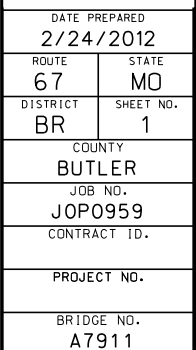



SEC/SUR 3 TWP 23N RGE 5E

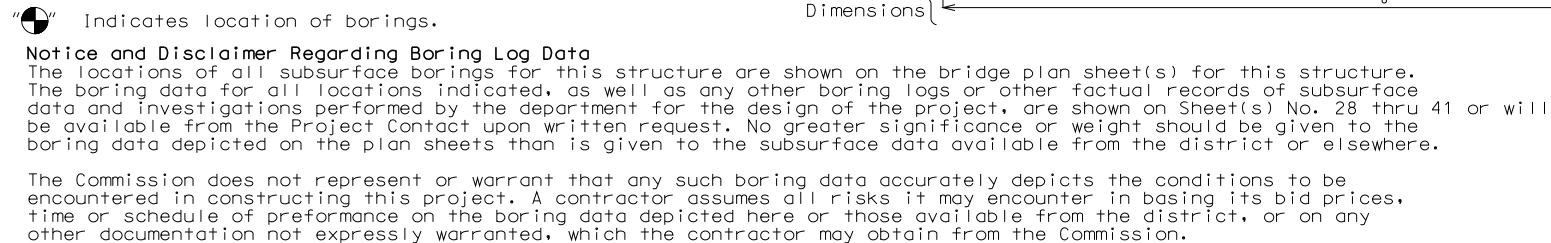
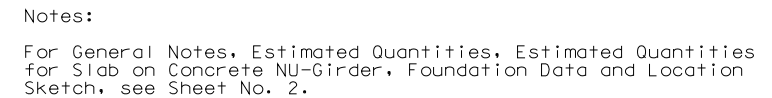


**MISSOURI HIGHWAYS AND TRANSPORTATION
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Note: This drawing is not to scale. Follow dimensions. Sheet No. 1 of 39

STATE ROAD SOUTH FROM POPLAR BLUFF
AT INTERSECTION WITH RTE. 158
STA. 550+87.19

STD. 609.00
STD. 617.10
STD. 706.35

Estimated Quantities				
Item		Substr.	Superstr.	Total
Bridge Approach Slab (Bridge)	sq. yard		443	443
Structural Steel Piles (12 in.)	linear foot	1802		1802
Pile Point Reinforcement	each	34		34
Class B Concrete (Substructure)	cu. yard	101.3		101.3
* Safety Barrier Curb	linear foot		219	219
Slab on Concrete NU-Girder	sq. yard		798	798
* Median Barrier Curb (Type C)	linear foot		139	139
NU 43, Prestressed Concrete NU-Girder	linear foot		609	609
Slab Drain	each		4	4
Vertical Drain at End Bents	each		2	2
Plain Neoprene Bearing Pad	each		14	14
Corrugated Metal Pipe Pile Spacers	each	34		34

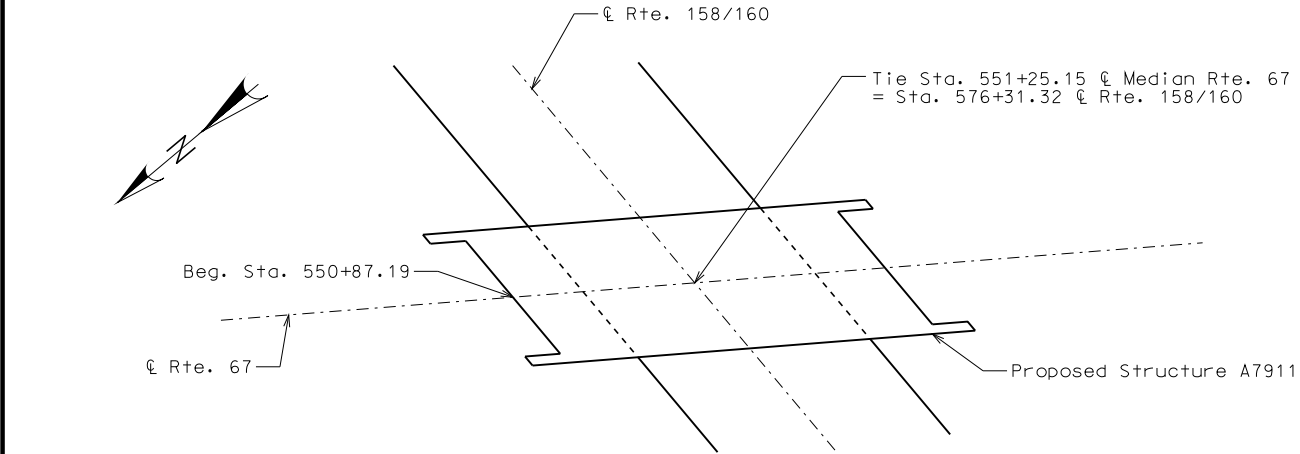
* Barrier curb shall be cast-in-place option or slip-form option.

All concrete above the construction joint in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

All reinforcement in the end bents is included in the Estimated Quantities for Slab on Concrete NU-Girder.

Plain Neoprene Bearing Pads shall be in accordance with Sec 716.

Cost of channel shear connectors C4 x 5.4 (ASTM A709 Grade 36) in place will be considered completely covered by the contract unit price for Structural Steel Piles (12 in.).



LOCATION SKETCH

General Notes:

Design Specifications:

2010 – AASHTO LRFD Bridge Design Specifications & 2010 Interims Revisions

Load and Resistance Factor Design

Seismic Design Category B (Details Only)

Design Loading:

HL-93

35#/Sq. Ft. Future Wearing Surface

Earth 120 #/Cu. Ft., Equivalent Fluid Pressure 45#/Cu. Ft.

Superstructure: Simply-supported, non-composite for dead load. Continuous composite for live load.

Design Unit Stresses:

Class B Concrete (Substructure) f’c = 3,000 psi

Class B-1 Concrete (Safety Barrier Curb & Median Curb)) f’c = 4,000 psi

Class B-2 Concrete (Superstructure, except Prestressed Girders, Safety Barrier Curb & Meidan Curb) f’c = 4,000 psi

Reinforcing Steel (Grade 60) fy = 60,000 psi

Steel Pile (ASTM A709 Grade 50) fb = 12,500 psi fy = 50,000 psi

For Prestressed Girder Stresses, see Sheet No. 10.

Neoprene Pads:

Bearings shall be 60 durometer neoprene pads.

Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1-1/2”, unless otherwise shown.

Traffic Handling:

Traffic on Rte. 158 to be maintained during construction. See Roadway Plans for traffic control.

Miscellaneous:

“Sec” refers to the sections in the standard and supplemental specifications unless specified otherwise.

A minimum vertical clearance of 15’-6” from crown of existing lanes and a minimum lateral clearance of 24’-0” centered on existing lanes shall be maintained during construction.

Estimated Quantities for Slab on Concrete NU-Girder		
Item		Total
Class B-2 Concrete	cu. yard	309.7
Reinforcing Steel	pound	17,870
Reinforcing Steel (Epoxy Coated)	pound	62,430

The table of Estimated Quantities for Slab on Concrete NU-Girder represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for stay-in-place forms,conventional forms, all concrete and coated and uncoated reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

Slab shall be cast-in-place with conventional forms or stay-in-place corrugated steel forms. Precast prestressed panels will not be permitted.

Class B-2 Concrete quantity is based on minimum top flange thickness and minimum joint material thickness.

All exposed vertical concrete surfaces including face and bottom of exterior girders, barriers, edge of slab, end bents, wing walls, and intermediate bents shall be treated with opaque concrete stain per Sec 1059. Exceptions include interior girders, bottom and top of slab, curbing and the traffic side of barriers adjacent to the roadway. Cost will be considered completely covered by the contract unit price for other items.

Foundation Data			
Bent No.		1	2
Driven Pile	Pile Type and Size	HP12 X 53	HP12 X 53
	Number	17	17
	Approximate Length foot	53	53
	Pile Driving Verification Method	Modified Gates Formula	Modified Gates Formula
	Minimum Nominal Axial Compressive Resistance kip	474	476
	Hammer Energy Required foot-pound	15,200	15,200

Driven Pile:

Minimum Nominal Axial Compressive Resistance = Maximum Factored Loads/Resistance Factor

Manufactured pile point reinforcement shall be used on all piles in this structure at Bents No. 1 & 2.



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ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 2

COUNTY BUTLER

JOB NO. JOP0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A7911

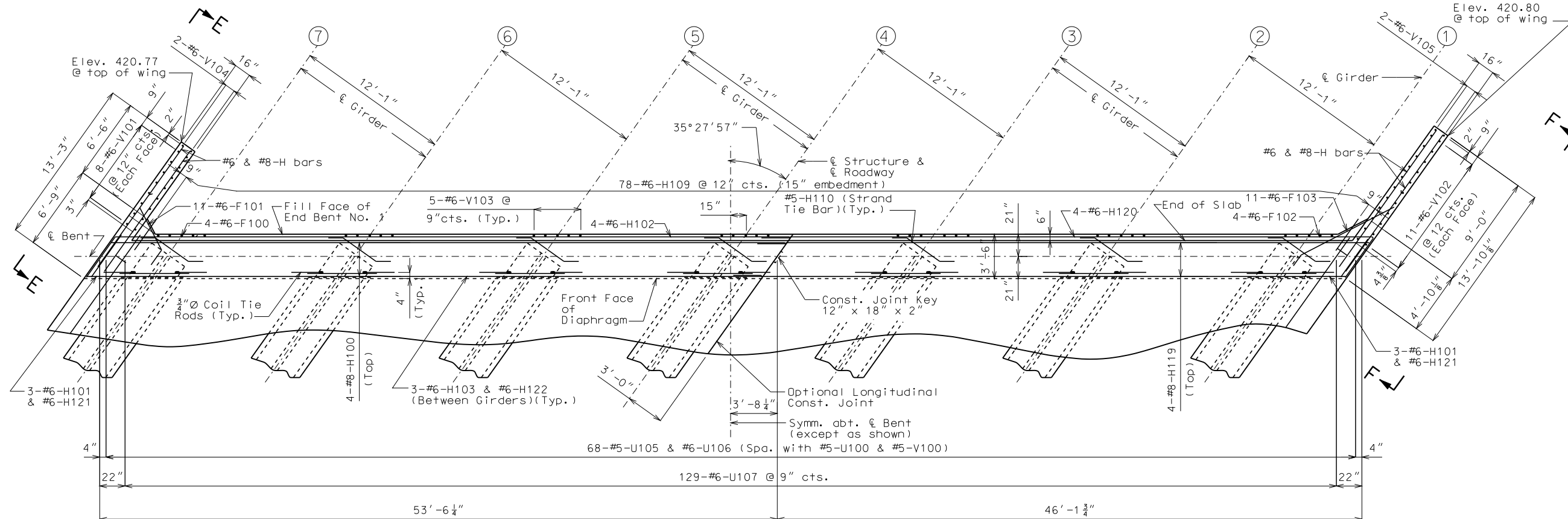
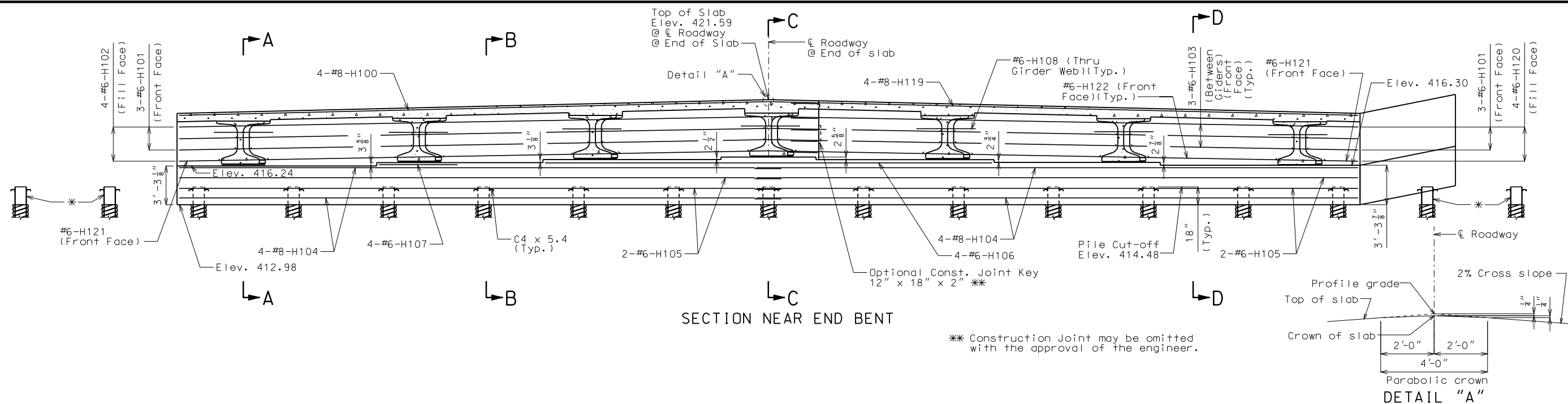
DESCRIPTION	DATE

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Note:
For Elevations E-E & F-F, see Sheet No. 5.

Substructure Quantity Table for Bent No. 1		
Item		Quantity
Structural Steel Piles (12 in.)	linear foot	901
Pile Point Reinforcement	each	17
Class B Concrete (Substructure)	cu. yard	49.6
Corrugated Metal Pipe Pile Spacers	each	17

Note: These quantities are included in the Estimated Quantities Table on Sheet No. 2.

PLAN SHOWING REINFORCEMENT

* Top 2'-0" of exposed piles shall be cleaned with a minimum of SSPC-SP-2 surface preparation. The area shall be coated with one coat of epoxy-mastic primer (non-aluminum) in accordance with Sec 1081 to produce a dry film thickness of no less than 5 mils. The epoxy-mastic primer (non-aluminum) shall be compatible with concrete.

The cost of the surface preparation and epoxy-mastic primer, complete-in-place, will be considered completely covered by other pay items.

DETAILS OF END BENT NO. 1

Notes:

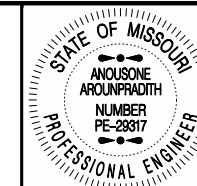
All vertical reinforcing bars in the substructure beams or caps shall be field adjusted to clear piles by at least $1\frac{1}{2}"$.

All concrete in the end bent above top of beam and below top of slab shall be Class B-2.

For details of End Bent No. 1 not shown, see
Sheets No. 3 & 5.

All U-bars and Pr. V-bars in end bent are to be placed parallel to ϕ Roadway unless otherwise shown.

For Sections A-A thru D-D, see Sheet No. 5.



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ROUTE	STATE
67	MO

DISTRICT BR	SHEET NO. 4
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JOB NO.
JOP0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

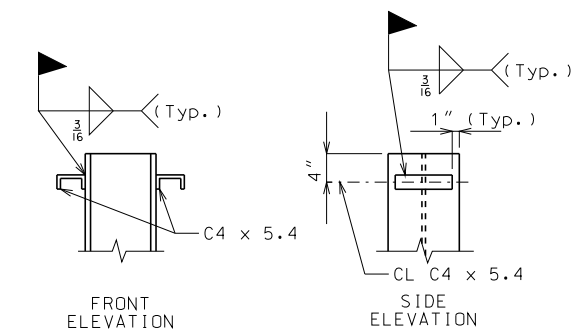
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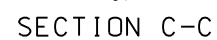
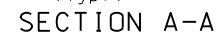
DETAILS OF PILE ANCHORS

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Sheet No. 7 of 39



* Place with grade



For location of Elevations E-E & F-F, see Sheet No. 8.

Concrete for prestressed girders shall be Class A-1 with $f'c = 8000$ psi and $f'ci = 6500$ psi.

(+) indicates prestressing strand.

Use 36 strands with an initial prestress force of 1582 kips.

Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6 inch diameter in accordance with AASHTO M 203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.

Girders shall be lifted by devices designed by the fabricator.

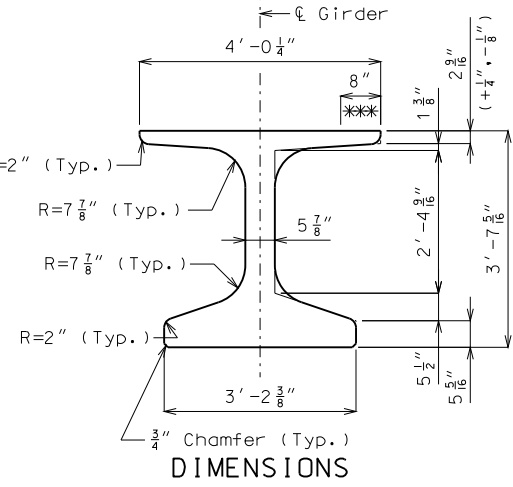
At the contractor's option the location for bent-up strands may be varied from that shown. The total number of bent-up strands shall not be changed. One strand tie bar is required for each layer of bent-up strands except at end bents which require one bar on the bottom layer of strands only. No additional payment will be made if additional strand tie bars are required.

Girder top flange shall be steel troweled to a smooth finish for 8" at the edges, as shown. Bond breaker shall be applied to this region only. The center portion shall be rough finished by scarifying the surface transversely with a wire brush, and no laitance shall remain on the surface.

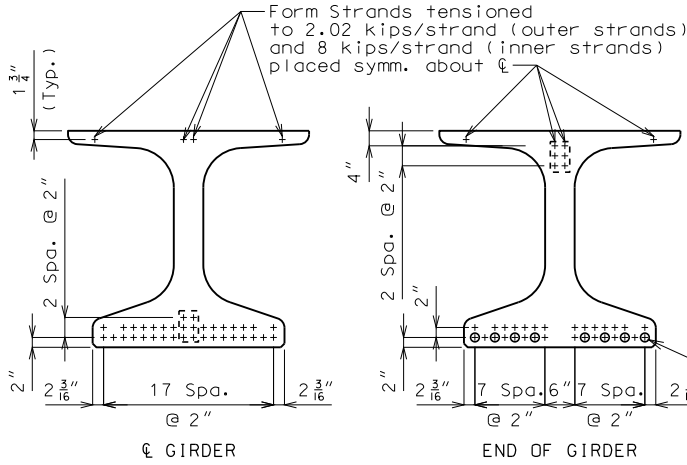
Form Strands tensioned to 2.02 kips/strand (outer strands) and 8 kips/strand (inner strands) placed symm. about ℓ

Cut top 2 rows of draped strands with a 12" projection and bend in shop. Cut any remaining top strands within 1" of end of girder. (Typ.)

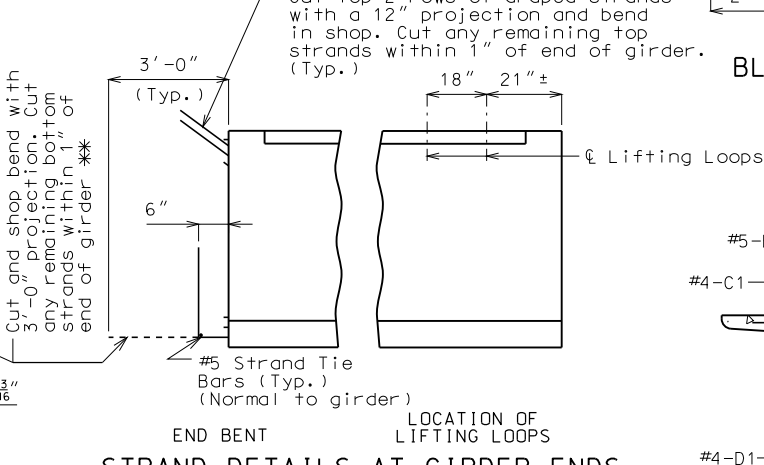
Cut and shop bend with 3'-0" projection. Cut any remaining bottom strands within 1" of end of girder *



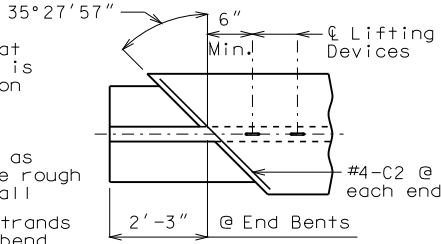
DIMENSIONS



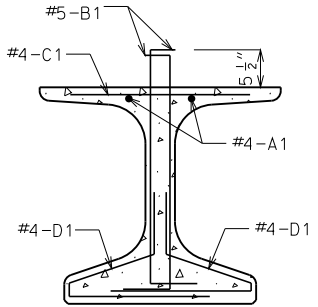
STRAND ARRANGEMENTS



STRAND DETAILS AT GIRDER ENDS

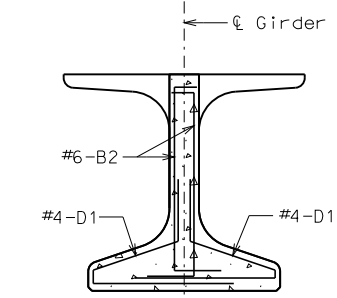


TOP FLANGE BLOCKOUT DETAIL



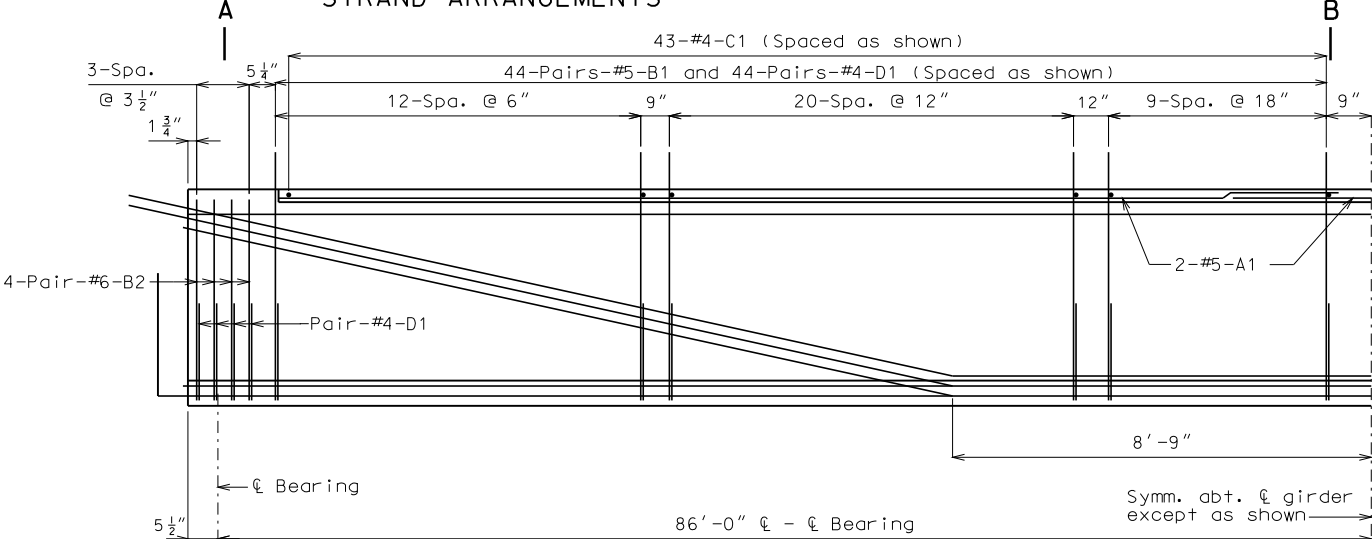
SECTION B-B

Strands not shown for clarity.



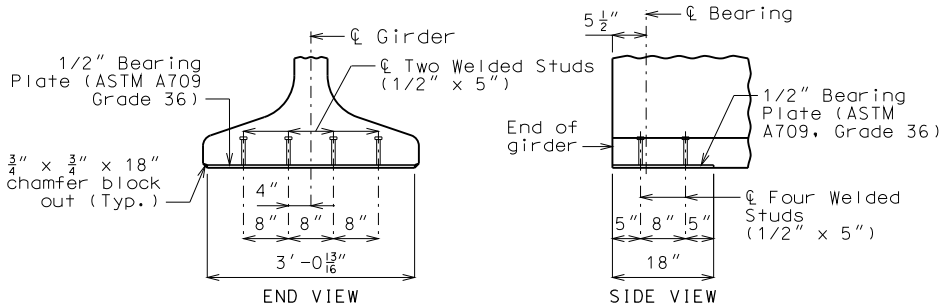
SECTION A-A

Strands not shown for clarity.



HALF ELEVATION OF GIRDER SPAN (1-2)

Exterior and interior girders are the same, except for coil ties, and coil inserts for slab drains.

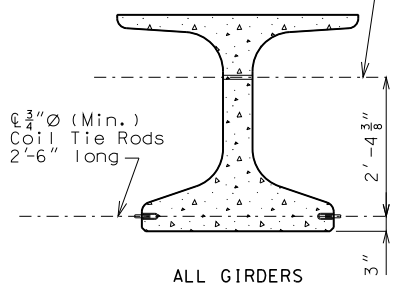


BEARING PLATE DETAILS

Galvanize the 1/2" bearing plate (ASTM A709 Grade 36) in accordance with ASTM A123.

Cost of furnishing, galvanizing, and installing the 1/2" bearing plate (ASTM A709 Grade 36) and welded studs in the prestressed girder will be considered completely covered by the contract unit price for Prestressed Concrete NU-Girder.

ℓ 1" \varnothing hole cast horizontally in beam (skewed) for #6 bar 5'-6" long (Clear strands and reinforcing steel by 1 1/2" min.)



ALL GIRDERS

DETAILS OF COIL TIES

ALTERNATE BAR REINFORCING STEEL DETAILS

BILL OF REINFORCING STEEL - EACH GIRDER					BENDING DIAGRAM	
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE			
4	5 A1	44'-2"	20		SHAPE 20 (C1)	
176	5 B1	4'-11"	19		C1/cos(skew)	
16	6 B2	4'-4"	19		SHAPE 20 (C2)	
86	4 C1	3'-10"	20		SHAPE 9	
2	4 C2	4'-8"	20		3'-11 5/8" B1	
192	4 D1	4'-2"	9		3'-5 5/16" B2	
					Top leg	
					SHAPE 19	

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1".

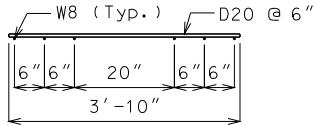
All reinforcement shall be Grade 60.

The two D1 bars may be furnished as one bar at the fabricator's option.

All B1 bars shall be epoxy coated.

Splay or cut C1 bars near top flange block out for skewed blockout.

At fabricator's option WWR5 bars may be used to replace C1 and A1 bars.



WWR5

WELDED WIRED BENDING DIAGRAM

Cost of 3/4" \varnothing coil tie rods placed in diaphragms will be considered completely covered by the contract unit price for Prestressed Concrete NU-Girder.

Coil ties shall be held in place in the forms by slotted wire-setting-studs projecting through forms. Studs are to be left in place or replaced with temporary plugs until girders are erected, then replaced by coil tie rods.

The contractor must provide any temporary intermediate diaphragms and/or bracing necessary to provide lateral and torsional stability for the girders during construction of the concrete slab. The temporary intermediate diaphragms/bracing shall be removed after the concrete slab has attained 75% of its design strength. The cost for furnishing, installing, and removing the temporary intermediate diaphragms and/or bracing shall be considered completely covered by the contract unit price for Prestressed Concrete NU-Girder.

For location of coil inserts at slab drains, see Sheet No. 12.

For location of coil ties, see Sheets No. 4 & 8.

Drilling is not allowed.

For Girder Camber Diagram, see Sheet No. 13.

Alternate bar reinforcing steel details are provided and may be used. The same type of reinforcing steel shall be used for all girders in all spans.



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DISTRICT
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STATE
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SHEET NO.
11

COUNTY
BUTLER

JOB NO.
JOP0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A7911

DESCRIPTION

DATE

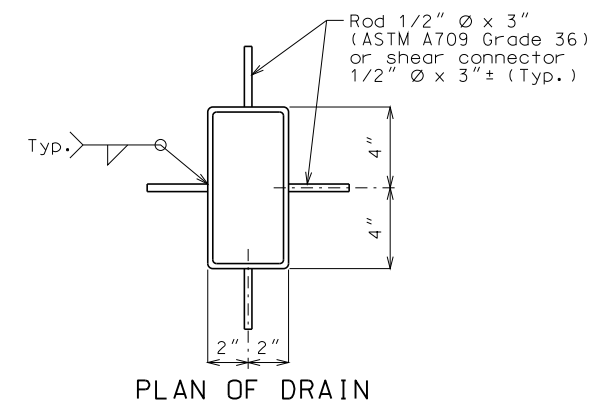
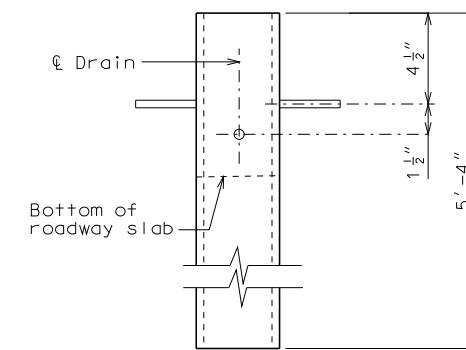
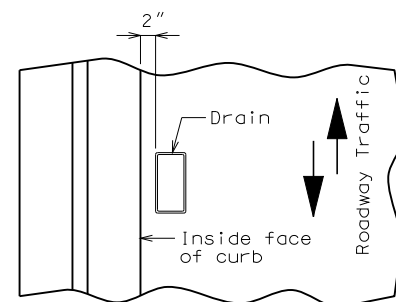
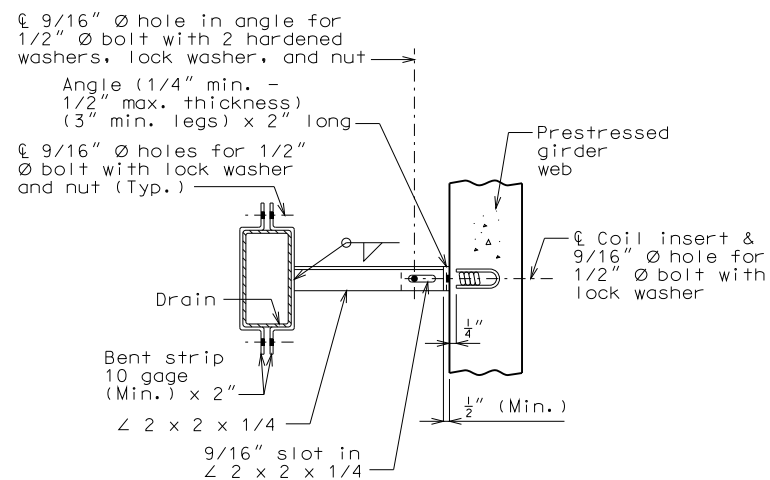
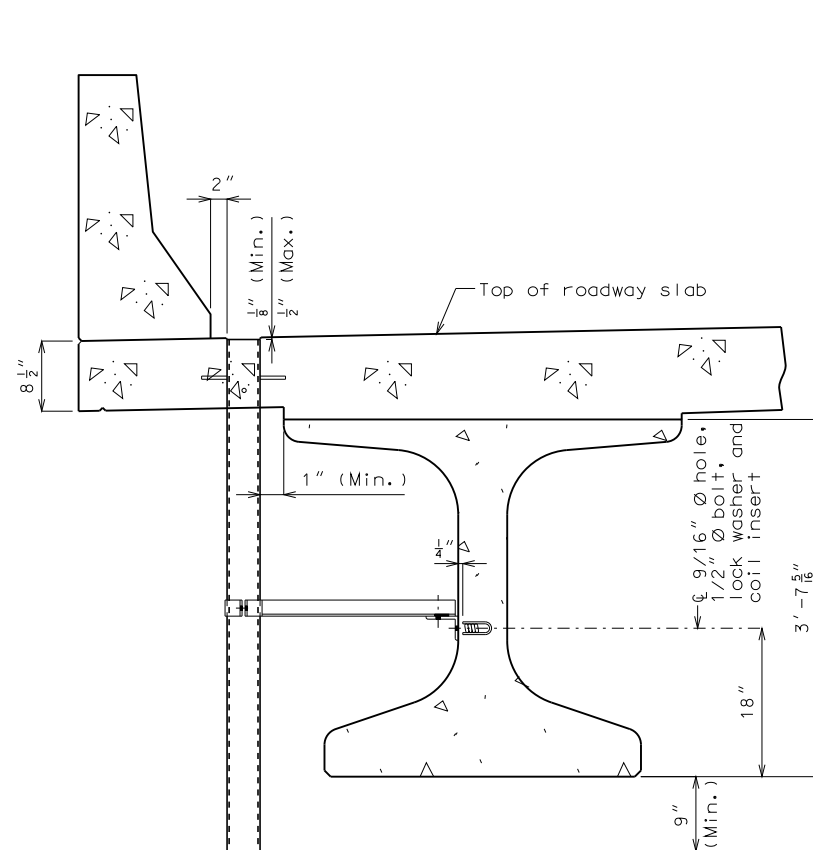
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Notes:

Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Outside dimensions of drains are 8" x 4".

Locate drains in slab by dimensions shown in Part Section Near Drain.

Shift reinforcing steel in field where necessary to clear drains.

The drains, coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

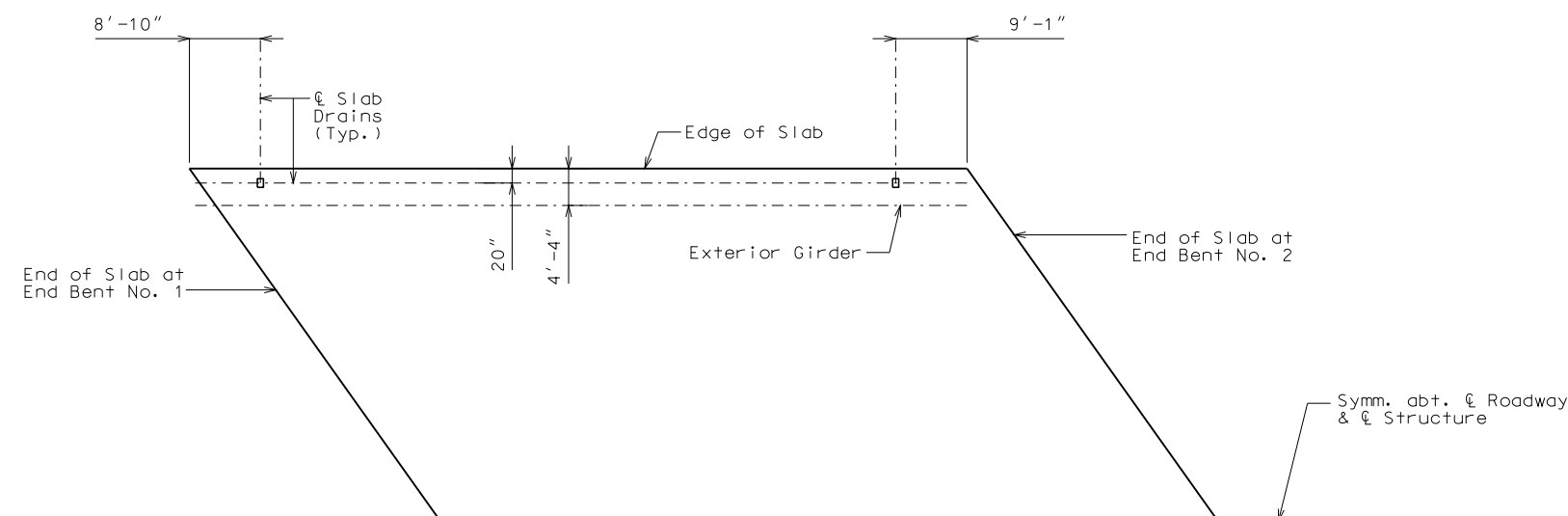
All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with ASTM A153.

The coil insert required for the bracket assembly attachment shall be located on the Prestressed NU-Girder shop drawings.

Shop drawings will not be required for the slab drains and the bracket assembly.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

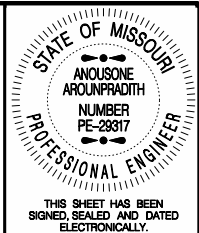
The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed NU-Girder fabricator.



PART PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS

Note: Longitudinal dimensions are horizontal.

SLAB DRAIN DETAILS



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ROUTE	STATE
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67	MO
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STRICT	SHEET NO.
22	10

BR	12
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JOB NO.
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CONTRACT ID

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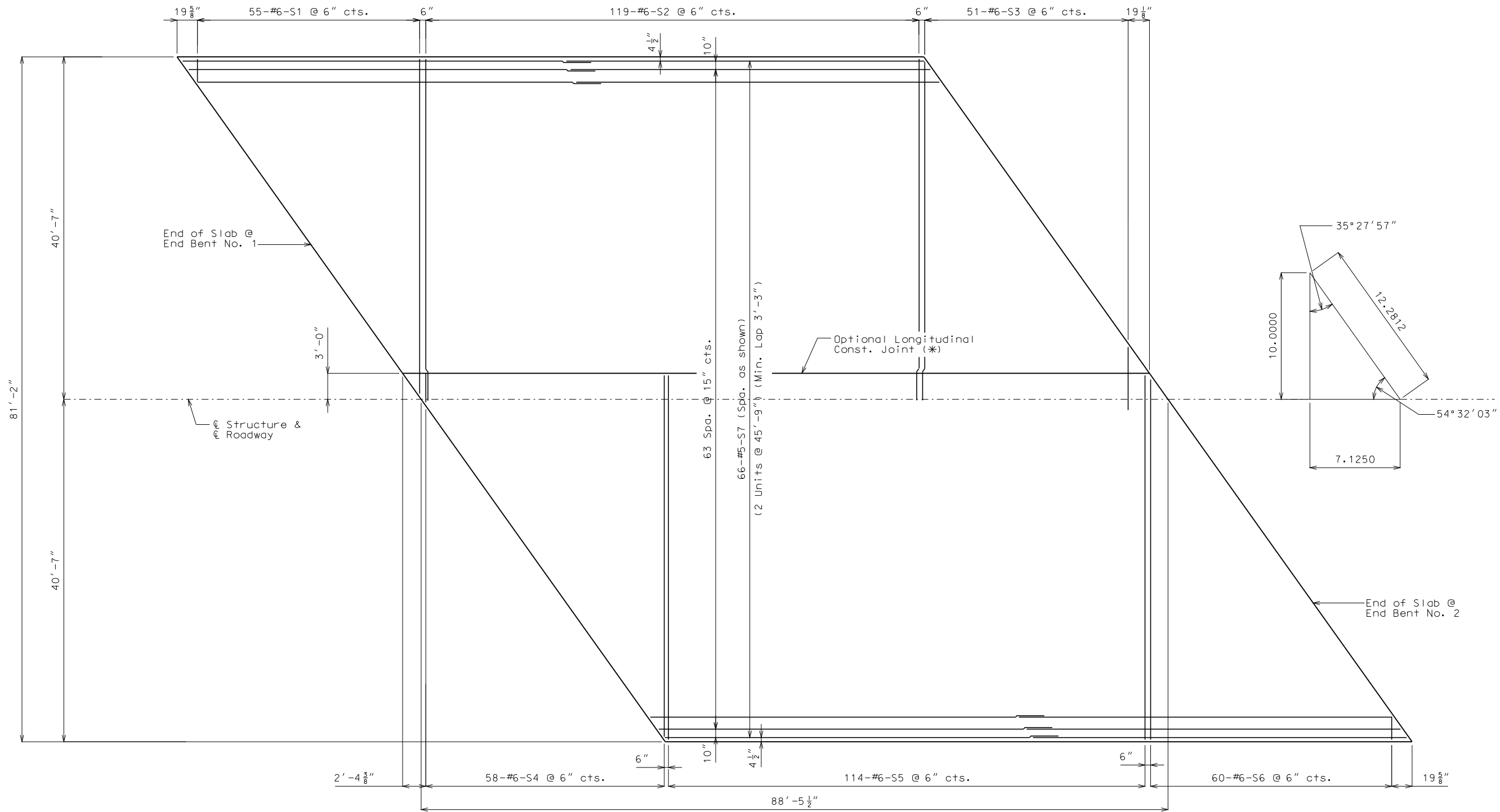
PROJECT NO.

TABLE 1. *Continued*

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Notes:
Longitudinal dimensions are horizontal.

For Theoretical Bottom of Slab Elevations and Theoretical Slab Haunching Diagram, see Sheet No. 13.

For Plan of Slab Showing Bottom Reinforcement, see Sheet No. 15.

For Section Thru Slab, see Sheet No. 16.

For details and locations of Slab Drains, see Sheet No. 12.

For details and reinforcement of Barrier Curb not shown, see Sheets No. 17 thru 21.

PLAN OF SLAB SHOWING TOP REINFORCEMENT

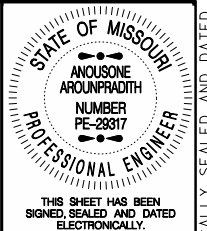
DETAILS OF SLAB

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 14 of 39

Note:

* The longitudinal construction joint may be omitted with the approval of the engineer. When the longitudinal construction joint is omitted, the minimum rate of pour shall be increased by a factor of 1.9.



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ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 14

COUNTY BUTLER

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CONTRACT ID.

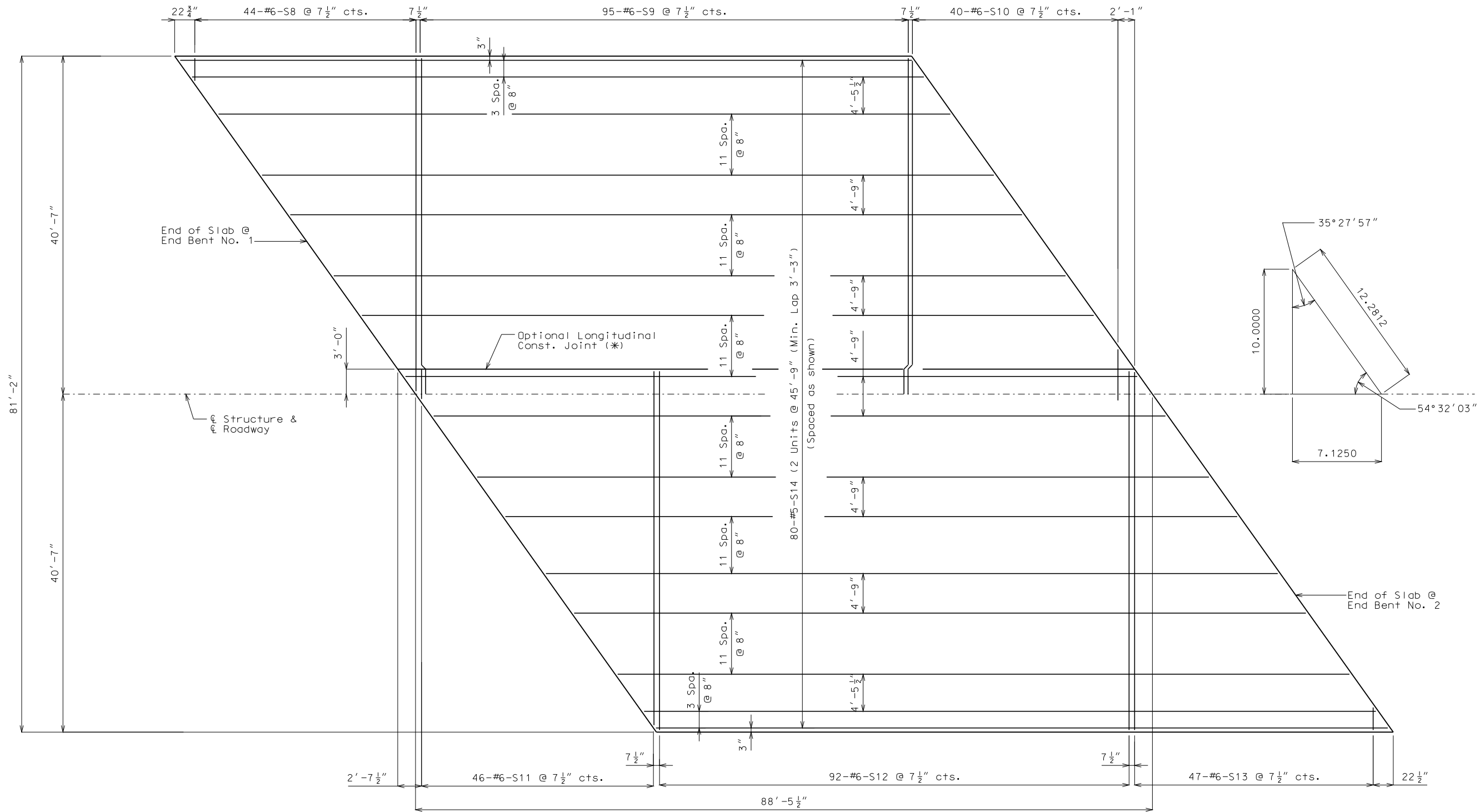
PROJECT NO.

BRIDGE NO. A7911

DESCRIPTION	DATE

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Notes:

Longitudinal dimensions are horizontal.

For Theoretical Bottom of Slab Elevations and Theoretical Slab Haunching Diagram, see Sheet No. 13.

For Plan of Slab Showing Top Reinforcement, see Sheet No. 14.

For Section Thru Slab, see Sheet No. 16.

For details and locations of Slab Drains, see Sheet No. 12.

For details and reinforcement of Barrier Curb not shown, see Sheets No. 17 thru 21.

PLAN OF SLAB SHOWING BOTTOM REINFORCEMENT

DETAILS OF SLAB

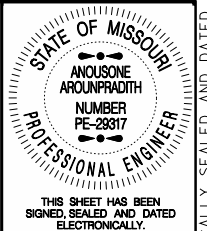
Note:

* The longitudinal construction joint may be omitted with the approval of the engineer. When the longitudinal construction joint is omitted, the minimum rate of pour shall be increased by a factor of 1.9.

Detailed Dec. 2011
Checked Dec. 2011

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 15 of 39



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DISTRICT BR SHEET NO. 15

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BRIDGE NO. A7911

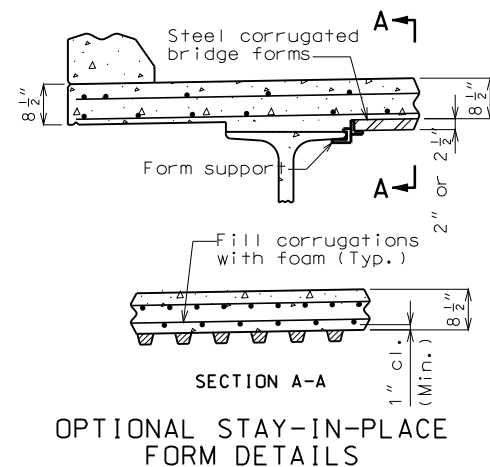
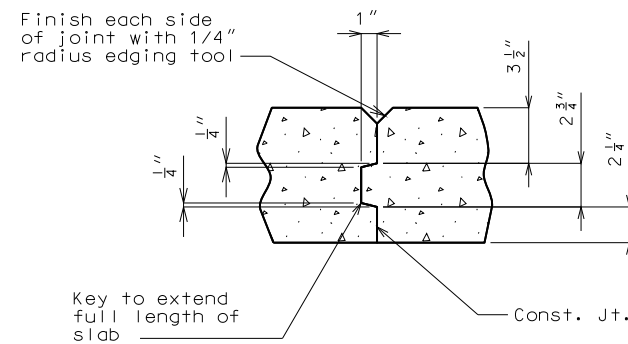
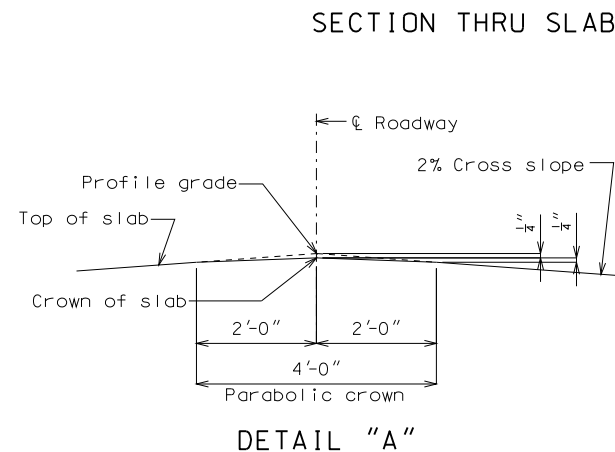
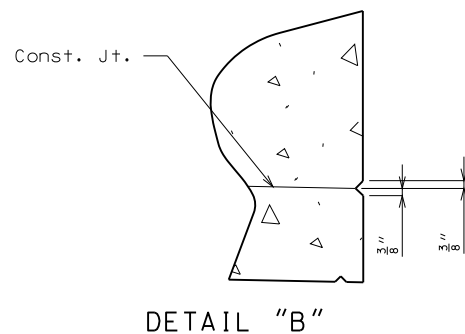
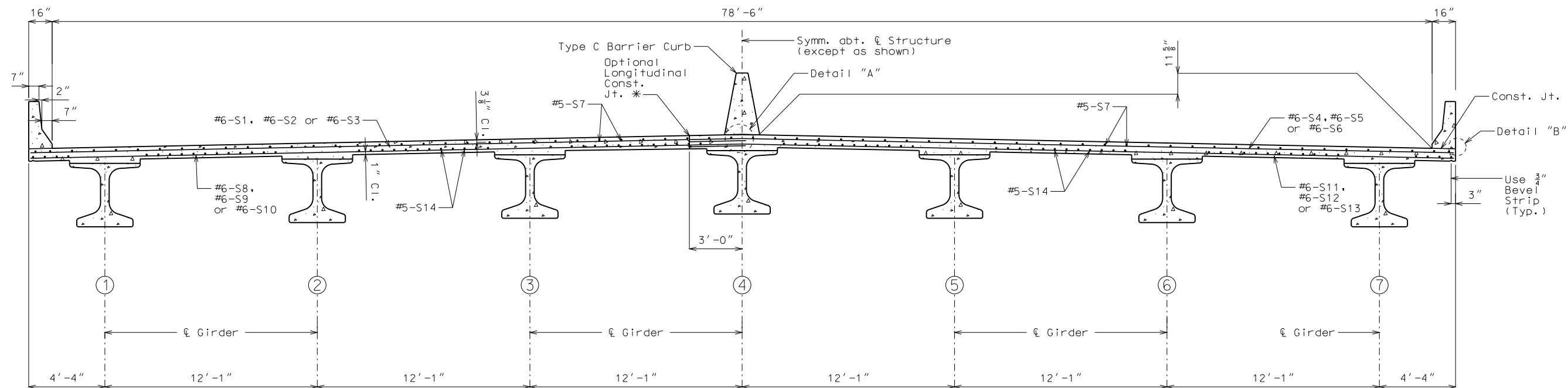
DESCRIPTION

DATE

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Notes:

Corrugated steel bridge deck forms, supports closure elements and accessories shall be in accordance with grade requirement and coating designation G165 of ASTM A653. Complete shop drawings of the permanent steel deck forms shall be required in accordance with Sec 1080.

Corrugations of stay-in-place forms shall be filled with an expanded polystyrene material. The polystyrene material shall be placed in the forms with an adhesive in accordance with the manufacturer's recommendations.

Form sheets shall not rest directly on the top of NU-Girders. Sheets shall be securely fastened to form supports with a minimum bearing length of one inch on each end. Form supports shall be placed in direct contact with the flange. Drilling holes in the flanges of the NU-Girders will not be permitted. All steel fabrication and construction shall be in accordance with Sec's 1080 and 712.

The contractor shall provide temporary bracing as necessary to prevent girders from rotating during slab pour. The cost for temporary bracing shall be considered completely covered by the contract unit price for NU-43, Prestressed Concrete NU-Girder.

Slab shall be poured upgrade from end to end at a minimum rate of 25 cu. yd./hr.

Alternate pour sequences may be submitted to the engineer for approval. Keyed construction joints shall be provided between pours.

Slab is to be considered at a uniform depth as shown on the plans. Haunching will vary.

Notes:

Longitudinal dimensions are horizontal.

For Theoretical Bottom of Slab Elevations and Theoretical Slab Haunching Diagram, see Sheet No. 13.

For Plan of Slab Showing Top Reinforcement, see Sheet No. 14.

For Plan of Slab Showing Bottom Reinforcement, see Sheet No. 15.

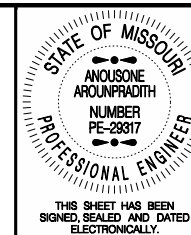
For details and locations of Slab Drains, see Sheet No. 12.

For details and reinforcement of Barrier Curb not shown, see Sheets No. 17 thru 23.

The contractor shall furnish an approved retarder to retard the set of the concrete to 2.5 hours and shall pour and satisfactorily finish the slab pours at the rate given.

The concrete diaphragm at the integral end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

* The longitudinal construction joint may be omitted with the approval of the engineer. When the longitudinal construction joint is omitted, the minimum rate of pour shall be increased by a factor of 1.9.



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

DATE PREPARED
2/24/2012

ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 16

COUNTY BUTLER

JOB NO. JOP0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A7911

DESCRIPTION

DATE

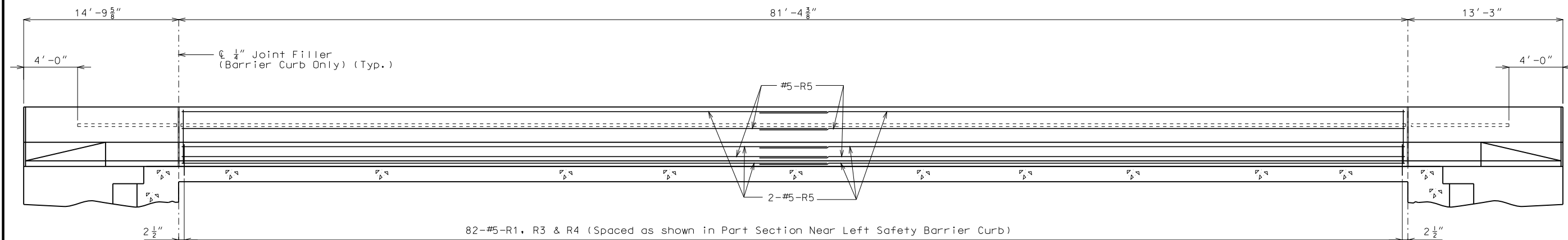
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITAL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

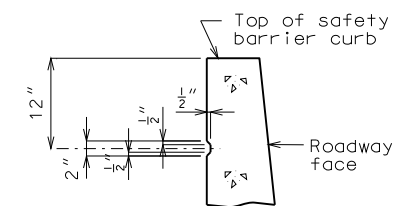


SPAN (1-2)

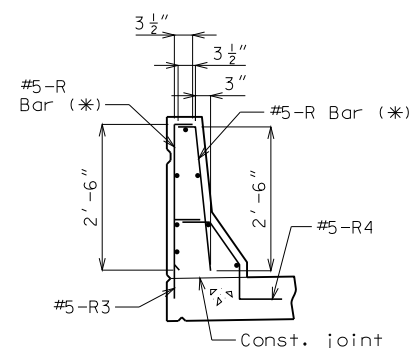
SECTION NEAR LEFT SAFETY BARRIER CURB

(Left side barrier curb shown, Right side barrier curb similar by 180° rotation)

Note: Longitudinal dimensions are horizontal.

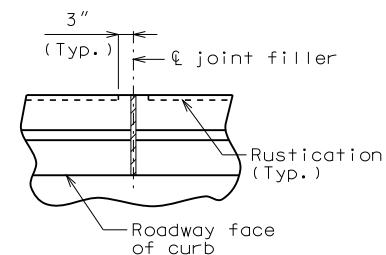
PART SECTION SHOWING
RUSTICATION DETAILS

Note: Rustication shall terminate 4'-0" from face of end of barrier curb.



R-BAR PERMISSIBLE ALTERNATE SHAPE

(*) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)



PART PLAN SHOWING
SAFETY BARRIER CURB JOINT

Notes:

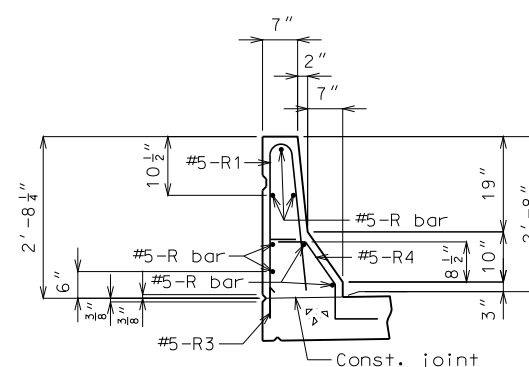
Top of safety barrier curb shall be built parallel to grade with barrier curb joints (except at end bents) normal to grade.

All exposed edges of safety barrier curb shall have either a $\frac{1}{2}$ " radius or a $\frac{3}{8}$ " bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete-in-place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

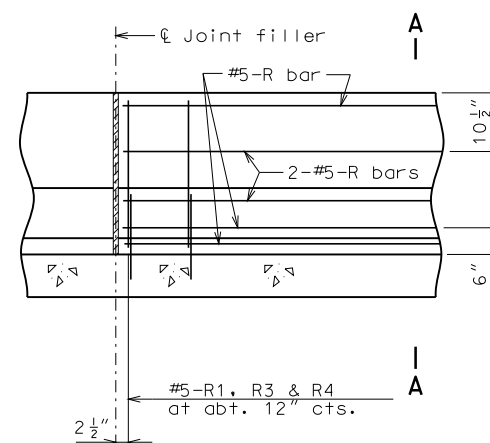


PART SECTION A-A

Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross-sectional area above the slab = 2.28 sq. ft.

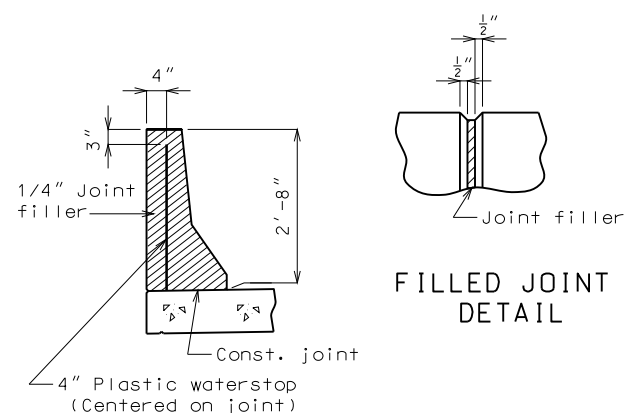


PART SECTION NEAR LEFT SAFETY BARRIER CURB
(CAST-IN-PLACE CONVENTIONAL FORMING OPTION)

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 17 of 39

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".



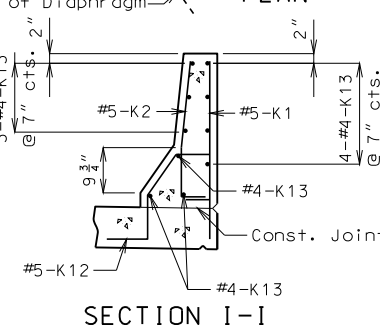
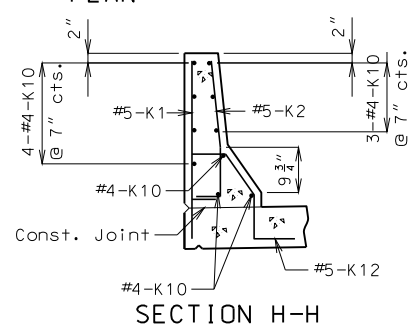
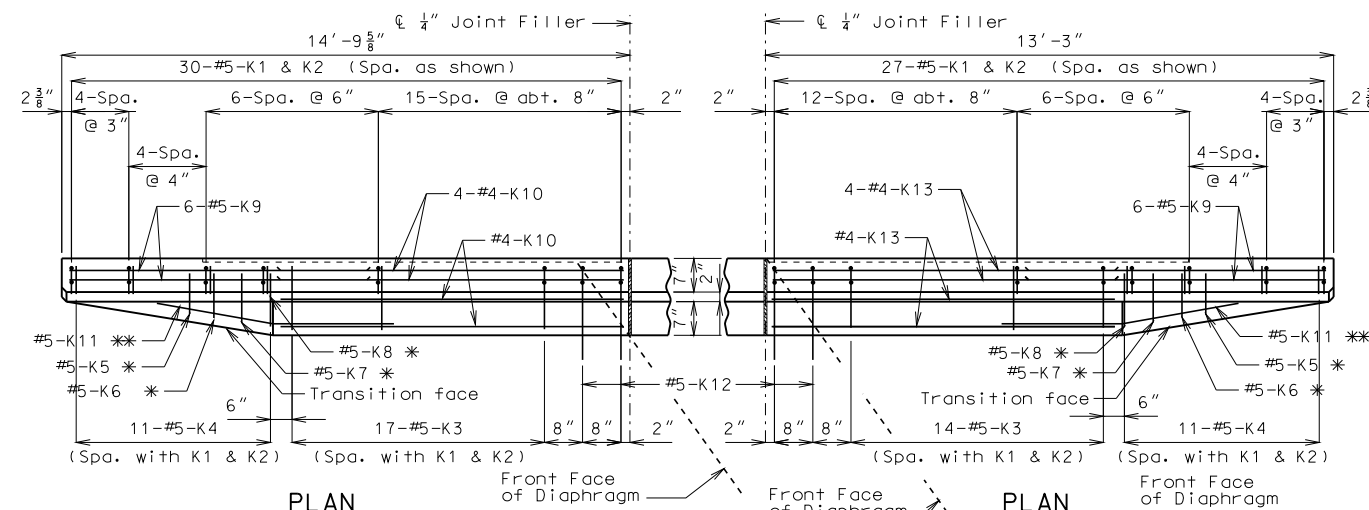
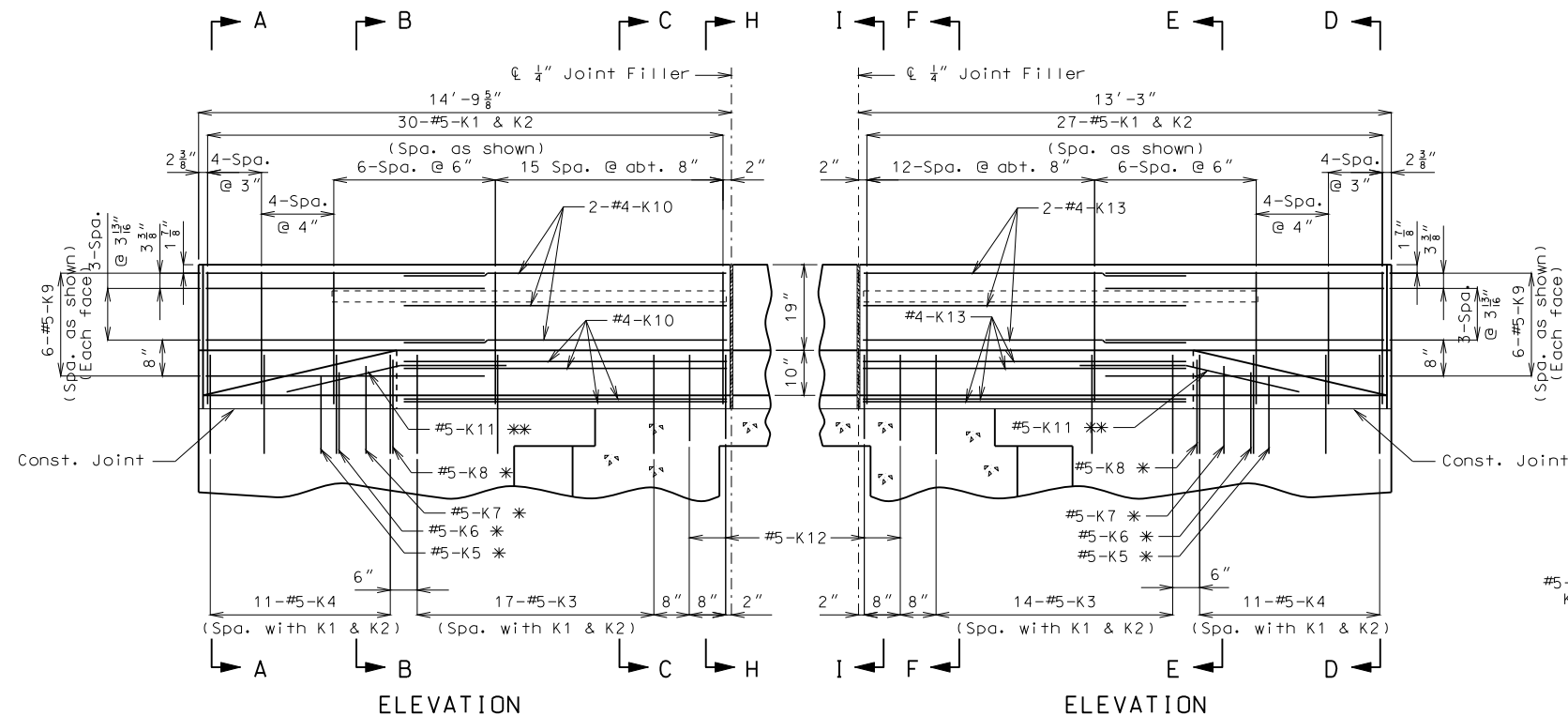
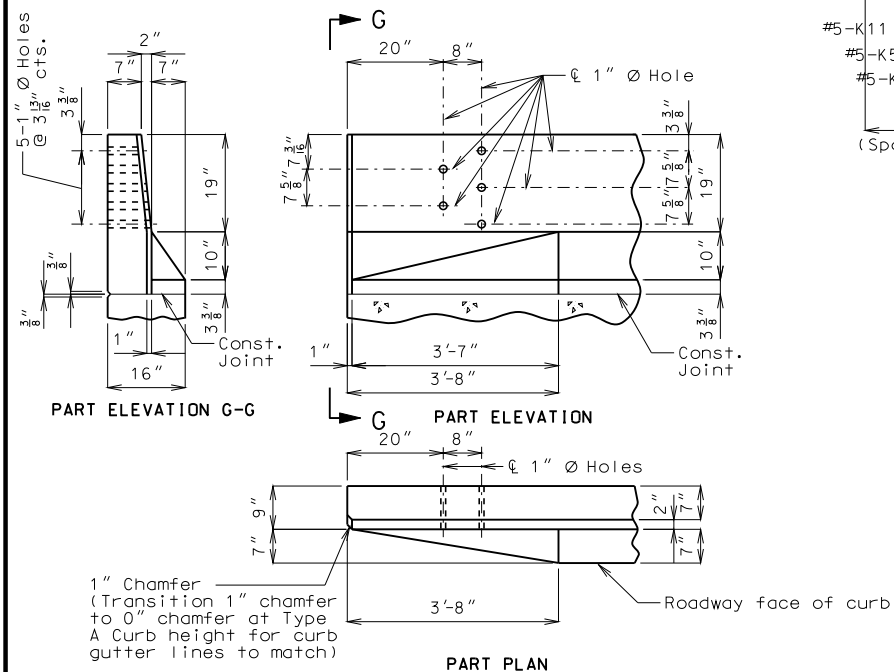
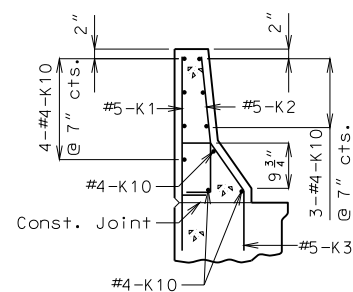
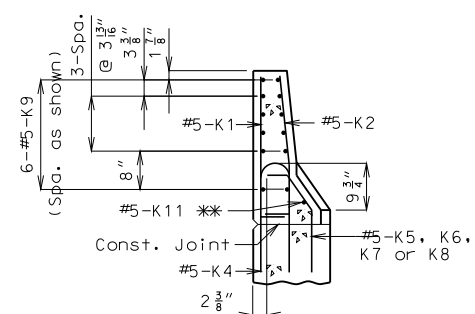
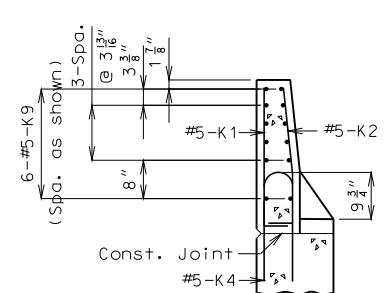
DETAILS OF PLASTIC WATERSTOP

Notes:

Plastic waterstop shall be placed in all safety barrier curb filled joints, except structures with superelevation, use on all lower safety barrier curb joints only.

Cost of plastic waterstop, complete-in-place, will be considered completely covered by the contract unit price for Safety Barrier Curb.

Detailed Dec. 2011
Checked Dec. 2011

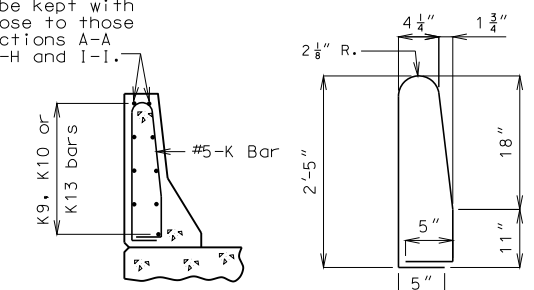
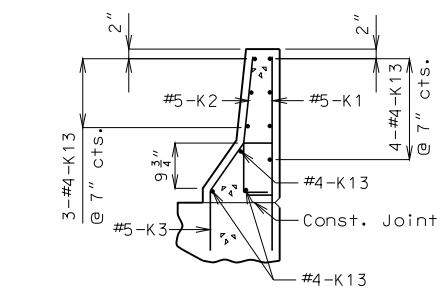
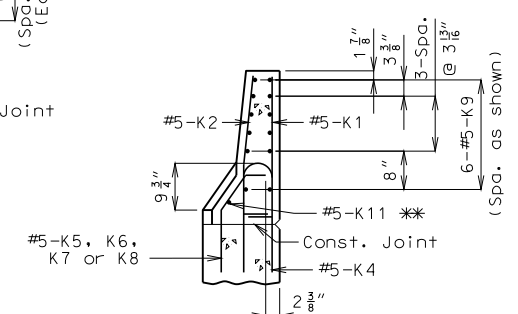
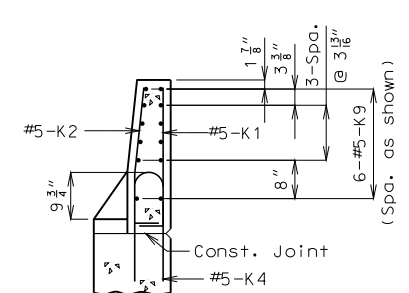


Note: Use a minimum lap of 2'-0" between K9 and K10 or K13 bars.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane two way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".

DETAILS OF LEFT SAFETY BARRIER CURB AT END BENTS

(Left barrier curb shown, right barrier curb similar by 180° rotation)



(K3 or K4 thru K8 bars not shown for clarity)

(***) The K1 and K2 bar combination may be furnished as one bar as shown, at the contractor's option.



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

DATE PREPARED
2/24/2012

ROUTE 67	STATE MO
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DISTRICT BR	SHEET NO. 18
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COUNTY
BUTLER

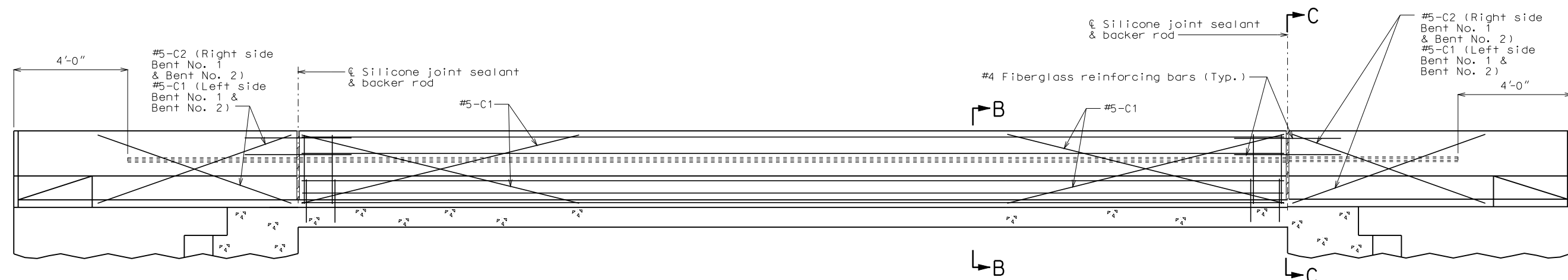
JOB NO.
JOP0959

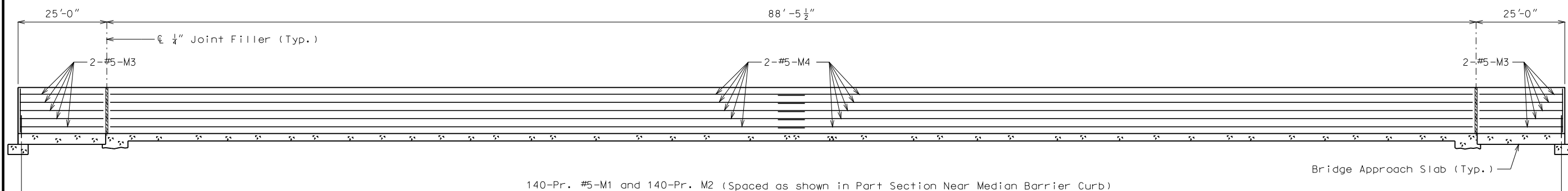
CONTRACT ID.

PROJECT NO.
DATE

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)





Note:

Top of median barrier curb (Type C)
shall be built parallel to grade with
median barrier curb joints (except at end
bents) normal to grade.

All exposed edges of median barrier curb (Type C) shall have either a $\frac{1}{2}$ " radius or a $\frac{3}{8}$ " bevel, unless otherwise noted.

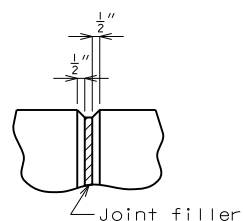
Payment for all concrete and reinforcement, complete-in-place will be considered completely covered by the contract unit price for safety median barrier curb (Type C) per linear foot.

Concrete in the median barrier curb (Type C) shall be Class B-1.

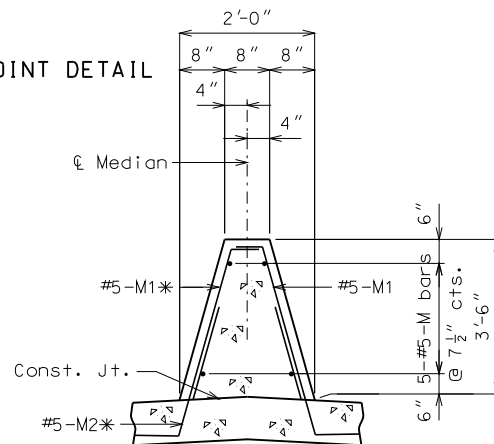
Measurement of median barrier curb (Type C) is to the nearest linear foot for each structure, measured along the top of slab from end of bridge approach slab to end of bridge approach slab.

SECTION NEAR MEDIAN BARRIER CURB (TYPE C)

Note: Longitudinal dimensions are horizontal.



FILLED JOINT DETAIL

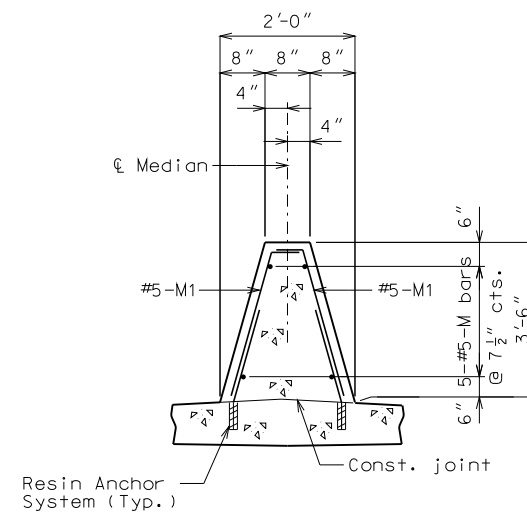


PART SECTION A-A

Note: Use a minimum lap of 2'-11" for #5 horizontal median barrier curb (Type C) bars.

The cross-sectional area above the slab = 4.70 sq. ft.

* The M1 and M2 bar combination may be furnished as one bar at the contractor's option.



RESIN ANCHOR OPTION

Note:

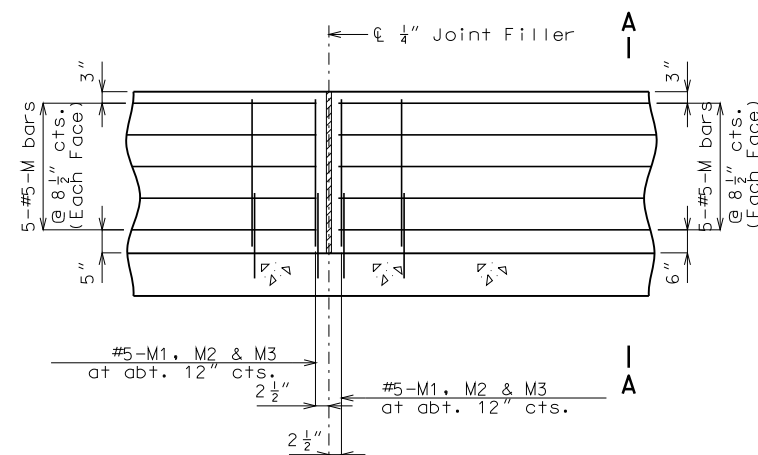
The contractor shall use one of the qualified resin anchor systems in accordance with Sec 1039.

Cost of furnishing and installing the resin anchor system complete-in-place will be completely covered by the contract unit price bid for Median Barrier Curb (Type C).


The minimum embedment depth in concrete with $f'c = 4,000$ psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5".

An epoxy coated #5 Grade 60 reinforcing bar 2'-6" long shall be substituted for the $\frac{3}{4}"$ \varnothing threaded rod.

Concrete traffic barrier delineators shall be placed on top of the median barrier curb (Type C) as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Median Barrier Curb (Type C)".



PART ELEVATION
(CAST-IN-PLACE CONVENTIONAL FORMING OPTION)



STATE OF MISSOURI
ANOUSONE
AROUNPRADITH
NUMBER
PE-29317
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

DATE PREPARED
2/24/2012

ROUTE	STATE
67	MO

DISTRICT BR	SHEET NO. 20
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COUNTY
BUTLER

JOB NO.
JOP0959


CONTRACT ID.

PROJECT NO.

BRIDGE NO.

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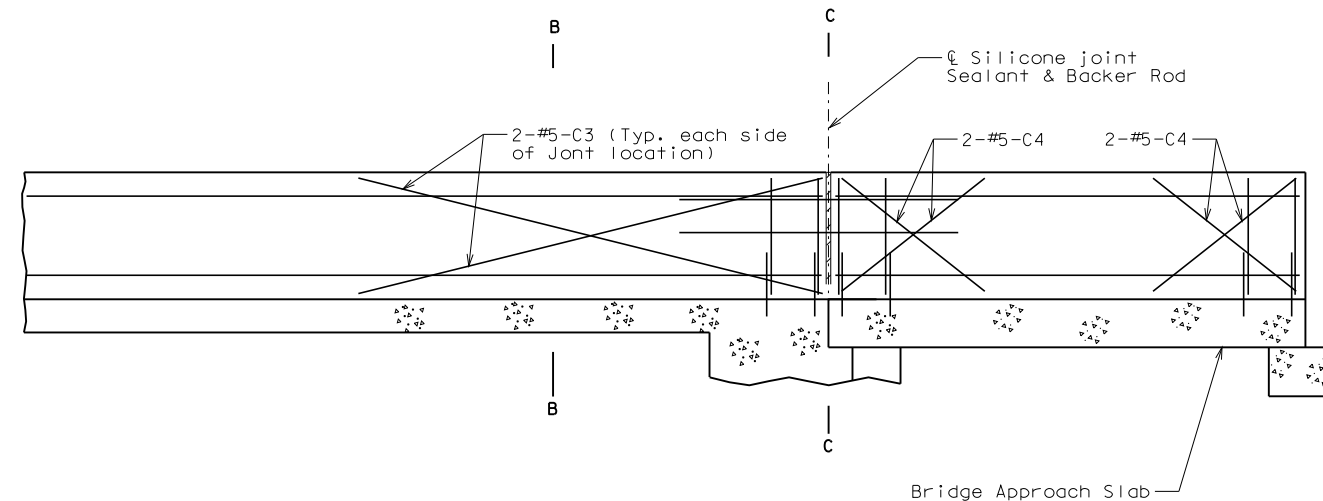
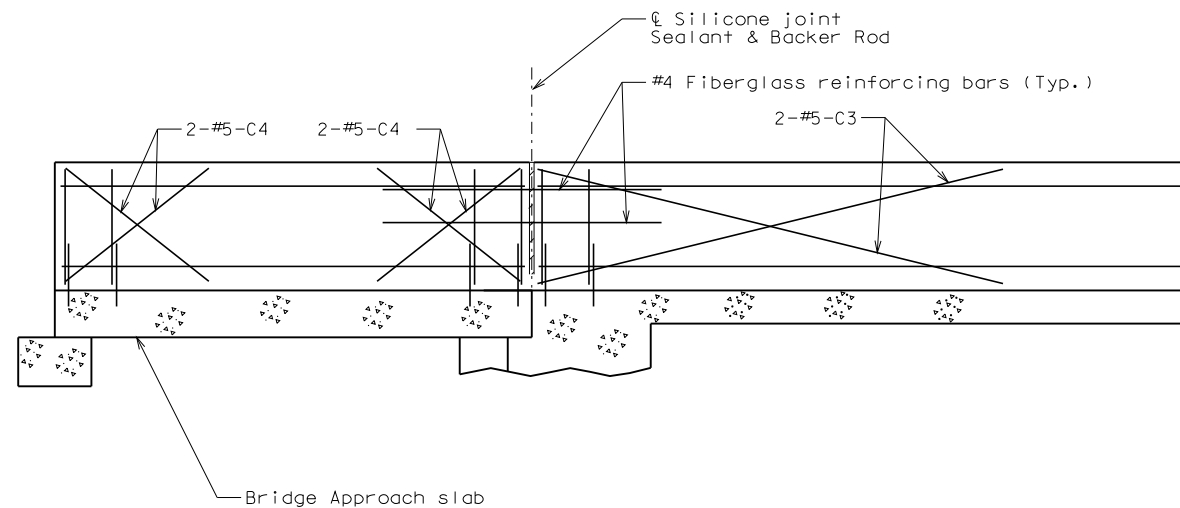
MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

 105 WEST CAPITOL
JEFFERSON CITY, MO 65102



105 WEST CAPITOL
JEFFERSON CITY, MO 65102

E A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED:



TYPICAL SECTION NEAR MEDIAN BARRIER CURB AT SUPPORT LOCATIONS
(OPTIONAL SLIP-FORM BRIDGE MEDIAN BARRIER CURB)

Note:

Top of median barrier curb (Type C) shall be built parallel to grade with barrier curb joints (except at end bents) normal to grade.

Payment for all concrete and reinforcement, complete in-place will be considered completely covered by the contract unit price for median barrier curb (Type C) per linear foot.

Concrete in the median barrier curb shall be Class B-1.

Measurement of median barrier curb (Type C) is to the nearest linear foot for each structure, measured along the top of slab from end of slab to end of slab.

Concrete traffic barrier delineators shall be placed on top of the median barrier curb (Type C) as shown on Missouri Standard Plans 617-10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Median Barrier Curb (Type C)".

The minimum embedment depth in concrete with $f'c = 4,000$ psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5".

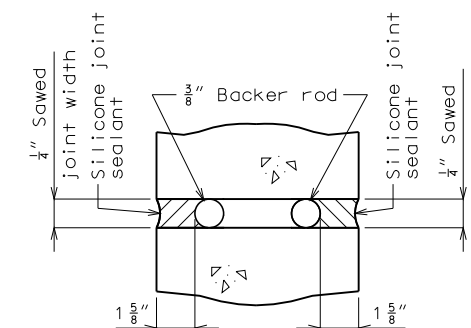
Note:

Joint sealant and backer rods shall be used on all slip-form barrier curbs (Type C) instead of joint filler shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints (except at end of slab of the end bents).

Plastic waterstop shall not be used with slip-form options.

For Slip-Form Option, all sides of median barrier curb (Type C) shall have a vertically broomed finish and the curb top shall have a transversely broomed finish.

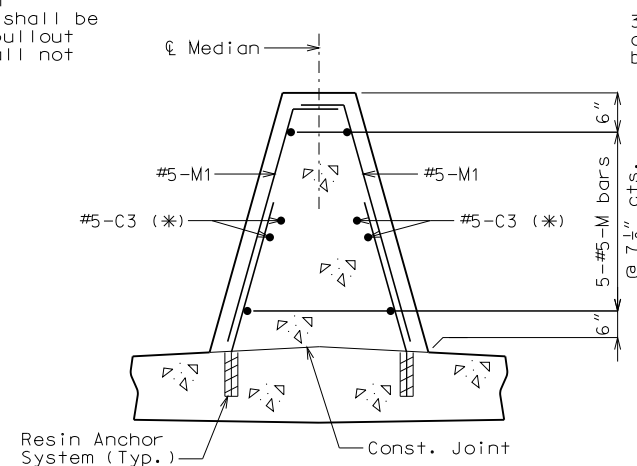
C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge median barrier curb (Type C).



SECTION A-A

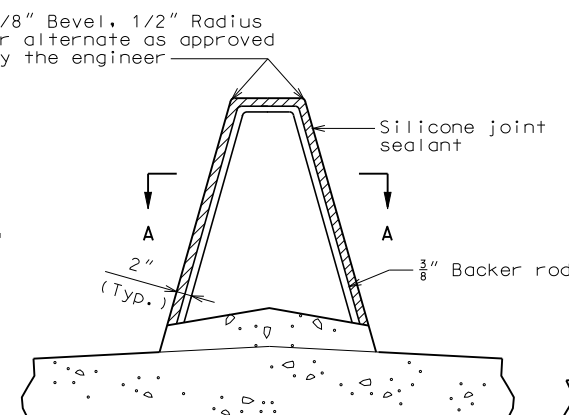
Note:

Cost of silicone joint sealant and backer rod, complete-in-place, will be considered completely covered by the contract unit price for barrier curb (Type C).

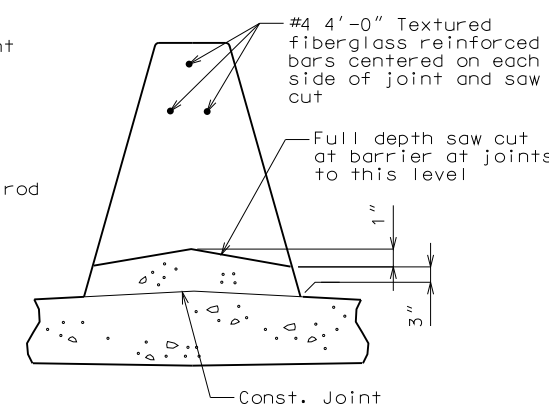


PART SECTION B-B

Note: * Each side of joint location.



SECTION THRU JOINT

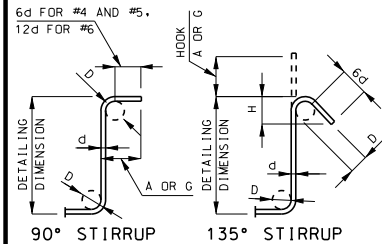


PART SECTION C-C

OPTIONAL SLIP-FORM MEDIAN BARRIER CURB (TYPE C)

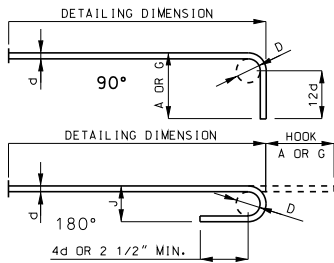
BILL OF REINFORCING STEEL

NO.	REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS												NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT			
										B		C		D		E		F		H					K		
										FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	LBS.	
			END BENT 1																								
4	6	F100	DIAPHRAGM		23	S				3	11.125	6	0.000					3	2.375	2	3.375	9	11	9	11		60
11	6	F101	WING/BRACE		23	S				14.000	4	2.375	14.000	12.500	6.375	12.500	6.375	6	6	6	5						106
4	6	F102	DIAPHRAGM		21	S				3	11.125	7	11.000					3	2.375	2	3.375	11	10	11	4		68
11	6	F103	WING/BRACE		23	S				14.000	8	1.875	14.000	6.375	12.500	6.375	12.500	10	6	10	5						172
4	8	H100	SLAB	E	20					53	2.000							53	2	53	2						568
6	6	H101	DIAPHRAGM		20					4	8.000							4	8	4	8						42
4	6	H102	DIAPHRAGM		20					53	2.000							53	2	53	2						319
18	6	H103	DIAPHRAGM		20					13	11.000							13	11	13	11						376
16	8	H104	BEAM		20					53	2.000							53	2	53	2						2271
8	6	H105	BEAM		20					51	8.000							51	8	51	8						621
4	6	H106	BEAM		20					37	8.000							37	8	37	8						226
4	6	H107	BEAM		20					6	6.000							6	6	6	6						39
7	6	H108	DIAPHRAGM		20					5	6.000							5	6	5	6						58
78	6	H109	APP HAUNCH	E	20					2	6.000							2	6	2	6						293
7	5	H110	STRAND TIE		23	S				15.000	3	2.375	15.000	8.750	12.250	8.750	12.250	5	8	5	8						41
4	8	H119	SLAB	E	20					52	1.000							52	1	52	1						556
4	6	H120	DIAPHRAGM		20					49	9.000							49	9	49	9						299
2	6	H121	DIAPHRAGM		20					3	0.000							3	0	3	0						9
6	6	H122	DIAPHRAGM		20					10	7.000							10	7	10	7						95
11	6	H111	WING		20					9	5.000							9	5	9	5						156
11	6	H112	WING		19	S				9.000	9	5.000						10	2	10	0						165
6	8	H113	WING		20					10	5.000							10	5	10	5						167
4	8	H114	WING	E	20					10	5.000							10	5	10	5						111
11	6	H115	WING		20					11	10.000							11	10	11	10						196
11	6	H116	WING		19	S				9.000	11	10.000						12	7	12	5						205
2	8	H117	WING	E	20					12	11.000							12	11	12	11						69
6	8	H118	WING		20					12	11.000							12	11	12	11						207
60	5	U100	BEAM		10	S				5	9.250	3	11.750					15	6	15	4						960
34	4	U101	BEAM		13	S				3	11.750	2	10.625	3	11.750	2	10.625	14	6	14	3						324
20	4	U102	BEAM		13	S				3	11.750	3	5.000	3	11.750	3	5.000	15	7	15	4						205
4	4	U103	BEAM		10	S				2	10.625	3	11.750					9	9	9	7						26
9	4	U104	BEAM		10	S				3	5.000	3	11.750					10	10	10	8						64
68	5	U105	DIAPHRAGM	E	10	S				3	11.000	3	4.500					11	3	11	0						780
68	6	U106	DIAPHRAGM		19	S				2	4.000	3	11.750					6	4	6	2						630
129	6	U107	DIAPHRAGM	E	19	S				4	1.000	6	2.000					10	3	10	1						1954
29	4	U108	BEAM		10	S				2	0.000	3	3.000					7	3	7	1						137
16	5	V100	BEAM		20					5	9.000							5	9	5	9						96
16	6	V101	WING		20				V	2	7	6.000						7	6	7	6						
			INCREMENT =							7	4.000							7	4	7	4						178
			0.250 INCH																								
22	6	V102	WING		20				V	2	7	6.000						7	6	7	6						
			INCREMENT =							7	4.000							7	4	7	4						245
			0.250 INCH																								
35	6	V103	DIAPHRAGM		20					2	5.000							2	5	2	5						127
2	6	V104	WING		20					7	6.000							7	6	7	6						23
2	6	V105	WING		20					7	6.000							7	6	7	6						23
			END BENT 2																								
4	6	F200	DIAPHRAGM		23	S				3	11.125	6	0.000					3	2.375	2	3.375	9	11	9	11		60
11	6	F201	WING/BRACE		23	S				14.000	4	2.375	14.000	12.500	6.375	12.500	6.375	6	6	6	5						106
4	6	F202	DIAPHRAGM		21	S				3	11.125	7	11.000					3	2.375	2	3.375	11	10	11	4		68
11	6	F203	WING/BRACE		23	S				14.000	8	1.875	14.000	6.375	12.500	6.375	12.500	10	6	10	5						172



STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK A OR G	135° HOOK A OR G	APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



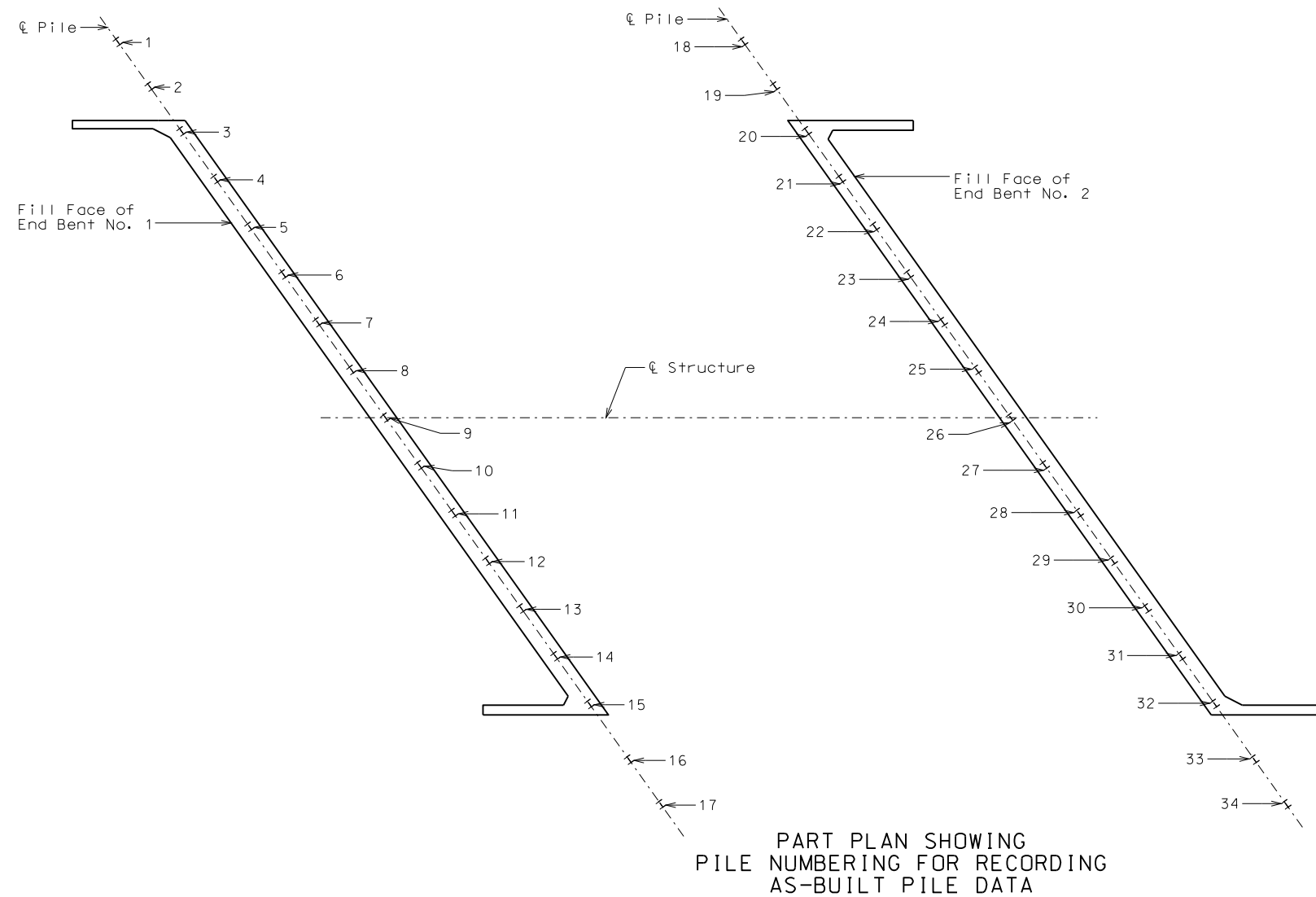
END HOOK DIMENSIONS				
ALL GRADES				
BAR SIZE	D (IN.)	180° HOOKS A OR G	90° HOOKS J	A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

TWO ADDITIONAL #8-H114 ARE INCLUDED IN THE BAR BILL FOR TESTING.

NOTE: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 180 DEGREE STANDARD HOOKS. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET. E = EPOXY COATED REINFORCEMENT. S = STIRRUP. X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES. V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE. NO. EA. = NUMBER OF BARS OF EACH LENGTH. NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH) ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH. PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS. FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF SPIRALS DO NOT INCLUDE SPICES OR SPACERS. REINFORCING STEEL (GRADE 60) F_y = 60,000 PSI.

BILL OF REINFORCING STEEL

NO.	REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS												NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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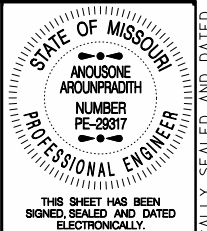


AS-BUILT PILE DATA			
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED NOMINAL AXIAL COMPRESSIVE RESISTANCE (KIPS)	REMARKS
			End Bent No. 1
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

AS-BUILT PILE DATA			
PILE NO.	LENGTH IN PLACE (FT.)	COMPUTED NOMINAL AXIAL COMPRESSIVE RESISTANCE (KIPS)	REMARKS
			End Bent No. 2
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			

NOTE: INDICATE IN REMARKS COLUMN:
A.) IF PILING WERE DRIVEN TO PRACTICAL REFUSAL.
B.) PILE BATTER IF OTHER THAN SHOWN ON BENT DETAIL SHEET.
C.) TYPE OF PILING USED.

NOTE: THIS SHEET TO BE COMPLETED BY
MoDOT CONSTRUCTION PERSONNEL.



DATE PREPARED

ROUTE	STATE
67	MO

DISTRICT BR	SHEET NO. 25
----------------	-----------------

COUNTY

JOB NO.

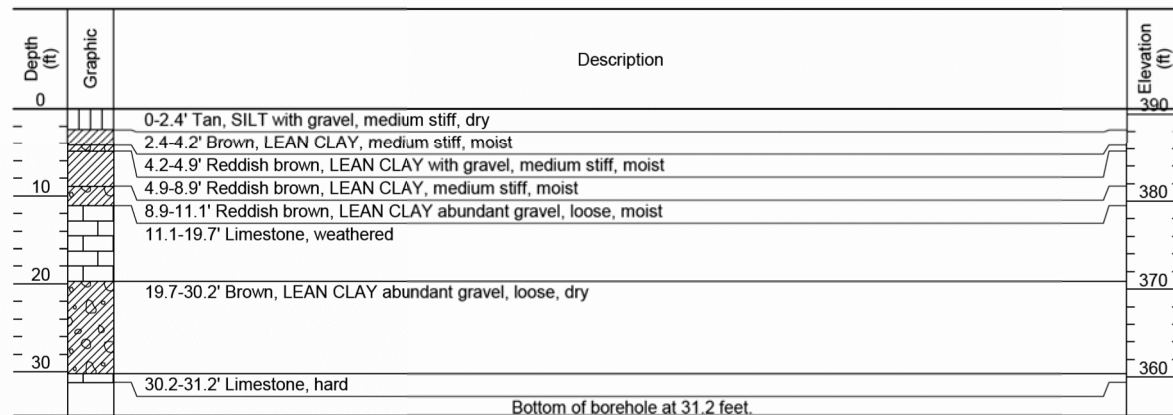
CONTRACT ID.

PROJECT NO.

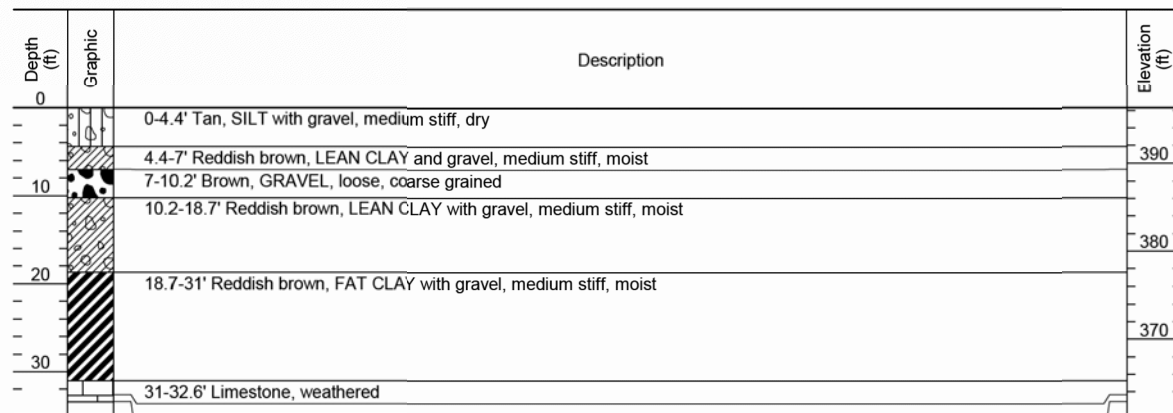
BRIDGE NO.
A7911

[illegible]MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

Job No.: J0P0959	County: Butler	Route: 158/160
Design: A7911	Skew: 35-27'-57"	Location: 7.25 Miles South of Poplar Bluff
Bent: 1	Logged By: Steve Owens	Operator: Burt Miller
Station: 550+27.5	Northing: 302434.2	Date of Work: 10/03/11-10/03/11
Offset: 15.0' Lt	Easting: 815837.6	Depth to Water: _____
Elevation: 390.6	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: Mobile B-31	
Requested Elevation: _____	Location Note: _____	



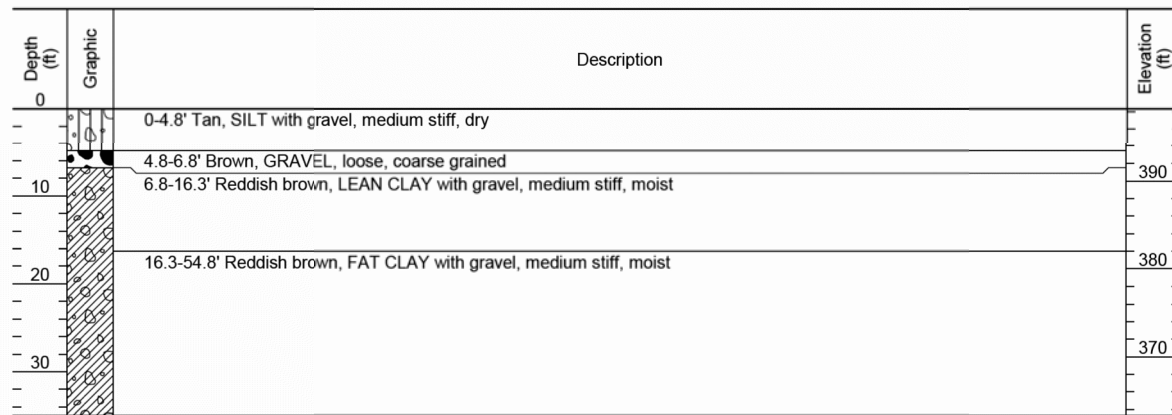
Job No.: JOP0959	County: Butler	Route: 158/160
Design: A8067	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 550+97.8	Northing: 302379.2	Date of Work: 10/04/11-10/04/11
Offset: 75.0' RT	Easting: 815706.2	Depth to Water:
Elevation: 396.3	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	



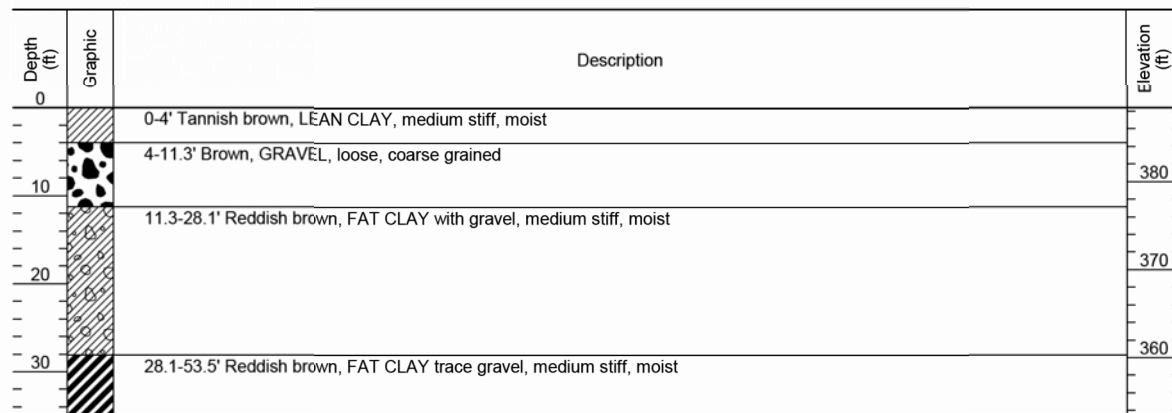
Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

Job No.: <u>J0P0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A8067</u>	Skew: _____	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: _____	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>550+97.8</u>	Northing: <u>302379.6</u>	Date of Work: <u>10/04/11-10/04/11</u>
Offset: <u>100.0' RT</u>	Easting: <u>815861.2</u>	Depth to Water: _____
Elevation: <u>398.3</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	

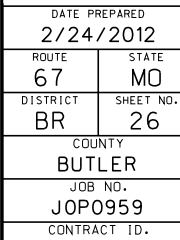


Job No.: JOP0959	County: Butler	Route: 158/160
Design: A8067	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 551+67.2	Northing: 302318.8	Date of Work: 10/05/11-10/05/11
Offset: 150' LT	Easting: 815890.2	Depth to Water:
Elevation: 388.4	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	



Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
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PROJECT NO.

BRIDGE NO.
A7911

[illegible]MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

[illegible]

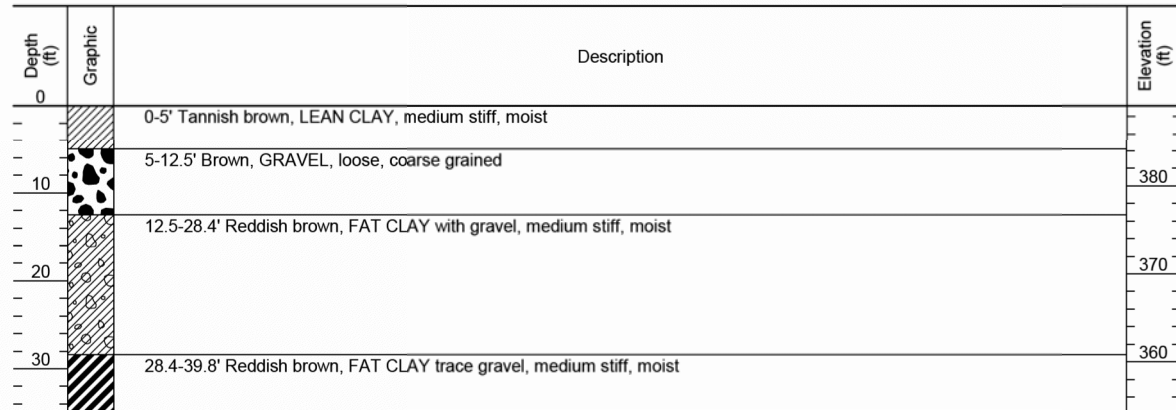
Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

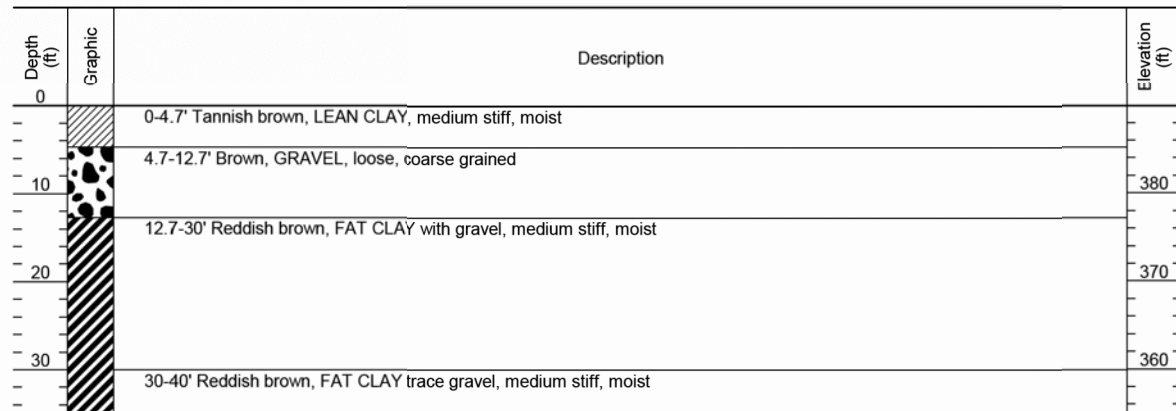
Sheet No. 26 of 39

Detailed Dec. 2011
Checked Dec. 2011

Job No.: <u>JOP0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A8067</u>	Skew: _____	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: _____	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>551+67.2</u>	Northing: <u>302319.2</u>	Date of Work: <u>10/05/11-10/05/11</u>
Offset: <u>125' LT</u>	Easting: <u>815865.2</u>	Depth to Water: _____
Elevation: <u>389.2</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	

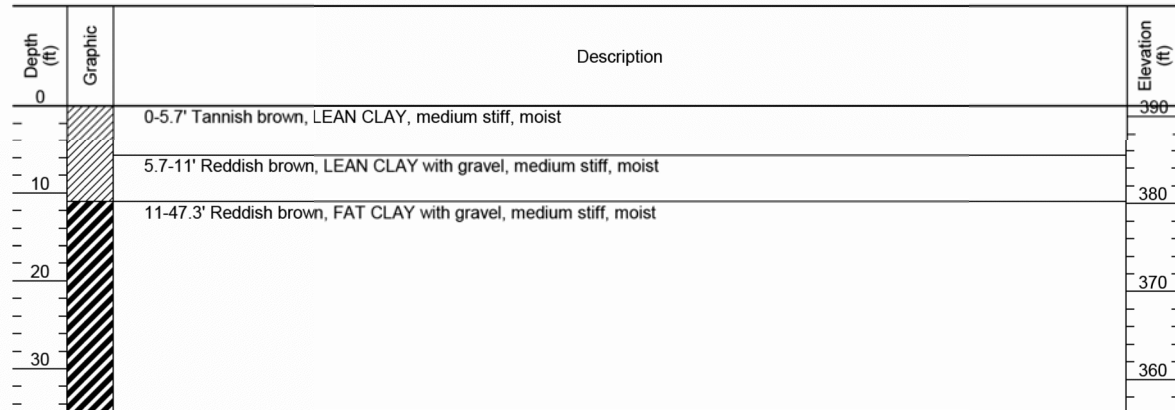


Job No.: JOP0959	County: Butler	Route: 158/160
Design: A8067	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 551+67.2	Northing: 302319.7	Date of Work: 10/05/11-10/05/11
Offset: 100'LT	Easting: 815840.2	Depth to Water:
Elevation: 389.9	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	

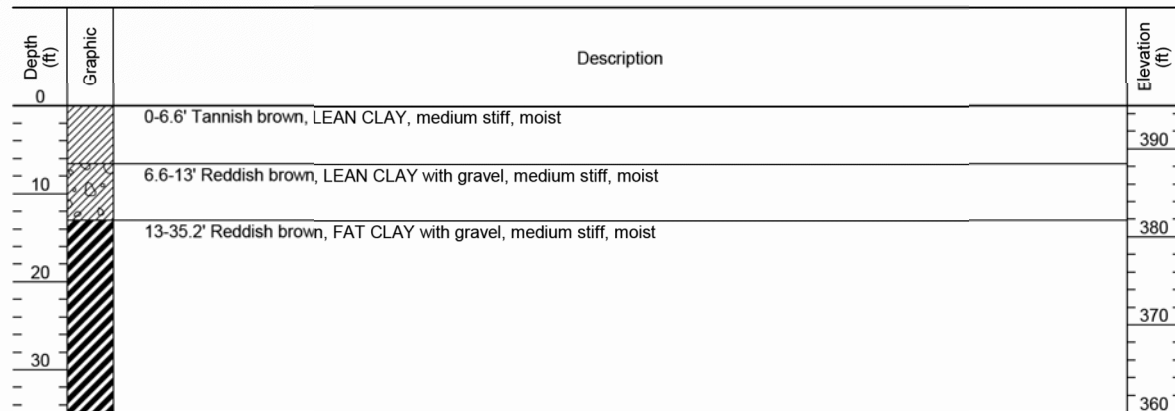


Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

Missouri Department of Transportation		
Construction and Materials		
Boring Data		
Job No.: <u>J0P0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A8067</u>	Skew: _____	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: _____	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>551+67.2</u>	Northing: <u>302320.2</u>	Date of Work: <u>10/05/11-10/05/11</u>
Offset: <u>75' LT</u>	Easting: <u>815815.2</u>	Depth to Water: _____
Elevation: <u>391.2</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	

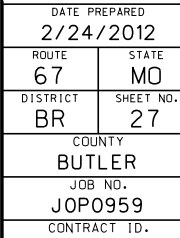


Job No.: J0P0959	County: Butler	Route: 158/160
Design: A8068	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 551+67.2	Northing: 302321.2	Date of Work: 10/05/11-10/05/11
Offset: 25' LT	Easting: 815765.2	Depth to Water:
Elevation: 394.9	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	



Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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PROJECT NO.	
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BRIDGE NO.
A7911

[illegible]MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

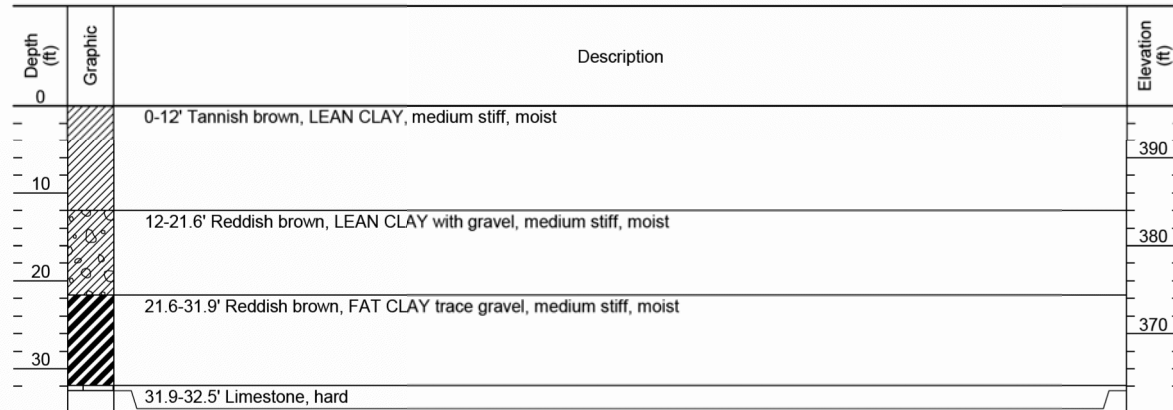
Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

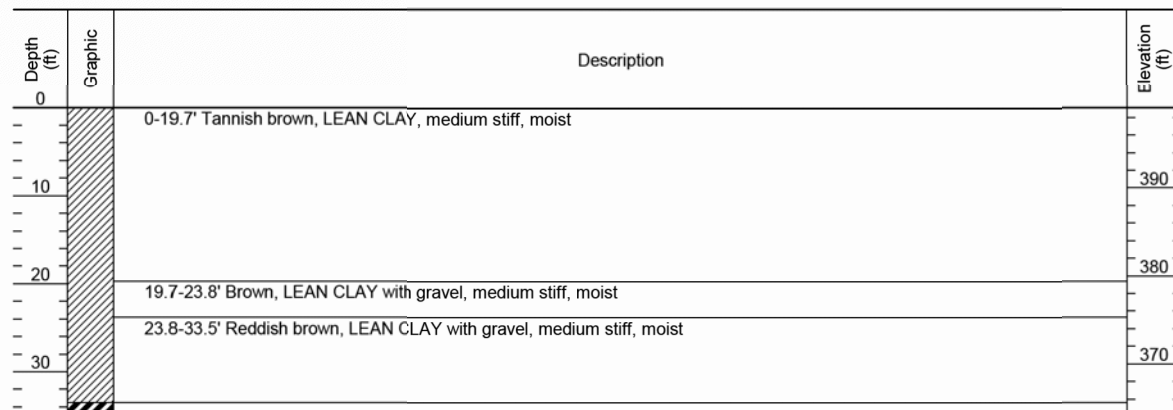
Sheet No. 27 of 39

Detailed Dec. 2011
Checked Dec. 2011

Job No.: JOP0959	County: Butler	Route: 158/160
Design: A8067	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 551+67.2	Northing: 302321.6	Date of Work: 10/05/11-10/05/11
Offset: C/L	Easting: 815740.3	Depth to Water:
Elevation: 396	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	



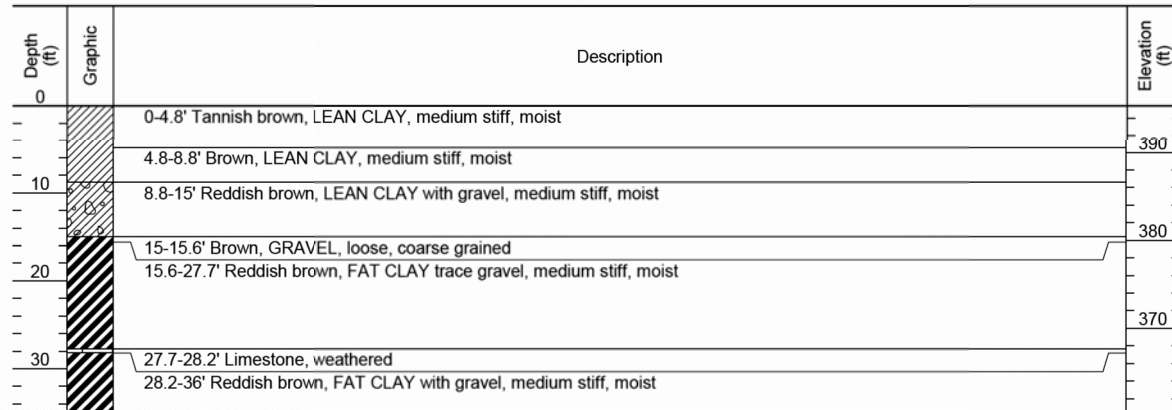
Job No.: J0P0959	County: Butler	Route: 158/160
Design: A8067	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 551+67.2	Northing: 302322.1	Date of Work: 10/05/11-10/05/11
Offset: 25' RT	Easting: 815715.3	Depth to Water:
Elevation: 399.1	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	



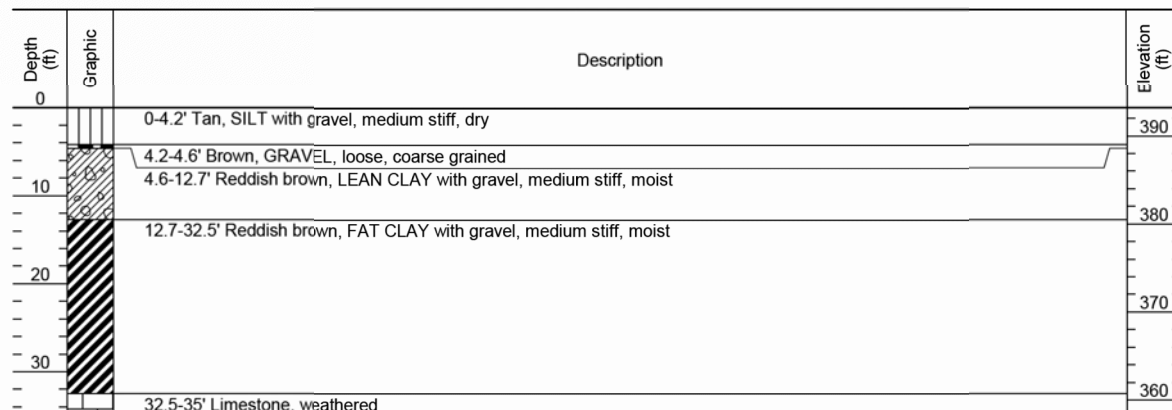
Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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Job No.: <u>J0P0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A7911</u>	Skew: <u>35-27-57"</u>	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: <u>4</u>	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>552 + 21.5</u>	Northing: <u>302277.5</u>	Date of Work: <u>10/06/11-10/06/11</u>
Offset: <u>15' LT</u>	Easting: <u>815723.3</u>	Depth to Water: _____
Elevation: <u>395.4</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	

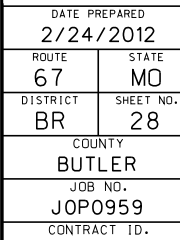


Job No.: <u>JOP0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A7911</u>	Skew: <u>35-27'-57"</u>	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: <u>2</u>	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>550+94.5</u>	Northing: <u>302380.7</u>	Date of Work: <u>10/04/11-10/04/11</u>
Offset: <u>15.0' RT</u>	Easting: <u>815768.1</u>	Depth to Water: _____
Elevation: <u>393.2</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	



Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
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PROJECT NO.

BRIDGE NO.
A7911

[illegible]MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

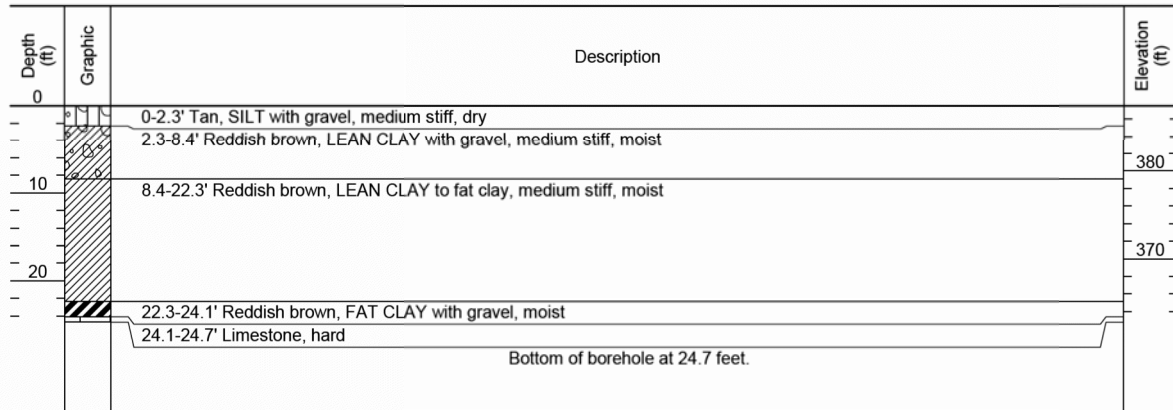
Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

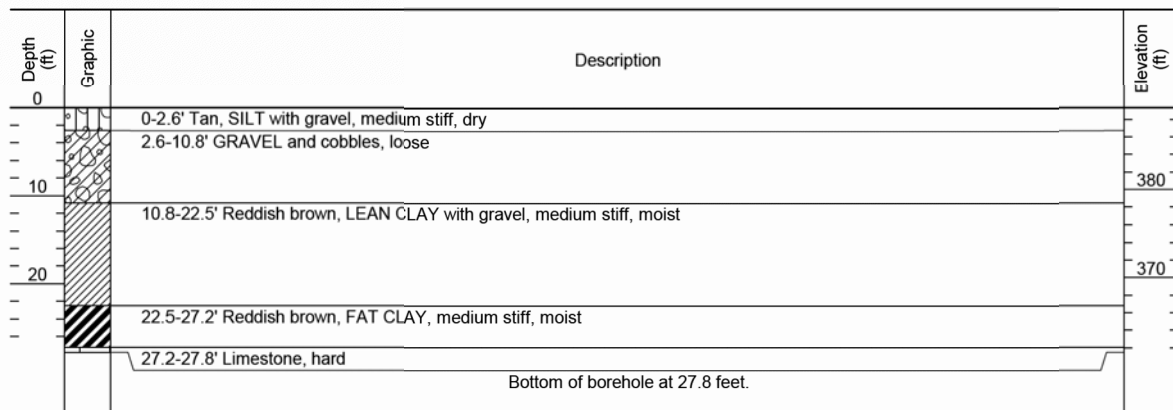
Sheet No. 28 of 39

Detailed Dec. 2011
Checked Dec. 2011

Job No.: <u>J0P0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A8066</u>	Skew: _____	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: _____	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>550+97.8</u>	Northing: <u>302376.8</u>	Date of Work: <u>10/04/11-10/04/11</u>
Offset: <u>50.0' LT</u>	Easting: <u>815831.1</u>	Depth to Water: _____
Elevation: <u>387.5</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	



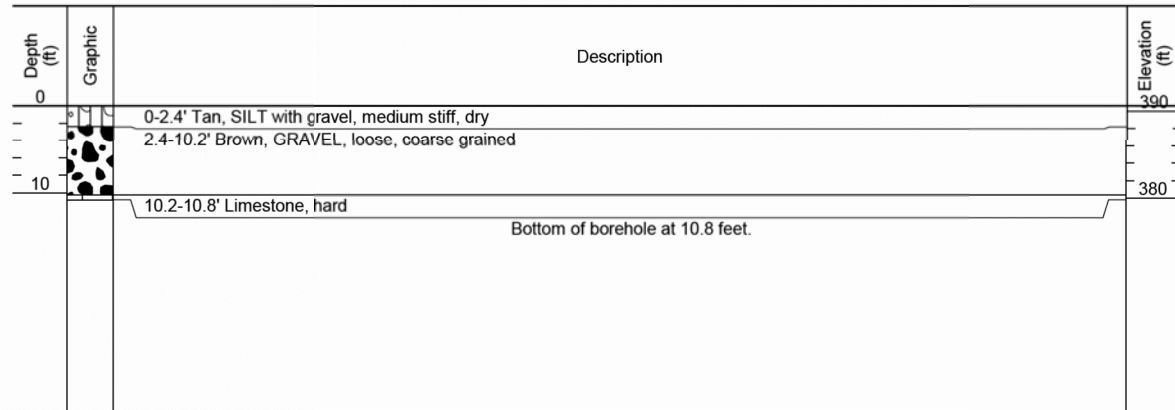
Job No.: J0P0959	County: Butler	Route: 158/160
Design: A8066	Skew:	Location: 7.25 Miles South of Poplar Bluff
Bent:	Logged By: Steve Owens	Operator: Burt Miller
Station: 550+97.8	Northing: 302377.2	Date of Work: 10/04/11-10/04/11
Offset: 25.0' LT	Easting: 815806.1	Depth to Water:
Elevation: 389.3	Requested Northing:	Depth Hole Open:
Requested Station:	Requested Easting:	Time Change:
Requested Offset:	Equipment: Mobile B-31	
Requested Elevation:	Location Note:	



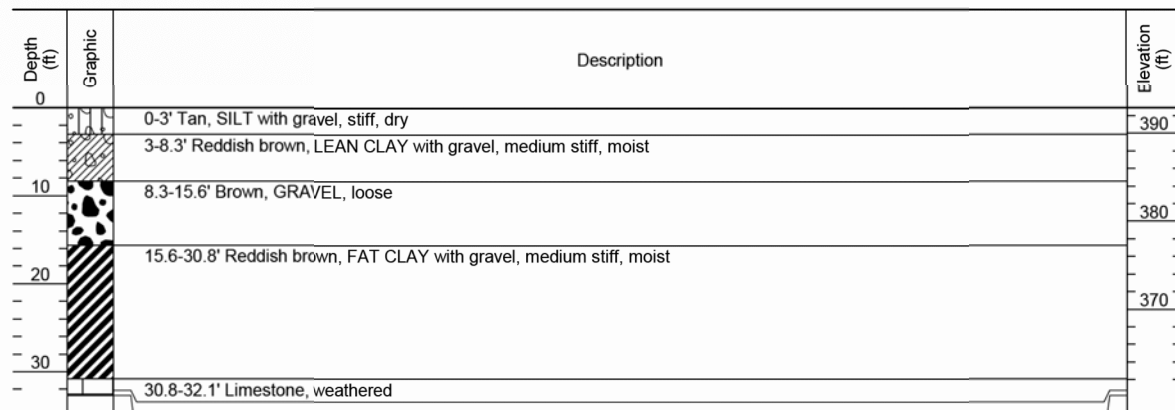
Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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Job No.: <u>J0P0959</u>	County: <u>Butler</u>	Route: <u>158/160</u>
Design: <u>A8066</u>	Skew: _____	Location: <u>7.25 Miles South of Poplar Bluff</u>
Bent: _____	Logged By: <u>Steve Owens</u>	Operator: <u>Burt Miller</u>
Station: <u>550+97.8</u>	Northing: <u>302377.7</u>	Date of Work: <u>10/04/11-10/04/11</u>
Offset: <u>C/L</u>	Easting: <u>815781.1</u>	Depth to Water: _____
Elevation: <u>390.6</u>	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: <u>Mobile B-31</u>	
Requested Elevation: _____	Location Note: _____	

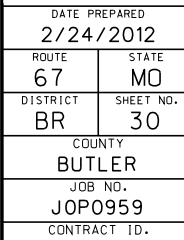


Job No.: J0P0959	County: Butler	Route: 158/160
Design: A8066	Skew: _____	Location: 7.25 Miles South of Poplar Bluff
Bent: _____	Logged By: Steve Owens	Operator: Burt Miller
Station: 550+97.8	Northing: 302378.2	Date of Work: 10/04/11-10/04/11
Offset: 25' RT	Easting: 815756.1	Depth to Water: _____
Elevation: 392.9	Requested Northing: _____	Depth Hole Open: _____
Requested Station: _____	Requested Easting: _____	Time Change: _____
Requested Offset: _____	Equipment: Mobile B-31	
Requested Elevation: _____	Location Note: _____	



Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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PROJECT NO.

BRIDGE NO.
A7911

[illegible]MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 30 of 39

Detailed Dec. 2011
Checked Dec. 2011

Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-83

Job No.: J0P0959
Design: A7911
Bent: 2
Station: 550 + 94.5
Offset: 45.0' LT
Elevation: 387.9
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.: G-9462

County: Butler
Skew: 35-27'-57"
Logged By: Steve Owens
Northing: 302379.5
Easting: 815828.1
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Operator: Ray Murray
Date of Work: 09/28/11-09/28/11
Depth to Water:
Depth Hole Open: 3.5
Time Change: 0 hours

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0		0-2.1' Tan, SILT with gravel, medium stiff, moist							
5		2.1-8.2' Reddish brown, LEAN CLAY with gravel, very stiff, moist	385			26-23-17 (53)		PP = 4.50 tsf	
10		8.2-22.5' Tannish red, LEAN CLAY to fat clay, with gravel	380			7-7-11 (24)		PP = 4.50 tsf	
15			375						
20			370			6-17-14 (41)		PP = 4.50 tsf	
25		22.5-24.2' Reddish brown, FAT CLAY with gravel, stiff, moist	365			4-6-8 (18)		PP = 4.50 tsf	
30		24 2-54 4' Limestone, gray, thin bedded, hard	360		68 (28)		Qu Test Results UCS = 852.4 ksf		
35			355		54 (14)		Qu Test Results UCS = 752.6 ksf		

$N_{60} = (Em/60)N_m$ N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-83

Job No.: J0P0959
Design: A7911
Bent: 2
Station: 550 + 94.5
Offset: 45.0' LT
Elevation: 387.9
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.: G-9462

County: Butler
Skew: 35-27'-57"
Logged By: Steve Owens
Northing: 302379.5
Easting: 815828.1
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Operator: Ray Murray
Date of Work: 09/28/11-09/28/11
Depth to Water:
Depth Hole Open: 3.5
Time Change: 0 hours

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35		24.2-54.4' Limestone, gray, thin bedded, hard (continued)					Qu Test Results UCS = 1344.4 ksf		
40			350		78 (34)				
45			345		100 (50)		Qu Test Results UCS = 1218.8 ksf		
50			340		100 (48)		Qu Test Results UCS = 1814.8 ksf		
			335		100 (30)		Qu Test Results UCS = 1378.6 ksf		
		Bottom of borehole at 54.4 feet.							

$N_{60} = (Em/60)N_m$ N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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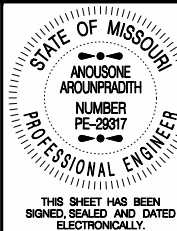
BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 31 of 39

Detailed Dec. 2011
Checked Dec. 2011



THIS SHEET HAS BEEN
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DATE PREPARED
2/24/2012

ROUTE 67 STATE MO
DISTRICT BR SHEET NO. 31

COUNTY
BUTLER

JOB NO.
J0P0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A7911

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-85

Job No.: J0P0959
Design: A8066
Bent:
Station: 550+97.8
Offset: 150Lt.
Elevation: 381.9
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.: G-9462

County: Butler
Skew:
Logged By: Steve Owens
Northing: 302374.8
Easting: 815931.1
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Operator: Ray Murray
Date of Work: 09/29/11-09/29/11
Depth to Water:
Depth Hole Open:
Time Change:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0									
0		0-2.7' Brown, LEAN CLAY, medium stiff, moist	380						
5		2.7-8.3' Brown, GRAVEL, coarse grained							
5						14-20-25 (59)			
10		8.3-13' Reddish brown, LEAN CLAY to fat clay, with gravel, very stiff, moist	375			12-11-14 (33)		PP = 4.50 tsf	
10			370		64			PP = 4.25 tsf Torvane = 0.90 tsf	MC = 21.7% γ _{sat} = 128 pcf ⁽¹⁾
15		13-32.2' Reddish brown, FAT CLAY with gravel, very stiff, moist			200		Qu Test Results Direct Shear Results Phi° = 17.5 ° c' = 536.6 psf	PP = 4.50 tsf Torvane = 0.90 tsf	MC = 19.5% γ _{sat} = 131 pcf ⁽¹⁾ LL = 50 PL = 29
15			365			2-1-1 (3)		PP = 2.25 tsf	
20						7-39/0.3'			
20			360			2-4-5 (12)		PP = 2.25 tsf	
25					32			PP = 0.75 tsf Torvane = 0.32 tsf	MC = 34.1% γ _{sat} = 117 pcf ⁽¹⁾
25			355			5-4-6 (13)		PP = 3.25 tsf	MC = 44.2% γ _{sat} = 110 pcf ⁽¹⁾
30						4-3-10 (17)			
30		32.2-33.1' Limestone, weathered	350						
35		33.1-39.9' Limestone, gray, thin bedded, hard			100 (20)		Qu Test Results UCS = 1724 ksf		

N₆₀ = (Em/60)/Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-85

Job No.: J0P0959
Design: A8066
Bent:
Station: 550+97.8
Offset: 150Lt.
Elevation: 381.9
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.: G-9462

County: Butler
Skew:
Logged By: Steve Owens
Northing: 302374.8
Easting: 815931.1
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Operator: Ray Murray
Date of Work: 09/29/11-09/29/11
Depth to Water:
Depth Hole Open:
Time Change:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35									
35		33.1-39.9' Limestone, gray, thin bedded, hard (continued)	345		58 (20)		Qu Test Results UCS = 2090 ksf		
		Bottom of borehole at 39.9 feet.							

N₆₀ = (Em/60)/Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387
Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 32 of 39

Detailed Dec. 2011
Checked Dec. 2011



THIS SHEET HAS BEEN
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ELECTRONICALLY.

DATE PREPARED
2/24/2012

ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 32

COUNTY
BUTLER

JOB NO.
J0P0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A7911

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0									
		0-6.1' Tan, SILT with gravel, medium stiff, dry	395						
5									
		6.1-18.7' Reddish brown, LEAN CLAY, stiff, dry	390	X		18-21-21 (55)		PP = 4.50 tsf	
10									
			385	X		14-18-28 (61)		PP = 4.50 tsf	
15									
			380	X		17-30-39/0.3'		PP = 4.50 tsf	
20		18.7-22.6' Reddish brown, LEAN CLAY with gravel, very stiff, dry							
			375	X		13-14-14 (37)			
25		22.6-26.5' Reddish brown, LEAN CLAY, very stiff, dry							
				X		8-9-12 (28)		PP = 4.50 tsf	
		Bottom of borehole at 26.5 feet.							

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Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0									
		0-2' Brown, LEAN CLAY with gravel, medium stiff, dry							
		2-4.2' Tan, SILT with gravel	385						
5		4 2-23' Brown, LEAN CLAY with gravel, very stiff, dry							
			380			18-26-28 (71)			
10									
			375			33-37-25 (82)			
15									
			370			10-12-10 (29)			
20									
			365			7-9-12 (28)		PP = 3.75 tsf	
25		23-33.8' Tan, SAND to silt, loose, moist							
			360			2-6-10 (21)			
30									
			355			2-1-1 (3)			
35		33.8-34.1' Limestone, weathered							
							Qu Test Results		

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Sheet No. 33 of 39

Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-87

Job No.: J0P0959
Design: A7911
Bent: 1
Station: 550+27.5
Offset: 45.0Lt
Elevation: 387.3
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.: G-9462

County: Butler
Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Logged By: Steve Owens
Northing: 302433.7
Easting: 815867.6
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Operator: Ray Murray
Date of Work: 10/04/11-10/04/11
Depth to Water:
Depth Hole Open:
Time Change:

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35							UCS = 900.6 ksf		
40		34.1-49.1' Limestone, gray, thin bedded, hard, vuggy (continued)	350				Qu Test Results UCS = 1413.8 ksf		
45			345						
		Bottom of borehole at 46.7 feet.							

$N_{60} = (Em/60)N_m$ N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387

Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-88

Job No.: J0P0959
Design: A8066
Bent:
Station: 550+97.8
Offset: 50.0Rt
Elevation: 394.6
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.: G-9462

County: Butler
Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Logged By: Steve Owens
Northing: 302378.7
Easting: 815731.1
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Operator: Ray Murray
Date of Work: 10/04/11-10/04/11
Depth to Water:
Depth Hole Open:
Time Change:

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0		0-3.6' Tan, SILT with gravel, medium stiff, dry							
5		3.6-17.1' Reddish brown, LEAN CLAY with gravel, very stiff	390			11-22-32 (71)		PP = 4.50 tsf	MC = 14.5% $\gamma_{sat} = 138 \text{ pcf}^{(1)}$
10			385			24-34-38 (95)		PP = 4.50 tsf	
15			380			21-36-29 (86)			MC = 7.4% $\gamma_{sat} = 149 \text{ pcf}^{(1)}$
20		17.1-28.3' Reddish brown, FAT CLAY with gravel, very stiff, moist	375		0	8-12-13 (33)		PP = 4.50 tsf	MC = 32.9% $\gamma_{sat} = 118 \text{ pcf}^{(1)}$
25			370		80	16-18-39/0.3'			LL = 97 PL = 33
30		28.3-30.2' Limestone, weathered	365			39/0.2'	Qu Test Results UCS = 1176.8 ksf		
35		30.2-40.2' Limestone, gray, thin bedded, hard	360		100 (36)				

$N_{60} = (Em/60)N_m$ N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387

Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 34 of 39

Detailed Dec. 2011
Checked Dec. 2011



THIS SHEET HAS BEEN
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DATE PREPARED
2/24/2012

ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 34

COUNTY
BUTLER

JOP0959

CONTRACT ID.

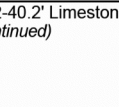
PROJECT NO.

BRIDGE NO.
A7911

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35									
		30.2-40.2' Limestone, gray, thin bedded, hard (continued)			100 (60)		Qu Test Results UCS = 1460 ksf		
40		Bottom of borehole at 40.2 feet.	355						

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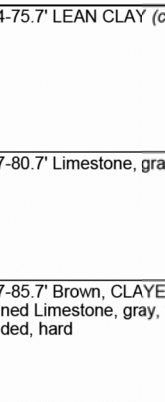
* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



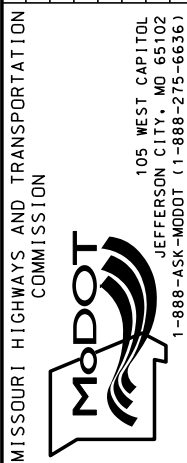
Sheet No. 35 of 39

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35									
35		35-37.1' Sandstone, highly weathered				17-12-14 (34)		PP = 3.75 tsf	
40		37.1-37.4' Limestone, weathered 37.4-59.4' Limestone, gray, thin bedded, hard Void encountered from 42.0-43.2'	360		61 (26)		Qu Test Results UCS = 2056 ksf		
45			355		80 (0)				
50			350		46 (30)		Qu Test Results UCS = 1624.8 ksf		
55			345		88 (28)		Qu Test Results UCS = 564.8 ksf Qu Test Results UCS = 594.8 ksf		
60		59.4-75.7' LEAN CLAY	340		74 (16)				
65			335		0 (0)				
70			330		0 (0)				

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Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
70									
		59.4-75.7' LEAN CLAY <i>(continued)</i>							
			325		0 (0)				
75									
		75.7-80.7' Limestone, gray, thin bedded, hard							
			320		56 (16)				
80									
		80.7-85.7' Brown, CLAYEY SAND, fine grained Limestone, gray, thin to medium bedded, hard							
			315		92 (40)		Qu Test Results UCS = 1539.2 ksf		
85									
		Bottom of borehole at 85.7 feet.							

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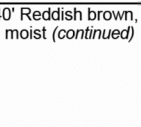



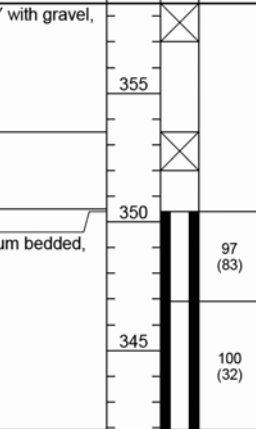



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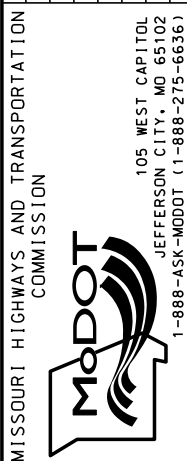
Sheet No. 36 of 39

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0									
0		0-5.4' Tannish brown, LEAN CLAY, medium stiff, moist	390						
5		5.4-17.5' Reddish brown, LEAN CLAY with gravel, very stiff, moist		X		8-12-14 (34)		PP = 4.50 tsf	
10				X		13-29-28 (75)		PP = 4.50 tsf	
15				X		15-10-12 (29)		PP = 4.50 tsf	
20		17.5-23.5' Tannish brown, LEAN CLAY, very stiff, moist	375						
20				X		4-7-5 (16)		PP = 4.50 tsf	
25		23.5-25' GRAVEL	370						
25		25-33' Reddish brown, FAT CLAY, medium stiff, moist		X		8-4-3 (9)			
30									
35				X		1-2-2 (5)		PP = 1.00 tsf	
35		33-40' Reddish brown, FAT CLAY with gravel, stiff, moist	360						

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Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35		33-40' Reddish brown, FAT CLAY with gravel, stiff, moist <i>(continued)</i>				10-7-4 (14)		PP = 1.25 tsf	
			355						
40		40-43' Tan, SILT, soft, moist				3-1-1 (3)		PP = 0.50 tsf	
		43-43.1' Limestone, weathered	350				Qu Test Results UCS = 1117.4 ksf		
45		43.1-51.6' Limestone, gray, medium bedded, medium hard, slightly weathered					97 (83)		
							345		100 (32)
50									
		Bottom of borehole at 51.6 feet.							

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IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Sheet No. 37 of 39

Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-91

Job No.: J0P0959
Design: A7911+A8067
Bent: 3
Station: 551+80.5
Offset: 45.0Rt.
Elevation: 399.4
Requested Station: 551+70.5
Requested Offset: 45.0Rt.
Requested Elevation:
Drill No.: G-9462

County: Butler
Skew: 35-27'-57"
Logged By: Ricardo Todd
Northing: 302319.8
Easting: 815693.3
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Operator: Ray Murray
Date of Work: 10/12/11-10/13/10
Depth to Water:
Depth Hole Open:
Time Change:

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
0									
0		0-7.6' Brownish tan, LEAN CLAY trace gravel, very stiff, moist							
5			395						
5				80		12-16-16 (42)		PP = 4.50 tsf Torvane = 0.90 tsf PP = 4.00 tsf	MC = 13.8% γ _{sat} = 139 pcf ⁽¹⁾ MC = 20.2% γ _{sat} = 130 pcf ⁽¹⁾
5				73					
10		7.6-18.3' Tannish brown, LEAN CLAY trace gravel, very stiff, moist	390		90	12-17-22 (51)		PP = 4.00 tsf Torvane = 0.90 tsf PP = 4.00 tsf	MC = 17.3% γ _{sat} = 134 pcf ⁽¹⁾ LL = 38 PL = 17
10				73			Direct Shear Results Phi° = 35.5 ° c' = 48.2 psf	PP = 4.50 tsf Torvane = 0.90 tsf PP = 4.50 tsf	MC = 135.4% γ _{sat} = 135 pcf ⁽¹⁾ LL = 37 PL = 17
10				100		11-17-21 (50)			
15			385		82		Direct Shear Results Phi° = 30.1 ° c' = 269.1 psf	PP = 4.00 tsf Torvane = 0.90 tsf	MC = 14.7% γ _{sat} = 137 pcf ⁽¹⁾ MC = 16.5% γ _{sat} = 135 pcf ⁽¹⁾ LL = 33 PL = 18
15				73		7-10-15 (33)		PP = 4.00 tsf	
20		18.3-35.1' Reddish brown, GRAVELLY FAT CLAY, stiff, moist	380						
20				60		9-7-9 (21)		PP = 1.50 tsf	LL = 32 PL = 14
25			375						
25				47		11-12-16 (37)			
30			370						
30				67		5-6-8 (18)			
35			365						

N₆₀ = (Em/60)/Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387

Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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Missouri Department of Transportation
Construction and Materials

BORING NO. O-11-91

Job No.: J0P0959
Design: A7911+A8067
Bent: 3
Station: 551+80.5
Offset: 45.0Rt.
Elevation: 399.4
Requested Station: 551+70.5
Requested Offset: 45.0Rt.
Requested Elevation:
Drill No.: G-9462

County: Butler
Skew: 35-27'-57"
Logged By: Ricardo Todd
Northing: 302319.8
Easting: 815693.3
Requested Northing:
Requested Easting:
Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube
Location Note:
Hammer Efficiency: 79%
Drilling Method: Hollow Stem Auger

Route: 158/160
Location: 7.25 Miles South of Poplar Bluff
Operator: Ray Murray
Date of Work: 10/12/11-10/13/10
Depth to Water:
Depth Hole Open:
Time Change:

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
35									
35		35.1-41.9' Tannish red, FAT CLAY scattered gravel, stiff, moist			67	11-6-6 (16)		PP = 1.25 tsf	MC = 13.8% γ _{sat} = 139 pcf ⁽¹⁾
40			360						
40				67		8-6-13 (25)		PP = 2.00 tsf	
45		41.9-42.2' Limestone, medium hard, weathered 42.2-56.6' Limestone, medium bedded, medium hard, siliceous, vuggy.	355		48 (0)				
50			350		76 (42)		Qu Test Results UCS = 1616.6 ksf Qu Test Results UCS = 412.6 ksf		
55			345		82 (30)		Qu Test Results UCS = 1052.4 ksf Qu Test Results UCS = 1353.4 ksf		
60		56.6-67.2' CLAY, layer.	340		0 (0)				
65			335		0 (0)				
70		67.2-87.2' Limestone, medium bedded, medium hard, siliceous	330		92		Qu Test Results UCS = 3095.4 ksf		

N₆₀ = (Em/60)/Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387

Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 38 of 39

Detailed Dec. 2011
Checked Dec. 2011



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

DATE PREPARED
2/24/2012

ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 38

COUNTY BUTLER

JOB NO. J0P0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A7911

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Job No.: J0P0959

Design: A7911+A8067

Bent: 3

Station: 551+80.5

Offset: 45.0Rt.

Elevation: 399.4

Requested Station: 551+70.5

Requested Offset: 45.0Rt.

Requested Elevation:

Drill No.: G-9462

Missouri Department of Transportation
Construction and Materials

County: Butler

Skew: 35-27'-57"

Logged By: Ricardo Todd

Northing: 302319.8

Easting: 815693.3

Requested Northing:

Requested Easting:

Equipment: Acker Soil XLS ,Rock Core, Standard Penetration Test, Shelby Tube

Location Note:

Hammer Efficiency: 79%

BORING NO. O-11-91

Route: 158/160

Location: 7.25 Miles South of Poplar Bluff

Operator: Ray Murray

Date of Work: 10/12/11-10/13/10

Depth to Water:

Depth Hole Open:

Time Change:

Drilling Method: Hollow Stem Auger

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Strength Data	Field Tests	Index Tests
70									
75		67.2-87.2' Limestone, medium bedded, medium hard, siliceous (continued)	325		(42)		Qu Test Results UCS = 1149.6 ksf		
					64 (26)		Qu Test Results UCS = 1409.4 ksf		
80			320		100 (50)		Qu Test Results UCS = 1679 ksf		
							Qu Test Results UCS = 1375.4 ksf Qu Test Results UCS = 1241.8 ksf		
85			315		100 (58)				
		Bottom of borehole at 87.2 feet.							

$N_{60} = (Em/60)/N_m$ N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri East Coordinate Proj. Factor: 1.00007882387

Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet

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CLIENT Missouri Department of Transportation Bridge Division

PROJECT NAME Bridge & MSE Walls

PROJECT NUMBER J0P0959

PROJECT LOCATION 7.25 Miles South of Poplar Bluff

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- CH: USCS High Plasticity Clay
- CL: USCS Low Plasticity Clay
- CL-CH: USCS Low to High Plasticity Clay
- CLG: USCS Low Plasticity Gravelly Clay
- GC: USCS Clayey Gravel
- GP: USCS Poorly-graded Gravel
- GW: USCS Well-graded Gravel
- LIMESTONE: Limestone
- ML: USCS Silt
- MLG: USCS Gravelly Silt
- SANDSTONE: Sandstone
- SP-SM: USCS Poorly-graded Sand with Silt

SAMPLER SYMBOLS

- Rock Core
- Standard Penetration Test
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- LL - LIQUID LIMIT (%)

PI - PLASTIC INDEX (%)

W - MOISTURE CONTENT (%)

DD - DRY DENSITY (PCF)

NP - NON PLASTIC

-200 - PERCENT PASSING NO. 200 SIEVE

PP - POCKET PENETROMETER (TSF)
- TV - TORVANE

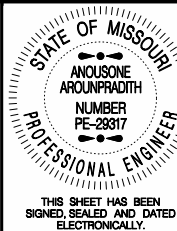
PID - PHOTOIONIZATION DETECTOR

UC - UNCONFINED COMPRESSION

ppm - PARTS PER MILLION

Water Level at Time Drilling, or as Shown

Water Level After 24 Hours, or as Shown



DATE PREPARED 2/24/2012

ROUTE 67 STATE MO

DISTRICT BR SHEET NO. 39

COUNTY BUTLER

JOB NO. J0P0959

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A7911

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 39 of 39

Detailed Dec. 2011
Checked Dec. 2011