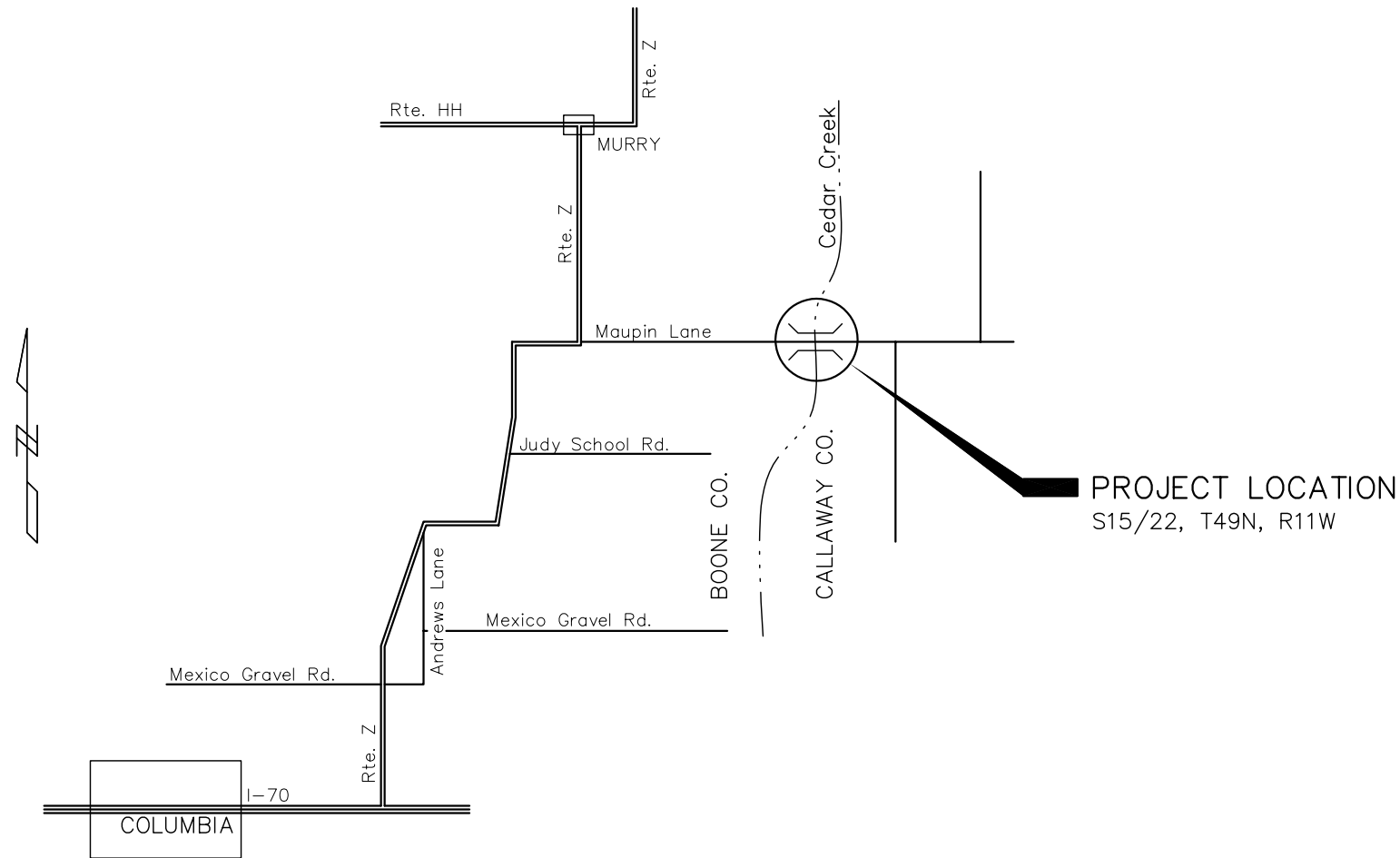


LOCATION PLAN



BOONE COUNTY, MISSOURI

CONSTRUCTION OF BRIDGE
NO. 31100241

on Maupin Lane over Cedar Creek

BOONE COUNTY COMMISSION

Keith Schnarre

Skip Elkin

Karen Miller

DIRECTOR OF PUBLIC WORKS

INDEX OF SHEETS

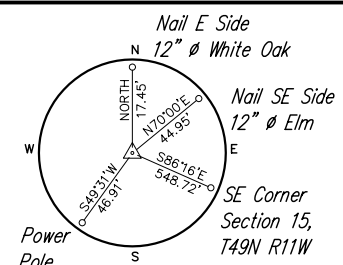
1. GENERAL PLAN AND PROFILE
2. GENERAL NOTES, QUANTITIES & BORINGS
3. MISCELLANEOUS DETAILS
4. END BENT DETAILS
5. SUPERSTRUCTURE DETAILS
6. SL-1 THRIE BEAM RAIL
7. RAILING DETAILS
8. BCT TERMINAL DETAILS
9. BILL OF REINFORCING
10. ROADWAY CROSS SECTIONS
- 11.-15. TRAFFIC CONTROL DEVICES
16. MO. STANDARD DRAWING 706.35G

PROJECT DATA

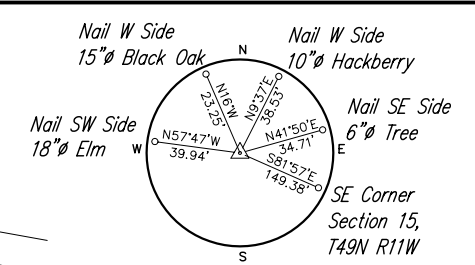
A.D.T.		
PRESENT		102
FUTURE - 20YR.		150
TRUCK PERCENTAGE - 20 YR.		10%
CURRENT RUNNING SPEED		35 m.p.h.
PROPOSED DESIGN SPEED		35 m.p.h.
BEGIN STATION		10+00.00
END STATION		12+62.03
PROJECT LENGTH		0.050 mi.
COUNTY ROAD NAME		Maupin Lane
FUNCTIONAL CLASSIFICATION		Rural Local

David Mink, P.E.

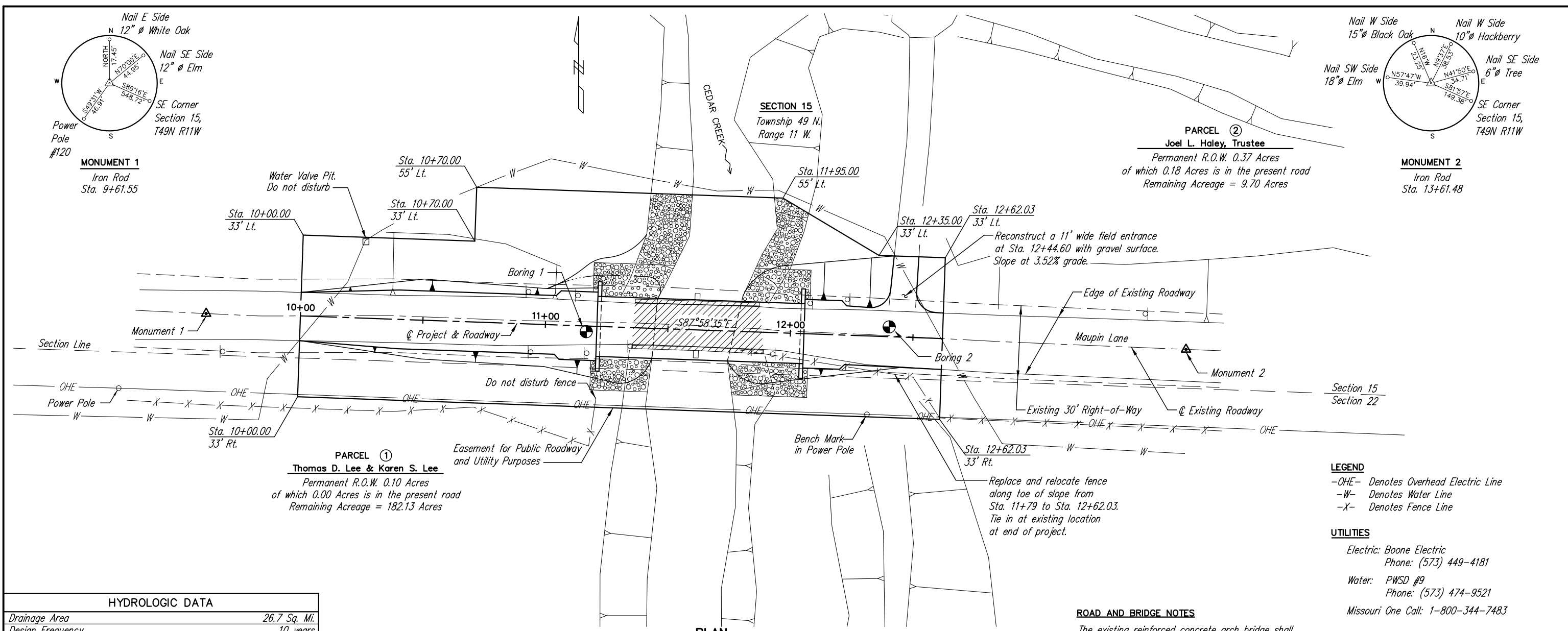
DATE



MONUMENT 1
Iron Rod
Sta. 9+61.55



MONUMENT 2
Iron Rod
Sta. 13+61.48



PLAN

SECTION 22
Township 49 N.
Range 11 W.

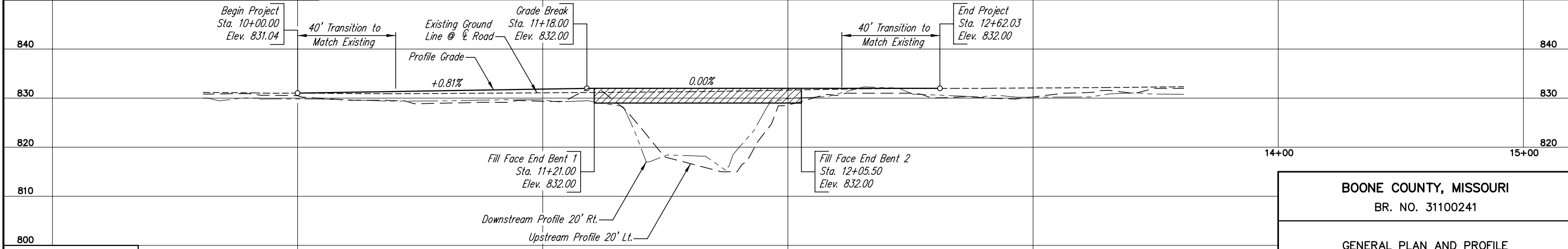
HYDROLOGIC DATA	
Drainage Area	26.7 Sq. Mi.
Design Frequency	10 years
Design Discharge	3,690 cfs
Maximum Backwater for Design Frequency	0.45 ft.
Design H.W. Elevation at the Structure	830.1
Low Elevation of Superstructure	828.5
100-Year Discharge	6,820 cfs
100-Year H.W. Elevation at the Structure	832.2
Approach Roadway Overtopping Frequency	25 Yrs.

- LEGEND**
- OHE- Denotes Overhead Electric Line
 - W- Denotes Water Line
 - X- Denotes Fence Line

- UTILITIES**
- Electric: Boone Electric
Phone: (573) 449-4181
 - Water: PWS #9
Phone: (573) 474-9521
 - Missouri One Call: 1-800-344-7483

- ROAD AND BRIDGE NOTES**
- The existing reinforced concrete arch bridge shall be removed by the contractor.
 - Reconstruct a 11' wide field entrance at Sta. 12+44.60 with gravel surface. Slope at 3.52% grade.
 - Replace and relocate fence along toe of slope from Sta. 11+79 to Sta. 12+62.03. Tie in at existing location at end of project.

- BENCH MARK**
- Bench Mark: 3/8" Spike in North side of power pole Sta. 12+32.02, 31.14' Rt. Elev. 833.34



PROFILE

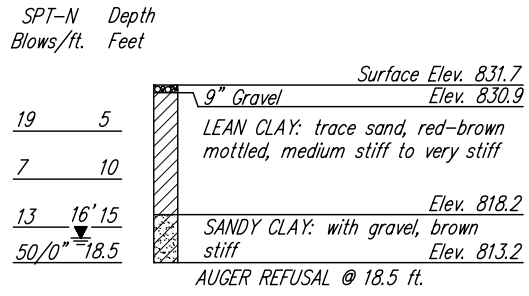
DETAILED CEB
CHECKED ARB

BOONE COUNTY, MISSOURI
BR. NO. 31100241

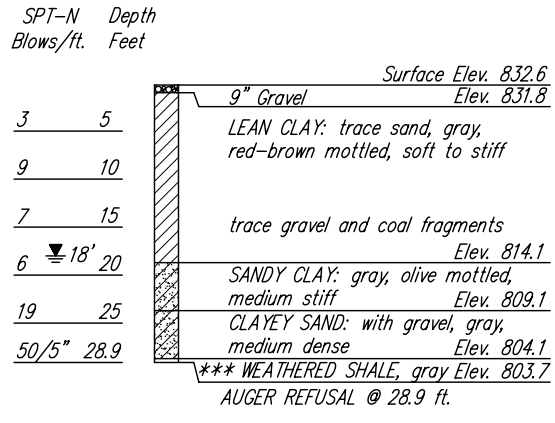
GENERAL PLAN AND PROFILE

HG HARRINGTON & CORTELYOU, INC.
Consulting Engineers

SHEET 1 OF 16



BORING ①



*** Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

BORING ②

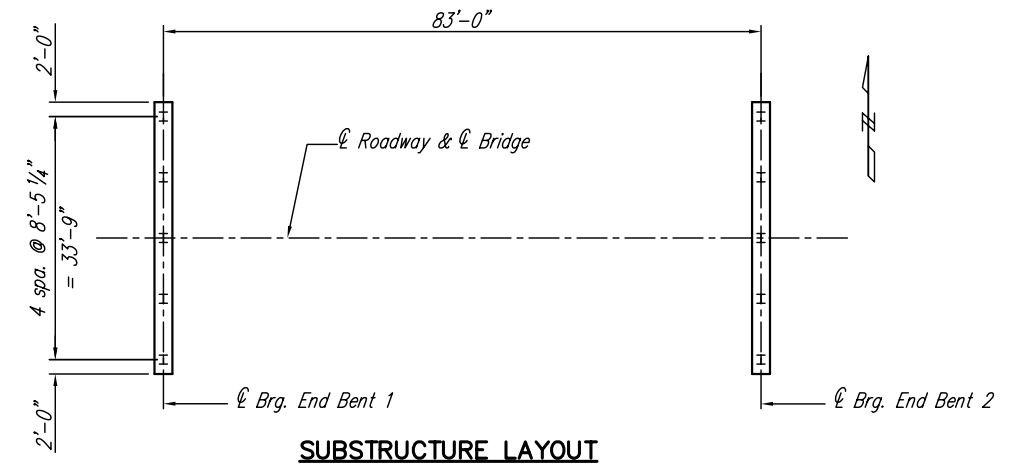
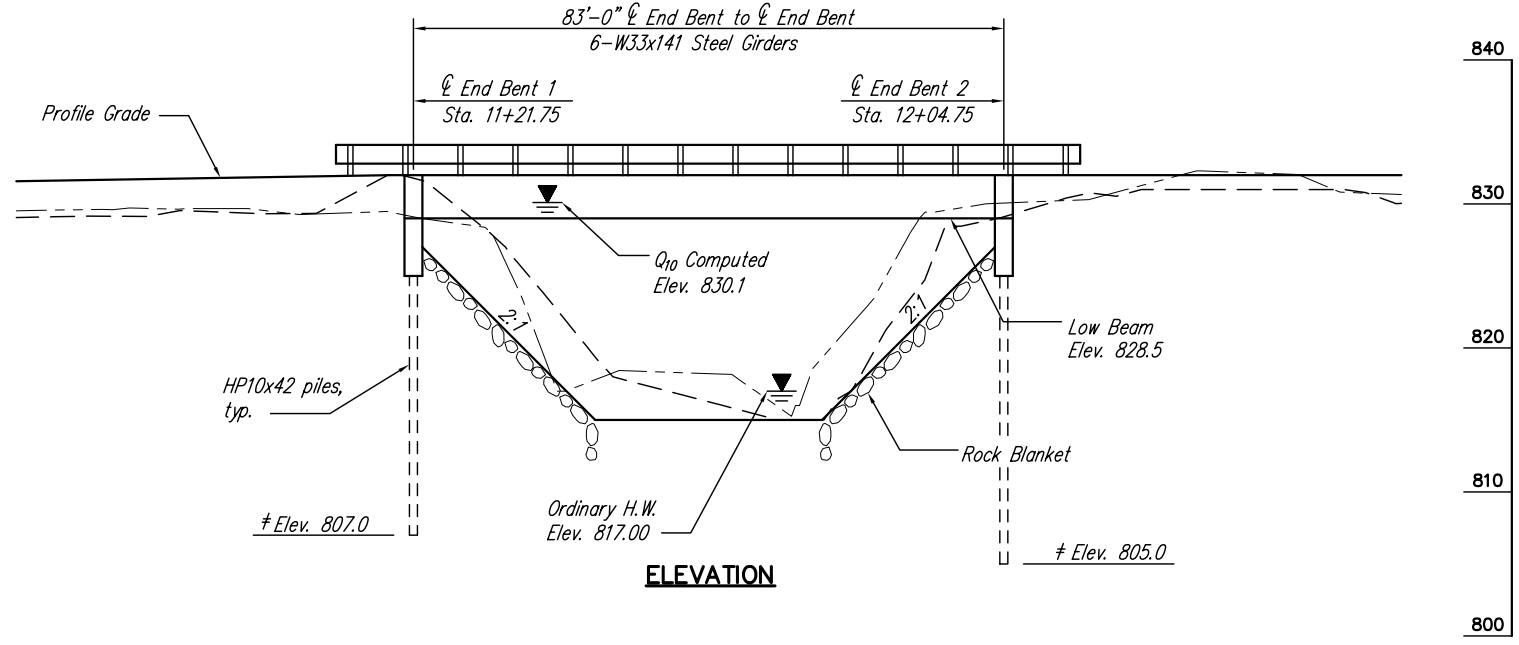
ESTIMATED QUANTITIES					
ITEM		SUB.	SUPER.	RDWY.	TOTAL
Mobilization	Lump Sum				1
Construction Signs	Sq. Ft.			77	77
Type III Movable Barricades	Each			4	4
Bridge Removal	Lump Sum				1
Class A Excavation	Cu. Yds.			593	593
Compacted Embankment In-Place	Cu. Yds.			74	74
Replacement Fences	Lin. Ft.			92	92
2" Aggregate Surface (Type 4)	Tons			51	51
4" Gravel Base	Tons			100	100
Type 2 Rock Blanket and Geotextile Fabric	Cu. Yds.			360	360
Seeding, Mulching & Fertilizing (0.2 Acres)	Lump Sum			1	1
Structural Steel Piles (HP10x42)	Lin. Ft.	210			210
Class B Concrete	Cu. Yds.		74.6		74.6
Structural Steel (ASTM A709 Grade 36) *	Lbs.		5,100		5,100
Structural Steel (ASTM A709 Grade 50W) **	Lbs.		70,850		70,850
Plain Neoprene Bearing Pads	Each				12
Reinforcing Steel	Lbs.	1,880	8,080		9,960
SL-1 Thrie Beam Rail	Lin. Ft.		217		217
Erosion Control	Lump Sum			1	1

Note:
All concrete in the End Bents is included with superstructure quantities.
All reinforcing below the beam seat elevation is included with substructure quantities.
Cost of any required excavation for End Bents shall be included in the contract unit price for other items.
Compacted Embankment In-Place quantity requires 0 cubic yards of Borrow Embankment.
See Embankment Quantity Summary on "Roadway Cross Sections" sheet.
* The structural steel weight is based upon the end welded shear studs, 7" edge channel, diaphragms and connection plates, and bolts.
** The structural steel weight is based upon the W33x141 girders only.

STEEL PILE DATA		
Bent Number	1	2
Pile Type and Size	HP10x42	HP10x42
Number	5	5
Approximate Length / Pile	Ft. 20	22
Design Bearing	Tons. 34	34
Hammer Energy Required	Ft. Lbs. 8,000	8,000

Minimum energy requirements of hammer based on plan length and design bearing value of piles.

All piles shall be driven to practical refusal.



GENERAL NOTES

DESIGN SPECIFICATIONS:

A.A.S.H.T.O. - 2002, 17th Edition (Load Factor Design)

For materials and construction procedures, the contractor shall follow the specifications as stated in the "Missouri Standard Specifications for Highway Construction - 1999" and supplemental revisions. In addition, refer to the General and Job Special Provisions which supercede the "Standard Specifications" for various items on this project.

DESIGN LOADING:

HS20-44
15# per sq. ft. Future Wearing Surface
Earth 120#/cu. ft., Equivalent Fluid Pressure 30 #/sq. ft.
Superstructure: Continuous Composite for Live Load

DESIGN UNIT STRESSES:

Class B Concrete f'c = 3,000 psi.
Reinforcing Steel: (Grade 60) fy = 60,000 psi.
Steel Pile fb = 9,000 psi.
Structural Steel: ASTM A709 Grade 50W, fy = 50,000 psi. - Girders
ASTM A709 Grade 36, fy = 36,000 psi. - Misc. Steel

OTHER:

Bearings shall be 60 durometer Plain Neoprene Pads. Cost of furnishing, fabricating & installing Plain Neoprene Bearing Pads, complete in place, shall be paid for at the contract unit price for Plain Neoprene Bearing Pads per each.

All joint filler shall meet the requirements of Std. Spec. 1057.2.4.

Minimum clearance to reinforcing steel shall be 1 1/2" unless otherwise shown.

LEGEND

- Denotes estimated Pile Tip Elevation

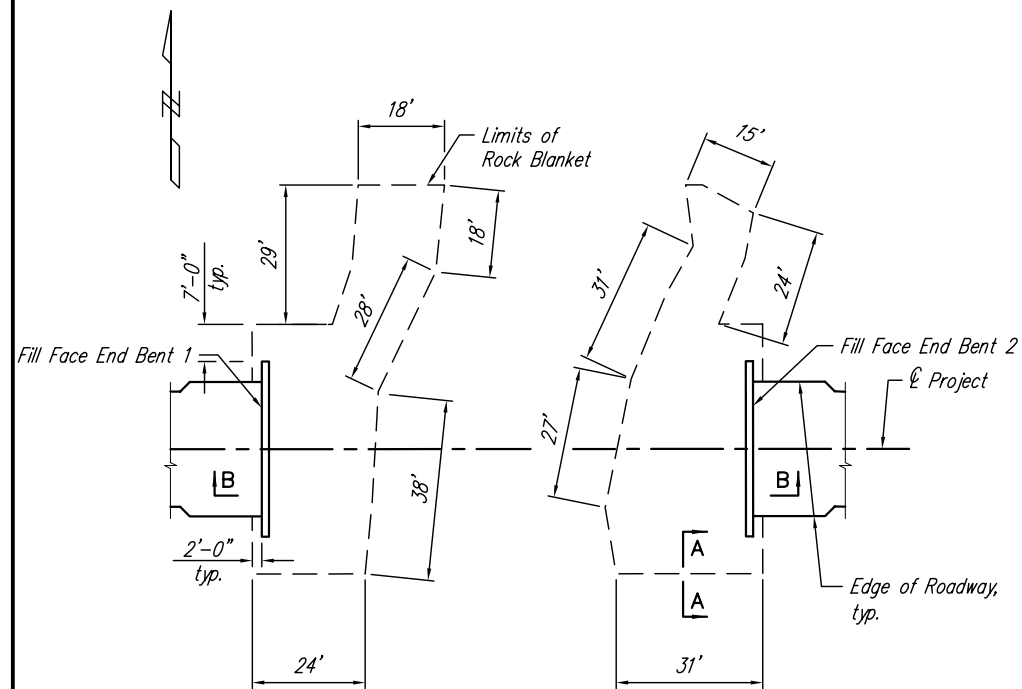
DETAILED KMW
CHECKED ARB

BOONE COUNTY, MISSOURI
BR. NO. 31100241

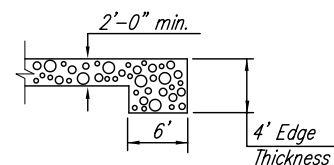
GENERAL NOTES, QUANTITIES & BORINGS

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

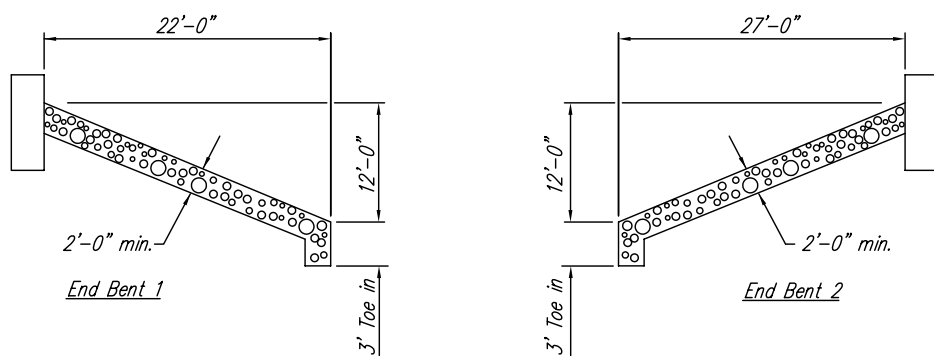
SHEET 2 OF 16



PLAN



SECTION A-A

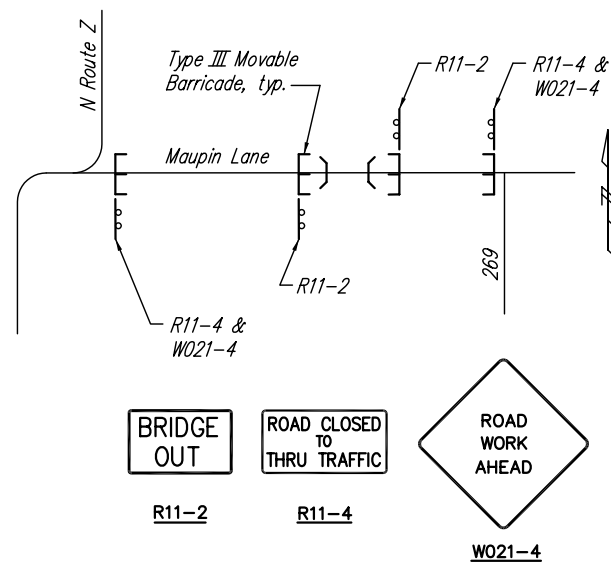


SECTION B-B

ROCK BLANKET DETAILS

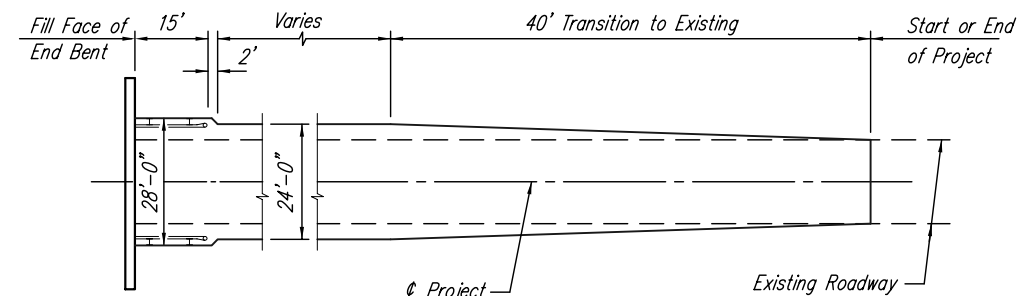
All dimensions horizontal

Rock blanket is to be placed around the ends of the wingwalls as shown.

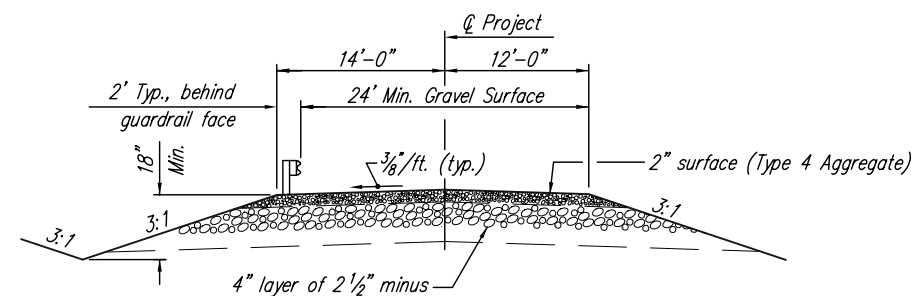


TRAFFIC CONTROL PLAN

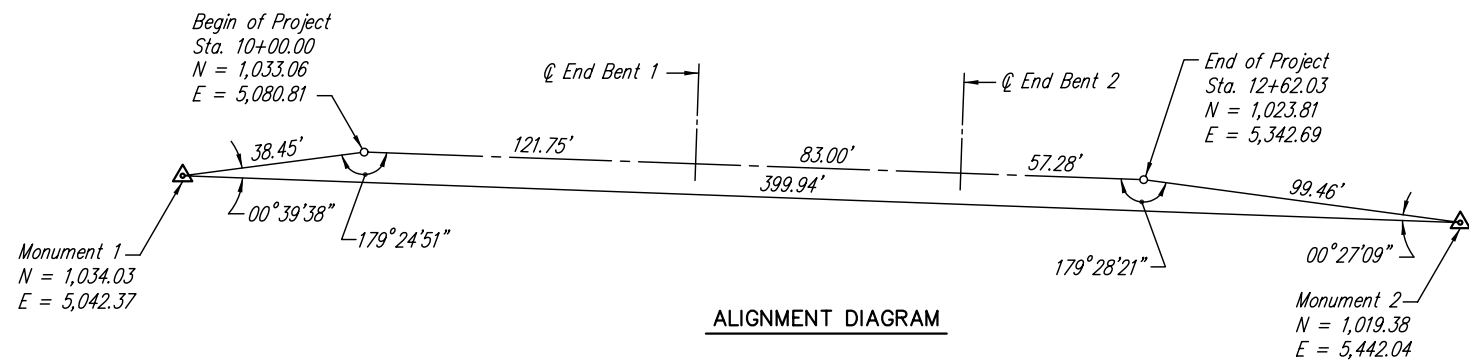
All traffic control devices shall comply with the M.U.T.C.D. Signs R11-2 and R11-4 shall be mounted on sign posts and placed along the side of the road. Signs W021-4 will be portable and placed along the side of the road when construction begins.



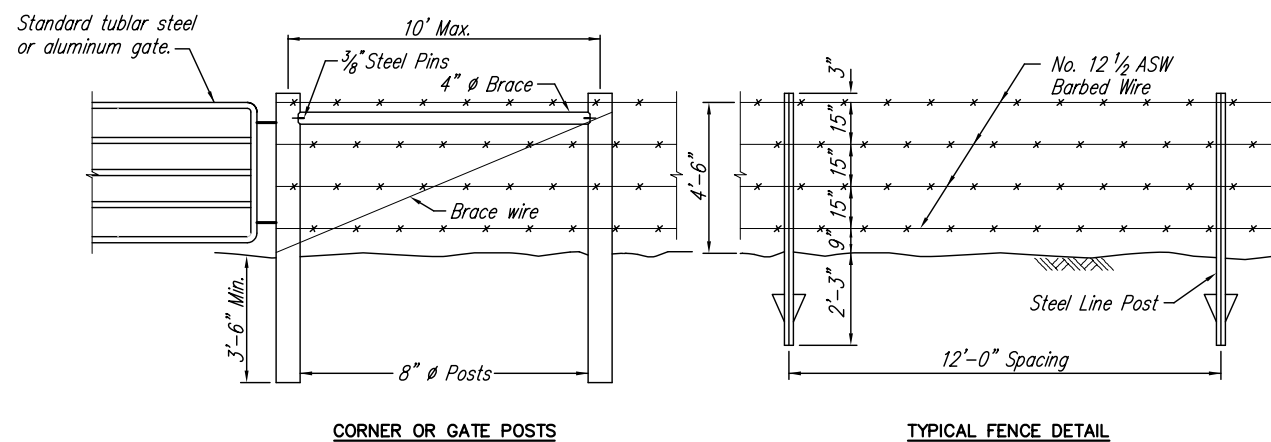
PLAN VIEW OF ROADWAY WIDTH



TYPICAL ROADWAY CROSS SECTION



ALIGNMENT DIAGRAM



CORNER OR GATE POSTS

TYPICAL FENCE DETAIL

FENCE DETAILS

Corner posts, gate posts and braces shall be treated timber.

DETAILED CEB

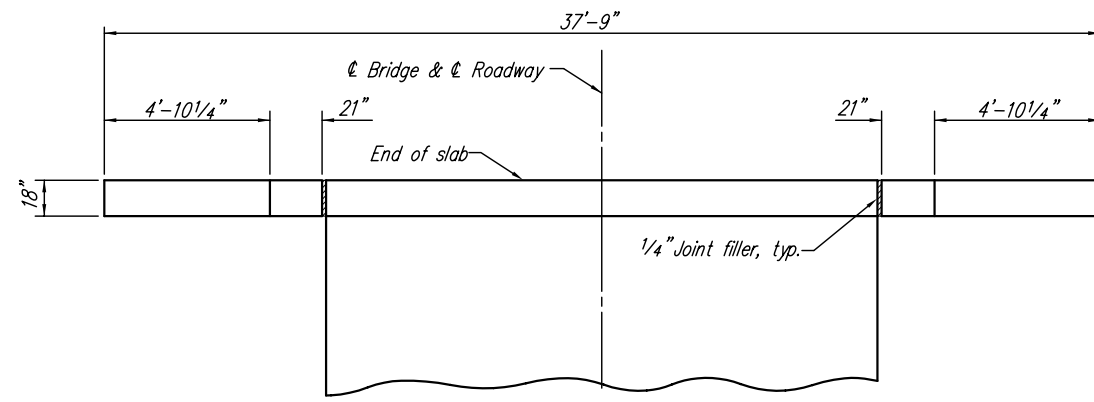
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BOONE COUNTY, MISSOURI
BR. NO. 31100241

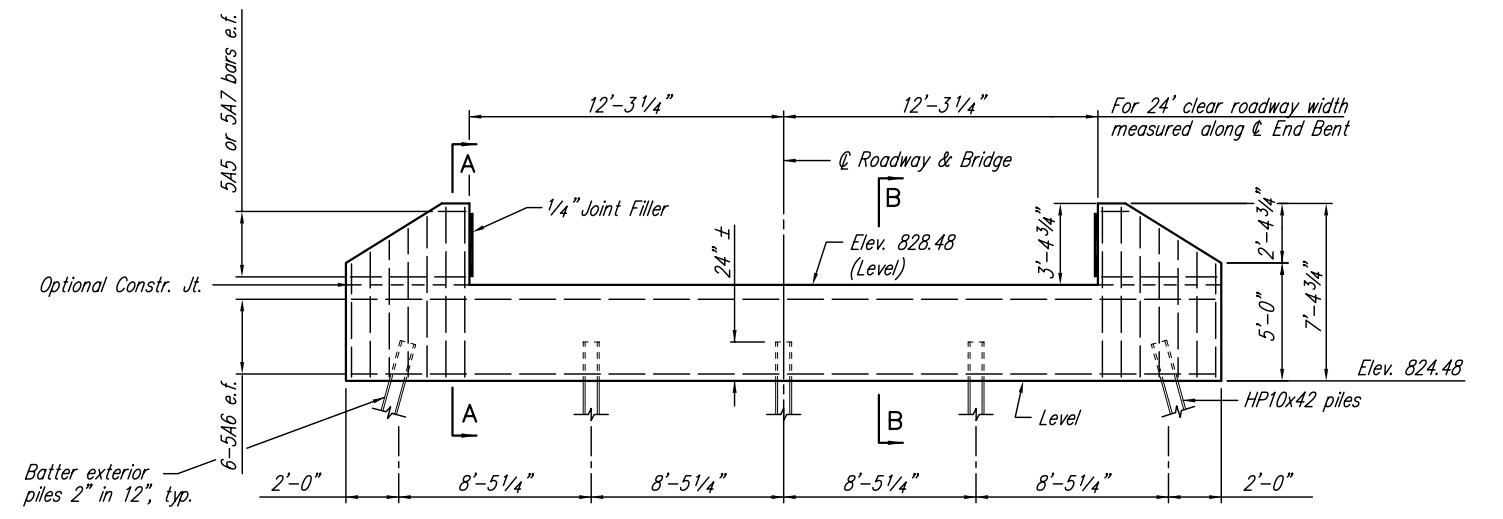
MISCELLANEOUS DETAILS

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

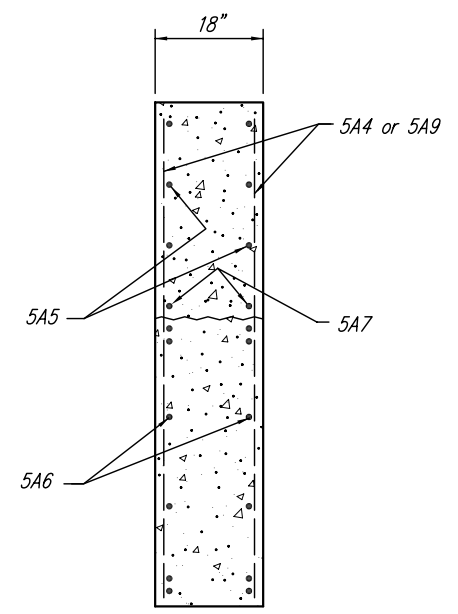
SHEET 3 OF 16



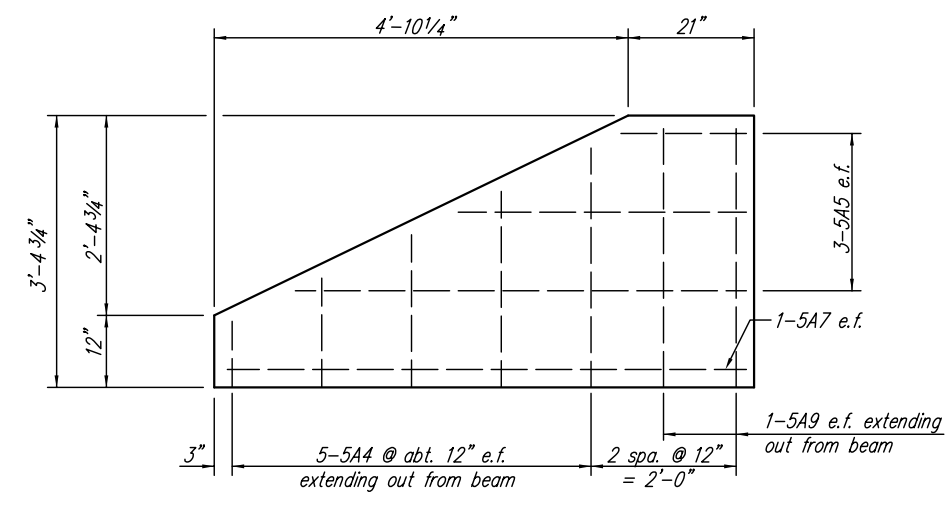
END BENT PLAN



END BENT ELEVATION

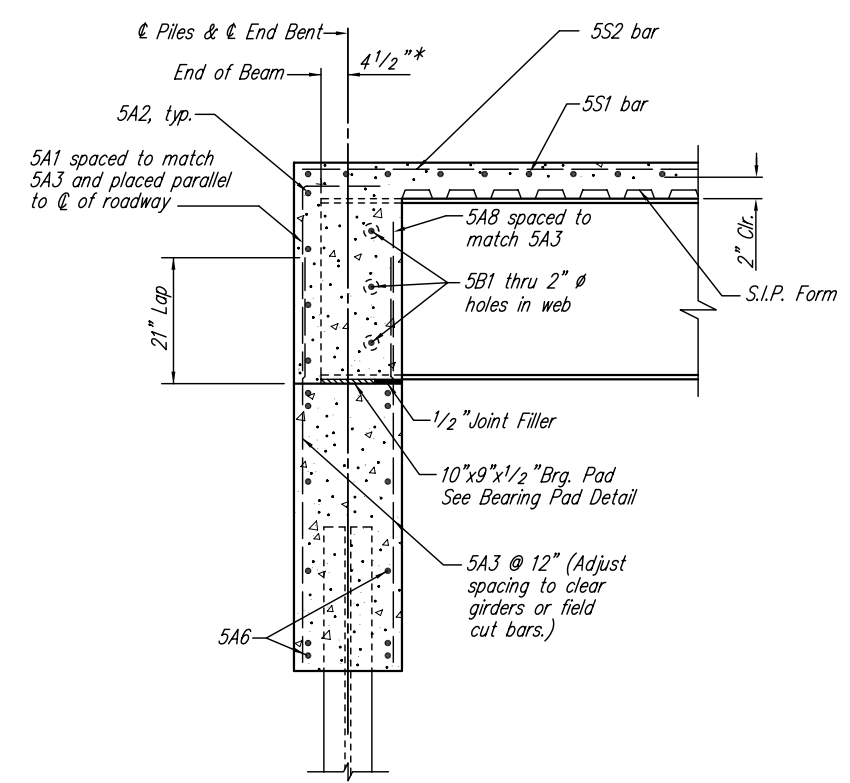


SECTION A-A



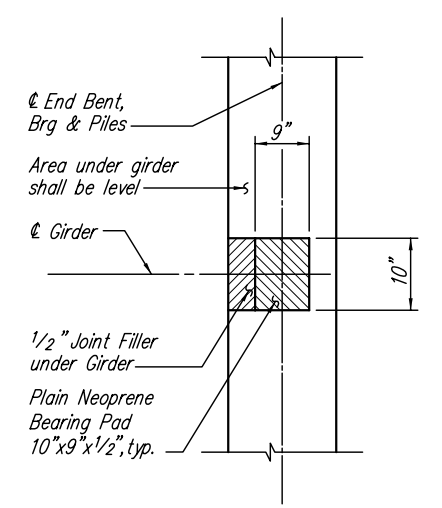
WING DETAIL

Note: The wing may be poured with the abutment wall, but shall be poured separately from the diaphragm.



SECTION B-B

Pile cut-off elev. = 826.5 (End Bent 1 & End Bent 2)



BEARING PAD DETAIL

LEGEND

e.f. Denotes each face
 * Measured along \mathcal{C} of girder
 For location of holes thru web, see "Superstructure Details" Sheet.

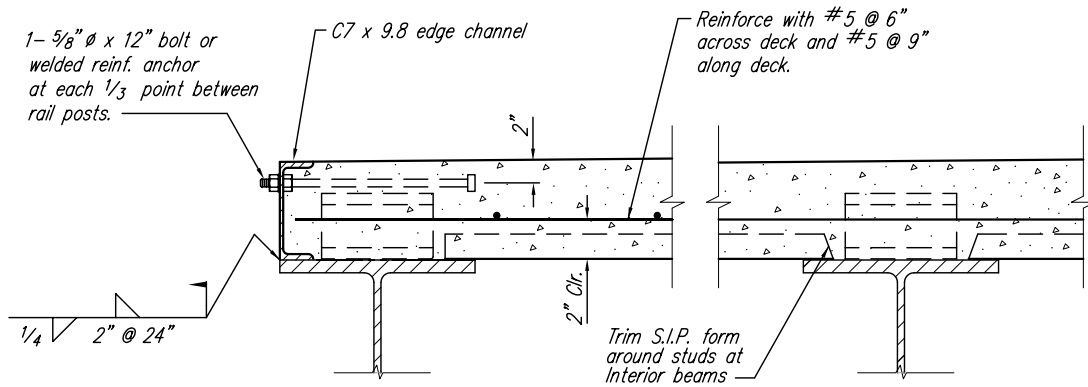
DETAILED CEB
 CHECKED ARB

BOONE COUNTY, MISSOURI
 BR. NO. 31100241

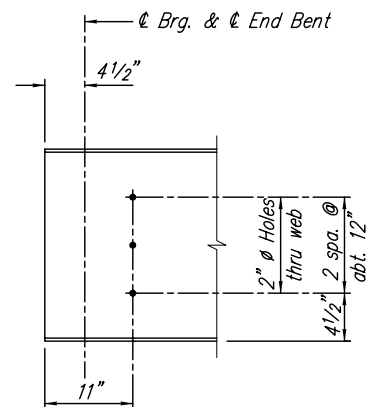
END BENT DETAILS

HARRINGTON & CORTELYOU, INC.
 Consulting Engineers

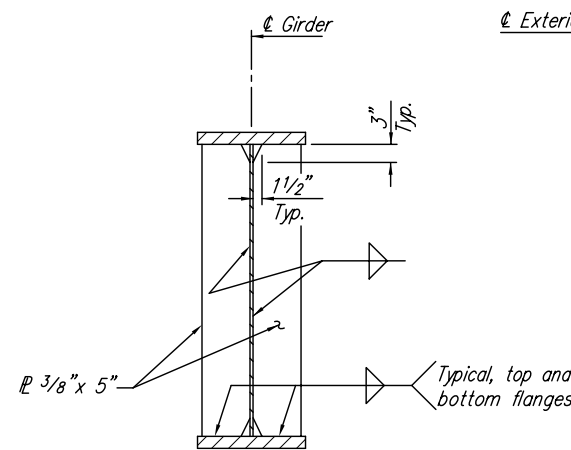
SHEET 4 OF 16



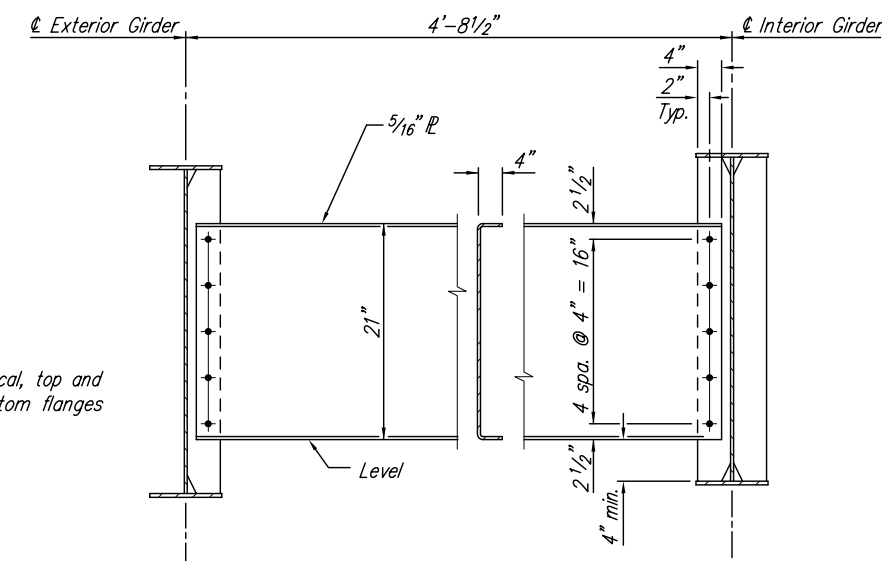
DETAIL A



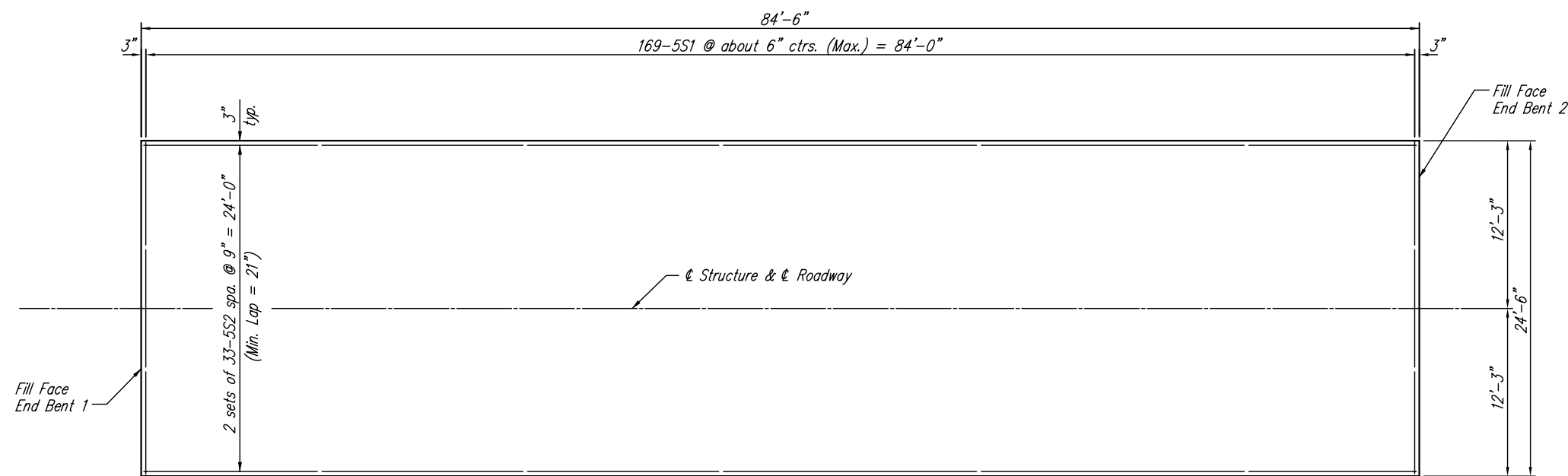
SECTION AT END OF GIRDER



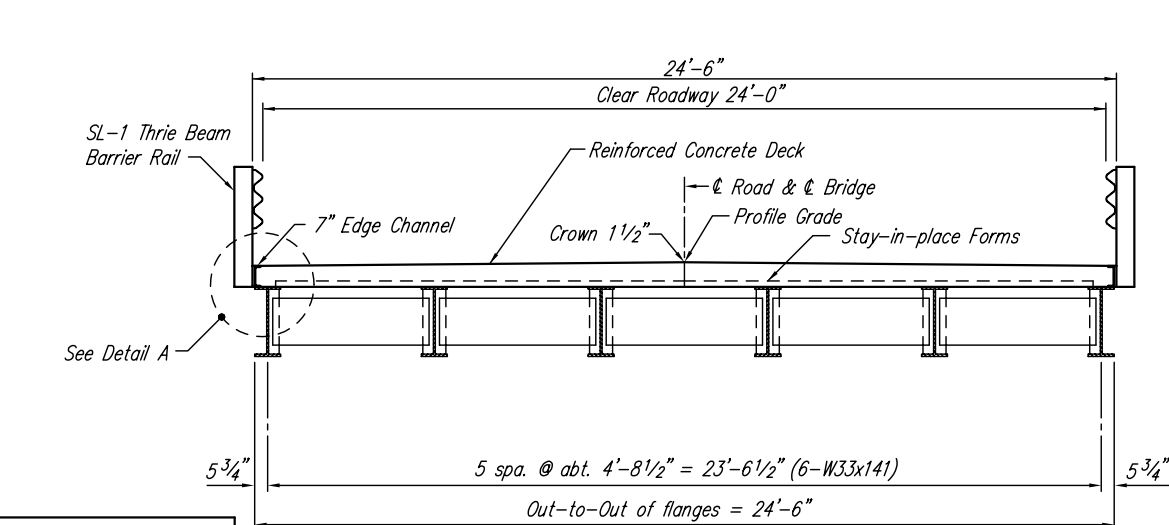
DIAPHRAGM STIFFENERS
(Interior girder shown)



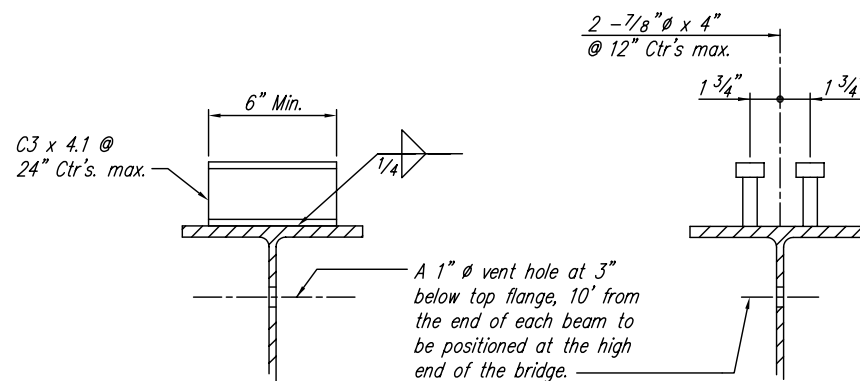
DIAPHRAGM



PLAN OF SLAB SHOWING REINFORCEMENT



CROSS SECTION
Beam Length = 83'-9"



ALTERNATE CHANNEL STUDS
(41 channels per girder)

ALTERNATE WELDED STUDS
(82 studs per girder)

SHEAR CONNECTORS

NOTES:

Mill certificates shall be furnished for new steel beams.

Diaphragms shall be located at the quarter points of the span, 15 total.

Stay-in-place forms shall be 22 gage minimum and capable of supporting the dead weight of concrete plus a 50 psf allowance for construction loads. Galvanized or painted forms not required.

Cost of stay-in-place forms shall be considered incidental to the cost of other items.

Edge channels and the outside faces of exterior beams shall be coated with one coat of good quality Aluminum paint.

Concrete shall be MoDOT Class B (6 Bag Min.)

All exposed corners of concrete shall be chamfered 3/4 inch.

All reinforcing shall be 2 inch clear unless otherwise shown.

Reinforcing splices when required shall be lapped 21 inch.

Camber at midspan shall = 27/8 inch (Interior Girder)
= 2 inch (Exterior Girder)

Holes for diaphragm thru stiffener plates shall be 13/16 inch. Bolts shall be 3/4 inch H.S. ASTM A325 bolts.

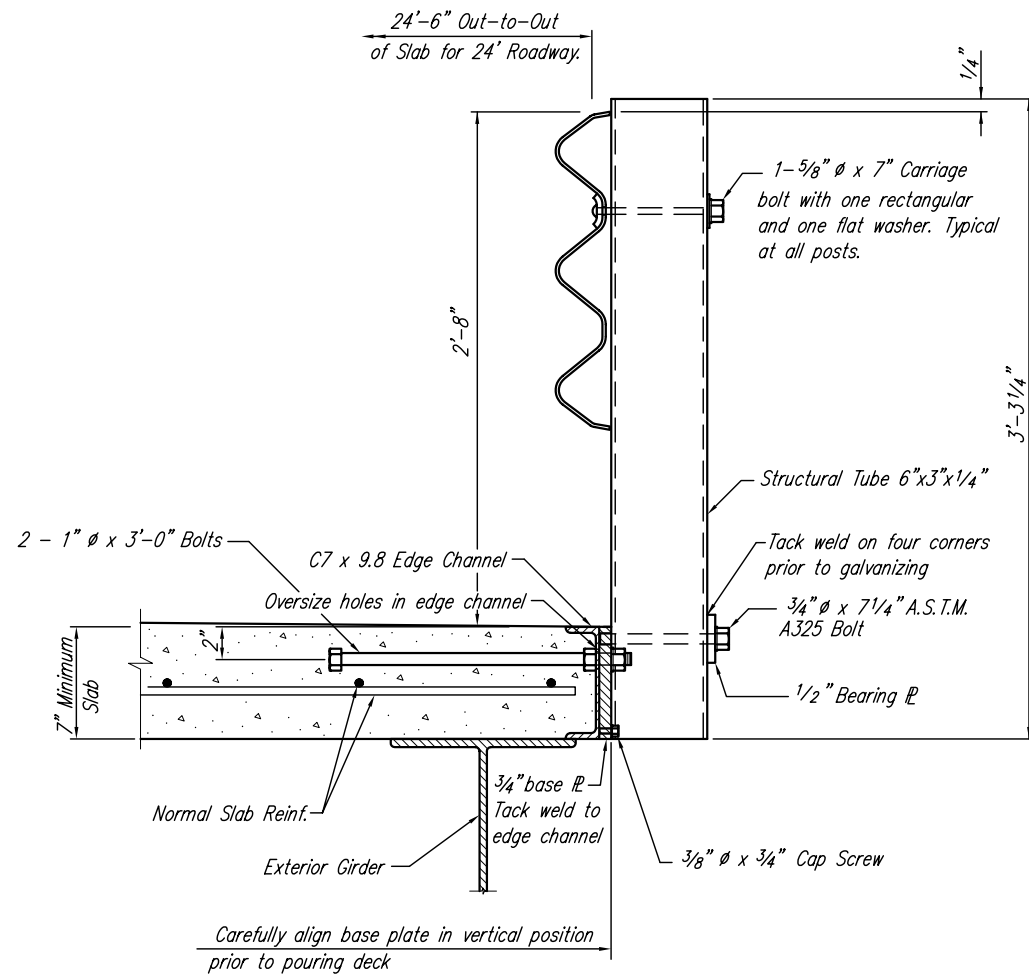
The cost of fabricating, furnishing, and installing stiffener plates, diaphragms, and High Strength ASTM A325 bolts complete in-place shall be included in the contract unit price for Structural Steel - ASTM A709 Grade 36.

The cost of fabricating, furnishing and installing shear connectors complete in-place shall be included in the contract unit price for Structural Steel - ASTM A709 Grade 36.

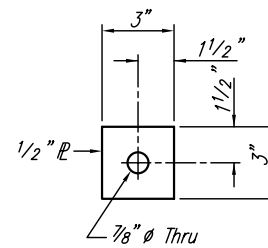
DETAILED CEB
CHECKED ARB

BOONE COUNTY, MISSOURI
BR. NO. 31100241

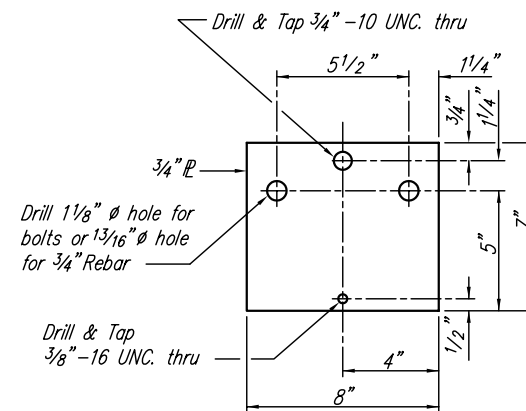
SUPERSTRUCTURE DETAILS



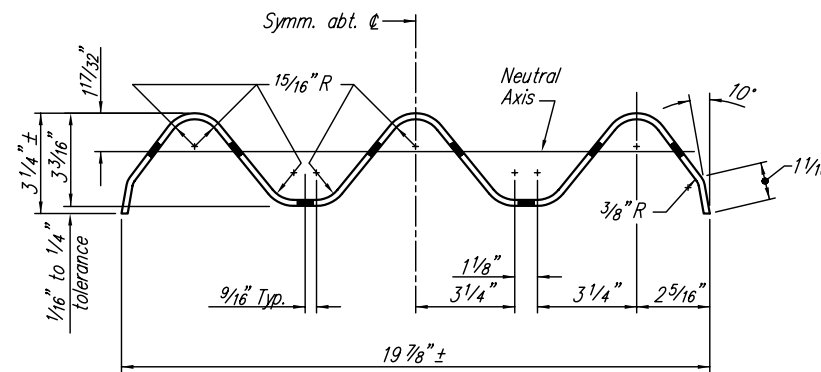
PART SECTION SHOWING BRIDGE MOUNTED POST



BEARING PLATE



BASE PLATE



THRIE BEAM RAIL MEMBER

Note: Special drilling of Thrie Beam may be required at splices.

NOTES:

Design—Crash Tested for A.A.S.H.T.O. Service Level 1.

All bolts, nuts, washers and plates are considered as part of the rail for payment.

All steel connecting bolts and fasteners, posts and railing and all anchor bolts, nuts, washers, and plates, shall be galvanized after fabrication. For protective coating and material requirement of steel railing see Section 1040 of the MoDOT Standard Specifications.

Tapped holes in base plate shall be sufficiently oversized to accommodate galvanized bolts and cap screws.

Rail posts shall be set perpendicular to roadway profile grade and vertically in cross section.

5/8\"/>

Minimum length of thrie beam rail section is equal to one post space.

Thrie beam guard rail shall be made of steel and shall be 12 gage.

Posts, base plates, and bearing plates to be fabricated from A36 steel.

Washers shall be used at all posts (between bolt head and beam). They shall be rectangular in shape (3\"/>

Fabrication of structural steel shall be in accordance with Section 712 of the MoDOT Standard Specifications.

Expansion splices in thrie beam are normally not required, but shall be provided at locations so that the maximum length without expansion provisions does not exceed 200 feet. At expansion slots in the thrie beam rails, tighten bolts, back off one-half turn and burr threads.

BIDDING AND DELIVERY REQUIREMENTS

Materials shall include all rail members, transition sections, end terminals, bolts, nuts, washers, posts, bearing plates and base plates to complete the installation including 10% spare nuts, bolts and washers.

Delivery shall be made to the location designated in the request for bids.

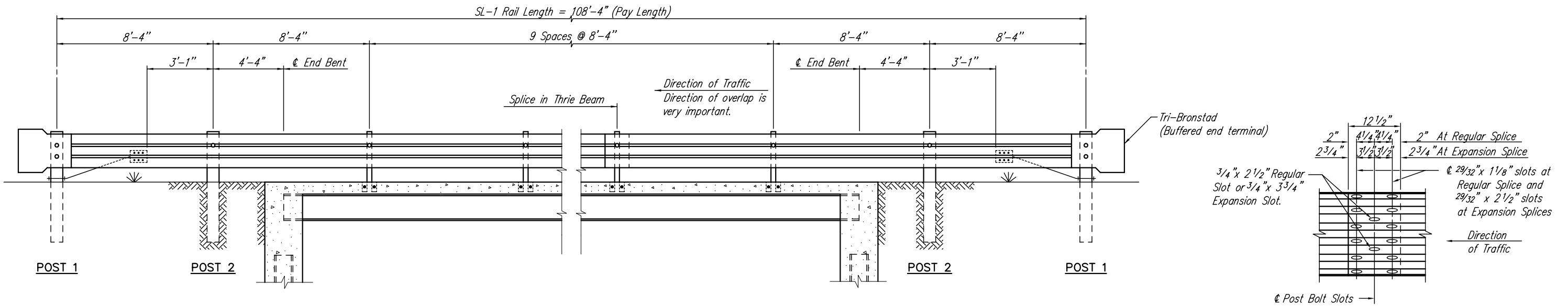
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CHECKED ARB

BOONE COUNTY, MISSOURI
BR. NO. 31100241

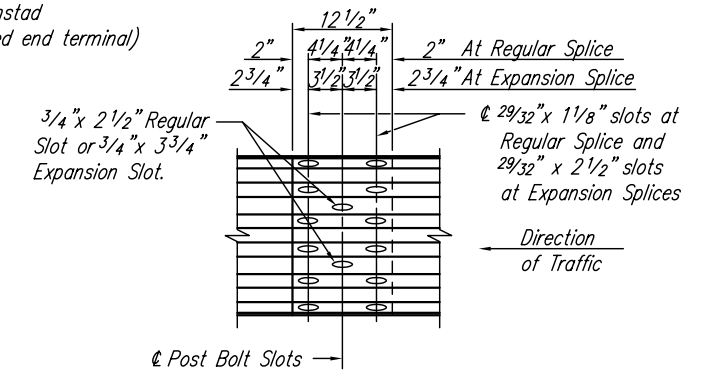
SL-1 THRIE BEAM RAIL

HG HARRINGTON & CORTELYOU, INC.
Consulting Engineers

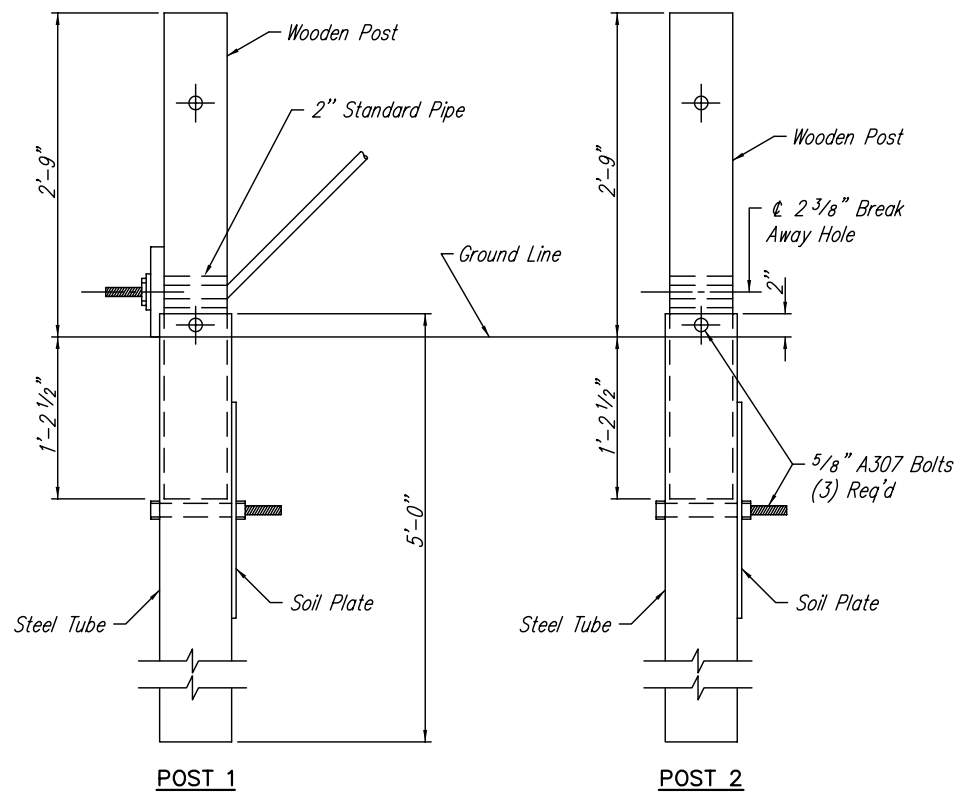
SHEET 6 OF 16



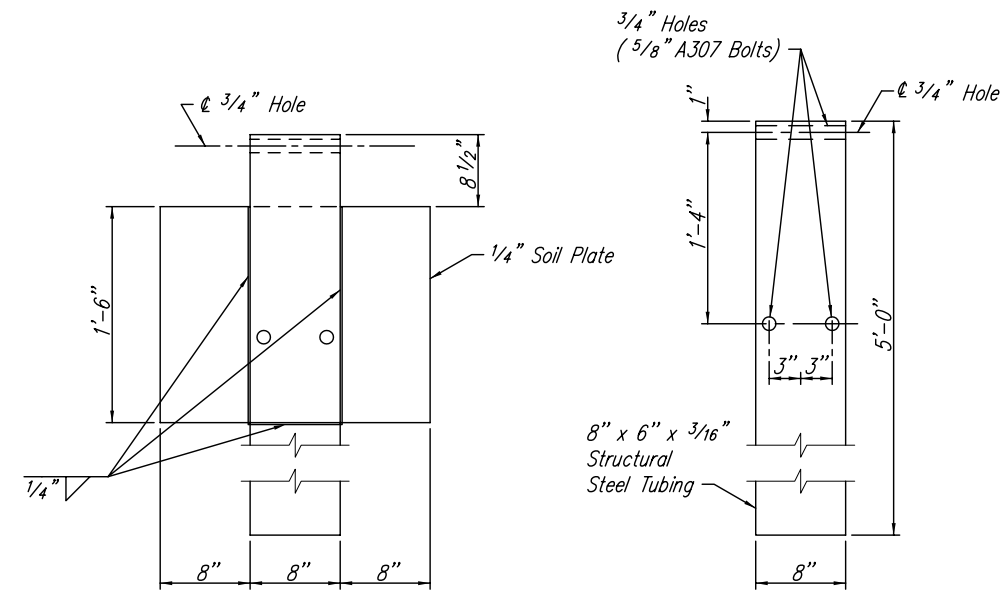
PART SECTION SHOWING RAIL



RAIL SPLICE DETAILS



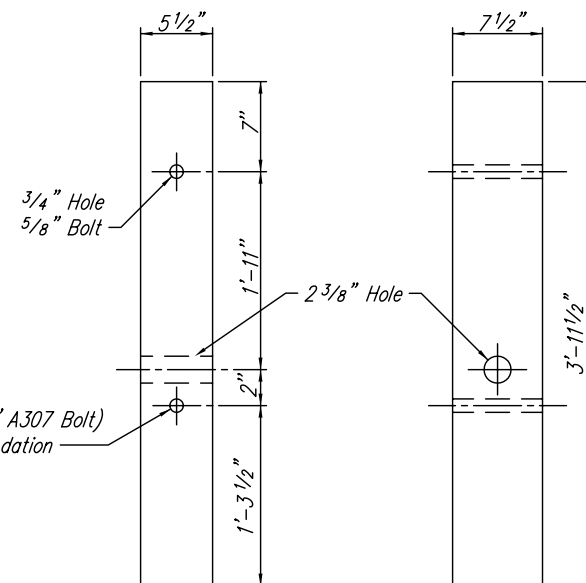
STEEL TUBE FOUNDATION



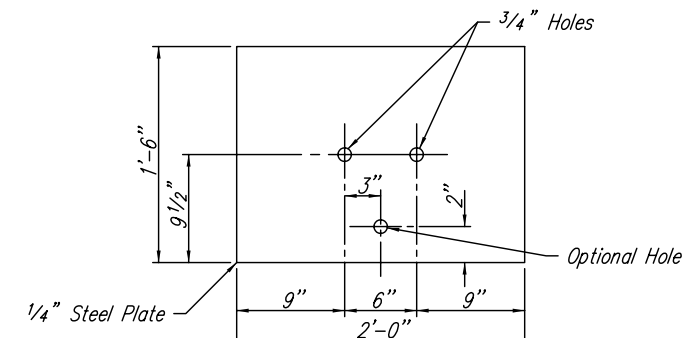
SHOP WELDED SOIL PLATE CONNECTION

STEEL TUBE

STEEL TUBE FOUNDATION



WOOD BREAKAWAY POST



SOIL PLATE

GENERAL NOTES:

Trimming of wood post may be necessary for steel tube foundation.

Steel tube foundations shall be drilled and backfilled with a suitable material when the soil plate is bolted, as shown, to the steel tube. Steel tube foundations may be driven when the soil plate is welded, as shown, to the steel tube.

Steel tubes and soil plates shall be galvanized, after fabrication, in accordance with the requirements of AASHTO M111. Bolts and nuts shall be galvanized in accordance with the requirements of AASHTO M232, or they may be mechanically galvanized in accordance with AASHTO M232 Class C.

For additional guard rail details see "SL-1 Thrie Beam Rail" sheet and "BCT Terminal Details" sheet.

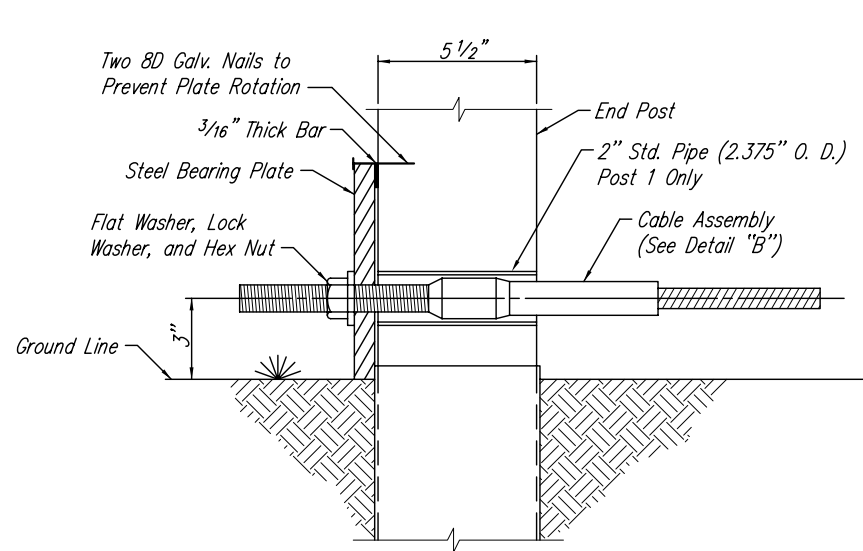
DETAILED CEB
CHECKED KSM

BOONE COUNTY, MISSOURI
BR. NO. 31100241

RAILING DETAILS

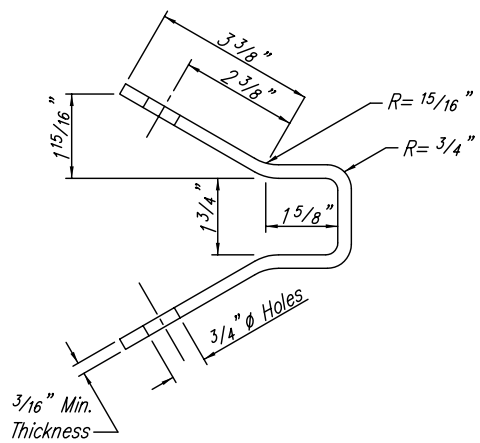
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

SHEET 7 OF 16

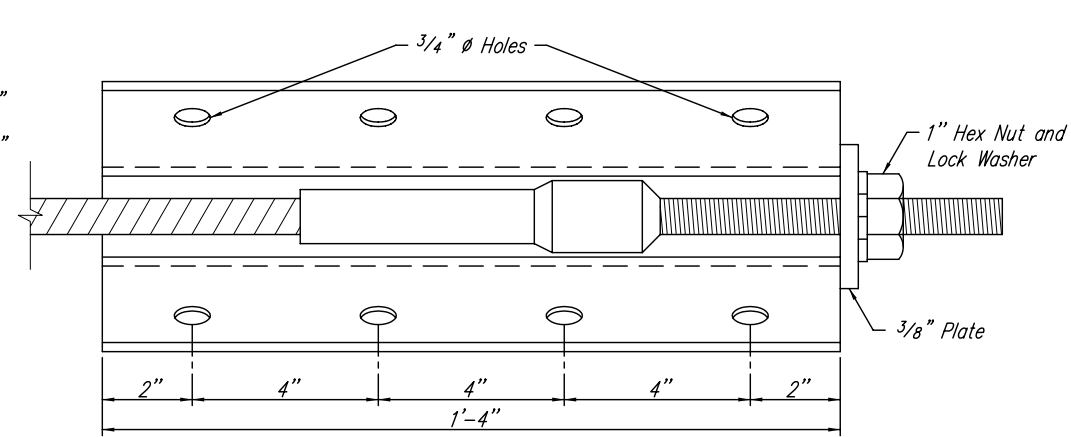


END POST DETAIL

DETAIL "A"

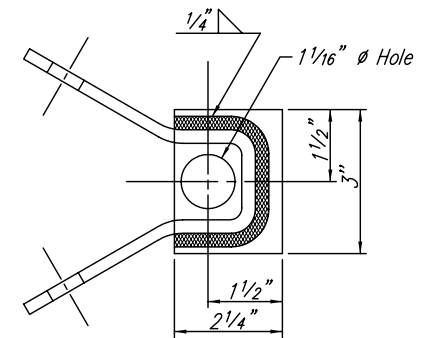


FABRICATION DETAIL

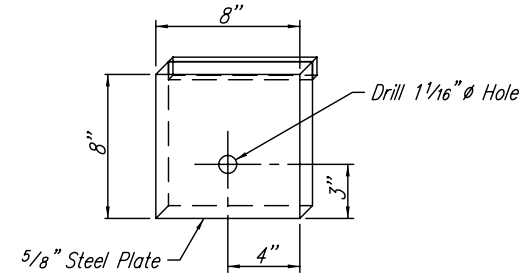
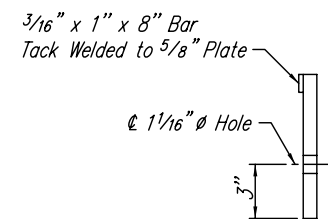


ANCHOR PLATE

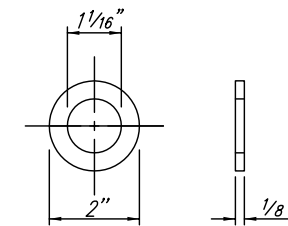
DETAIL "C"



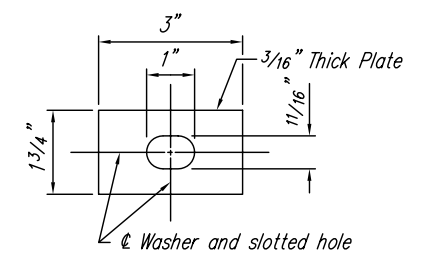
END VIEW



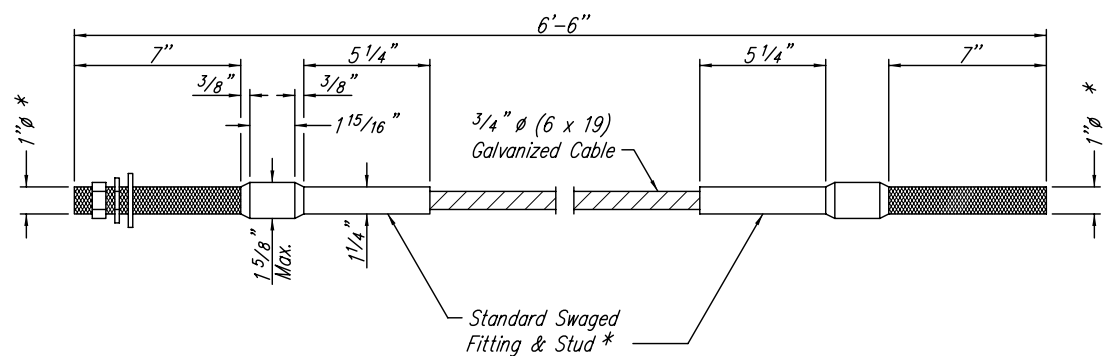
STEEL BEARING PLATE



TYPE "A" WASHER



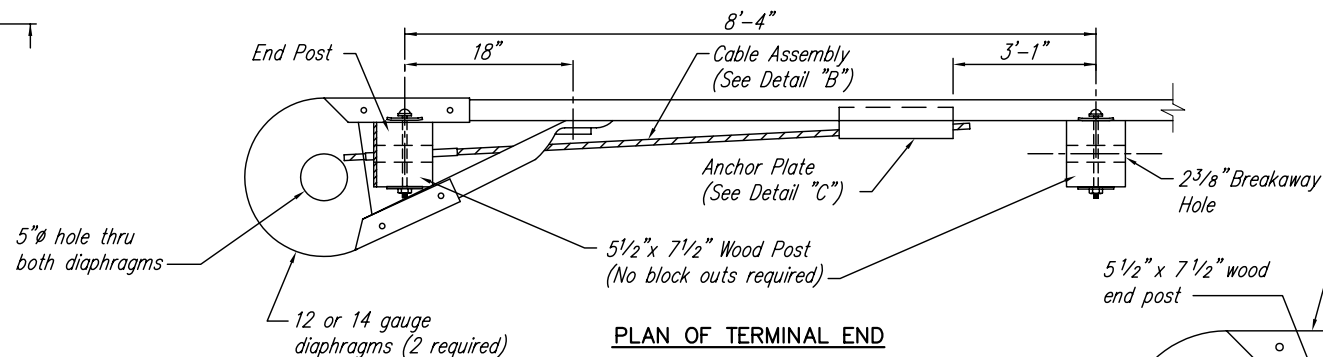
3"x 1 3/4" PLATE WASHER



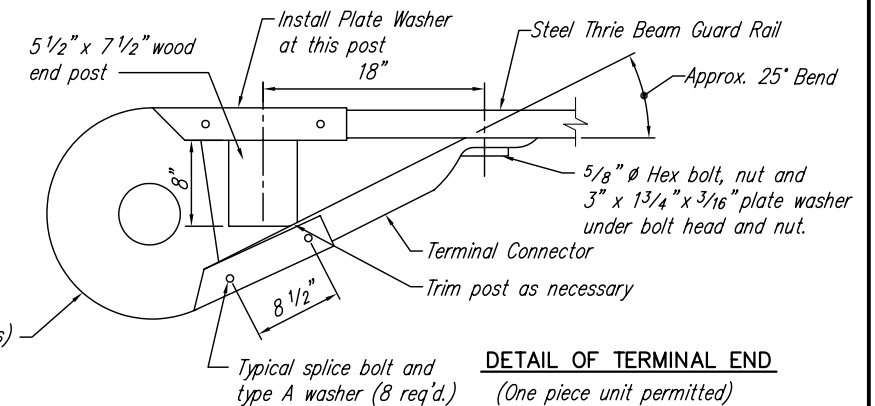
CABLE ASSEMBLY

DETAIL "B"

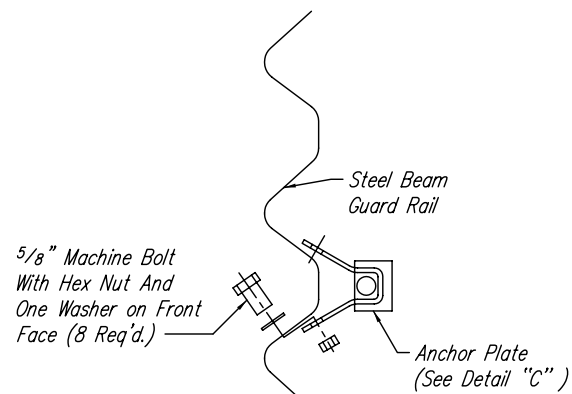
* Stud threaded entire length



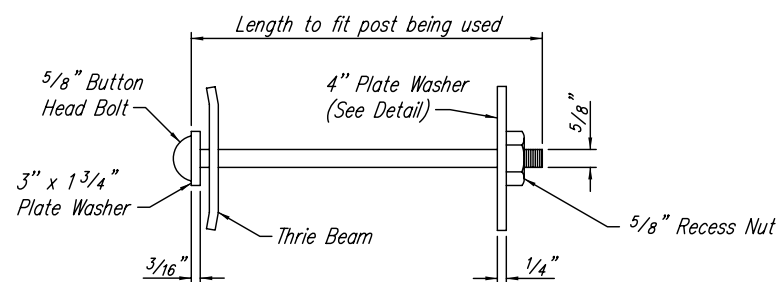
PLAN OF TERMINAL END



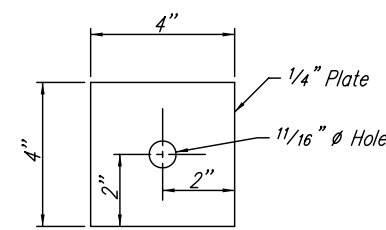
DETAIL OF TERMINAL END
(One piece unit permitted)



SECTION THRU RAIL



POST BOLT ASSEMBLY



4" PLATE WASHER

DETAILED CEB
CHECKED ARB

BOONE COUNTY, MISSOURI
BR. NO. 31100241

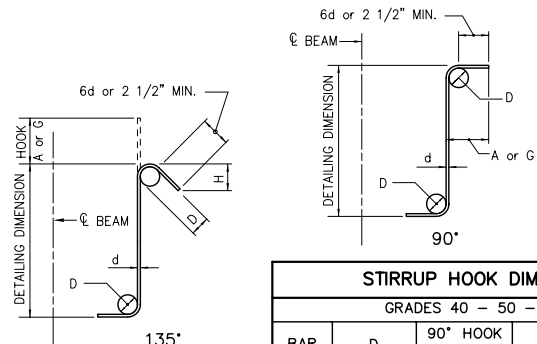
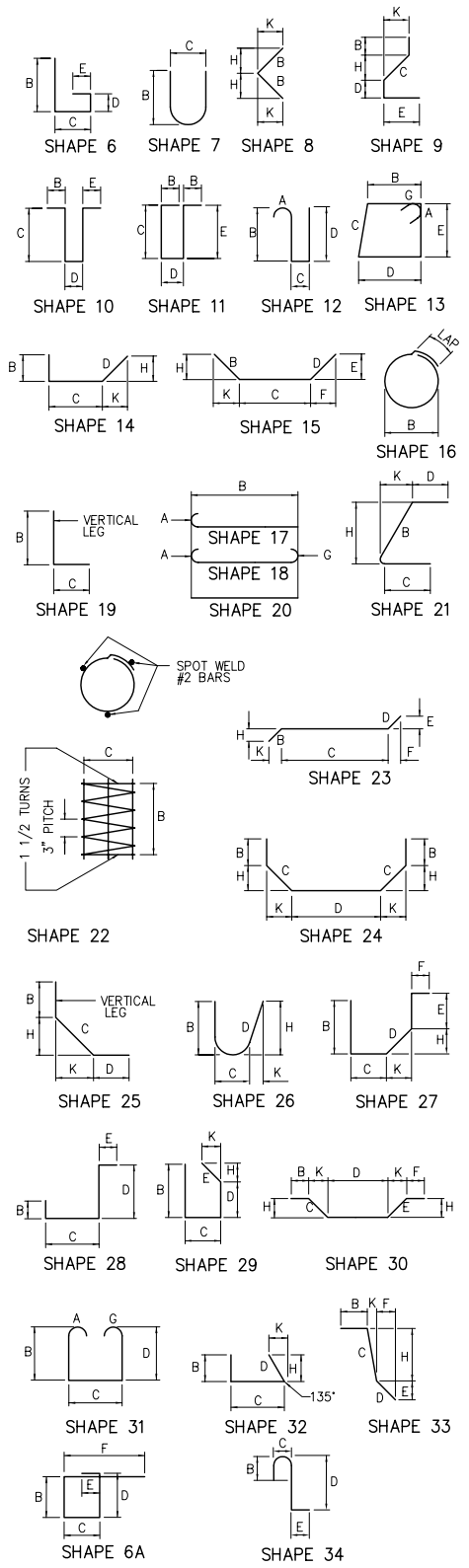
BCT TERMINAL DETAILS

COMPLETE BILL OF REINFORCING STEEL

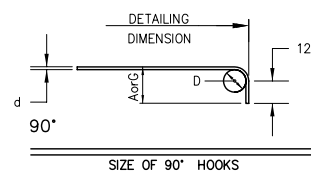
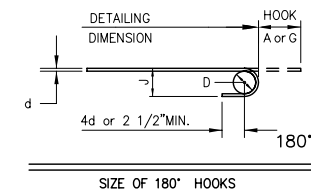
NO. REQ.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS							NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT	
									B	C	D	E	F	H	K				
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.				FT. IN.
SUBSTRUCTURE																			
END BENT (EACH END BENT)																			
50	5	A3		Beam & Diaph.	20			5	7							5	7.5	7	291
20	5	A4		Beam & Wing	20		V	4	6	9						6	9.6	9	
				Incr. = 6.0"					4	9						4	9.4	9	120
12	5	A6		Beam (Horiz.)	20				37	6						37	6.37	6	469
8	5	A9		Beam & Wing	20				7	1						7	1.7	1	59

COMPLETE BILL OF REINFORCING STEEL

NO. REQ.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	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.	FT. IN.
SUPERSTRUCTURE																			
END BENT (TOTAL FOR BOTH END BENTS)																			
50	5	A1		Diaph. (Fill Face)	19			2	11	0	15					4	2.4	1	212
8	5	A2		Diaph. (Horiz.)	20			24	3							24	3.24	3	202
24	5	A5		Wing (Horiz.)	20		V	8	5	11						5	11.5	11	
				Incr. = 2'-0.5"					0	22						0	22.0	22	98
8	5	A7		Wing (Horiz.)	20			6	4							6	4.6	4	53
50	5	A8		Diaph. (Front Face)	20			2	6							2	6.2	6	130
6	5	B1		Diaph. (Thru Girder)	20			24	3							24	3.24	3	152
SLAB																			
169	5	S1		Transverse	20			24	3							24	3.24	3	4,274
66	5	S2		Longitudinal	20			43	0							43	0.43	0	2,960



STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (in.)	90° HOOK		135° HOOK
		HOOK A or G	HOOK A or G	APPROX. H
# 3	1 1/2"	4"	4"	2 1/2"
# 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"	7 3/4"	4 1/2"



BAR SIZE	D (IN.)	180° HOOKS			90° HOOKS	
		ALL GRADES		ALL GRADES		
		A or G	J	A or G	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"		

NOTES: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

E - EPOXY COATED REINFORCEMENT.

S - STIRRUP.

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.

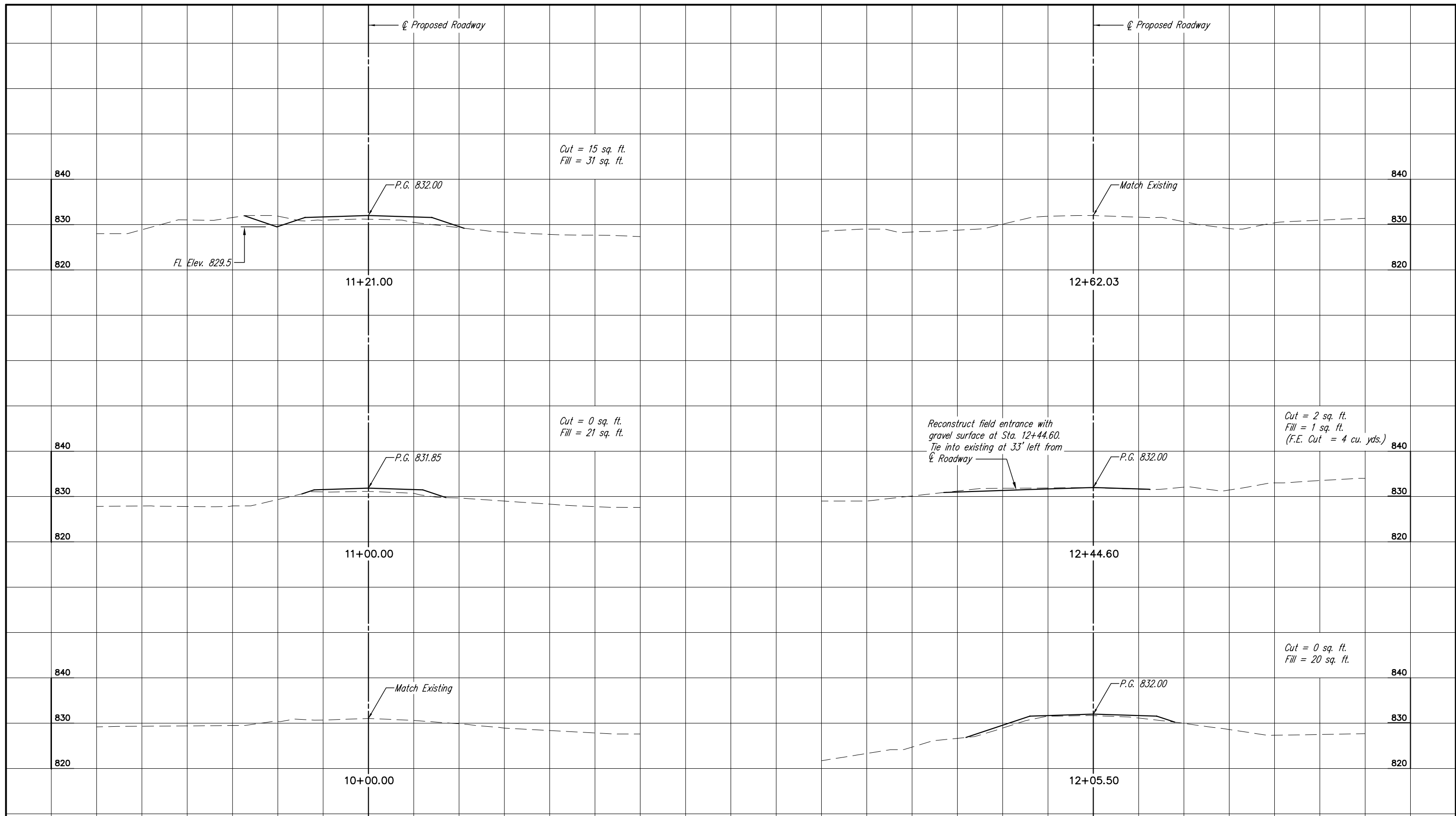
NOTE: This drawing is not to scale. Follow dimensions.

BOONE COUNTY, MISSOURI
BR. NO. 31100241

BILL OF REINFORCING

DETAILED KMW
CHECKED KSJ

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

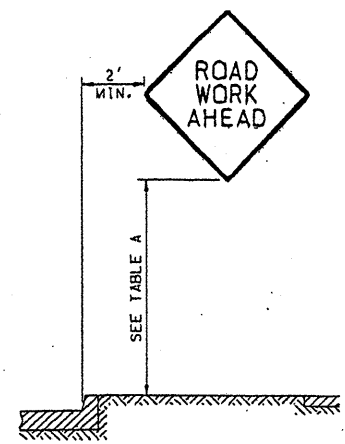
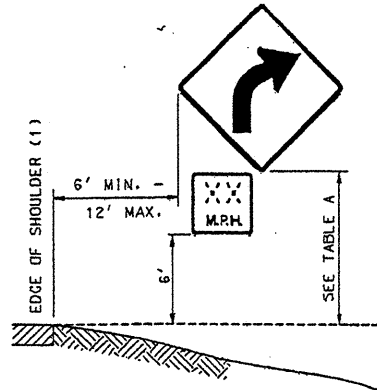


EMBANKMENT QUANTITY SUMMARY	
Roadway Class A Excavation	= 12 Cu. Yds.
Channel Class A Excavation	= 581 Cu. Yds.
Compacted Embankment In-Place	= 74 Cu. Yds.
Less 70% Class A Excavation	= 415 Cu. Yds.
Required Borrow	= 0 Cu. Yds.
Excess Earth	= 341 Cu. Yds.

DETAILED CEB
 CHECKED ARB

BOONE COUNTY, MISSOURI BR. NO. 31100241	
ROADWAY CROSS SECTIONS	
HARRINGTON & CORTELYOU, INC. Consulting Engineers	SHEET <u>10</u> OF <u>16</u>

(1) EDGE OF TRAVELED WAY WHERE THERE IS NO PAVED OR STABILIZED SHOULDER.



HEIGHT AND LATERAL LOCATIONS FOR POST AND PORTABLE SIGN MOUNTING

WORK ZONE ACTIVITY	SIGN CLASSIFICATION	MOUNTING METHOD	MINIMUM MOUNTING HEIGHT
DAYTIME OPERATIONS	WARNING	1, 2	7 FT.
		3, 4	12 IN.
NIGHTTIME OPERATIONS	WARNING, GUIDE AND REGULATORY	1, 2	7 FT.
		3, 4	5 FT.
INACTIVE OR CONTINUOUS OPERATIONS	WARNING, GUIDE AND REGULATORY	1, 2, 4	7 FT.

WORK ZONE ACTIVITY:
 DAYTIME OPERATION - AN ACTIVITY WHERE WORKERS ARE PRESENT ANY TIME FROM DAWN TO DUSK.
 NIGHTTIME OPERATION - AN ACTIVITY WHERE WORKERS ARE PRESENT ANY TIME FROM DUSK TO DAWN.
 INACTIVE OPERATION - NO ACTIVITY OCCURRING ON SITE IN WORK ZONE (DAY, NIGHT, WEEKEND, OFF-SEASON OR OTHER EXTENDED PERIOD OF TIME).
 CONTINUOUS OPERATION - AN ACTIVITY WHERE SIGNS REMAIN IN PLACE 24 HOURS OR LONGER.

SIGN CLASSIFICATION:
 REFER TO STANDARD DRAWING 616.10, SHEET 5 OF 5.

MOUNTING METHOD:
 1. POST - GROUND-MOUNTED SIGN SUPPORT SYSTEM WITH RIGID SIGN SUBSTRATE.
 2. PORTABLE - SKID-MOUNTED OR OTHER SIGN SUPPORT SYSTEM WITH RIGID SIGN SUBSTRATE PERMITTED WHERE POST MOUNTING IS NOT FEASIBLE.
 3. TEMPORARY - LIGHTWEIGHT SIGN SUPPORT SYSTEM WITH ROLL-UP OR RIGID SIGN SUBSTRATE.
 4. BARRIER - SIGN SUPPORT SYSTEM WITH ROLL-UP OR RIGID SIGN SUBSTRATE PERMITTED WHERE BARRIER IS PRESENT. MUST ASSURE POSITIVE CONNECTION TO BARRIER WITHOUT POTENTIAL FOR VEHICLE SNAGGING.

MOUNTING HEIGHT:
 VERTICAL HEIGHT OF SIGN MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF PAVEMENT.

TABLE A
 WORK ZONE SIGN MOUNTING REQUIREMENTS

SIGN AREA (SQ. FT.)	POST TYPE		
	U-CHANNEL	WOOD	PERF. SQUARE STEEL TUBING
≤ 10	1 - 3.0 LB./FT.*	1 - 4" X 4"*	1 - 2" 12 GA.*
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4"* 1 - 4" X 6"*	2 - 2" 12 GA.
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"	3 - 2" 12 GA.*
> 24 ≤ 30	3 - 3.0 LB./FT.	2 - 4" X 6"	N/A
> 30 ≤ 50	N/A	2 - 6" X 6"	N/A

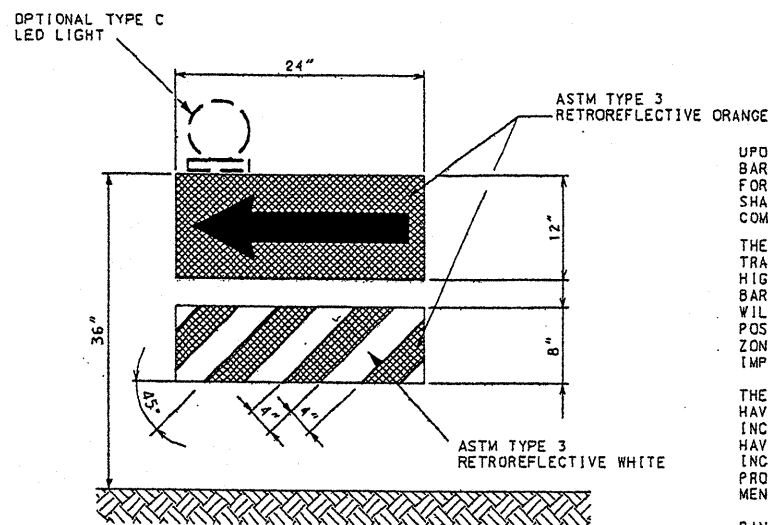
* SIGNS GREATER THAN 4 FEET IN WIDTH, EXCEPT DIAMOND SHAPE SIGNS, REQUIRE TWO POSTS.
 ** REQUIRES SLIP BASE PER MANUFACTURER'S RECOMMENDATION.

TABLE B
 POST SIZE REQUIREMENTS

GENERAL NOTES:

- ALL SIGN SUPPORT SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 TEST LEVEL 3 EXCEPT FOR THOSE MOUNTED ON BARRIERS.
- LONGITUDINAL SPACING OF SIGNS SHOWN IN THE PLANS ARE PREFERRED MINIMUMS, BUT MAY BE ADJUSTED TO MEET EXISTING FIELD CONDITIONS WITH APPROVAL FROM THE ENGINEER.
- SIGNS MOUNTED ON PORTABLE OR TEMPORARY SUPPORTS MAY BE PLACED WITHIN THE ROADWAY ITSELF WITH THE APPROVAL OF THE ENGINEER.
- SIGNS SHALL NOT BE MOUNTED IN OR ON CHANNELIZERS.
- ALL POSTS AND SIGNS SHALL BE INSTALLED AND MAINTAINED IN A PLUMB POSITION.
- ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET.
- BRACING OF SUPPORT POSTS NOT ALLOWED.
- SIGNS MOUNTED ON TEMPORARY SIGN SUPPORT SYSTEMS SHALL BE WITHIN 30° OF A VERTICAL POSITION FOR DAYTIME OPERATIONS AND WITHIN 5° OF A VERTICAL POSITION FOR NIGHTTIME OPERATIONS.
- CONSTRUCTION SIGNS SHALL NOT BE LOCATED ON SIDEWALKS, BICYCLE LANES, OR AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE TRAFFIC.
- SUPPORT POST SHALL NOT EXTEND ABOVE THE SIGN UNLESS NEEDED FOR WARNING LIGHT ATTACHMENT.
- ALL BATTERY PACKS SEPARATE FROM WARNING LIGHT SHALL BE MOUNTED ON A SUPPORT POST NO HIGHER THAN 18" ABOVE GROUND LINE. IF USED, WARNING LIGHTS SHALL NOT COVER ANY PORTION OF THE SIGN FACE.
- REFER TO STANDARD DRAWING 903.03 FOR INSTALLATION DETAILS OF U-CHANNEL, WOOD AND PERFORATED SQUARE STEEL TUBE POSTS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	TRAFFIC CONTROL DEVICES SIGN MOUNTING REQUIREMENTS		
	DATE: 2/12/03	EFFECTIVE: 04-01-2003	616.10AD
			1 5



DIRECTION INDICATOR BARRICADE

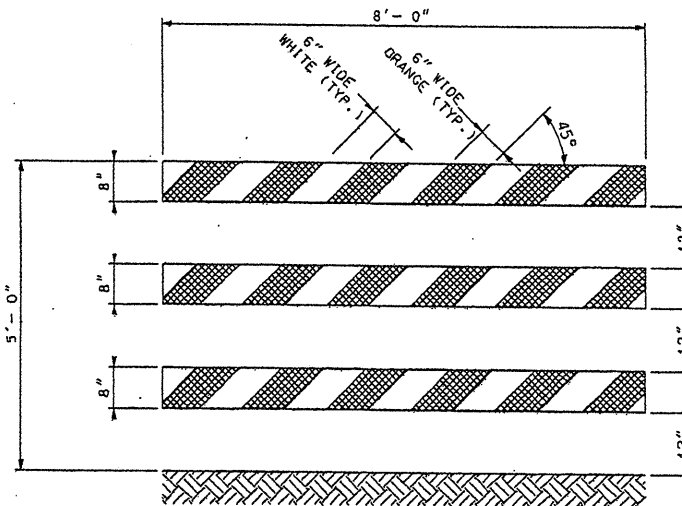
UPON APPROVAL FROM THE ENGINEER, DIRECTION INDICATOR BARRICADES MAY BE USED IN LIEU OF DRUM-LIKE CHANNELIZERS FOR MERGE TAPERS ONLY. DIRECTION INDICATOR BARRICADES SHALL NOT BE USED IN SHIFTING TAPERS. NO ADDITIONAL COMPENSATION WILL BE MADE.

THE BARRICADE SHALL BE MANUFACTURED SPECIFICALLY FOR TRAFFIC CONTROL PURPOSES AND SHALL BE FABRICATED FROM HIGH-DENSITY POLYETHYLENE (HDPE) PLASTIC. EACH BARRICADE SHALL HAVE A SPRINGLOADED MECHANISM THAT WILL LOCK THE VERTICAL MEMBER INTO A PERPENDICULAR POSITION TO THE PAVEMENT WHEN DEPLOYED IN THE WORK ZONE AND IN A PARALLEL POSITION TO THE PAVEMENT UPON IMPACT.

THE BARRICADE FRAME SHALL CONSIST OF VERTICAL MEMBERS HAVING NOMINAL DIMENSIONS OF 28 INCHES WIDE BY 39 INCHES HIGH BY 3 INCHES DEEP AND HORIZONTAL FEET HAVING NOMINAL DIMENSIONS OF 36 INCHES LONG BY 2.75 INCHES HIGH BY 2 INCHES DEEP. EACH FOOT SHALL BE PROVIDED WITH A MEANS TO REDUCE UNINTENTIONAL MOVEMENT OF THE BARRICADE ACROSS THE PAVEMENT.

PANELS SHALL BE RECESSED WITHIN THE CONTOUR OF THE VERTICAL FRAME MEMBERS. A TOP AND BOTTOM PANEL SHALL BE FURNISHED FOR BOTH SIDES OF EACH BARRICADE. ONE SIDE OF EACH OF THESE PANELS SHALL BE SHEETED AS SHOWN WHILE THE OTHER SIDE SHALL REMAIN UNSHEETED. THE SHEETED SIDE OF THE PANELS SHALL ONLY BE DISPLAYED ON THE TRAFFIC SIDE OF THE BARRICADE. THE UNSHEETED SIDE OF THE PANELS SHALL BE DISPLAYED ON THE SIDE OF THE BARRICADE WHEN THAT SIDE IS NOT USED TO DIRECT THE MOVEMENT OF TRAFFIC.

THE BARRICADE SHALL BE DESIGNED TO RESIST OVERTURNING BY MEANS OF HORIZONTAL FEET HAVING A MINIMUM WEIGHT OF 2.5 POUNDS. THE BARRICADE SHALL BE CAPABLE OF HANDLING ADDITIONAL BALLASTS. BALLASTS SHALL BE PLACED ONTO THE UPSTREAM FEET OF THE DEVICE WHEN USED.



TYPE III MOVABLE BARRICADE

TYPE III MOVABLE BARRICADES SHALL CONSIST OF THREE HORIZONTAL PANELS MOUNTED TO SUPPORTS IN SUCH A MANNER THAT THE ENTIRE ASSEMBLY IS CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.

THE SUPPORT STRUCTURE SHALL CONSIST OF A MINIMUM OF TWO UPRIGHTS CAPABLE OF KEEPING THE PANELS SECURELY ATTACHED IN THE DESIGNATED ARRANGEMENT. THE UPRIGHTS SHALL BE MOUNTED TO A BASE CAPABLE OF SUPPORTING THE ENTIRE ASSEMBLY WHILE REMAINING COMPLETELY PORTABLE.

THE PANELS SHALL CONSIST OF A SUBSTRATE OF HIGH-DENSITY POLYETHYLENE, WOOD, OR OTHER APPROVED MATERIAL SHEETED WITH ASTM TYPE 7 RETROREFLECTIVE MATERIAL.

ONE TYPE III MOVABLE BARRICADE WILL BE REQUIRED TO COMPLETELY CLOSE EACH 8' OF TRAVELED WAY WIDTH.

NOMINAL DIMENSIONS WILL BE ALLOWED FOR DIMENSIONAL LUMBER.

NO SIGNS OR LIGHTING DEVICES SHALL BE MOUNTED OR ATTACHED TO TYPE III MOVABLE BARRICADES.

WHERE A BARRICADE ARRAY EXTENDS ACROSS A ROADWAY, THE STRIPES SHALL SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN OR PASS.

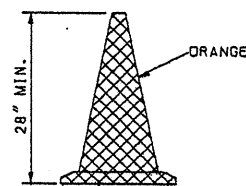
WHERE BOTH RIGHT AND LEFT VEHICULAR MOVEMENTS ARE PROVIDED, THE STRIPES SHALL SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE ARRAY.

WHERE NO VEHICULAR MOVEMENTS ARE PROVIDED, THE STRIPES SHALL SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE ARRAY.

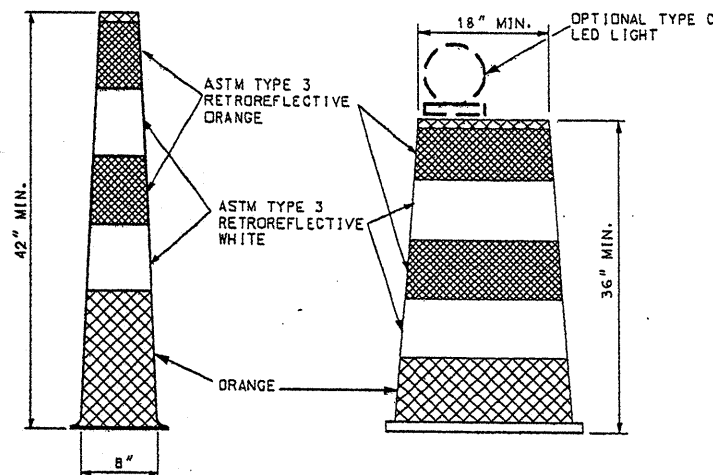
MARKING SHALL ONLY BE APPLIED TO TRAFFIC SIDE OF BARRICADE.

CONES SHALL MAINTAIN THEIR SHAPE UPON EXPOSURE TO NORMAL WORK CONDITIONS.

CONES SHALL BE USED DURING DAYLIGHT HOURS ONLY.



CONE



TRIM-LINE

DRUM-LIKE

CHANNELIZERS

STRIPES ON TRIM-LINE CHANNELIZERS SHALL BE 6" TO 8". STRIPES ON DRUM-LIKE CHANNELIZERS SHALL BE 4" TO 6".

VERTICAL DIMENSIONS DO NOT INCLUDE PROJECTIONS DESIGNED FOR EASE OF HANDLING.

MARKINGS ON CHANNELIZERS SHALL BE HORIZONTAL, CIRCUMFERENTIAL, ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES. EACH CHANNELIZER SHALL HAVE A MINIMUM OF TWO ORANGE AND TWO WHITE STRIPES WITH THE TOP STRIPE BEING ORANGE LOCATED NO MORE THAN 4 INCHES FROM THE TOP. ANY NON-REFLECTORIZED SPACES BETWEEN THE HORIZONTAL ORANGE AND WHITE STRIPES SHALL NOT EXCEED 2 INCHES WIDE.

DRUM-LIKE CHANNELIZERS SHALL HAVE CLOSED TOPS THAT WILL NOT ALLOW COLLECTION OF CONSTRUCTION OR OTHER DEBRIS.

TRIM-LINE CHANNELIZERS SHALL BE MANUFACTURED FROM LOW DENSITY POLYETHYLENE PLASTIC.

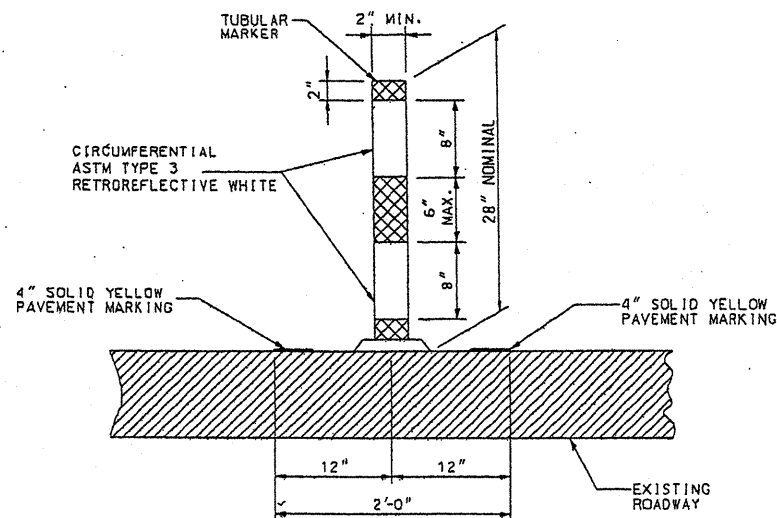
UPON APPROVAL FROM THE ENGINEER, TRIM-LINE CHANNELIZERS MAY BE USED IN LIEU OF DRUM-LIKE CHANNELIZERS IN RAMP AREAS AND INTERSECTIONS WHERE SIGHT DISTANCE MAY BE OBSTRUCTED BY USING DRUM-LIKE CHANNELIZERS AND IN LONGITUDINAL SECTIONS OF CHANNELIZATION WHERE THERE IS INADEQUATE LATERAL CLEARANCE TO USE DRUM-LIKE CHANNELIZERS. TRIM-LINE CHANNELIZERS SHALL BE PLACED AT ONE-HALF THE SPACING OF DRUM-LIKE CHANNELIZERS. NO ADDITIONAL COMPENSATION WILL BE MADE.

GENERAL NOTES:

BALLAST FOR TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUFACTURERS' RECOMMENDATION FOR FIELD CONDITIONS.

IF REQUIRED BY THE ENGINEER OR SPECIFIED ON THE PLANS, EACH DIRECTION INDICATOR BARRICADE OR DRUM-LIKE CHANNELIZER SHALL BE EQUIPPED WITH ONE TYPE C LED PORTABLE LIGHT UNIT. IF USED, THE LIGHT UNIT AND BATTERY COMPARTMENT SHALL BE FURNISHED BY THE DEVICE MANUFACTURER OR OTHERWISE MEET THE MANUFACTURER'S RECOMMENDATIONS FOR DESIGN AND WILL BE REQUIRED ON ALL DEVICES IN THE SERIES.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	TRAFFIC CONTROL DEVICES		
	DATE: 2/12/03	EFFECTIVE: 04-01-2003	616.10AD
			2 5



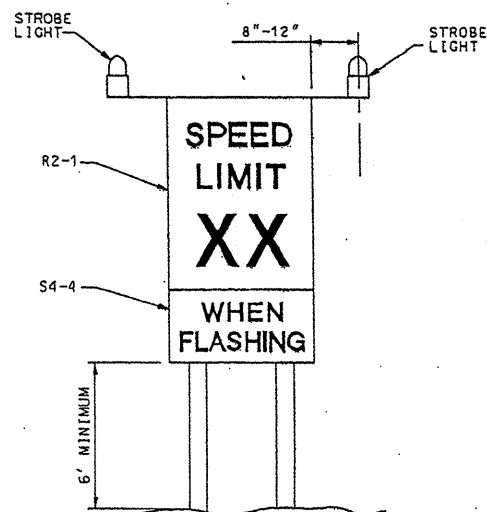
SECTION A-A
TUBULAR MARKER DETAIL

THE TUBULAR MARKER SHALL BE MADE OF A FLEXIBLE MATERIAL OR HAVE A FLEXIBLE JOINT AT THE BASE SUCH THAT IT WILL NOT CAUSE DAMAGE TO VEHICLES UPON IMPACT AND WILL RETURN TO ITS ORIGINAL SHAPE AFTER BEING STRUCK BY 5000 LB. VEHICLE AT A VELOCITY OF 75 FT./SEC.

THE TUBULAR MARKER SHALL BE ORANGE WITH TWO WHITE ASTM TYPE 3 RETROREFLECTIVE STRIPES.

REFLECTORIZED MATERIALS SHALL HAVE A SMOOTH SEALED OUTER SURFACE WHICH WILL DISPLAY THE SAME APPROXIMATE COLOR DAY AND NIGHT.

AN ADHESIVE, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, SHALL BE USED TO APPLY THE TUBULAR MARKER TO THE ROADWAY SURFACE. THE ADHESIVE SHALL PERMIT EASY REMOVAL OF THE TUBULAR MARKER WITHOUT DAMAGE TO THE ROADWAY SURFACE.



SEE NON-PORTABLE SIGN MOUNTING FOR LATERAL DIMENSIONS
SPEED LIMIT AND STROBE LIGHT ASSEMBLY

THE ASSEMBLY MAY BE EITHER POST- OR PORTABLE-MOUNTED.

THE ASSEMBLY SHALL ONLY BE USED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

THE ASSEMBLY SHALL BE COVERED OR ROTATED SO THE SIGNS ARE NOT VISIBLE TO TRAFFIC WHEN WORK IS SUSPENDED OR THE CONDITION REQUIRING THE SPEED REDUCTION IS NOT PRESENT FOR 48 HOURS OR MORE.

THE STROBE LIGHTS SHALL BE TURNED OFF WHEN THE SPEED LIMIT IS NOT IN EFFECT.

STROBE LIGHT REQUIREMENTS

THE STROBE LIGHTS SHALL BE 12/24 VDC BATTERY- OR SOLAR-POWERED WITH AMBER FRESNEL, HIGH-PROFILE LENSES. THE INPUT CURRENT SHALL BE 1.75 AMPS OR LESS. THE STROBE LIGHT SHALL HAVE A FLASH RATE OF 60 TO 80 FLASHES PER MINUTE. EACH STROBE LIGHT WILL PROVIDE NOT LESS THAN 500,000 CANDLEPOWER OF ILLUMINATION. EACH LIGHT SHALL BE FULLY VISIBLE THROUGH AN ARC OF APPROXIMATELY 120 DEGREES WHEN VIEWED FACING THE SIGN. THE LIGHTS SHALL BE SHIELDED SO THEY WILL NOT BE DIRECTLY VISIBLE FROM THE REAR. NO DIRECT PAYMENT WILL BE MADE FOR THE BATTERIES REQUIRED TO POWER THE STROBE LIGHTS.

AT THE CONTRACTOR'S OPTION, THE STROBE LIGHTS MAY BE CONTROLLED BY A SWITCH LOCATED ON THE SIGN OR BE A STANDARD TWO-CHANNEL DIGITAL TRANSMITTER AND RECEIVER UNIT. IF THE TRANSMITTER AND RECEIVER METHOD IS USED, ONE TRANSMITTER SHALL BE FURNISHED TO THE ENGINEER AT THE TIME OF INSTALLATION OF THE SPEED LIMIT ASSEMBLY. THE TRANSMITTER WILL BE RETURNED TO THE CONTRACTOR AT THE COMPLETION OF THE PROJECT. THE TRANSMITTER AND RECEIVERS WILL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE PROJECT IS COMPLETED. NO DIRECT PAYMENT WILL BE MADE FOR THE COST OF THE TRANSMITTER AND RECEIVER.

PORTABLE WARNING LIGHTS

	TYPE A LOW INTENSITY	TYPE B HIGH INTENSITY	TYPE C STEADY BURN
LENS DIRECTIONAL FACES	1 OR 2	1	1 OR 2
FLASHING RATE PER MINUTE	55 TO 75	55 TO 75	CONSTANT
MINIMUM ON-TIME(1)	10%	8%	CONSTANT
HOURS OF OPERATION	DUSK TO DAWN	24HRS/DAY	DUSK TO DAWN

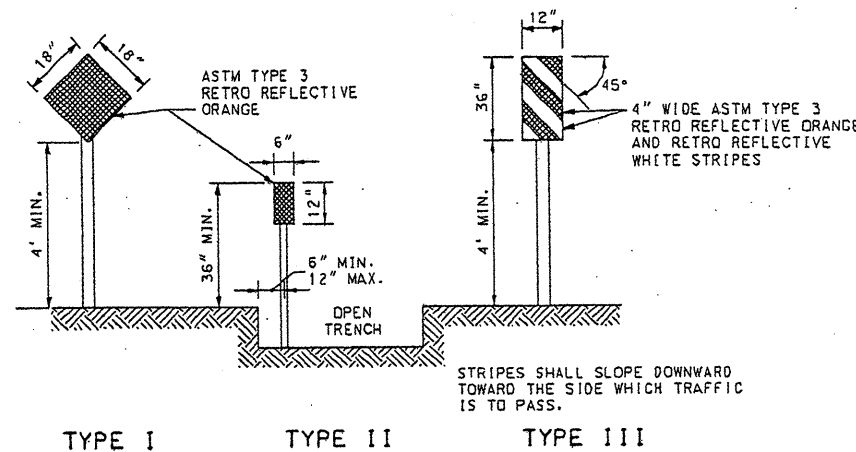
TYPE A AND C LIGHTS SHALL BE VISIBLE ON A CLEAR NIGHT FROM A DISTANCE OF 3000 FEET(2).

TYPE B LIGHTS SHALL BE VISIBLE ON A SUNNY DAY WHEN VIEWED WITHOUT THE SUN DIRECTLY ON OR BEHIND THE DEVICE FROM A DISTANCE OF 1000 FEET(2).

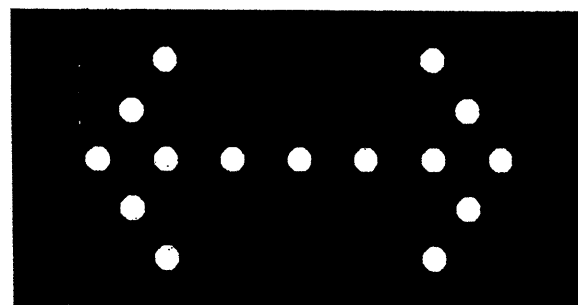
(1) LENGTH OF TIME THAT INSTANTANEOUS INTENSITY IS EQUAL TO OR GREATER THAN EFFECTIVE INTENSITY.

(2) THIS VISIBILITY MUST BE MAINTAINED WITHIN A SOLID ANGLE 9° ON EACH SIDE OF THE VERTICAL AXIS, AND 5° ABOVE AND 5° BELOW THE HORIZONTAL AXIS.

PORTABLE WARNING LIGHTS SHALL BE BATTERY- OR SOLAR-POWERED.



TYPE I TYPE II TYPE III



FLASHING ARROW PANEL REQUIREMENTS

FLASHING ARROW PANELS USED IN STATIONARY OPERATIONS SHALL HAVE A NOMINAL PANEL SIZE OF 4 FEET HIGH BY 8 FEET WIDE. PANELS MAY BE EITHER TRAILER- OR TRUCK-MOUNTED.

FLASHING ARROW PANELS USED IN OPERATIONS WHICH MOVE INTERMITTENTLY OR CONTINUOUSLY SHALL HAVE A MINIMUM NOMINAL PANEL SIZE OF 3 FEET HIGH BY 6 FEET WIDE. PANELS SHALL BE TRUCK-MOUNTED.

THE FRONT SURFACE OF THE PANEL SHALL BE NONREFLECTIVE FLAT BLACK.

PANELS SHALL HAVE A MINIMUM OF 15 SEALED BEAM LAMPS. EACH LAMP SHALL HAVE A NOMINAL 5 INCH, 360° TUNNEL VISOR. MINIMUM LAMP "ON TIME" SHALL BE 50 PERCENT. THE FLASHING RATE OF THE LAMPS SHALL NOT BE LESS THAN 25 NOR GREATER THAN 40 FLASHES PER MINUTE. A LAMP ON THE BACK SIDE OF THE PANEL SHALL BE CONTINUOUSLY ENERGIZED DURING OPERATION OF THE ARROW PANEL. AUTOMATIC CONTROL CIRCUITRY SHALL PROVIDE A MINIMUM OF 50 PERCENT VOLTAGE REDUCTION TO ALL LAMPS DURING NIGHT OPERATIONS.

LAMPS MUST BE VISIBLE AT AN ANGLE OF 15° TO THE LEFT AND RIGHT OF CENTER AND 4° ABOVE AND BELOW CENTER DURING "ON TIME".

PANEL MOUNTING HEIGHT SHALL BE 7 TO 9 FEET FROM THE ROADWAY SURFACE TO THE LOWEST POINT ON THE PANEL. THE BOTTOM OF THE PANEL SHALL BE RELATIVELY LEVEL WHEN IN USE.

PANEL SHALL CONTAIN A DEVICE TO ALIGN THE ARROW PANEL TO ONCOMING TRAFFIC.

CONTROL PROGRAM:

CAUTION: FLASH THE 2 HIGHEST AND 2 LOWEST LAMPS ON PANEL SIMULTANEOUSLY.

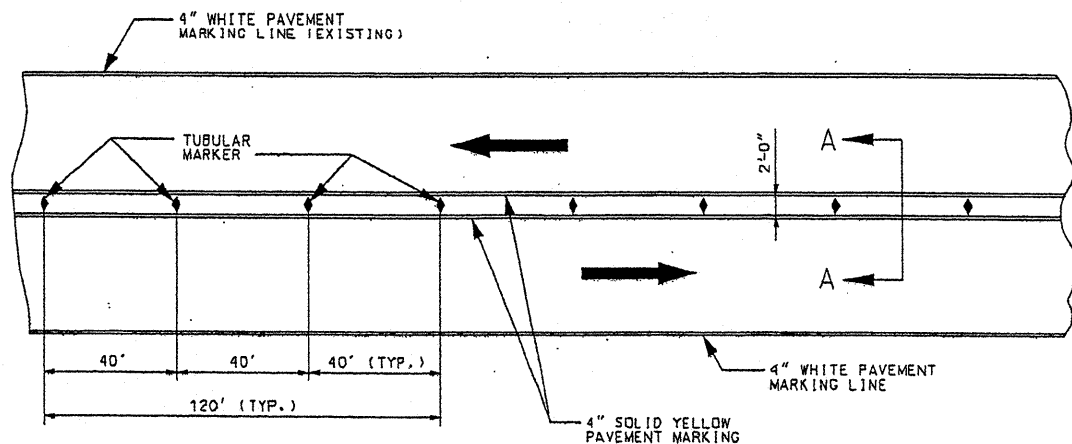
LEFT OR RIGHT ARROW: FLASH 5 LAMPS IN THE ARROWHEAD AND 5 LAMPS IN THE HORIZONTAL SHANK SIMULTANEOUSLY.

DOUBLE ARROW: FLASH 5 LAMPS IN BOTH THE LEFT AND RIGHT ARROWHEADS AND 3 LAMPS IN THE HORIZONTAL SHANK SIMULTANEOUSLY.

ADDITIONAL REQUIREMENTS FOR SOLAR-POWERED ARROW PANELS:

THE FLASHING ARROW SHALL BE ABLE TO OPERATE IN THE SINGLE ARROW MODE IN TOTAL DARKNESS FOR 20 CONSECUTIVE DAYS.

A DEVICE SHALL BE PROVIDED TO INDICATE THE REMAINING CHARGE IN BATTERIES.



TWO LANE / TWO WAY TRAFFIC DELINEATION PLAN FOR DIVIDED HIGHWAY

IF RAISED PAVEMENT MARKERS ARE PRESENT, THE LENSES SHALL BE REMOVED OR COVERED TO THE SATISFACTION OF THE ENGINEER.

OBJECT MARKERS

BOONE COUNTY-Bridge 311002411
Sheet 13 of 16

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	TRAFFIC CONTROL DEVICES
DATE: 2/12/03	EFFECTIVE: 04-01-2003
616.10AD	3/5

LOCATION OF ACTIVITY (I.E. WORKERS, EQUIPMENT, MATERIAL)	POSTED SPEED GREATER THAN 55 MPH		POSTED SPEED LESS THAN OR EQUAL TO 55 MPH	
	PROTECTED	UNPROTECTED	PROTECTED	UNPROTECTED
BEYOND 30' OF EOTP	POSTED	POSTED	POSTED	POSTED
10' TO 30' OF EOTP	POSTED	POSTED-10	POSTED	POSTED
WITHIN 10' OF EOTP	POSTED	POSTED-10	POSTED	POSTED-10
IN TRAFFIC LANE OF MULTILANE FACILITY	POSTED-10	POSTED-20 (MIN. 45 MPH)	POSTED-10	POSTED-10
2 LANE / 2 WAY OPERATION				
BEYOND 10' OF EOTP	POSTED	POSTED-10 (MIN. 55 MPH)	POSTED	POSTED
WITHIN 10' OF EOTP	POSTED	POSTED-20 (MIN. 45 MPH)	POSTED	POSTED-10
1 LANE / 2 WAY OPERATION	35 MPH *			
TEMPORARY CLOSURE WITH FLAGGER	35 MPH *			

LEGEND:

"EOTP" = EDGE OF THROUGH PAVEMENT

"PROTECTED" INDICATES THAT ACTIVITY IS PHYSICALLY SHIELDED BY A CRASH-WORTHY DEVICE (TRAFFIC BARRIER, GUARD RAIL, IMPACT ATTENATORS, ETC.).

"UNPROTECTED" INDICATES THAT ACTIVITY IS NOT SHIELDED BY A CRASH-WORTHY DEVICE. IT MAY ONLY BE DELINEATED BY CHANNELIZING DEVICES OR PAVEMENT MARKINGS.

"POSTED" INDICATES POSTED (EXISTING) SPEED PRIOR TO WORK ACTIVITY.

"POSTED-XX" INDICATES A REDUCTION IN THE SPEED LIMIT BY THE AMOUNT SHOWN IN MPH.

* CONDITIONS MAY ALLOW FOR SPEEDS GREATER THAN 35 MPH.

WORK ZONE SPEED LIMIT

GENERAL NOTES:

REDUCED SPEEDS SHALL NOT BE BELOW 35 MPH EXCEPT WHEN LOCAL ORDINANCE PROVIDES FOR A LOWER SPEED. THE LOWER SPEED WILL BE USED WHEN APPLICABLE.

ON DIVIDED HIGHWAYS, THE REDUCED SPEED IS APPLICABLE TO THE AFFECTED DIRECTION OF TRAVEL ONLY. WHEN TRAFFIC ON DIVIDED HIGHWAYS IS DETOURED TO A HEAD-TO-HEAD OPERATION, THE SPEED LIMIT SHALL BE "POSTED-10" MPH.

IF A SPEED REDUCTION IS USED, EXISTING SPEED LIMIT SIGNS WITHIN THE WORK ZONE SHALL BE COVERED OR REMOVED. SPEED LIMIT SIGNS INDICATING THE NORMAL SPEED LIMIT SHALL BE INSTALLED AT THE END OF THE WORK ZONE, PROVIDED NO FURTHER WORK ZONES WILL BE ENCOUNTERED WITHIN THE NEXT 1/2 MILE.


IF THERE ARE GEOMETRICS IN THE WORK ZONE THAT REQUIRE A LOWER SPEED THAN THE SPEED INDICATED IN THE CHART (I.E. TEMPORARY BYPASSES, NARROW LANES, ETC.), APPROPRIATE WARNING SIGNS WITH ADVISORY SPEED PLATES SHALL BE USED TO ADVISE OF THIS SPECIALIZED SITUATION.

TEMPORARY SPEED LIMIT SIGNS AND REDUCED SPEED AHEAD SIGNS SHALL BE COVERED OR REMOVED WHEN THE CONDITIONS REQUIRING REDUCED SPEEDS DO NOT EXIST.

SPECIAL ACTIVITY WITHIN A WORK ZONE MAY REQUIRE A LOWER SPEED LIMIT THAN THE GENERAL WORK ZONE SPEED LIMIT. THE FURTHER REDUCED SPEED LIMIT SHALL BE EFFECTIVE ONLY FOR THE DURATION OF THAT SPECIAL ACTIVITY.

FOR SPEED REDUCTIONS GREATER THAN 20 MPH, THE SPEED LIMIT SHOULD BE REDUCED IN TWO STAGES.

DEVIATIONS FROM THIS CHART SHALL BE DOCUMENTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	TRAFFIC CONTROL DEVICES
DATE: <u>2/12/03</u>	EFFECTIVE: 04-01-2003
616.10AD	4 5

SIGN	SIZE	AREA	LETTER SIZE			COLOR		DESCRIPTION
			LINE 1	LINE 2	LINE 3	SYM. LEG. BRD.	BACK GROUND	
WARNING SIGNS								
WF20-4	36X36	9.00	5C	5C	5C	BK	FL. OR	ONE LANE ROAD AHEAD (2) (6)
WF20-5	36X36	9.00	5C	5C	5C	BK	FL. OR	RIGHT LANE/CENTER LANE/LEFT LANE CLOSED AHEAD (2) (6) (7)
WF20-6a	36X36	9.00	6C	6C	6C	BK	FL. OR	RIGHT/CENTER/LEFT LANE CLOSED (5) (6) (7)
WF21-4	36X36	9.00	5D	5D	5D	BK	FL. OR	ROAD WORK AHEAD (2) (6)
WF22-6e	21X15	2.19	3D	3D	ARROW	BK	FL. OR	WET PAINT (ARROW PIVOTS) (5) (6)
WD1-1L	48X48	16.00	---	---	---	BK	OR	TURN (SYMBOL LEFT ARROW) (2)
WD1-1R	48X48	16.00	---	---	---	BK	OR	TURN (SYMBOL RIGHT ARROW) (2)
WD1-2L	48X48	16.00	---	---	---	BK	OR	CURVE (SYMBOL LEFT ARROW) (2)
WD1-2R	48X48	16.00	---	---	---	BK	OR	CURVE (SYMBOL RIGHT ARROW) (2)
WD1-3L	48X48	16.00	---	---	---	BK	OR	REVERSE TURN (SYMBOL LEFT ARROW) (2)
WD1-3R	48X48	16.00	---	---	---	BK	OR	REVERSE TURN (SYMBOL RIGHT ARROW) (2)
WD1-4L	48X48	16.00	---	---	---	BK	OR	REVERSE CURVE (SYMBOL LEFT ARROW) (2)
WD1-4R	48X48	16.00	---	---	---	BK	OR	REVERSE CURVE (SYMBOL RIGHT ARROW) (2)
WD1-4bL	48X48	16.00	---	---	---	BK	OR	DOUBLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (4)
WD1-4bR	48X48	16.00	---	---	---	BK	OR	DOUBLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (4)
WD1-4cL	48X48	16.00	---	---	---	BK	OR	TRIPLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (4)
WD1-4cR	48X48	16.00	---	---	---	BK	OR	TRIPLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (4)
WD1-6	48X24	8.00	---	---	---	BK	OR	HORIZONTAL ARROW (SYMBOL) (2)
WD1-6a	72X36	18.00	---	---	---	BK	OR	HORIZONTAL ARROW (SYMBOL ON BARRICADE) (3)
WD1-7	48X24	8.00	---	---	---	BK	OR	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL) (2)
WD1-7a	72X36	18.00	---	---	---	BK	OR	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL ON BARRICADE) (3)
WD1-8	18X24	3.00	---	---	---	BK	OR	CHEVRON (SYMBOL) (2)
WD1-8a	36X48	12.00	---	---	---	BK	OR	CHEVRON (SYMBOL FOR DIVIDED HIGHWAYS) (2)
WD3-1	48X48	16.00	10D	10C	---	BK	OR	STOP AHEAD (3)
WD3-2	48X48	16.00	10C	10C	---	BK	OR	YIELD AHEAD (5)
WD3-3	48X48	16.00	RED	YELLOW	GREEN	BK	OR	SIGNAL AHEAD (SYMBOL) (1)
WD4-1L	48X48	16.00	---	---	---	BK	OR	MERGE (SYMBOL FROM LEFT) (1)
WD4-1R	48X48	16.00	---	---	---	BK	OR	MERGE (SYMBOL FROM RIGHT) (1)
WD5-1	48X48	16.00	8D	8D	---	BK	OR	ROAD NARROWS (2)
WD5-3	48X48	16.00	8C	8C	---	BK	OR	ONE LANE BRIDGE (2)
WD5-5	48X48	16.00	8C	8C	---	BK	OR	NARROW LANES (5)
WD6-1	48X48	16.00	---	---	---	BK	OR	DIVIDED HIGHWAY (SYMBOL) (2)
WD6-2	48X48	16.00	---	---	---	BK	OR	DIVIDED HIGHWAY END (SYMBOL) (2)
WD6-3	48X48	16.00	---	---	---	BK	OR	TWO WAY TRAFFIC (SYMBOL) (1)
WD7-3a	24X18	3.00	4C	4C	---	BK	OR	NEXT XX MILES (PLAQUE) (2)
WD8-1	48X48	16.00	12D	---	---	BK	OR	BUMP (2)
WD8-2	48X48	16.00	12E	---	---	BK	OR	DIP (2)
WD8-3	48X48	16.00	8C	8C	---	BK	OR	PAVEMENT ENDS (3)
WD8-4	48X48	16.00	8C	8C	---	BK	OR	SOFT SHOULDER (2)
WD8-5	48X48	16.00	---	---	---	BK	OR	SLIPPERY WHEN WET (SYMBOL) (2)
WD8-6	48X48	16.00	8C	8C	---	BK	OR	TRUCK CROSSING (2)
WD8-6a	48X48	16.00	8C	8C	---	BK	OR	TRUCK ENTRANCE (5)
WD8-7	36X36	9.00	6D	6D	---	BK	OR	LOOSE GRAVEL (2)
WD8-9	48X48	16.00	8C	8C	---	BK	OR	LOW SHOULDER (2)
WD8-9a	48X48	16.00	8C	8C	---	BK	OR	SHOULDER DROP-OFF (4)
WD8-11	48X48	16.00	8D	8D	---	BK	OR	UNEVEN LANES (4)
WD8-12	36X36	9.00	6D	6D	6D	BK	OR	NO CENTER STRIPE (4)
WD10-1	42 RND.	9.62	9E	---	---	BK	YL	RAILROAD CROSSING (10)
WD12-1	24X24	4.00	---	---	---	BK	OR	DOUBLE DOWN ARROW (SYMBOL) (2)
WD12-2	48X48	16.00	16D	---	---	BK	OR	LOW CLEARANCE (SYMBOL) (2)
WD12-2x	24X18	3.00	5D	3C	---	BK	OR	LOW CLEARANCE (PLAQUE) (5)
WD12-3a,b	144X24	24.00	16D, 12D	---	---	BK	OR	OVERHEAD LOW CLEARANCE (FEET AND INCHES) (5)
SPECIAL	120X60	50.00	8E	10E	8E	BK	OR	LOW CLEARANCE XX' XX" XX MILES AHEAD (5)
SPECIAL	120X60	50.00	8E	10E	8E	BK	OR	WIDTH RESTRICTION XX' XX" XX MILES AHEAD (5)
WD13-1	24X24	4.00	10E	4E	---	BK	OR	ADVISORY SPEED (PLAQUE) (2)
WD20-2	48X48	16.00	8D	8D	---	BK	OR	DETOUR AHEAD (2)
WD20-3	48X48	16.00	7D	7D	7D	BK	OR	ROAD CLOSED AHEAD (2)
WD20-4	48X48	16.00	7C	7C	7C	BK	OR	ONE LANE ROAD AHEAD (2)
WD20-5	48X48	16.00	6C	6C	6C	BK	OR	RIGHT LANE/CENTER LANE/LEFT LANE CLOSED (2) (7)
WD20-6a	48X48	16.00	7D	7D	7D	BK	OR	RIGHT/CENTER/LEFT LANE CLOSED (5) (7)
WD20-7a	48X48	16.00	---	---	---	BK	OR	FLAGGER (SYMBOL) (2)
WD20-7x	24X18	3.00	5D	5D	---	BK	OR	500 FEET/1000 FEET (PLAQUE) (2)
WD20-7b	48X48	16.00	8C	8C	8C	BK	OR	BE PREPARED TO STOP (4)
WD20-9c	48X48	16.00	8D	8D	---	BK	OR	OPEN TRENCH (5)
WD21-2	48X48	16.00	8D	8D	---	BK	OR	FRESH OIL (3)
WD21-4	48X48	16.00	7D	7D	7D	BK	OR	ROAD WORK AHEAD (2)
WD21-5b	48X48	16.00	7C	7C	7C	BK	OR	SHOULDER WORK AHEAD (5)
WD21-7	36X36	9.00	6D	6D	---	BK	OR	SAND BLASTING (5)
WD22-1	48X48	16.00	7C	7C	7C	BK	OR	BLASTING ZONE 1000 FT (2)
WD22-2	42X36	10.50	4E	4E	4E/4E	BK	OR	TURN OFF 2-WAY RADIO AND PHONE (4)
WD22-3	42X36	10.50	7C	7C	7C	BK	OR	END BLASTING ZONE (4)
WD25-5	30X12	2.50	6C	---	---	BK	OR	1/2 MILE/1 MILE (PLAQUE) (5)

SIGN	SIZE	AREA	LETTER SIZE			COLOR		DESCRIPTION
			LINE 1	LINE 2	LINE 3	SYM. LEG. BRD.	BACK GROUND	
REGULATORY SIGNS								
R1-1	48X48	13.25	16C	---	---	WH	RD	STOP (2)
R1-2	48 TR1.	6.93	4C	---	---	RD	WH	YIELD (1)
R1-3	20X9	1.25	4D	---	---	WH	RD	4-WAY (PLAQUE) (3)
R1-5	20X9	1.25	4D	---	---	WH	RD	3-WAY (PLAQUE) (5)
R2-1	36X48	12.00	6E	6E	14E	BK	WH	SPEED LIMIT XX (1)
R2-5a	36X48	12.00	8E	8C	8C	BK	WH	REDUCED SPEED AHEAD (2)
R3-1	48X48	16.00	---	---	---	BK/RD	WH	NO RIGHT TURN (SYMBOL) (2)
R3-2	48X48	16.00	---	---	---	BK/RD	WH	NO LEFT TURN (SYMBOL) (2)
R3-3	36X36	9.00	10D	8D	---	BK	WH	NO TURNS (2)
R3-4	48X48	16.00	---	---	---	BK/RD	WH	NO U-TURN (SYMBOL) (2)
R3-7L	30X30	6.25	4C	5C	4C	BK	WH	LEFT LANE MUST TURN LEFT (2)
R3-7R	30X30	6.25	4C	5C	4C	BK	WH	RIGHT LANE MUST TURN RIGHT (2)
R4-1	36X48	12.00	8D	8D	8D	BK	WH	DO NOT PASS (2)
R4-2	36X48	12.00	8C	8C	8C	BK	WH	PASS WITH CARE (2)
R4-7aL	36X48	12.00	8D	ARROW	8D	BK	WH	KEEP LEFT (HORIZONTAL ARROW) (2)
R4-7a	36X48	12.00	8D	ARROW	8D	BK	WH	KEEP RIGHT (HORIZONTAL ARROW) (2)
R4-17aL	36X36	9.00	8D	8D	---	BK	WH	KEEP LEFT (5)
R4-17aR	36X36	9.00	8D	8D	---	BK	WH	KEEP RIGHT (5)
R5-1	30X30	6.25	4D	---	4D	RD	WH	DO NOT ENTER (1)
R5-1a	36X24	6.00	6E	6E	---	WH	RD	WRONG WAY (1)
R6-1L	48X18	6.00	5D	---	---	BK	WH	ONE WAY ARROW (LEFT) (1)
R6-1R	48X18	6.00	5D	---	---	BK	WH	ONE WAY ARROW (RIGHT) (1)
R6-2L	24X30	5.00	6D	6D	ARROW	BK	WH	ONE WAY (LEFT) (1)
R6-2R	24X30	5.00	6D	6D	ARROW	BK	WH	ONE WAY (RIGHT) (1)
R10-6	24X36	6.00	5D	3D	5D	BK	WH	STOP HERE ON RED (45° ARROW) (2)
R11-2	48X30	10.00	8D	8D	---	BK	WH	ROAD CLOSED (2)
R11-3a	60X30	12.50	6C	5C	4C	BK	WH	ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY (2)
R11-4	60X30	12.50	6C	5C	6C	BK	WH	ROAD CLOSED TO THRU TRAFFIC (2)
R12-3b	36X36	9.00	6D	6B	6C	BK	WH	TO ONCOMING TRAFFIC (PLAQUE) (5)
S4-4	36X15	3.75	4D	4D	---	BK	WH	WHEN FLASHING (2)
STOP/SLOW	18 OCT.	---	6C/6B	---	---	WH/BK	RD/OR	STOP/SLOW PADDLE (STOP/SLOW) (2)
CONST-3A	60X48	20.00	6E	6E	6C/6C	BK	WH	FINE SIGN (SEE LEGEND AT RIGHT) (5)
CONST-3X	57X9	---	6C	---	---	BK	WH	SPEEDING/PASSING (PLATE) (5)
SUPPLEMENTAL PLATES FOR WARNING SIGNS								
WF25-6	20X6	---	5C	---	---	BK	FL. OR	BRIDGE/RAMP (PLATE) (USE WITH WF21-4) (5) (6)
WD25-1a	26X9	---	6C	---	---	BK	OR	1000 FT/1500 FT (PLATE) (5)
WD25-1b	38X9	---	8D	---	---	BK	OR	500 FT/1000 FT (PLATE) (5)
WD25-1c	34X9	---	7D	---	---	BK	OR	500 FT/1000 FT (PLATE) (5)
WD25-6	28X9	---	7C	---	---	BK	OR	BRIDGE/RAMP (PLATE) (USE WITH WD21-4 OR WD5-1) (5)
GUIDE SIGNS								
E05-1	60X48	20.00	10E	ARROW	---	BK	OR	CORE EXIT (5)
G020-1	60X24	10.00	5D	5D	---	BK	OR	ROAD WORK NEXT XX MILES (4)
G020-2a	48X24	8.00	6C	6C	---	BK	OR	END ROAD WORK (2)
G020-4	36X18	4.50	5C	5C	---	BK	OR	PILOT CAR FOLLOW ME (2)
G023-1	36X12	3.00	6C	---	---	BK	OR	WORK ZONE (PLAQUE) (5) (8)
WD4-1	24X12	2.00	4B	---	---	BK	OR	ALTERNATE (PLAQUE) (1)
WD4-8	24X12	2.00	6B	---	---	BK	OR	DETOUR (PLAQUE) (1)
WD4-8a	24X18	3.00	5C	5C	---	BK	OR	END DETOUR (4)
WD4-9L	48X36	12.00	8D	ARROW	---	BK	OR	DETOUR (LEFT ARROW) (2)
WD4-9R	48X36	12.00	8D	ARROW	---	BK	OR	DETOUR (RIGHT ARROW) (2)
WD4-10L	48X18	6.00	6D	---	---	BK	OR	DETOUR (ARROW LEFT) (2)
WD4-10R	48X18	6.00	6D	---	---	BK	OR	DETOUR (ARROW RIGHT) (2)
W5-1L	21X15	2.19	---	---	---	BK	WH	ADVANCE LEFT TURN ARROW (1)
W5-1R	21X15	2.19	---	---	---	BK	WH	ADVANCE RIGHT TURN ARROW (1)
W6-1	21X15	2.19	---	---	---	BK	WH	TURN ARROW (1)
W6-3	21X15	2.19	---	---	---	BK	WH	STRAIGHT ARROW (1)

WF20-6a (5)(6)(7)
OR
W020-6a (5)(7)

WF22-6e (5)(6)

W03-2 (5)

W05-5 (5)

W08-7c (5)

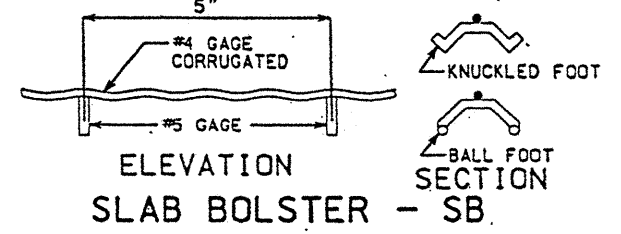
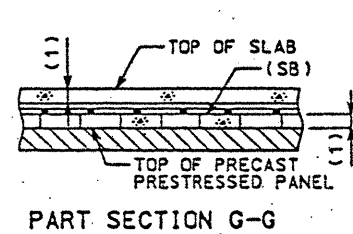
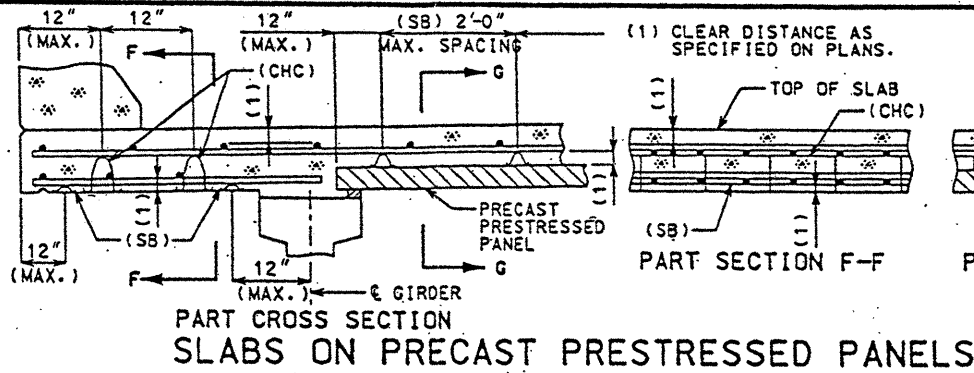
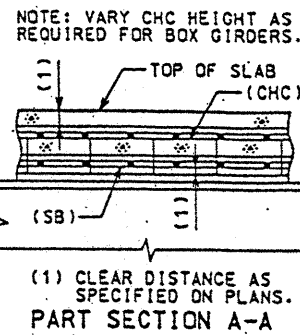
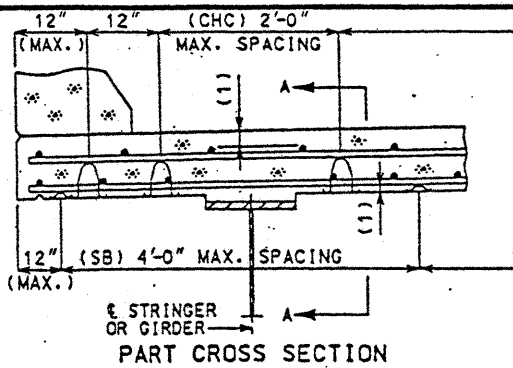
W012-2x (5)

W012-3a (5)

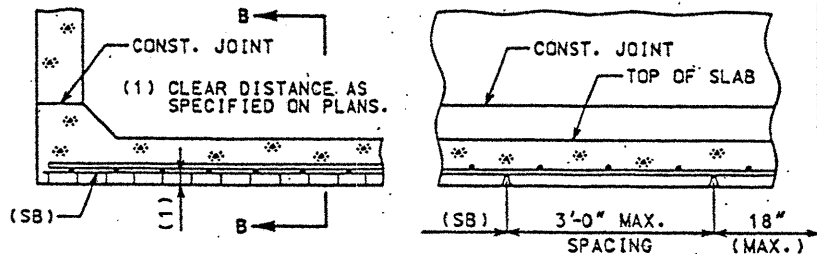
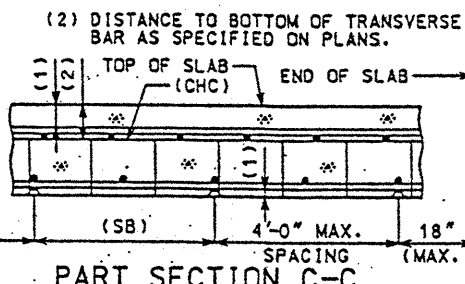
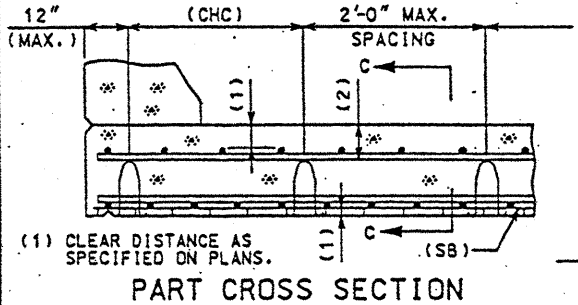
SPECIAL (5)

W012-3b (5)

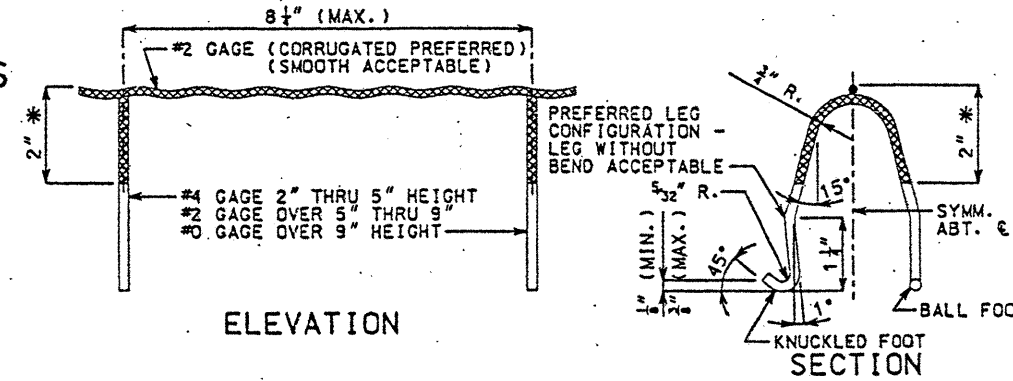
CONST-3X (5)



W BEAM SPANS
 PLATE GIRDER SPANS
 PRESTRESSED GIRDER SPANS
 DECK GIRDER SPANS
 BOX GIRDER SPANS (TOP SLAB ONLY)
SLABS ON STRINGERS AND GIRDERS

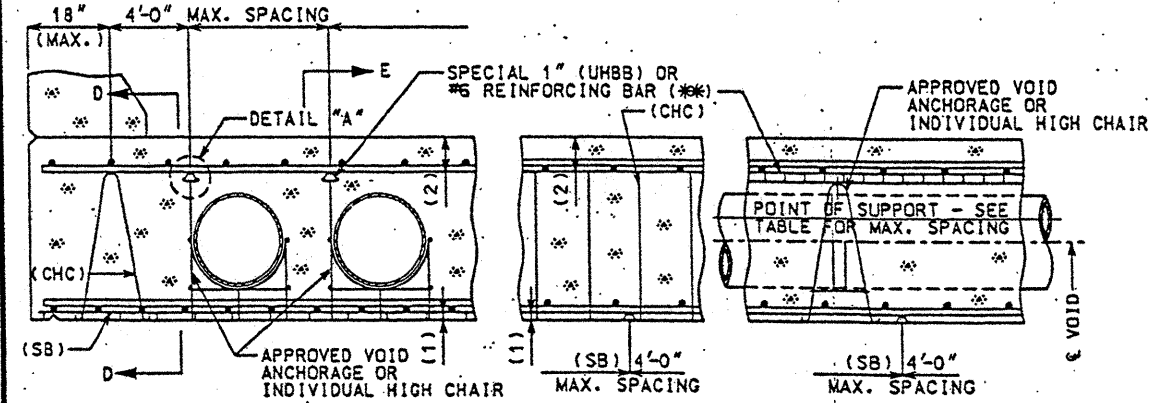


BOX GIRDER - BOTTOM SLAB



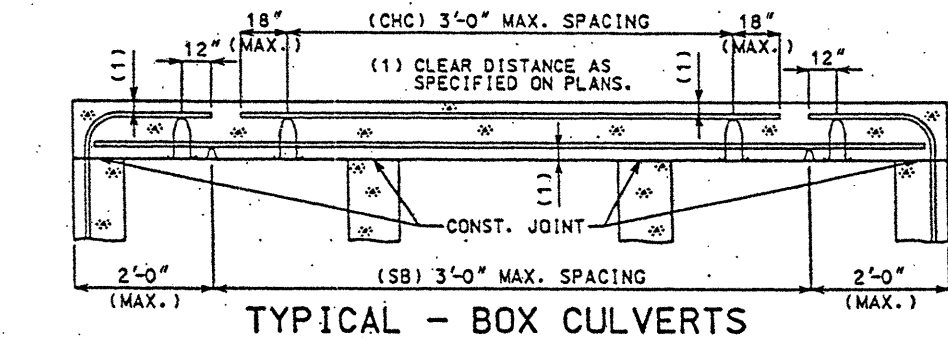
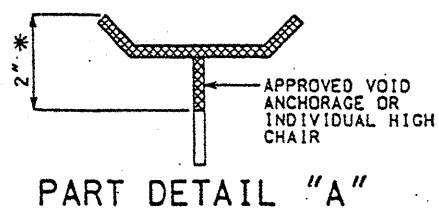
CONTINUOUS HIGH CHAIR - CHC

SLAB SPANS - NO VOIDS
TRUSSES - NO LONGITUDINAL STRINGERS

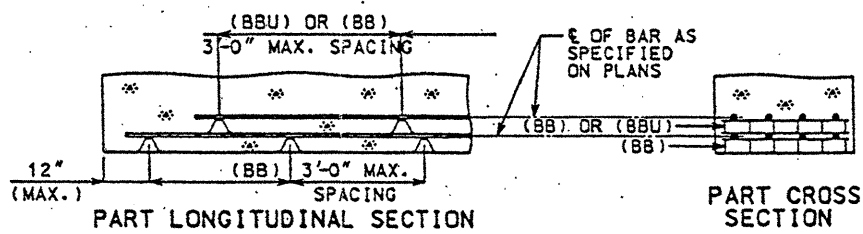


SLAB SPANS - WITH VOIDS

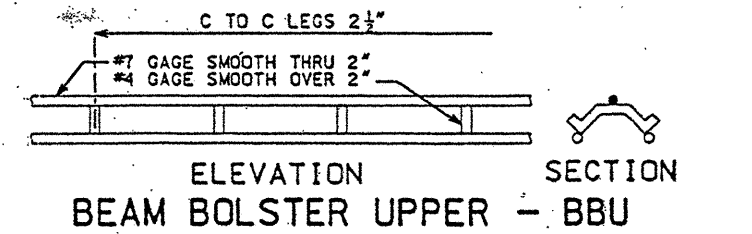
VOIDS	MAX. SPACING
14" & LESS	4'-0"
16" & 17"	3'-0"
19"	2'-6"
21"	2'-0"
22"	21"
23" & UP	18"



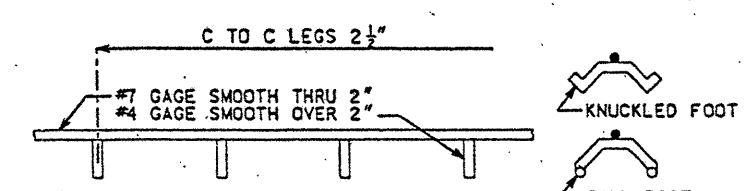
TYPICAL - BOX CULVERTS



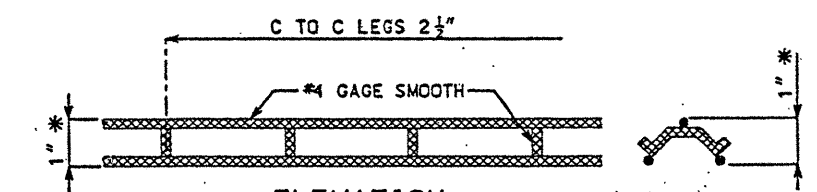
TYPICAL - BEAMS & GIRDERS
 DECK GIRDERS
 SUBSTRUCTURE BEAMS
 VOIDED SLAB DROP PANELS
 BOX GIRDER CROSS BEAMS
RECOMMENDED METHOD



BEAM BOLSTER UPPER - BBU

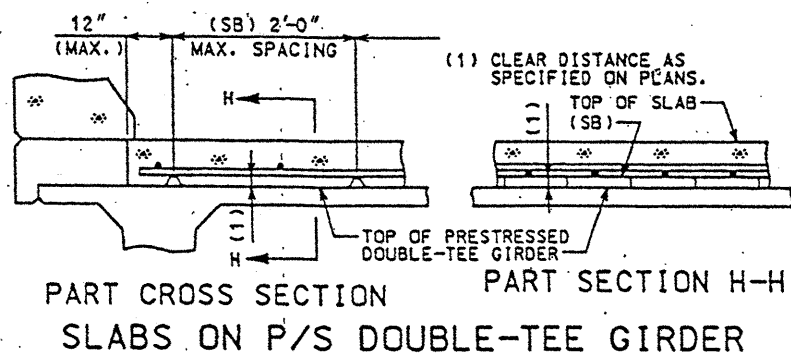


BEAM BOLSTER - BB



SPECIAL 1" UPPER HEAVY BEAM BOLSTER (SPECIAL 1" UHBB)

GENERAL NOTES:
 ALL GAGES GIVEN ARE AMERICAN STEEL AND WIRE GAGES.
 ALL CONTACT POINTS TO BE SECURELY WELDED.
 USE A BALL OR KNUCKLED FOOT ON ALL BAR SUPPORTS BEARING ON FORMS, WHERE BAR SUPPORTS ARE USED ON EARTH OR AGGREGATE SUBGRADES, SUITABLE PLATES OR CONTINUOUS BARS SHALL BE PROVIDED TO PREVENT DISPLACEMENT OF THE SUPPORT FOOT.
 ALL DIMENSIONS TO REINFORCING STEEL ARE TO ϵ BAR EXCEPT WHERE CLEAR DISTANCE FROM FACE OF CONCRETE IS INDICATED.
 HEIGHT OF BAR SUPPORTS TO BE THAT REQUIRED TO SUPPORT BARS IN EXACT POSITIONS SHOWN ON PLANS.
 SPIRAL REINFORCING SHALL BE SUPPORTED BY USE OF APPROVED SPIRAL SPACERS AT NOT MORE THAN 3'-0" CENTERS. NO DIRECT PAYMENT WILL BE MADE FOR THE SPACERS AND ALL OTHER BAR SUPPORTS.
 WHEN BARS OF DIFFERENT SIZES ARE USED IN THE SAME MEMBERS, THE SELECTION OF BAR SUPPORTS SHALL BE BASED ON THE LARGER SIZE. SUPPORTS FOR THE UPPER LAYERS NEED NOT BE DIRECTLY OVER THE SUPPORTS BELOW.
 * PORTIONS TO BE EPOXY OR PLASTIC COATED WHEN USED TO SUPPORT COATED REINFORCEMENT.
 ** EPOXY OR PLASTIC COATED #6 REINFORCING BAR WHEN USED TO SUPPORT COATED REINFORCEMENT.



SLABS ON P/S DOUBLE-TEE GIRDER

BOONE COUNTY-Bridge 31100241
 Sheet 16 of 16

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

STATE OF MISSOURI
 GHANSHYAM D. GUPTA
 NUMBER 2-15771

BAR SUPPORTS FOR CONCRETE REINFORCEMENT

DATE 1/31/01 EFFECTIVE: 07-01-2001 706.35G 1/1