (End Bent 2)
Effective - Cohesion 0 psf

End Bent 1:
Min. B_{Req} = 30 feet

End Bent 2:
Min. B_{Req} = 30 feet

External Stability Limit State Design:

- Permanent MSE Walls have been evaluated to meet external stability for Strength, Service, and Extreme Event I limit states.
- The external stability of the MSE walls, with appropriate load and resistance factors, is satisfied with the minimum base width required, B_{Req} .

MSE Wall Loadings:

- Design MSE walls for live load surcharge (LS) located at the top of the MSE walls either perpendicular or parallel to the roadway. The live loads are modeled as uniform surcharge (LS), q_s , and are factored using load factors. The unfactored live load surcharge (LS) is 250 psf.
- Design MSE walls for Long Term design using a uniform dead load vertical surcharge pressure, q_{dl} , to account for the pavement section constructed on top of the MSE wall. In addition, use a minimum uniform dead load vertical surcharge pressure of 94 psf to account for future pavement overlay sections.
- Design MSE walls to resist horizontal loadings resulting from live load uniform vertical surcharge (LS), dead load vertical surcharges, and active pressure backfill by multiplying the vertical surcharge pressures or effective overburden pressures times the active earth pressure coefficient, K_a , of 0.307 and the appropriate load factors, γ .

Extreme Event I Limit State: Two-Level Seismic Design

- Project Location and Site Class
 - Latitude: 34°02'21" N
 - Longitude: 81°05'45" W
- Design Earthquake:
 - Functional Evaluation Earthquake (FEE) 15% Probability of Exceedance in 75 years
 - Safety Evaluation Earthquake (SEE) 3% Probability of Exceedance in 75 years
- Peak ground accelerations obtained from ADRS are presented in the table below.

Parameter	MSE Walls	
	FEE	SEE
PGA	0.20 g	0.39 g

Values determined from Three-Point Method

MSE Wall LRFD Design Criteria:

- Design MSE Walls for the following limit states:
 - Strength I Limit State
 - Service I Limit State
 - Extreme Event I Limit State
 - Extreme Event II Limit State
- MSE wall design criteria for each limit state are presented below in Tables 1-1, 1-2, 1-3, 1-4 and 1-5.

Table 1-1 MSE Wall Strength I Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
		Max.	Min.
DC: Dead Load of Components and Attachments (γ_D)	Load	1.25	0.90
LS: Live Load Surcharge (γ)	Load	1.75	
EH: Horizontal Earth Pressure - Active (γ_E)	Load	1.50	0.90
EV: Vertical Earth Pressure - MSE Walls (γ_E)	Load	1.35	1.00
ES: Earth Surcharge (γ_E)	Load	1.50	0.75
Limiting Eccentricity Due To Overturning (Φ)	Eccentricity	$B_{Req}/4$	
Soil Bearing Capacity (Φ Bearing)	Resistance	0.65	
Sliding Frictional Resistance (Soil - Soil) (Φ Sliding)	Resistance	1.0	
Sliding Frictional Resistance (Soil - Soil Reinforcement) (Φ Sliding)	Resistance	1.0	

Table 1-2 MSE Wall Service I Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
DC: Dead Load of Components and Attachments (γ_D)	Load	1.00	
LS: Live Load Surcharge (γ)	Load	1.00	
EH: Horizontal Earth Pressure - Active (γ_E)	Load	1.00	
EV: Vertical Earth Pressure - Overall Stability (γ_E)	Load	1.00	
EV: Vertical Earth Pressure - MSE Walls (γ_E)	Load	1.00	
ES: Earth Surcharge (γ_E)	Load	1.00	
Lateral Displacement (Φ)	Resistance	1.00	
Vertical Displacement (Φ)	Resistance	1.00	
Global Stability (Fill Walls) (Φ Stability)	ROC = I, II	Resistance	
	ROC = III	Resistance	

Table 1-3 MSE Wall Extreme Event I Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
		MAX.	MIN.
DC: Dead Load of Components and Attachments (γ_D)	Load	1.00	
LS: Live Load Surcharge (γ)	Load	0.50	0.00
EH: Horizontal Earth Pressure - Active (γ_E)	Load	1.00	
EV: Vertical Earth Pressure - Overall Stability (γ_E)	Load	1.00	
EV: Vertical Earth Pressure - MSE Walls (γ_E)	Load	1.00	0.0
ES: Earth Surcharge (γ_E)	Load	1.00	0.0
EQ: Earthquake (γ)	Load	1.00	
Limiting Eccentricity Due To Overturning (Φ_{eq})	Eccentricity	$B_{Req}/3$	
Soil Bearing Capacity (Φ Bearing-eq)	Resistance	1.00	
Sliding Frictional Resistance (Soil - Soil) (Φ Sliding)	Resistance	0.95	
Sliding Frictional Resistance (Soil - Soil Reinforcement) (Φ Sliding-eq)	Resistance	1.00	
Lateral Displacement (Φ)	Resistance	1.00	
Vertical Displacement (Φ)	Resistance	1.00	
Global Stability (Fill Walls) (Φ Stability-eq)	FEE	Resistance	
	SEE	Resistance	

- Assume responsibility for the design of the MSE wall internal stability. Internal stability load and resistance factors are presented in Tables 1-4 and 1-5. Load factors outlined in Table 1-4 are for Extreme Event II only. Load Factors used for internal stability analysis at other limit states are defined in Tables 1-1 through 1-3.

Table 1-4 MSE Wall Extreme Event II Limit State Design Criteria

Design Parameter	Factor Type	Factor Value	
		MAX.	MIN.
DC: Dead Load of Components and Attachments (γ_D)	Load	1.00	
LS: Live Load Surcharge (γ)	Load	0.50	
EH: Horizontal Earth Pressure - Active (γ_E)	Load	1.00	
EV: Vertical Earth Pressure - Overall Stability (γ_E)	Load	1.00	
EV: Vertical Earth Pressure - MSE Walls (γ_E)	Load	1.00	0.0
ES: Earth Surcharge (γ_E)	Load	1.00	0.0
CT: Vehicular Collision (γ)	Load	1.00	

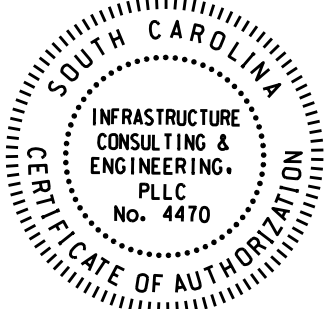
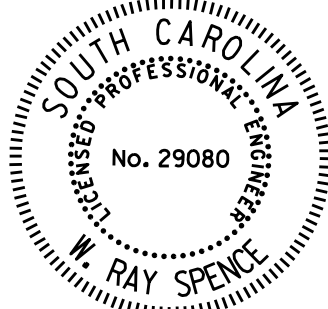
Table 1-5 Internal Stability Resistance Factors

Performance Limit		Factor Value		
		Strength	Service	Extreme Event I and II
① Tensile Resistance of Metallic Reinforcement and Connectors	Strip Reinforcement	0.75	N/A	1.00
	② Grid Reinforcement	0.65		0.85
Tensile Resistance of Geosynthetic Reinforcement and Connectors		0.90	N/A	1.20
Pullout Resistance of Tensile Reinforcement		0.90	N/A	1.20


- ① Apply to gross cross-section less sacrificial area. For sections with holes, reduce the gross area and apply to net section less sacrificial area.
- ② Applies to grid reinforcements connected to a rigid facing element (concrete panel or block). For grid reinforcements connected to a flexible facing mat or which are continuous with the facing mat, use the resistance factor for strip reinforcements.

Additional Requirements:

- For leveling pad, provide Class 2500 concrete.
- For 4" concrete slope protection ditches, provide Class 2500 concrete.
- Any portion of wall coping sloped at 2H:1V or steeper must be cast-in-place concrete and anchored with dowels.
- Do not attach traffic barrier, pedestrian railing, or moment slab to MSE wall facing or wall coping.
- Determine the location of all guardrail posts behind wall facing. Show guardrail post locations on the Shop Plans. Prior to placement of soil reinforcement, individual reinforcing strips/mesh may be skewed (15° Max.) to avoid post locations. No cutting of soil reinforcement is allowed. Repair any damage done to the soil reinforcement due to guardrail installation at no additional expense to the Department.
- To ensure that the wall does not have a negative slope or batter (Slope outward from the face) after completion of construction, a batter is recommended. Monitor the actual movement of panels during the placement and compaction of each lift of backfill and adjust the amount of batter as needed according to field conditions. In accordance with Supplemental Technical Specification SC-M-713 (01/19), walls constructed with negative batter are not acceptable.



REV. 0	WRS	09-22-22
	RFC	PLANS
REV.	BFS	WRS 05-22
	Updated for	Bridge
REV.	JXY	SAN 3-14
	New	Border
REVIEWED	WRS	06-22
QUAN.		
DR.	MRW	SAN 2-12
DES.	JPF	KLC 4-22
	BY	CHK. DATE



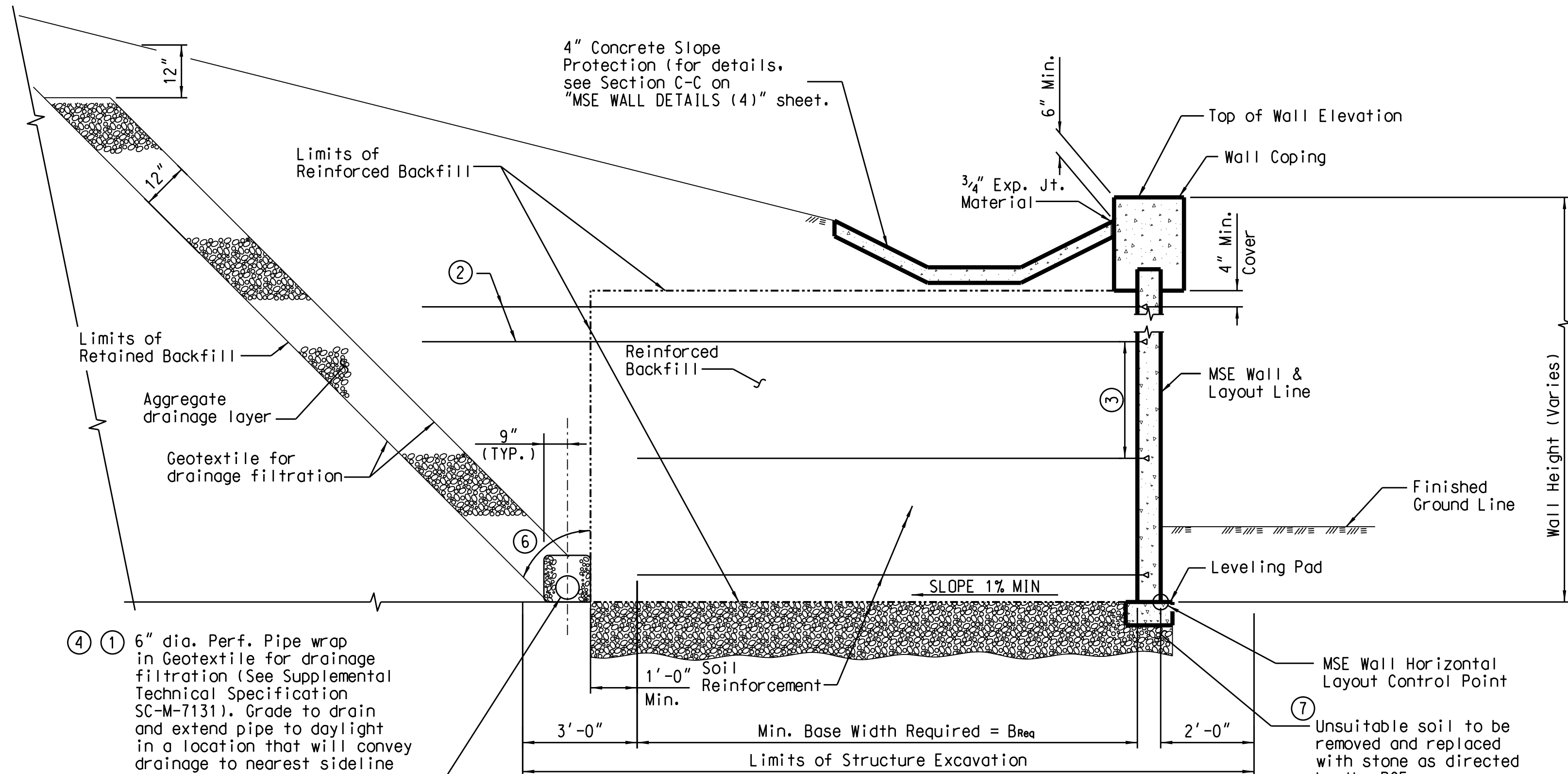
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MSE WALL DETAILS (1)

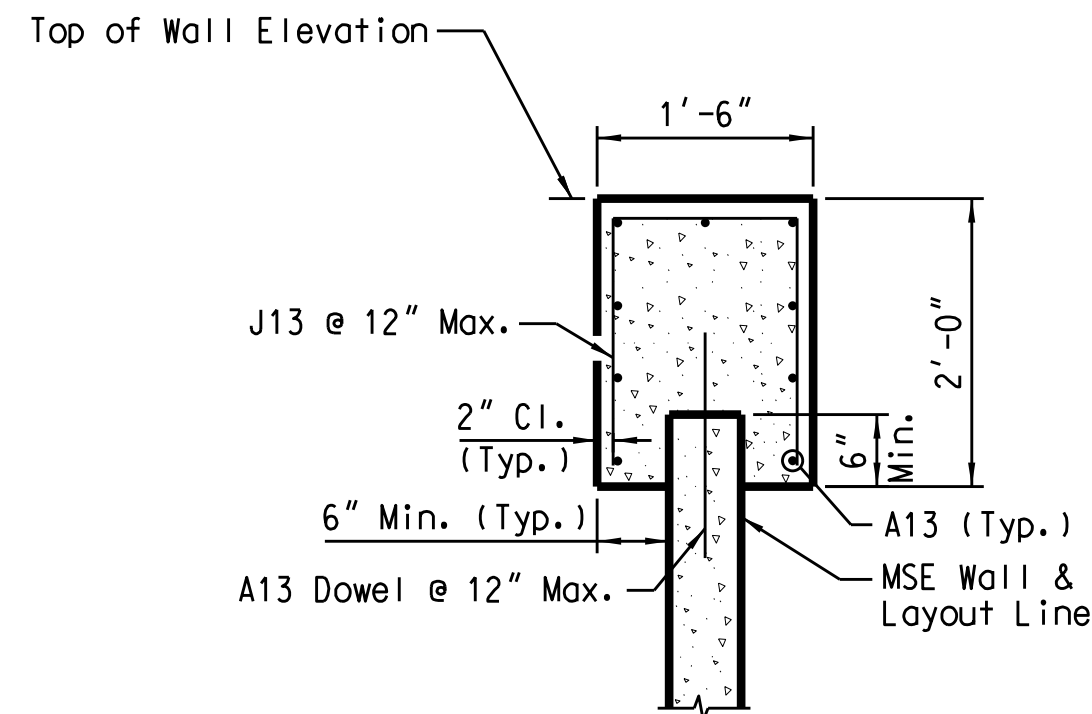
RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLANDROUTE RAMP F

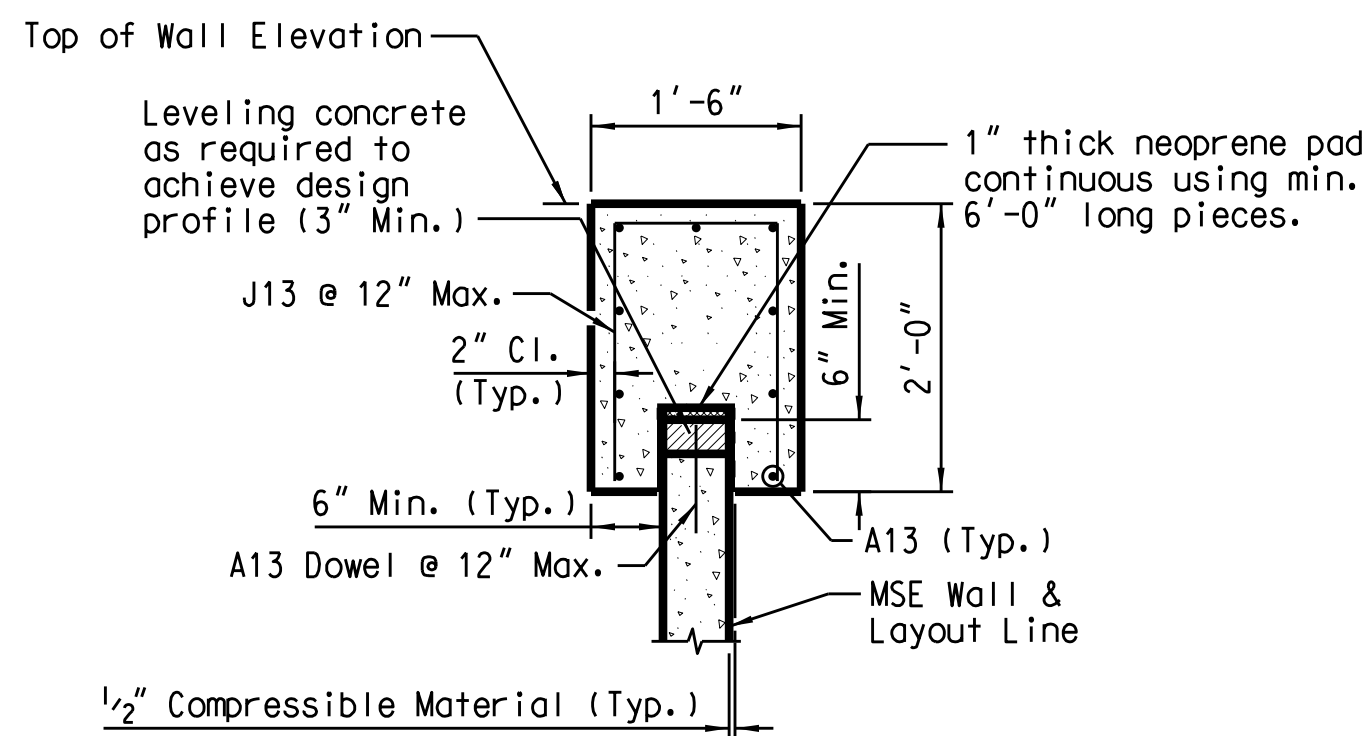
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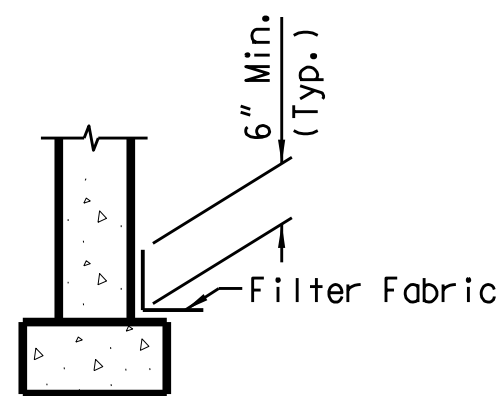
TYPICAL SECTION



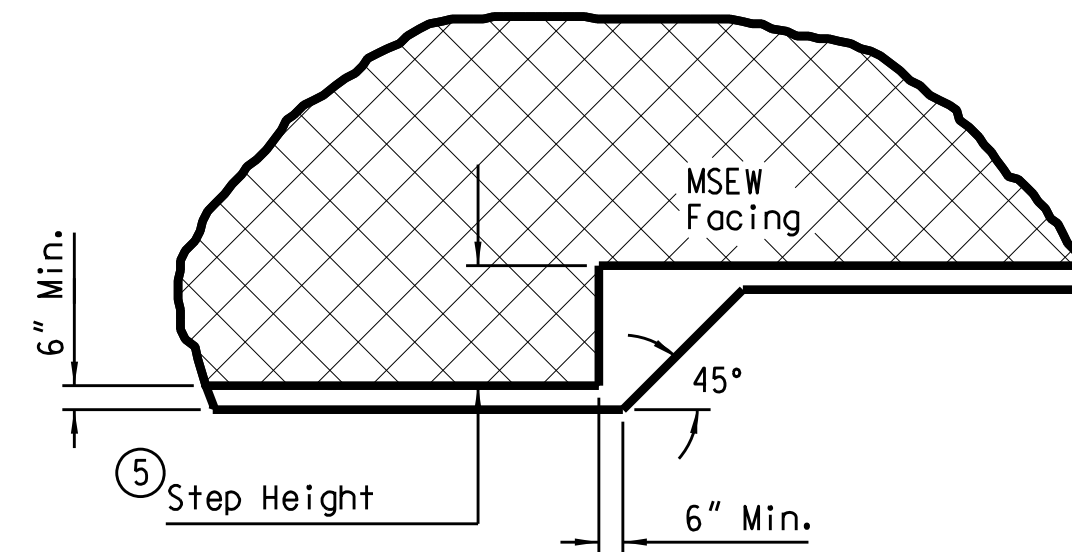
SECTION THRU
CAST-IN-PLACE WALL COPING



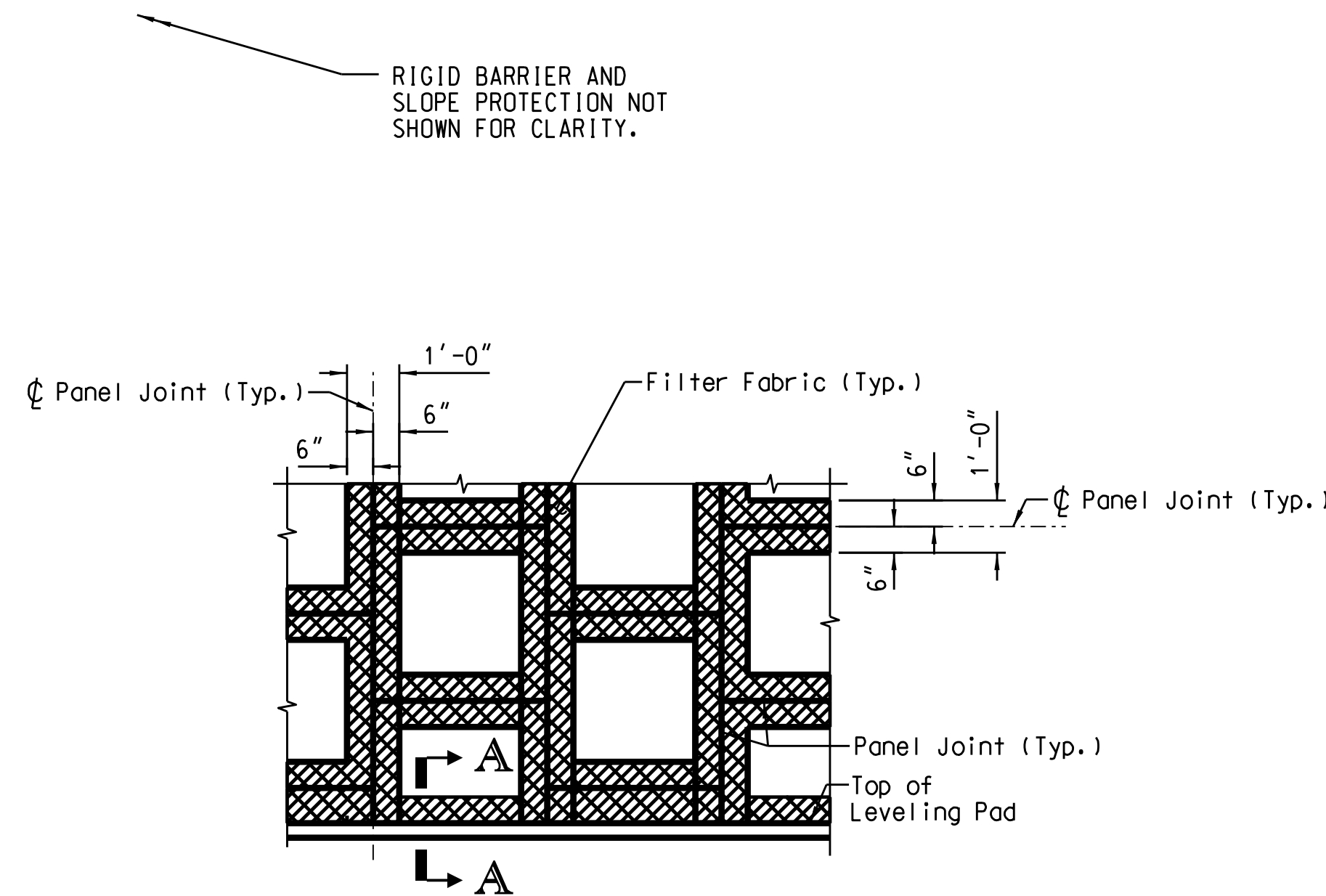
SECTION THRU PRECAST WALL COPING



SECTION A-A

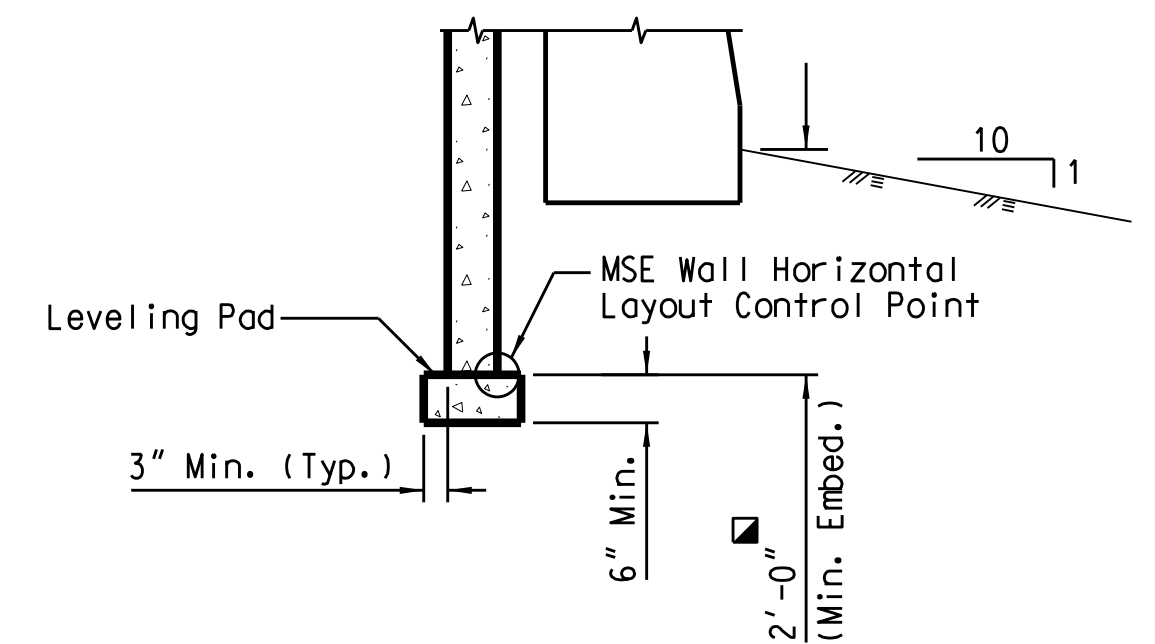


LEVELING PAD STEP DETAIL



LAYOUT OF FILTER FABRIC AT
FILL FACE OF PANEL JOINTS

- ① 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.
- ② Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.
- ③ Maximum vertical spacing of soil reinforcement is 36".
- ④ 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.
- ⑤ Limit step height for panel facing to 1/2 of the full panel height.
- ⑥ 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.
- ⑦ 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



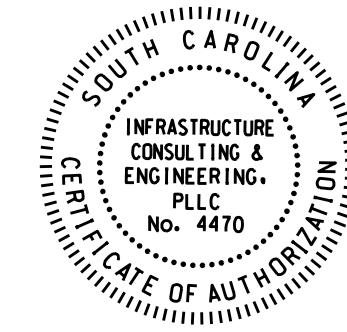
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MSE WALL DETAILS (2)

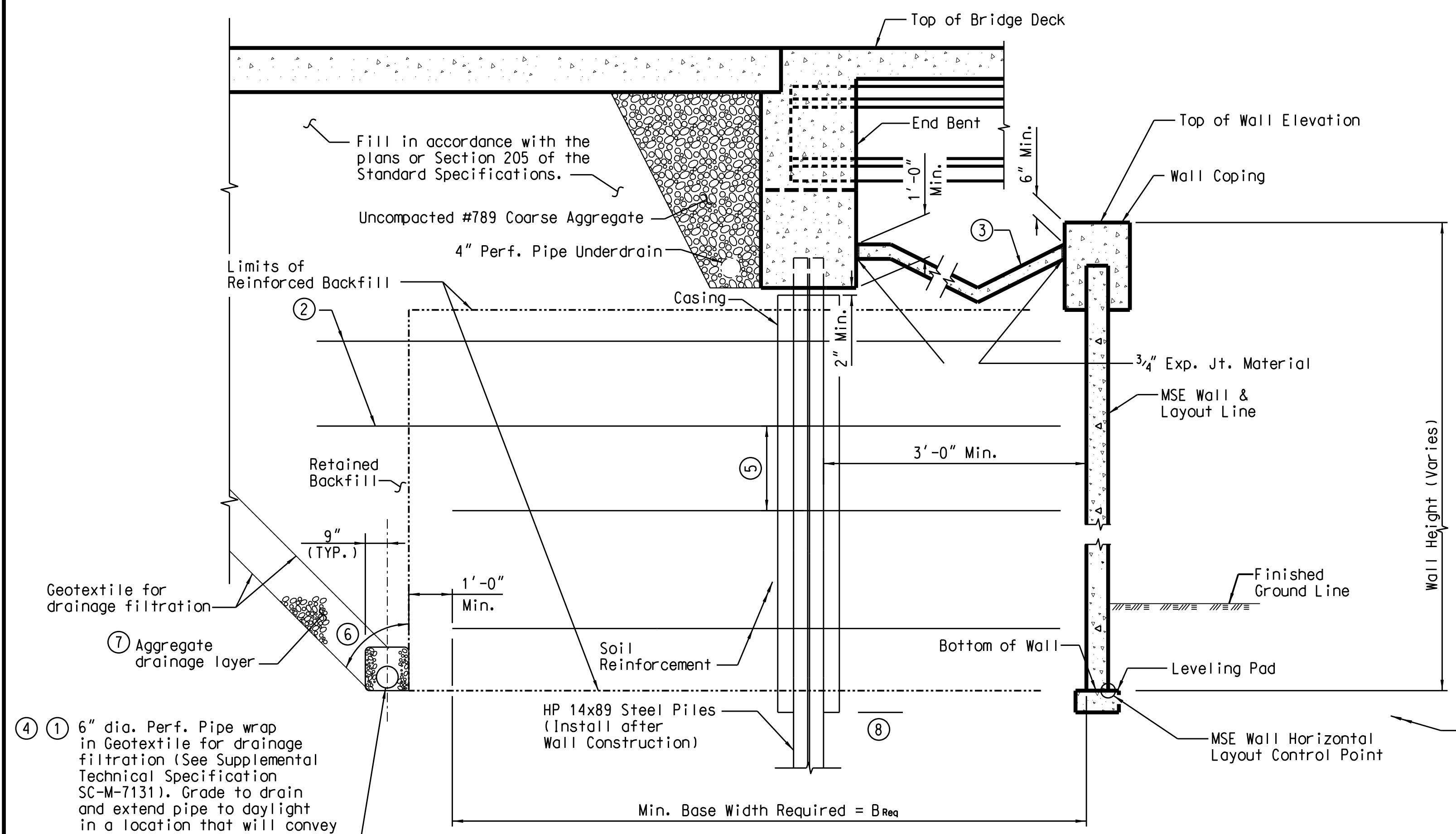
RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND

ROUTE RAMP F

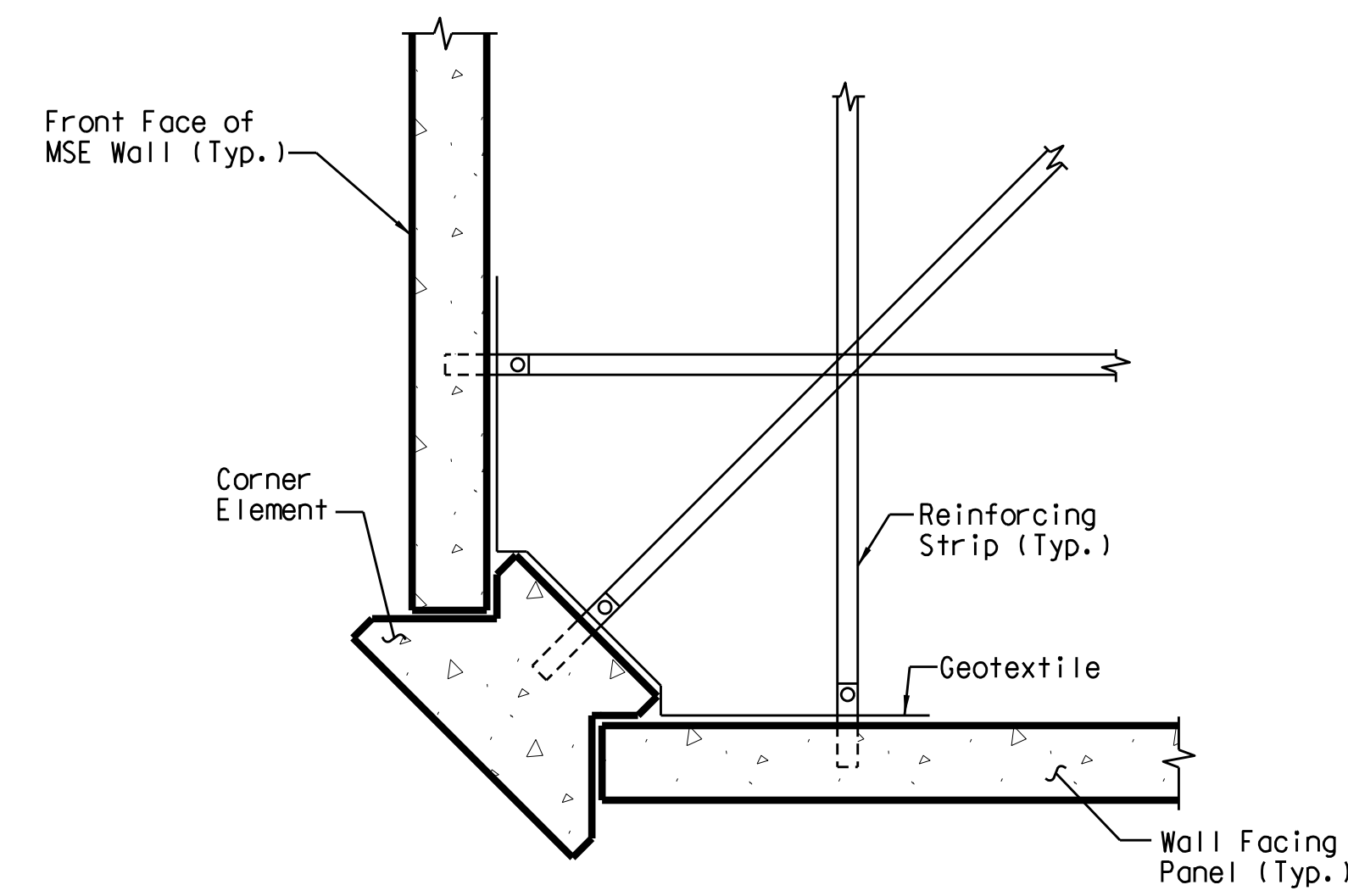


REV.	WRS	09-22-22
0	RFC	PLANS
REV.	BFS	WRS 05-22
		Updated for Bridge
REV.	JXY	SAN 3-14
		New Border
REVIEWED	WRS	06-22
QUAN.		
DR.	MRW	SAN 2-12
DES.	JPF	KLC 4-22
BY	CHK.	DATE



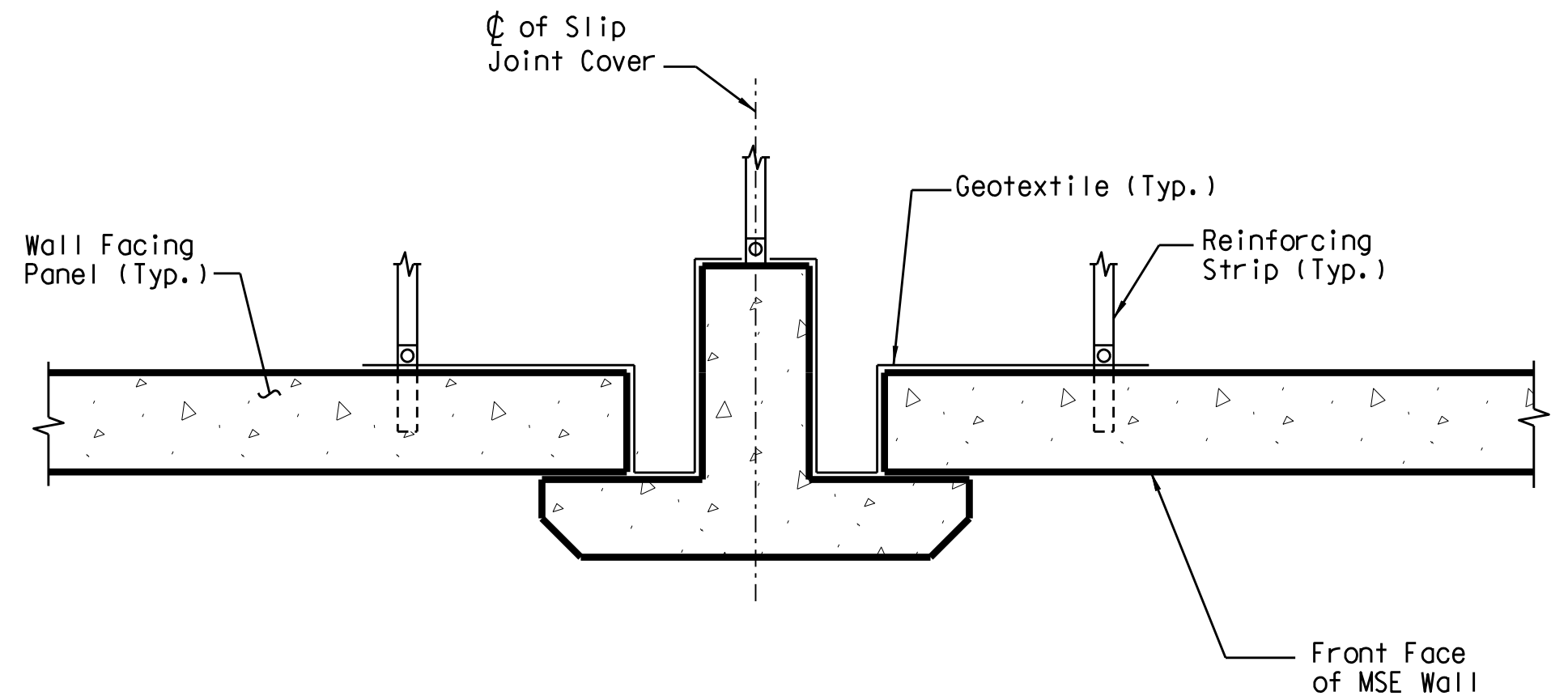
- ④ ① 6" dia. Perf. Pipe wrap in Geotextile for drainage filtration (See Supplemental Technical Specification SC-M-713). Grade to drain and extend pipe to daylight in a location that will convey drainage to nearest sideline ditch or catch basin. Protect outlet with Class A rip rap.
- ② Extend top two layers of soil reinforcement 5 feet beyond the end of the lower layers of soil reinforcement.
- ③ 4" Concrete Slope Protection in ditch. For details, see Section A-A on "MSE Wall Details (4)" Sht.
- ④ 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).
- ⑤ Maximum vertical spacing of soil reinforcement is 36".
- ⑥ 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.
- ⑦ Provide aggregate, other than Macadam, that meets the requirements for stone backfill in Supplemental Technical Specification SC-M-713.
- ⑧ Extend casing to bottom of leveling pad elevation.

TYPICAL SECTION AT END BENTS

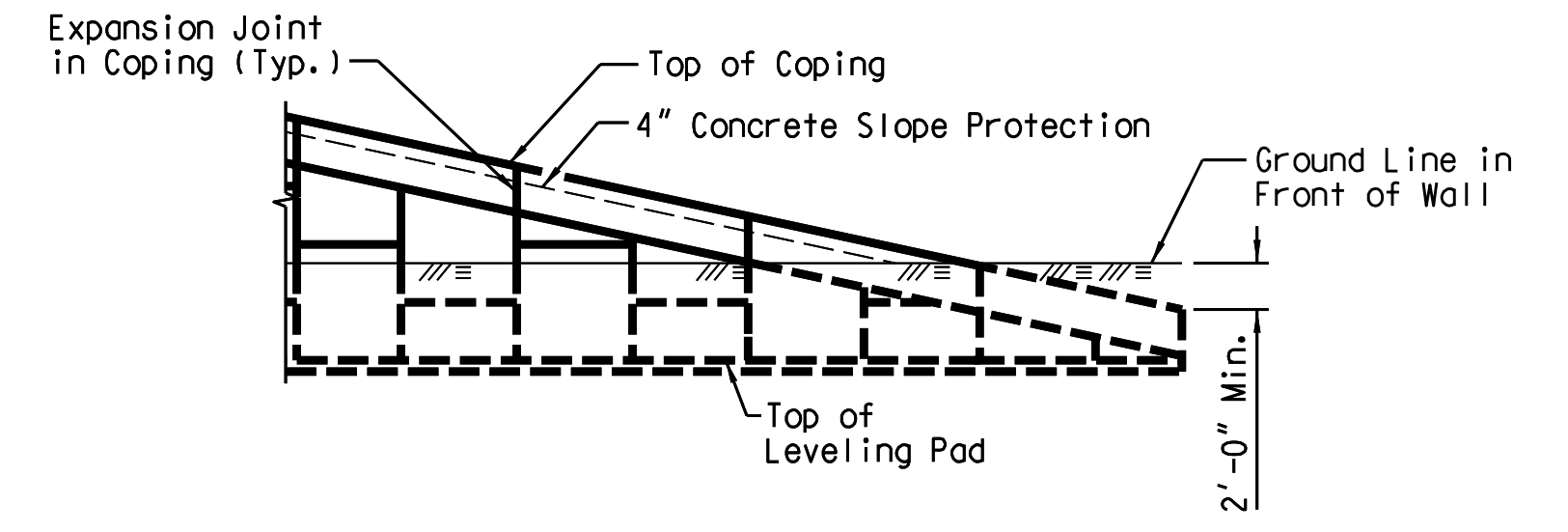


OUTSIDE CORNER DETAIL

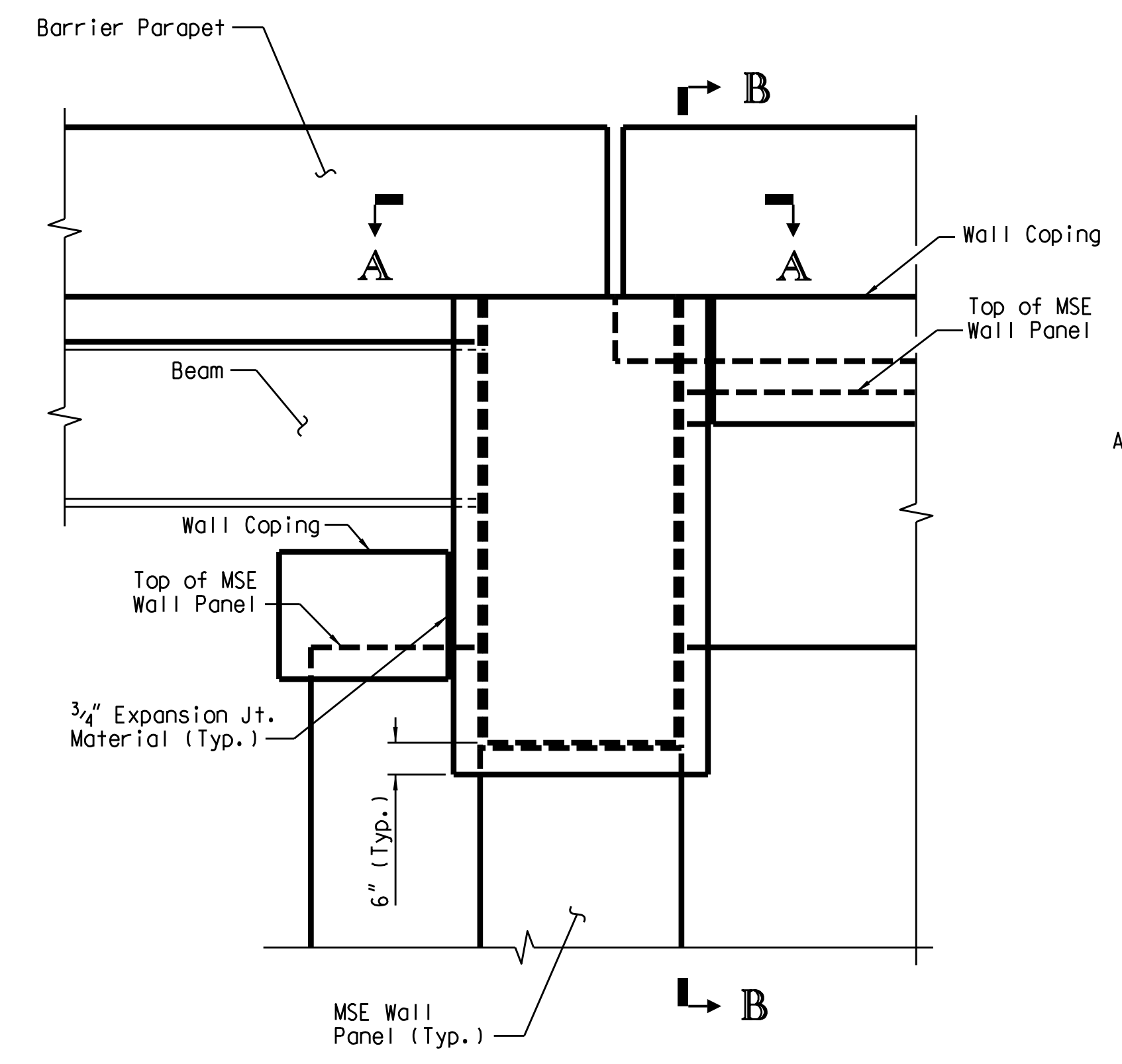
Acute angles less than 70° not permitted



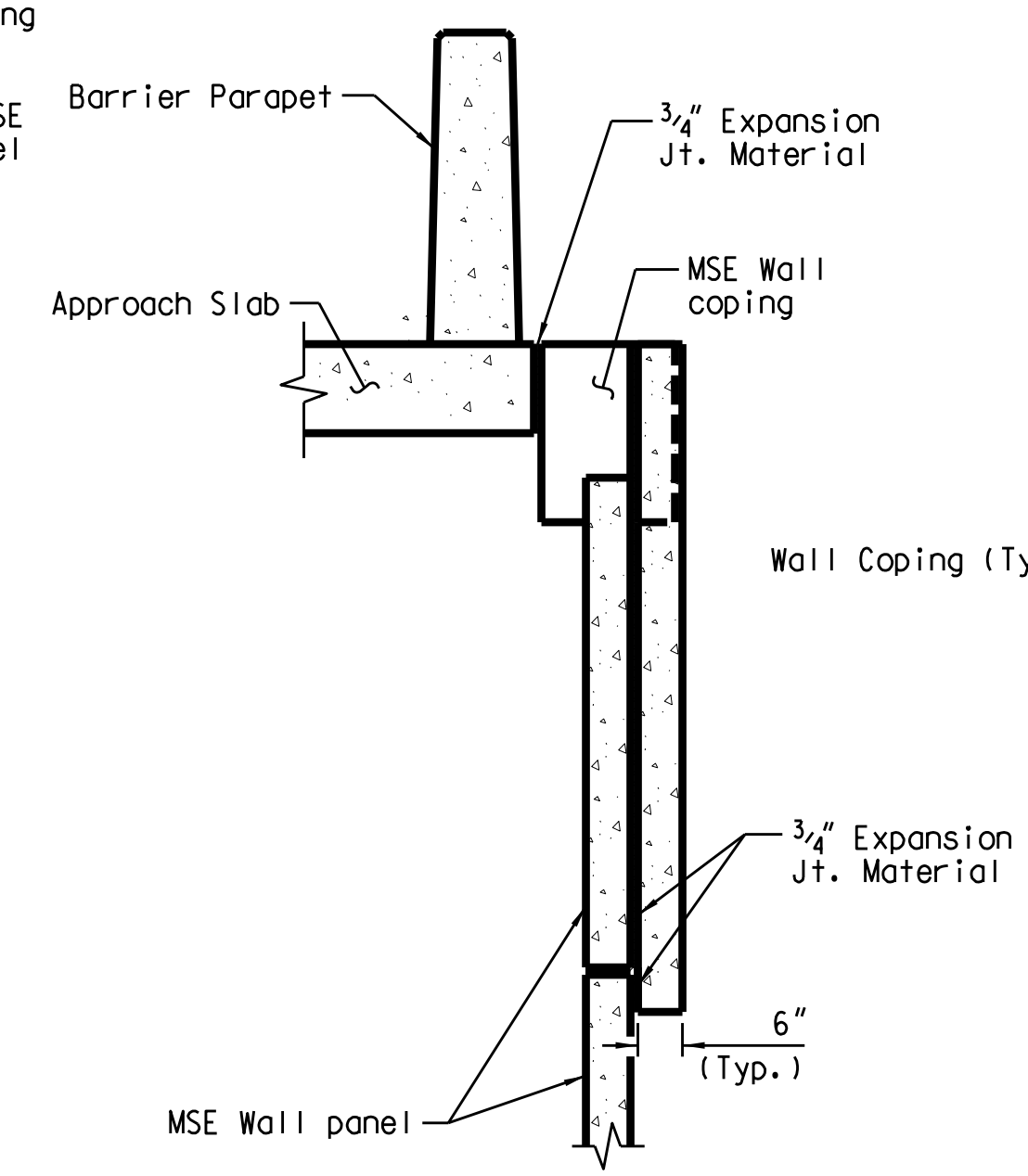
SLIP JOINT DETAIL - PRECAST PANELS



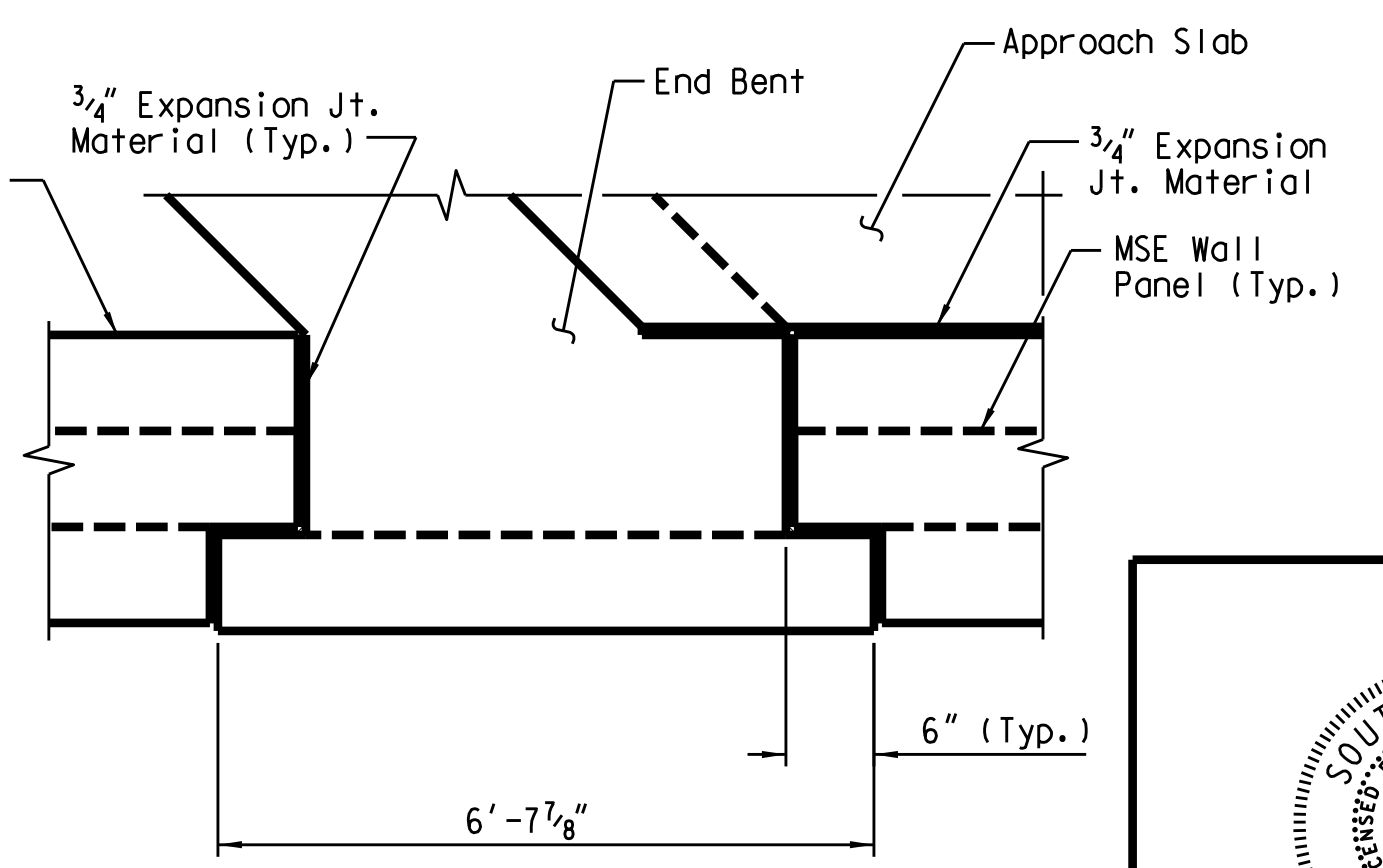
WALL TERMINATION DETAIL



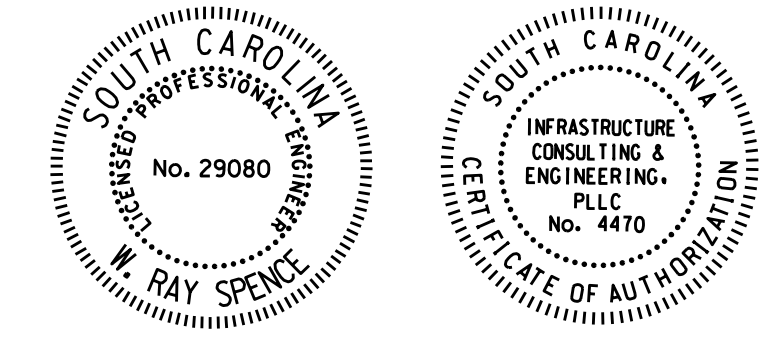
ELEVATION - END OF END BENT



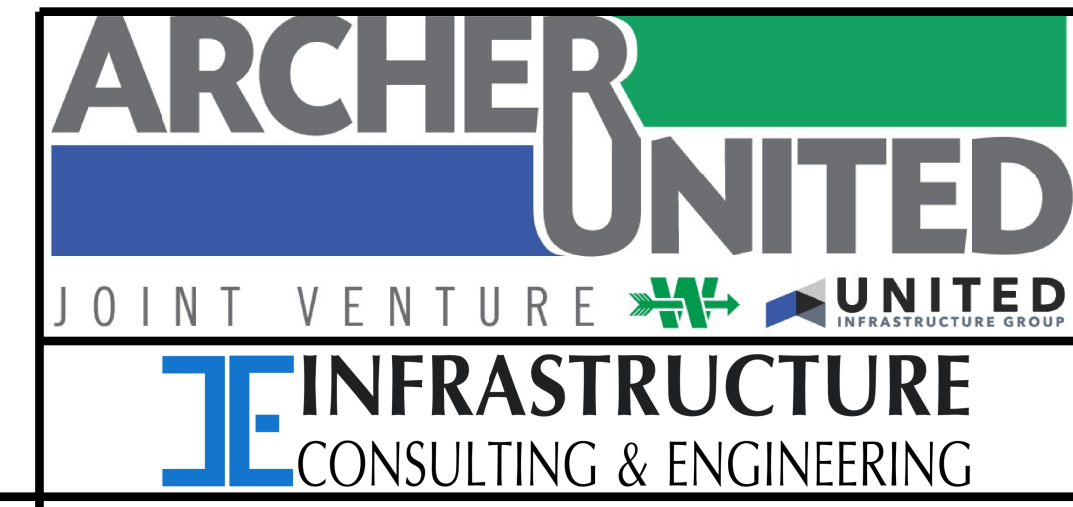
SECTION B-B



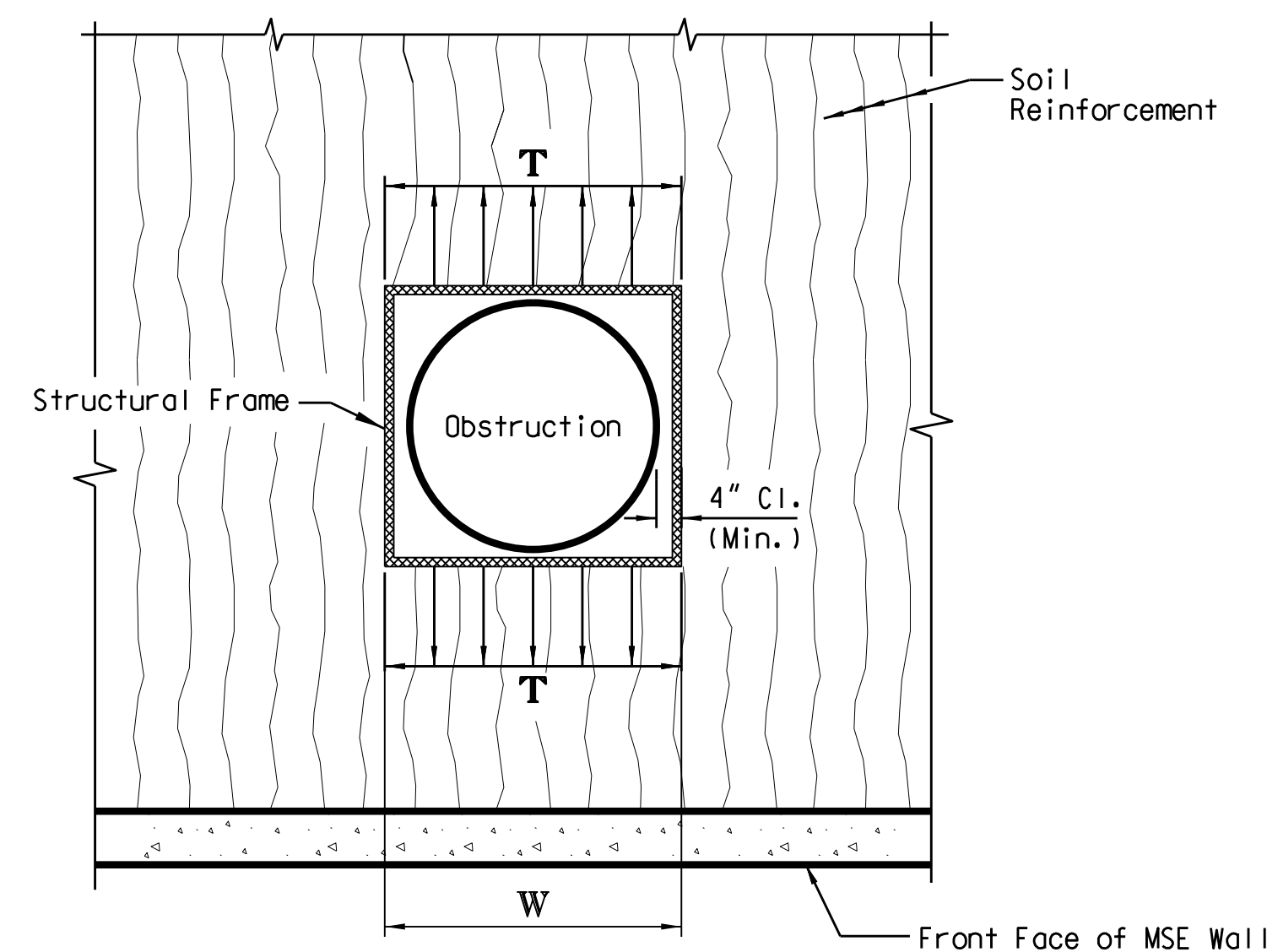
SECTION A-A
(Slab not Shown)



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		RFC	PLANS
REV.		BFS	WRS 05-22
		Updated for Bridge	
REV.		JXY	SAN 3-14
		New Border	
REVIEWED		WRS	06-22
QUAN.			
DR.	MRW	SAN	2-12
DES.	JPF	KLC	4-22
	BY	CHK.	DATE

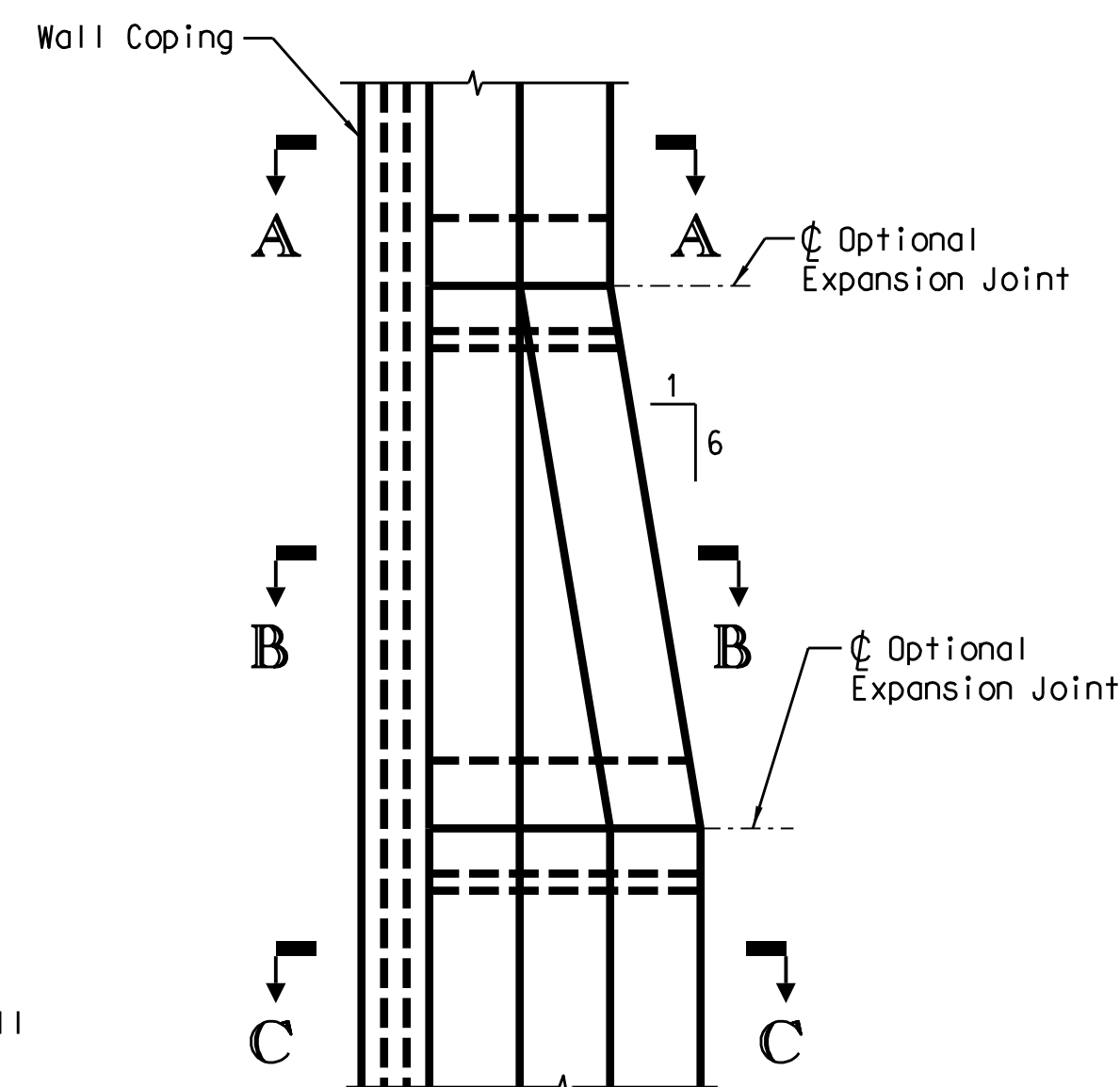


SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
MSE WALL DETAILS (3)	
RAMP F BRIDGE OVER I-20 CD	
COUNTY	RICHLAND
ROUTE	RAMP F

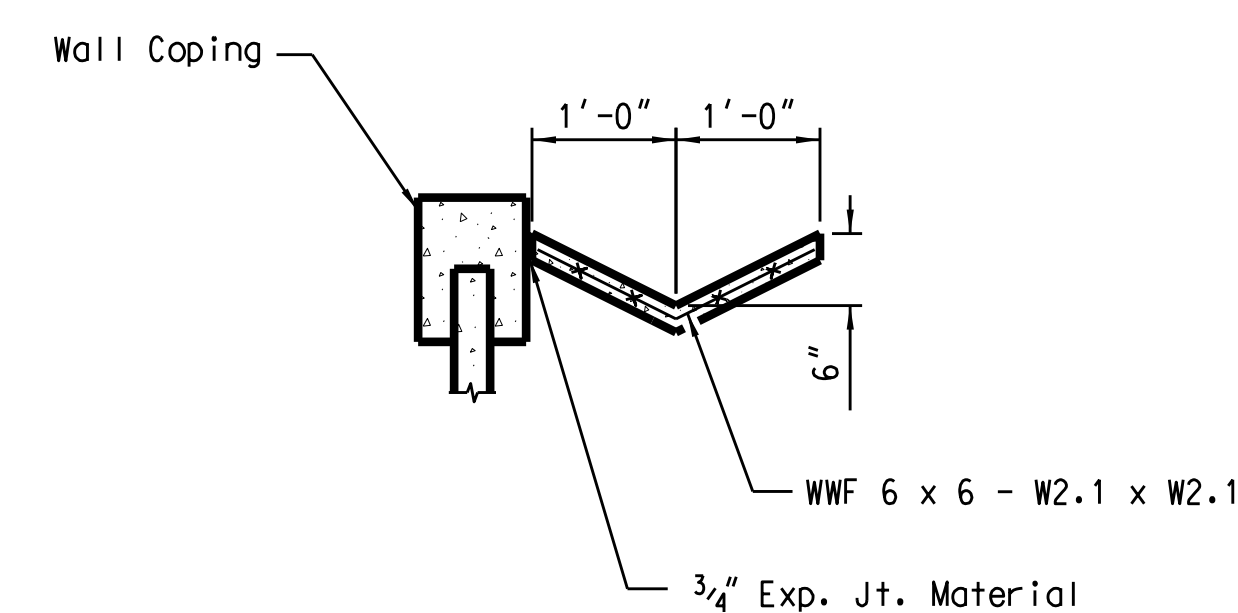


MSE WALL OBSTRUCTION
(VERTICAL) WITH STRUCTURAL FRAME ^①
(Plan View)

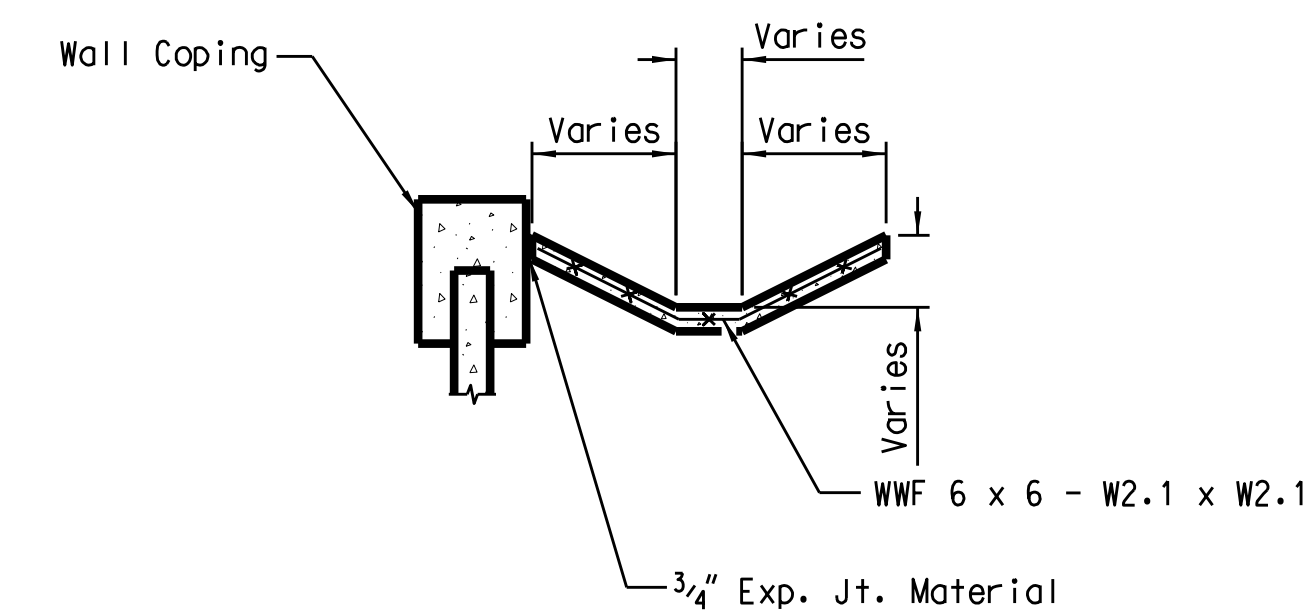
T = Total Load Which Structural Frame Must Carry = $T_{max} \times W$
 T_{max} = Max. Reinforcement Unit Tensile Load



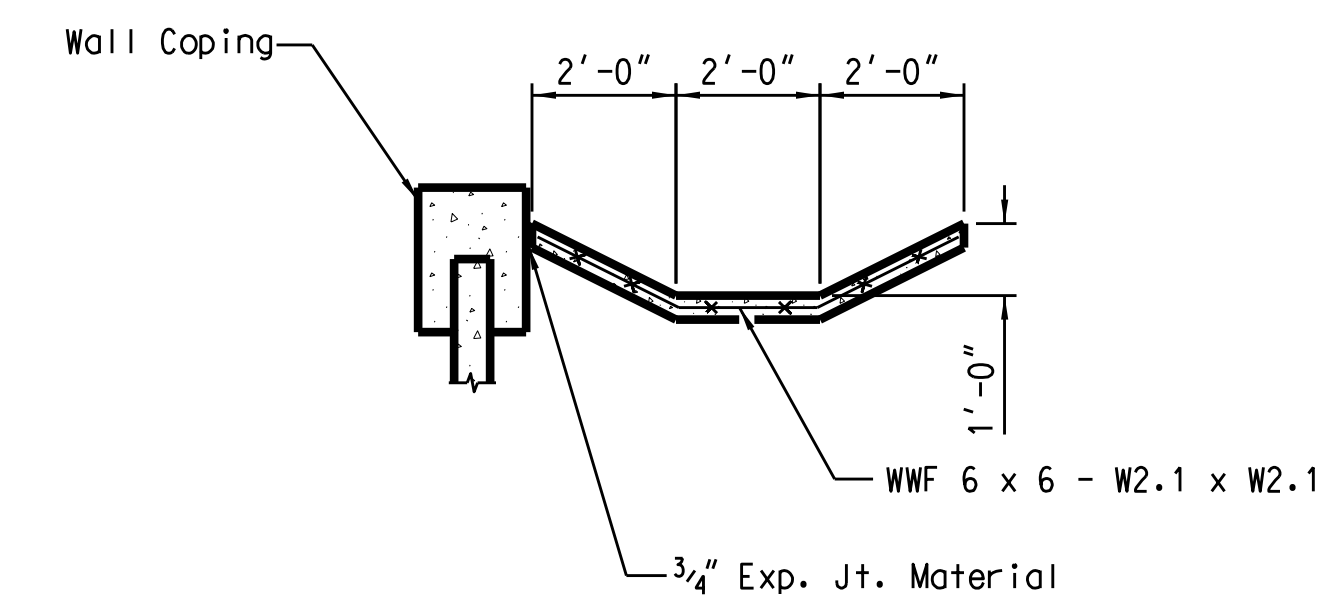
DITCH TRANSITION



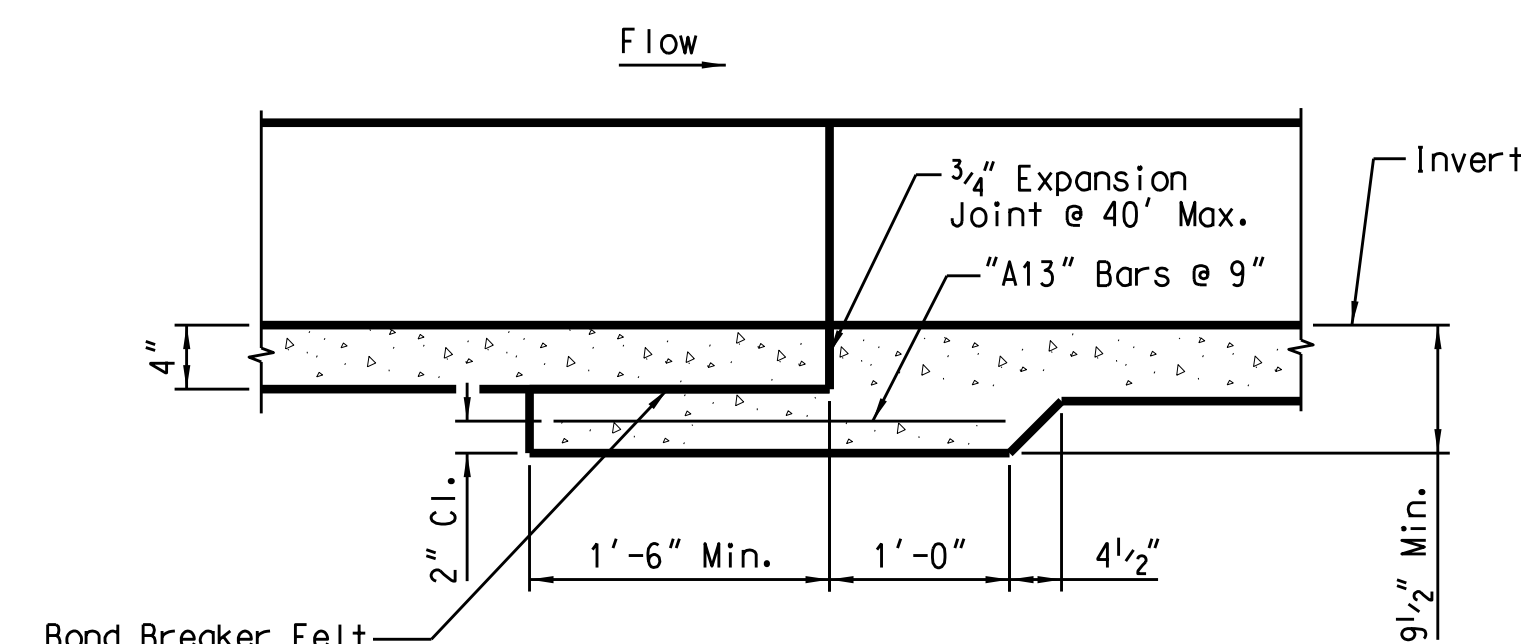
SECTION A-A



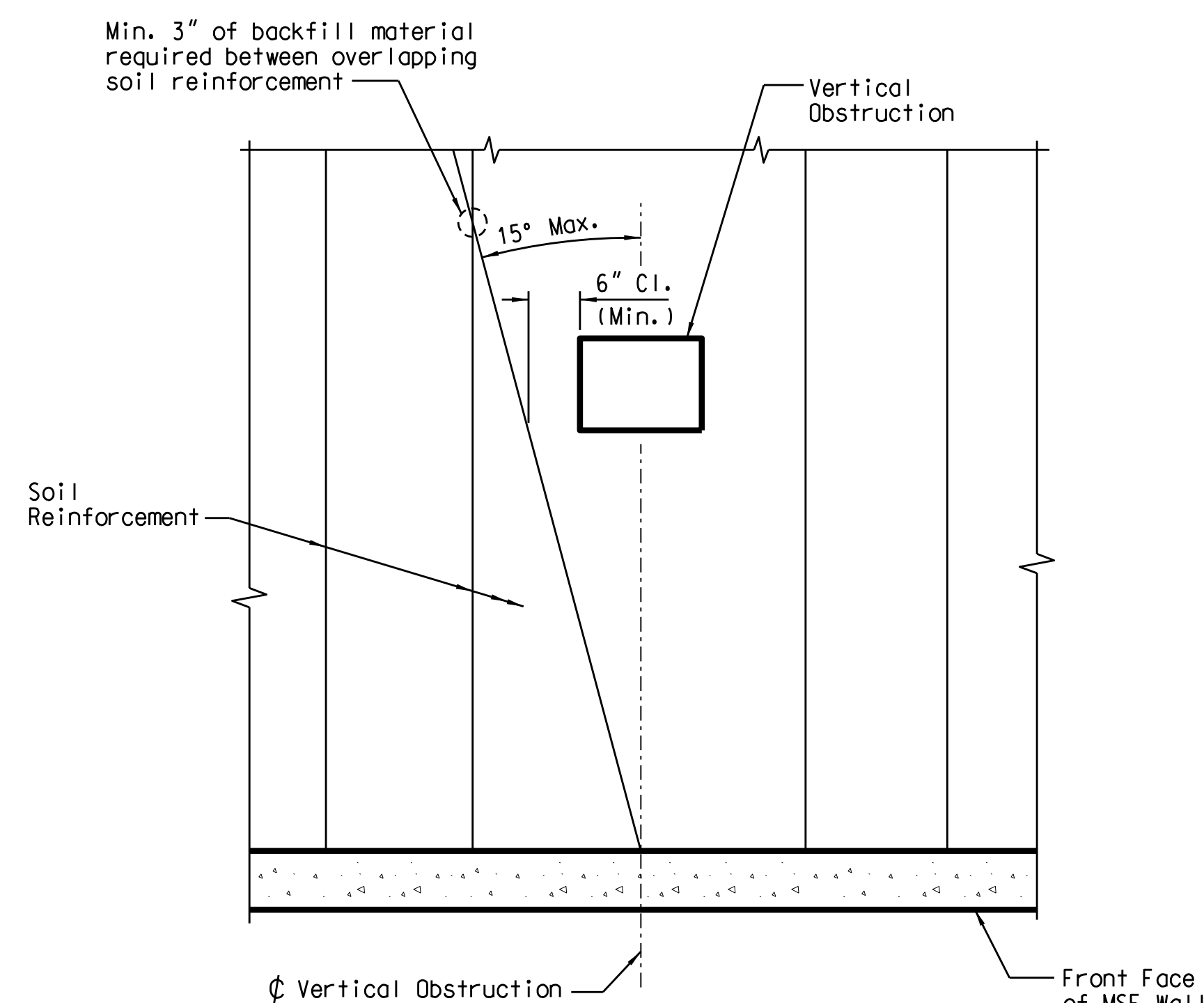
SECTION B-B



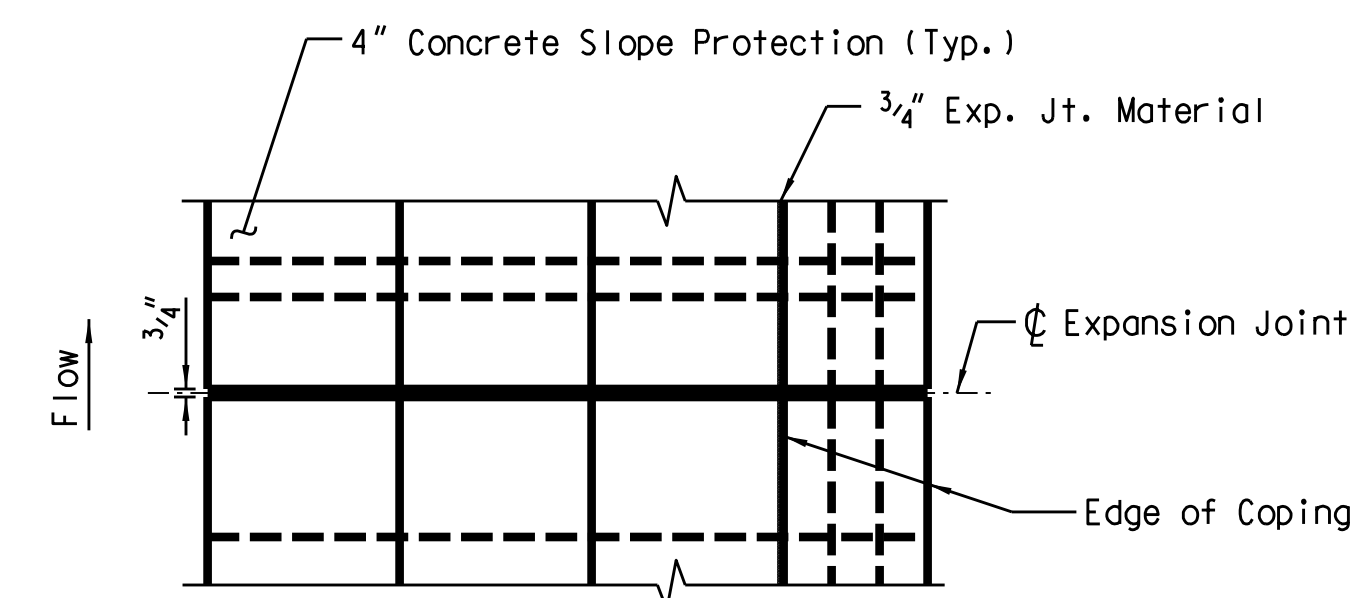
SECTION C-C



SECTION THRU DITCH
AT EXPANSION JOINT



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



PART. PLAN OF DITCH
AT EXPANSION JOINT

The diagram illustrates the transition distance for a pipe passing under an obstruction. Key dimensions and features include:

- Obstruction Height:** The vertical distance from the ground to the top of the obstruction is labeled $n_1' + n_2'$.
- Ground Level:** The vertical distance from the ground to the top of the pipe is labeled $4''$.
- Minimum Clearance:** The vertical distance from the ground to the top of the pipe is labeled **Min.**
- Transition Distance:** The horizontal distance from the start of the transition to the obstruction is labeled X'' .
- Obstruction Width:** The horizontal distance from the end of the transition to the obstruction is labeled $6''$.
- Angle:** The angle of the transition is labeled 15° Max.
- Smooth Curves:** A note indicates "Smooth Curves (no kinks) (Typ.)" with a line pointing to the transition curve.

The diagram illustrates the transition distance for a pipe crossing an obstruction. Key features include:

- Soil Reinforcement:** Indicated by a bracket on the left side of the pipe.
- Obstruction:** A circular feature representing a pipe or structure that the main pipe crosses.
- Transition Distance:** The horizontal distance from the end of the soil reinforcement to the start of the smooth curves, labeled as x'' .
- Smooth Curves:** The section of the pipe that transitions from the straight section to the main pipe, labeled as "Smooth Curves (no kinks) (Typ.)".
- Dimensions:**
 - A vertical dimension of $4''$ is shown for the soil reinforcement.
 - A vertical dimension of $15''$ is shown for the main pipe.
 - A horizontal dimension of $6''$ is shown for the smooth curve section.
 - An angle of 15° Max. is indicated for the smooth curve.

TRANSITION DISTANCE
(Over Obstruction)

Pipe Inside Diameter	Pipe Radius "r"	" χ_n " ¹	" χ_n " 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)

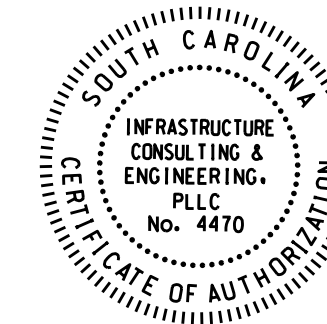
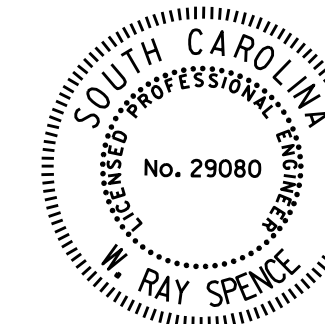


**SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION**

MSE WALL DETAILS (4)

RAMP F BRIDGE OVER
I-20 CD

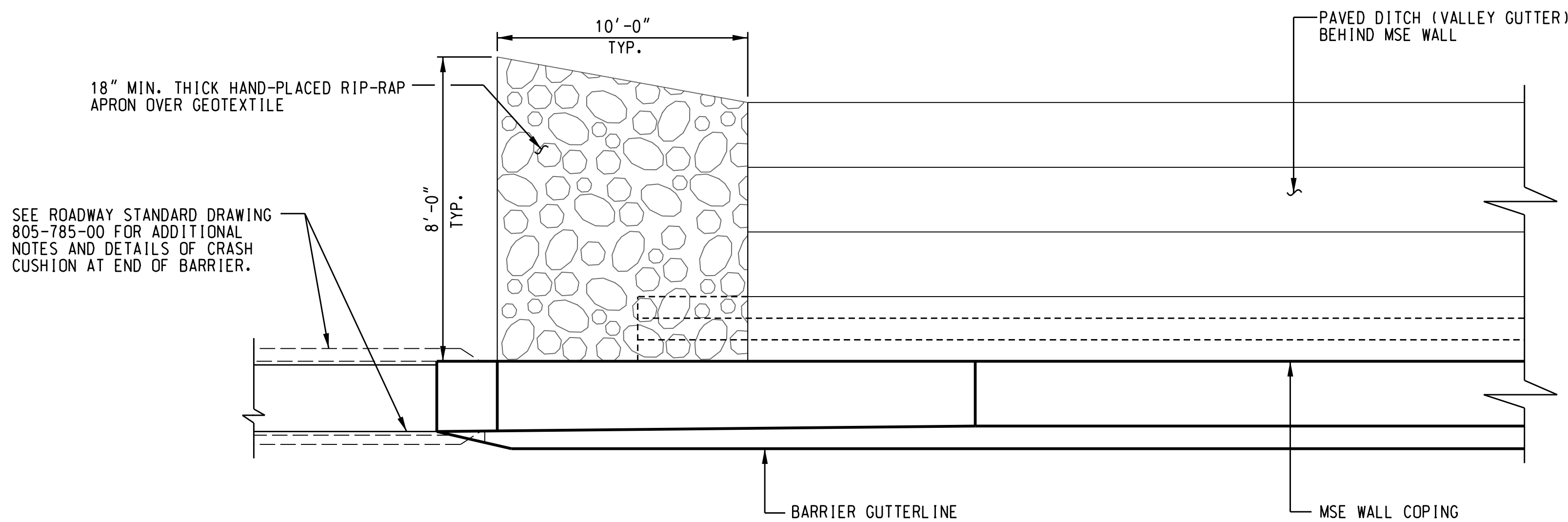
COUNTY	RICHLAND	ROUTE	RAMP F
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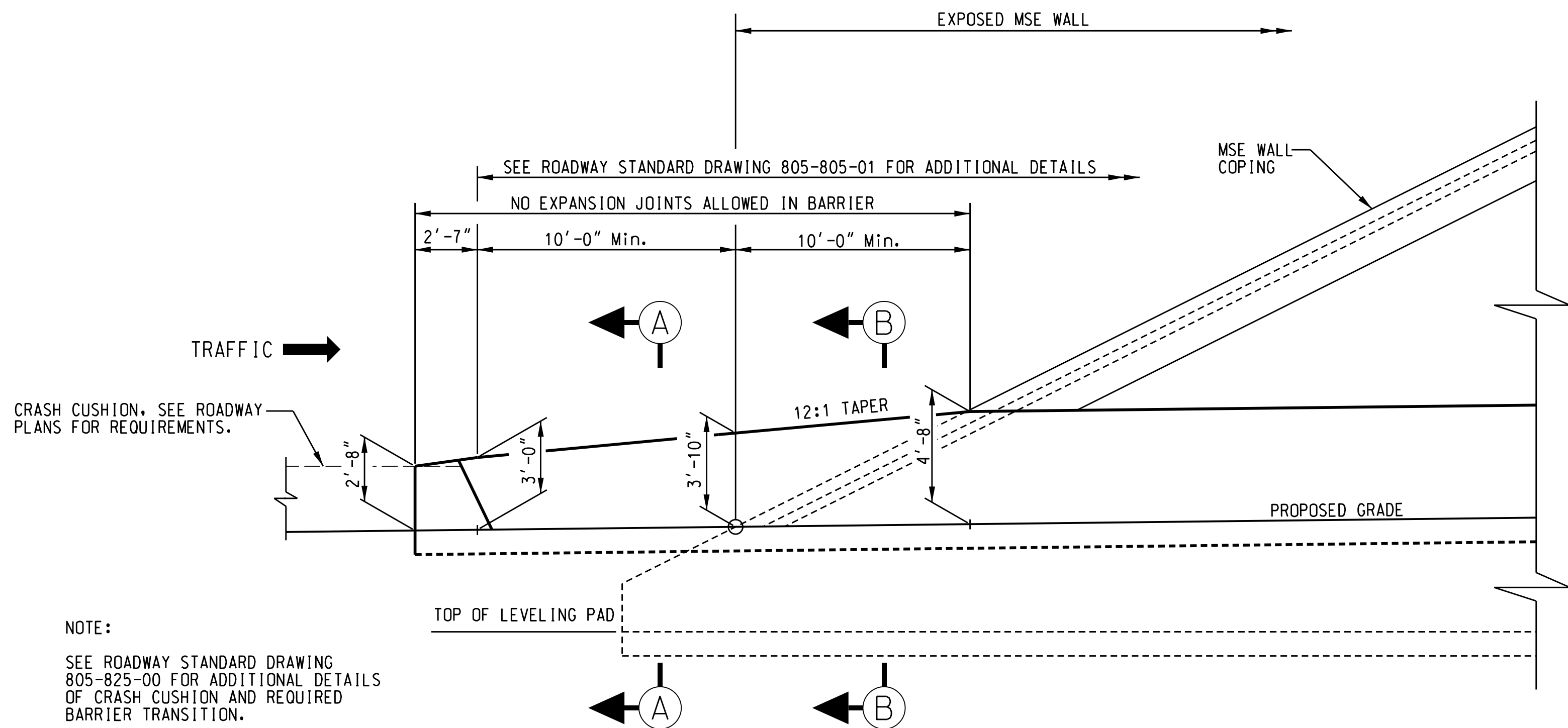
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0	RFC PLANS		
REV.	BFS	WRS	05-2
	Updated for Bridge		
REV.	JXY	SAN	3-1
	New Border		
REVIEWED	WRS	06-22	
QUAN.			
DR.	MRW	SAN	2-12
DES.	JPF	KLC	4-22
	DK	CHK	DATE

Z:\Projects\20-81CCR Ph 2\Structures\02.New Bridges\Bridge 44\04_Final Plans\47_BRIDGE 44_RIGID BARRIER DETAILS.dgn
9/22/2022 4:18:02 PM

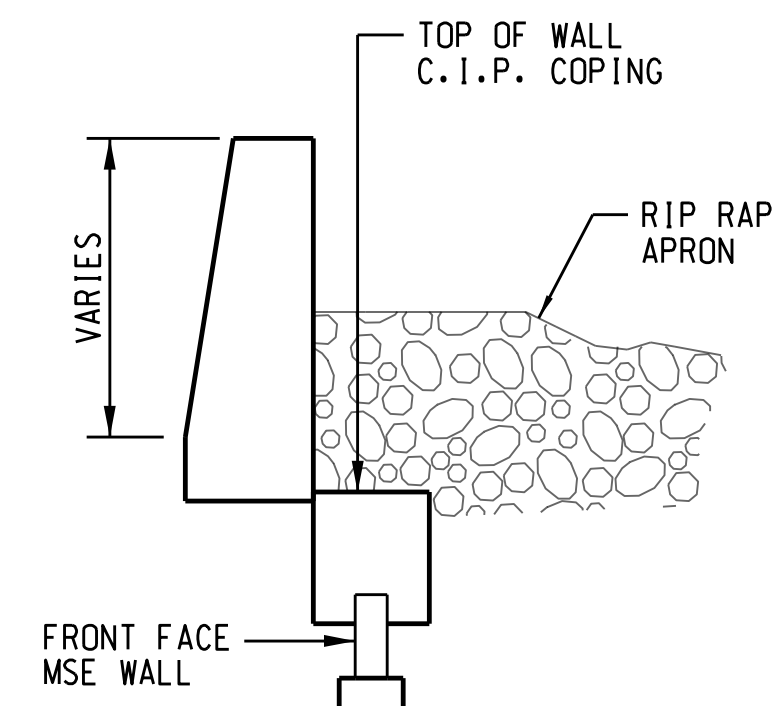
BRIDGE PLANS ID	SHEET NO.
P039719-B44	47



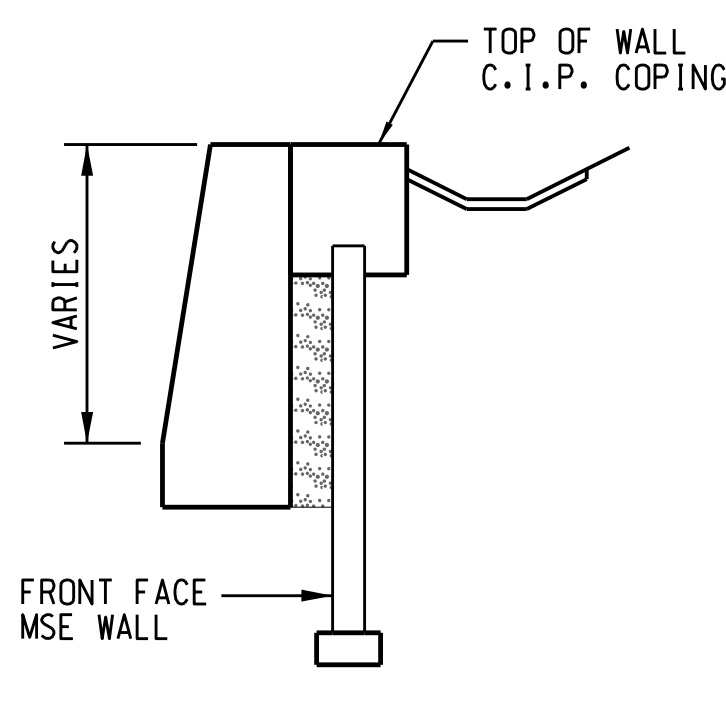
PARTIAL PLAN OF RIGID BARRIER - MSE WALL



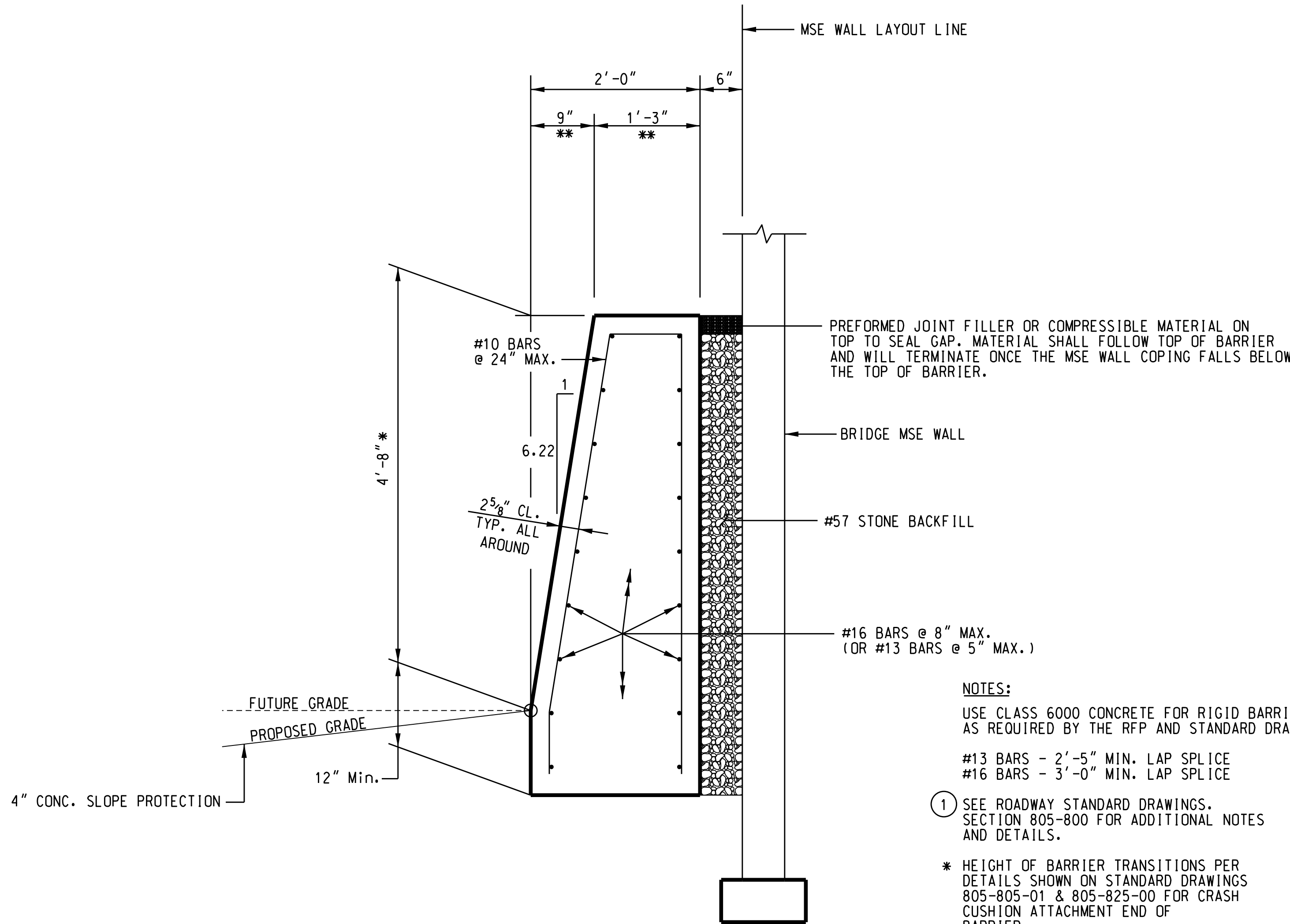
PARTIAL ELEVATION OF RIGID BARRIER



SECTION A-A



SECTION B-B



CONCRETE RIGID BARRIER SECTION
(PER RFP)



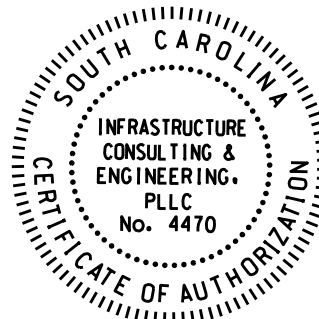
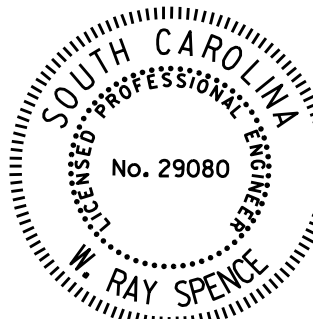
INFRASTRUCTURE
CONSULTING & ENGINEERING

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

RIGID BARRIER DETAILS

RAMP F BRIDGE OVER
I-20 CD

COUNTY RICHLAND ROUTE RAMP F



REV.	WRS	09-22-22
0	RFC	PLANS
REV.		
REV.		
REVIEWED	WRS	06-22
QUAN.		
DR.	BFS	WRS 05-22
DES.		
BY	CHK.	DATE