

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
(72'-80'-72') Prestressed Concrete I-Girder Spans

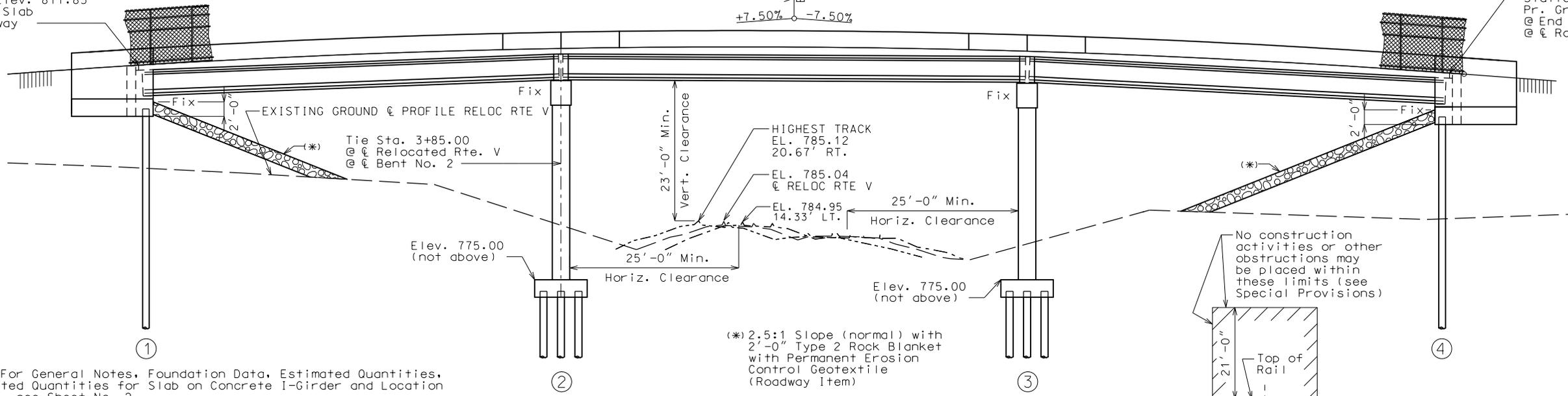
SEC/SUR 36 TWP 58N RGE 24E

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

Station 3+11.72
Pr. Gr. Elev. 811.85
@ End of Slab
@ ϕ Roadway

Station 5+38.28
Pr. Gr. Elev. 810.48
@ End of Slab
@ ϕ Roadway

VPI 4+15.00
EL 819.74
+7.50% -7.50%

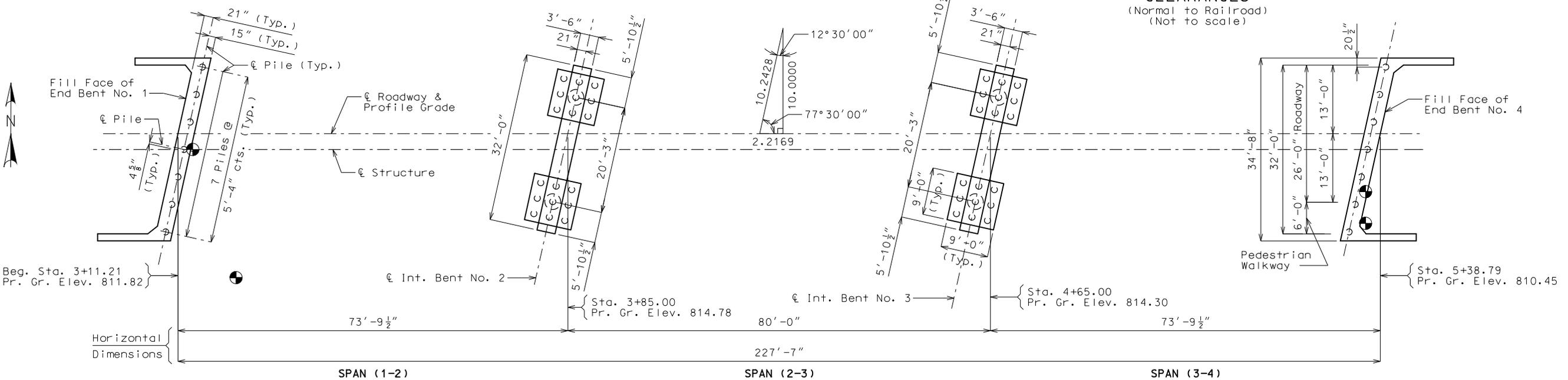


GENERAL ELEVATION

MINIMUM CONSTRUCTION CLEARANCES
(Normal to Railroad)
(Not to scale)

Note: For General Notes, Foundation Data, Estimated Quantities, Estimated Quantities for Slab on Concrete I-Girder and Location Sketch, see Sheet No. 2.

Roadway fill shall be completed to the final roadway section and up to the elevation of the bottom of the concrete beam within the limits of the structure and for not less than 25 feet in back of the fill face of the end bents any piles are driven for any bents falling within the embankment section.



PLAN

" \bullet " Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

The locations of all subsurface borings for this structure are shown on the bridge plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, are shown on Sheet(s) No. 21-33 or will be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.

B.M.

BRIDGE

STATE ROAD
ABOUT
STA.

STD.
STD.
STD.
STD.

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



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

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

Estimated Quantities				
Item	Substr.	Superstr.	Total	
Class 1 Excavation	cu. yard	230		230
(112 in.) Curved Top Pedestrian Fence (Structures)	linear foot		250	250
Cast-In-Place Concrete Piles (14 in.)	linear foot	2,463		2,463
Dynamic Pile Testing	each	4		4
Pre-Bore for Piling	linear foot	196		196
Pile Point Reinforcement	each	50		50
Dynamic Pile Restrike	each	4		4
Class B Concrete (Substructure)	cu. yard	137.5		137.5
Slab on Concrete I-Girder	sq. yard		873	873
* Safety Barrier Curb	linear foot		472	472
Pedestrian Curb	linear foot		250	250
Type 6 (54 in.) Prestressed Concrete I-Girder	linear foot		895	895
Reinforcing Steel (Bridges)	pound	15,140		15,140
Conduit System on Structure	lump sum		1	1
Steel Intermediate Diaphragm for P/S Concrete Girders	each		9	9
Vertical Drain at End Bents	each		2	2
Laminated Neoprene Bearing Pad (Tapered)	each		24	24

* Safety 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 I-Girder.

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

All reinforcement in the intermediate bent concrete diaphragms except reinforcement embedded in the beam cap is included in the Estimated Quantities for Slab on Concrete I-Girder.

All concrete above the intermediate beam cap is included in the Estimated Quantities for Slab on Concrete I-Girder.

All reinforcement in cast-in-place piling at end bents is included in the superstructure quantities.

All reinforcement in cast-in-place piling at intermediate bents is included in the substructure quantities for intermediate bents.

GENERAL NOTES:

Design Specifications:

2010 AASHTO LRFD Bridge Design Specifications and 2010 Interim Revisions
Load and Resistance Factor Design
Seismic Design Category A

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-2 Concrete (Superstructure, except Prestressed Girders & Barrier Curb)	f'c = 4,000	psi
Class B-1 Concrete (Barrier Curb & Pile)	f'c = 4,000	psi
Reinforcing Steel (Grade 60)	fy = 60,000	psi
Steel Pipe Pile (ASTM A709 Grade 50)	fy = 50,000	psi

For prestressed girder stresses, see Sheets No. 15, 16 & 17.

Neoprene Pads:

Bearings shall be 60 durometer neoprene pads.

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

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 Control:

Maintain traffic on existing Rte. V.

Estimated Quantities for Slab on Concrete I-Girder		
Item		Total
Class B-2 Concrete	cu. yard	303.1
Reinforcing Steel	pound	10,290
Reinforcing Steel (Epoxy Coated)	pound	64,090

The table of Estimated Quantities for Slab on Concrete I-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 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.

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

Foundation Data						
Bent No.		1	2	3	4	
Driven Pile	Type	Foundation	Foundation	Foundation	Foundation	
	Pile Type and Size	CIP 14" Ø	CIP 14" Ø	CIP 14" Ø	CIP 14" Ø	
	Number	7	18	18	7	
	Approximate Length	foot	55	48	48	50
	Pile Driving Verification Method	**	**	**	**	
	Minimum Nominal Axial Compressive Resistance	kip	220	232	232	220
	Hammer Energy Required	foot-pound	9,100	8,250	8,250	8,300
	Minimum Tip Penetration		782.00	762.00	762.00	775.00
	Criteria for Minimum Tip Penetration		***	***	***	***

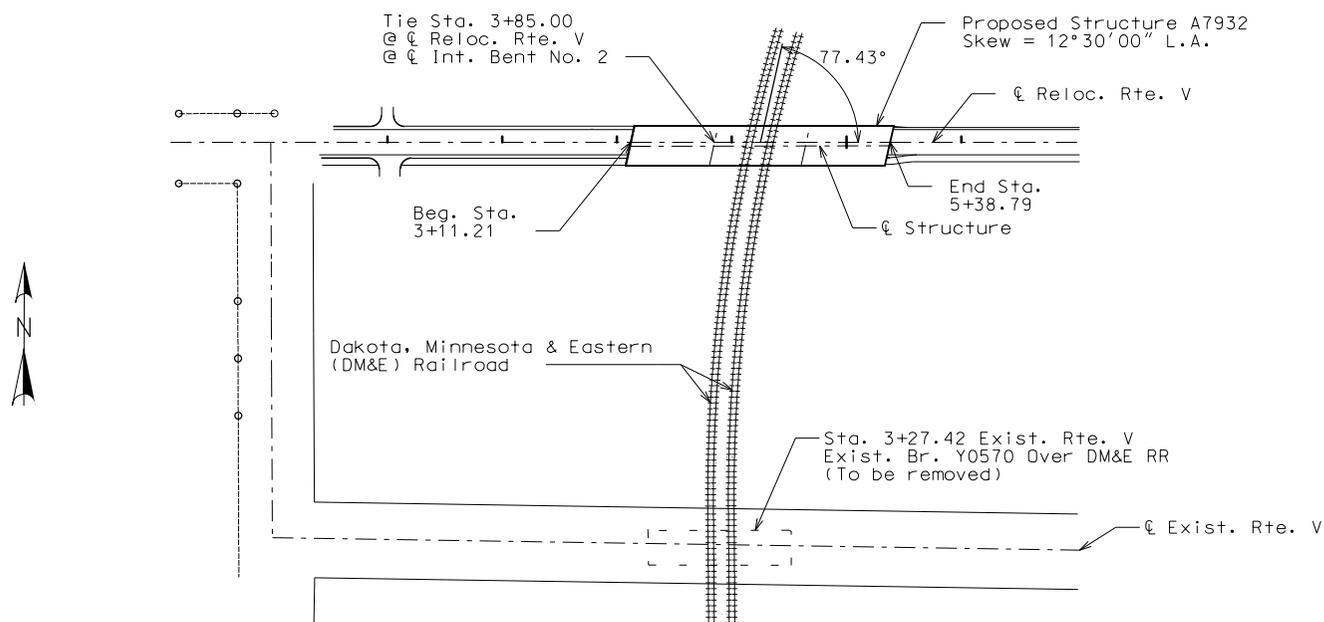
** Dynamic Pile Testing

*** Minimum Embedment

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

Dynamic Pile Testing shall be performed during pile installation to ensure pile integrity and capacity (see Special Provisions). A minimum of one Dynamic Pile Test shall be done at each bent.

Fluted type cast-in-place pile will not be permitted.



"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED

5/3/2012

ROUTE V STATE MO

DISTRICT BR SHEET NO. 2

COUNTY LIVINGSTON

JOB NO. J2S0787

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A7932

DESCRIPTION

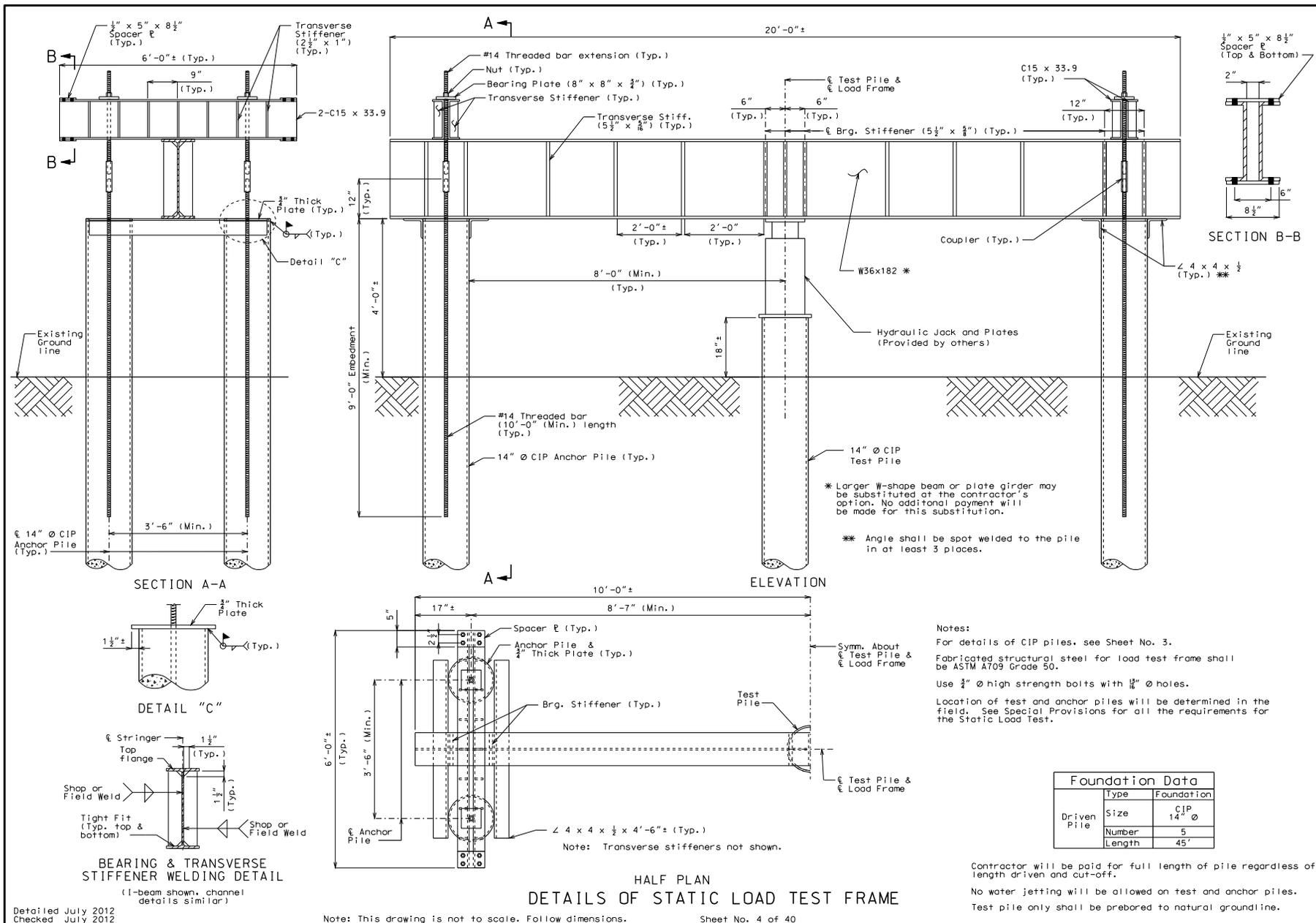
DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

MDOT

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



Detailed July 2012
 Checked July 2012

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

Sheet No. 4 of 40

BRIAN A. HARNAGE
 PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
 DIGITALLY SIGNED AND DATED
 ELECTRONICALLY.

DATE PREPARED: 7/11/2012
 ROUTE: V STATE: MO
 DISTRICT: BR SHEET NO.: 4
 COUNTY: LIVINGSTON
 JOB NO.: J2S0787
 CONTRACT ID.:
 PROJECT NO.:
 BRIDGE NO.: A7932

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITAL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MISSOURI (1-888-275-6628)

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DATE PREPARED
5/3/2012

ROUTE V STATE MO

DISTRICT BR SHEET NO. 3

COUNTY LIVINGSTON

JOB NO. J2S0787

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A7932

DESCRIPTION

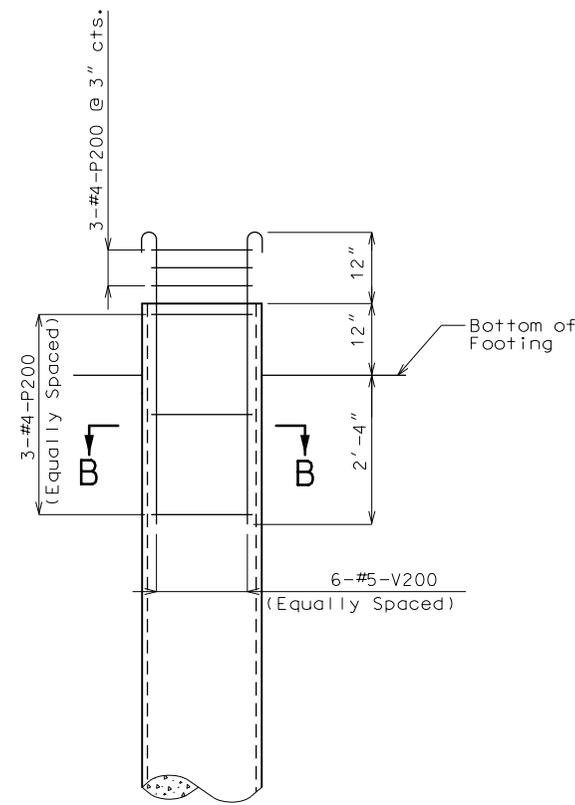
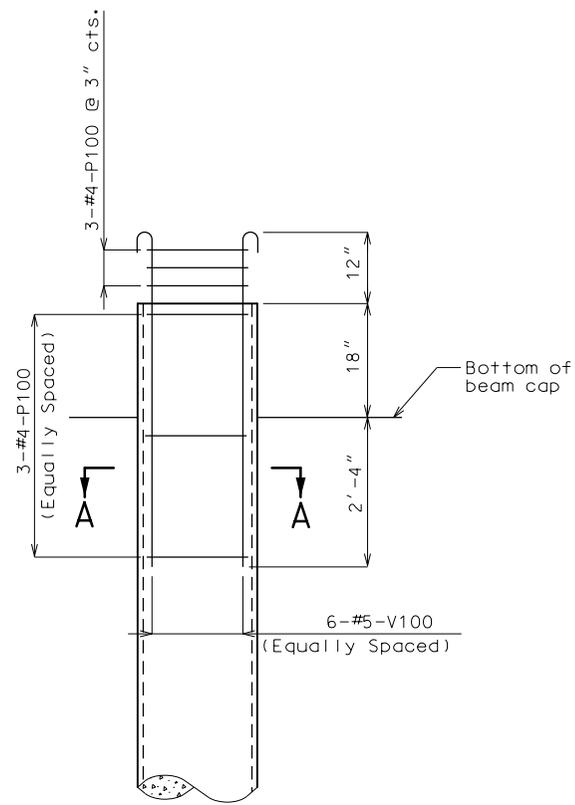
DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

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

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Notes:

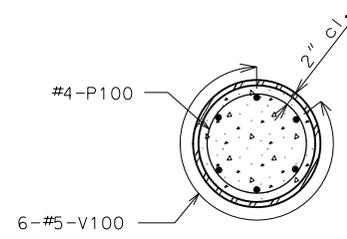
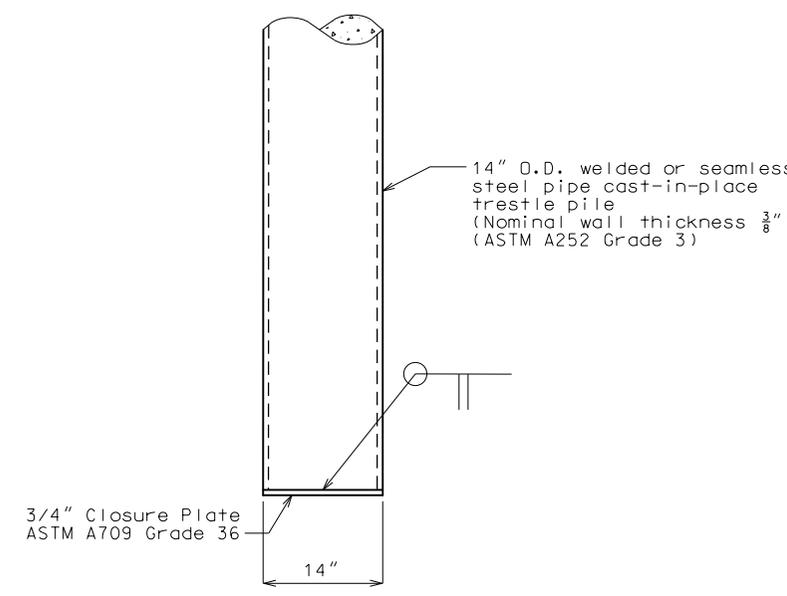
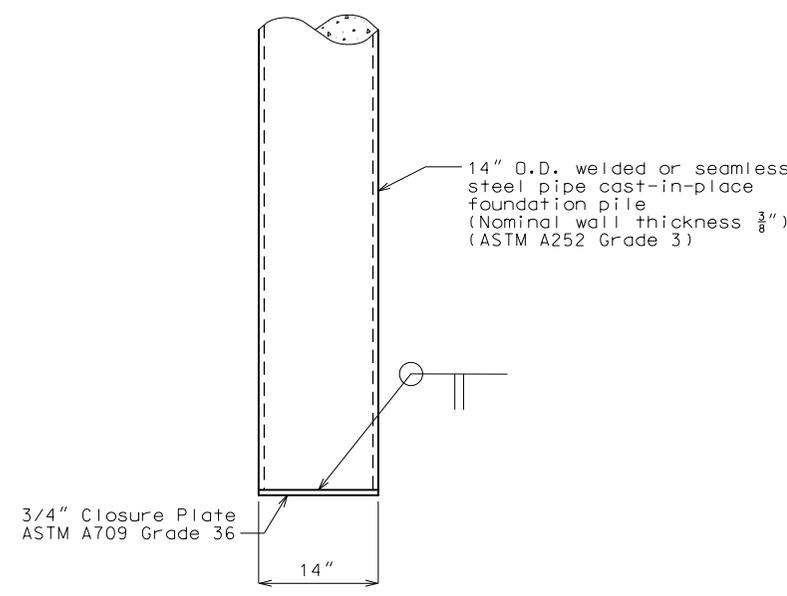
All concrete for cast-in-place piles shall be Class B-1.

Where 3/4" closure plates are required for tips of pipe piles, the closure plates shall not project beyond the outside diameter of the pipe piles. Satisfactory weldments may be made by beveling tip ends of pipe or by use of inside backing rings. In either case, proper gaps shall be used to obtain weld penetration full thickness of pipe.

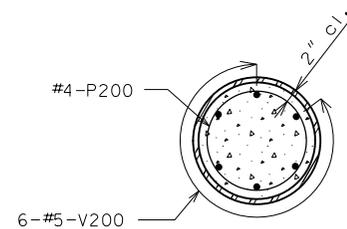
Splice details for cast-in-place concrete piles shall be in accordance with the manufacturer's recommendations.

All splices of shells for cast-in-place concrete piles shall be made watertight and to the full strength of the shell above and below the splice to permit hard driving without damage. All shells damaged during driving shall be replaced without cost to the State. Shell sections used for splicing shall be at least 5'-0" in length. The splice at the tapered section shall be at least 3'-0" below the streambed for intermediate trestle type bents.

The minimum wall thickness of any spot or local area of any type shall not be more than 12.5% under the specified nominal wall thickness.



SECTION A-A



SECTION B-B

WELDED OR SEAMLESS STEEL PIPE CAST-IN-PLACE PILE AT END BENTS NO. 1 & 4

WELDED OR SEAMLESS STEEL PIPE CAST-IN-PLACE PILE AT INTERMEDIATE BENTS NO. 2 & 3

DETAILS OF CAST-IN-PLACE PILE

MISSOURI DEPARTMENT OF TRANSPORTATION
Construction and Materials

BORING DATA

Sheet 1 of 3

Job No.: J2S0787
 County: Livingston Route: V Design: A7932
 Over: DM&E Railroad Skew: 12° 3' L.A.
 Logged by: E. Thomas Operator: Abbott
 Equipment: Mobile Drill B-31, 3" Augers Date of Work: 2/14-15/2011

Bent	Station	Location	Surface Elevation	Log of Materials *
1	3+14.0 1347228.1E	3.0' RT. 1445015.5N	794.1	0.0-10.0' Brown, mottled gray, lean clay, moist, stiff.
				10.0-70.0' Brown, mottled gray, speckled red, lean clay, scattered sand, moist, very stiff.
4	5+36.0 1347447.1E	17.0' RT. 1445002.6N	787.0	0.0-20.0' Brown, mottled gray, speckled red lean clay, trace fine sand, moist, very stiff.
				20.0-68.0' Brown, mottled gray, scattered sand, moist, stiff to very stiff.
				68.0-70.0' Brown sandy clay, wet, medium stiff to very stiff.

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri Central 2402
 Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet Coordinate Projection Factor: 1.0000009

* 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 judgment of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

MISSOURI DEPARTMENT OF TRANSPORTATION
Construction and Materials

BORING DATA (CORE & SPT)

Sheet 2a of 3

Job No.: J2S0787
 County: Livingston Route: V Design: A7932
 Over: DM&E Railroad Skew: 12° 30' L.A.
 Logged by: E. Thomas Operator: Donahoe
 Equipment: CME 850 Drillers Hole No.: V-11-05
 Hole Stab. by: Hollow Stem Augers Date of Work: 2/16/2011
 Automatic Hammer Efficiency: 81 % Drill No.: G-7950

Bent	Station	Location	Surface Elevation, ft.	LOG OF MATERIALS*
1	3+14.0 1347225.1E	17.0' RT. 1445001.8N	793.7	Inaccessible due to power line.
				Offset to: 3+22.2 1347229.1E

TEST DATA					
Depth, ft.	SPT Blows/6"	N ₆₀	P.P., tsf	T _v , tsf	Wn%
6.3	--	--	1.50	0.70	22.9
7.5	2-4-4	11	1.50	--	--
11.3	--	--	4.00	0.90	18.5
12.5	4-7-9	22	4.00	--	15.9
16.3	--	--	4.00	0.90	15.5
17.5	5-8-12	27	4.50	--	--
21.3	--	--	3.50	0.90	17.0
22.5	5-8-10	24	3.75	--	15.5
26.3	--	--	3.00	0.70	15.0
27.5	4-7-9	22	2.75	--	--
30.0	4-6-9	20	2.75	--	17.1
35.0	4-8-9	23	3.00	--	--
40.0	5-8-9	23	2.75	--	22.0
50.0	5-8-8	22	2.75	--	18.0
60.0	5-8-8	22	2.75	--	19.3
70.0	4-8-12	27	3.00	--	17.8
80.0	5-7-11	24	2.50	--	19.6
90.0	6-6-6	16	Sand	--	--
93.0	5-7-10	23	Sand	--	--
100.0	20-28-35	85	Sand	--	--

10.0-40.0' Brown mottled sandy lean clay, with iron nodules, moist, very stiff.
 40.0-60.0' Brown mottled sandy lean to fat clay, moist, very stiff.
 60.0-88.1' Brown mottled lean clay, with sand.
 88.1-101.5' Brown medium grained sand, with silt, moist, medium dense to very dense.

UNCONFINED COMPRESSIVE STRENGTH

TEST DATA		
Depth, ft.	Q _u , ksf	P.P., tsf
16.3	7.3	4.50
21.3	7.9	4.50
26.3	5.3	3.75

SHEAR TEST DATA
DRAINED DIRECT SHEAR TEST

Depth, ft.	σ ^o	c', psf
6.3	18.6	367.8
	(21.8)	(0)
11.3	29.5	384.0
	(31.4)	(0)
21.3	25.6	763.9
	(32.0)	(0)

SOIL CLASSIFICATION TEST DATA			
Depth, ft.	LL	PI	ASTM Class.
6.3	50	32	CH
11.3	43	27	CL
16.3	39	24	CL
21.3	39	24	CL
26.3	42	26	CL
40.0	51	30	CH
60.0	38	22	CL
93.0	NA	NP	SP-SM

WATER TABLE OBSERVATIONS			
Date	Time Change	Depth Hole Open	Depth To Water
2/7/2011	½ hour	58.0'	31.0'

Coordinate System: Modified U.S. State Plane 1983 Coordinate Zone: Missouri Central 2402
 Coordinate Datum: NAD 83 (CONUS) Coordinate Units: U.S. Survey Feet Coordinate Projection Factor: 1.0000009

N₆₀ = (Em/60)Nm
 N₆₀ - Corrected N value for standard 60% SPT efficiency.
 Em - Measured transfer efficiency in percent.
 Nm - Observed N-value.

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DATE PREPARED
5/3/2012

ROUTE STATE
V MO

DISTRICT SHEET NO.
BR 33

COUNTY
LIVINGSTON

JOB NO.
J2S0787

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A7932

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

MODOT

BORING DATA

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

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

Sheet No. 33 of 38

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

Elevation	Soil Classification	Compressible		Downring		Scour		Total Unit WT γ _v Driven lbf	Effective Unit WT γ' Pile lbf	Undrained Shear Strength S _u or c _u lbf	P.P. tsf	SPT N ₆₀	Internal Friction Angle φ°	Soil/Rock Strain ε _{50%/K} in	Lateral Subgrade Modulus, K _i pci	Young's Modulus E _{mass} psi 10 ⁶	Rock Quality Designation, RQD	Unconfined Compressive Strength, q _u lbf	
		Yes	No	Yes	No	Yes	No												
0	0.0-9.0' Stiff clay, without free water.																		
5																			
10	775.9' @7.5'		X		X		X	126.5	126.5	3250	3.25	15		0.006	700				
15	9.0-19.2' Stiff clay, with free water.		X		X		X	128.4	66.0	3250	3.25	23		0.005	1000				
20	19.2-25.0' Sand.		X		X		X	129	66.6	3500	3.5	27	42.5	0.012	425				
25	25.0-74.0' Stiff clay, with free water.		X		X		X	126	63.6	2500	2.5	16		0.006	700				
30			X		X		X	125	62.6	1750	1.75	14		0.0063	600				
35			X		X		X	127.2	64.8	2750	2.75	19		0.004	950				
40			X		X		X	125	62.6	1750	1.75	15		0.0063	600				

JOB NO.: J2S0787
 COUNTY: LIVINGSTON
 ROUTE: V
 STATION: 5+36.0, 110' LT
 BRIDGE NO.: A7932
 COORDINATES: 1347453.0E, 1445050.0N

Key:
 V Water Table
 c Cohesion

FIGURE 2 of 2
 SHEET 1 of 3

Elevation	Soil Classification	Compressible		Downring		Scour		Total Unit WT γ _v Driven lbf	Effective Unit WT γ' Pile lbf	Undrained Shear Strength S _u or c _u lbf	P.P. tsf	SPT N ₆₀	Internal Friction Angle φ°	Soil/Rock Strain ε _{50%/K} in	Lateral Subgrade Modulus, K _i pci	Young's Modulus E _{mass} psi 10 ⁶	Rock Quality Designation, RQD	Unconfined Compressive Strength, q _u lbf	
		Yes	No	Yes	No	Yes	No												
40	25.0-74.0' Stiff clay, with free water.																		
45			X		X		X	128	65.6	2750	2.75	18		0.004	950				
50			X		X		X	129	66.6	2500	2.5	26		0.0055	850				
55			X		X		X	120	66.6	3000	3.0	26		0.005	1000				
60			X		X		X	125	62.6	1500	1.5	14		0.007	500				
65			X		X		X	128	65.6	1750	1.75	18		0.004	950				
70			X		X		X	125	62.6	1500	1.5	14		0.007	500				
75	74.0-101.5' Sand.		X		X		X	130	67.6			61	43		125				
80			X		X		X	133	70.6			72	48		150				

JOB NO.: J2S0787
 COUNTY: LIVINGSTON
 ROUTE: V
 STATION: 5+36.0, 110' LT
 BRIDGE NO.: A7932
 COORDINATES: 1347453.0E, 1445050.0N

Key:
 V Water Table
 c Cohesion

FIGURE 2 of 2
 SHEET 2 of 3

BORING DATA

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

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

Sheet No. 37 of 38

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



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

BRIDGE NO.
A7932

PROJECT NO.

CONTRACT ID.
J2S0787

COUNTY
LIVINGSTON

JOB NO.
A7932

DISTRICT
BR

ROUTE
V

STATE
MO

DATE PREPARED
5/3/2012

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