CONTRACT PLANS BUREAU
MONTANA DEPARTMENT OF TRANSPORTATION

As-Built Drawings

The following are as-built drawings for the structures. MDT provides them for informational purposes only. They do not include drawings for modifications to the structures, such as joint replacements and guardrail revisions and may not completely represent current conditions. Thus, some of the information contained in these documents may be out of date or not applicable with regard to the advertised project. The contractor should not rely solely on the as-built drawings provided for bidding purposes nor does any data in these files supersede the data in the contract documents.

STATE OF MONTANA

STATE HIGHWAY COMMISSION

BRIDGE PLANS & QUANTITIES

FEDERAL AID SECONDARY PROJECT NO. S 335(4)

SACO – COLE

PHILLIPS COUNTY

LIST OF DRAWINGS

SHEET NO.	DWG. NO.	TITLE
1	3354	GENERAL LAYOUT
2	3355	FOOTING PLAN
3	3356	BENTS NOS. 1 & 4
4	3357	PIERS NOS. 2 & 3
5	3358	GIRDER DETAILS
6	3359	CROSS SECTION, FLOOR JOINTS & SLAB DETAILS
7	3360	BRIDGE RAIL & SHOE DETAILS

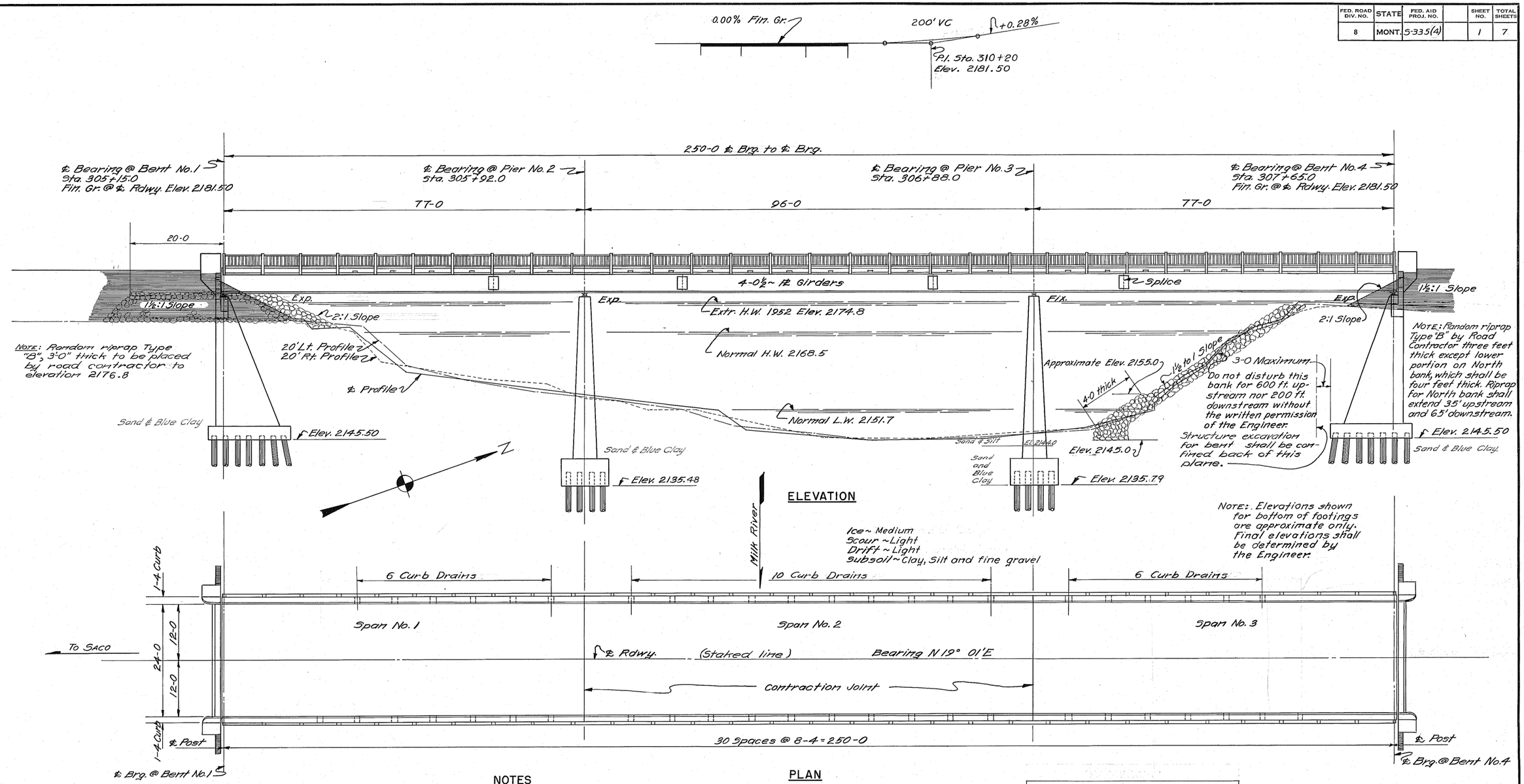
ESTIMATED BRIDGE PLAN QUANTITIES — 5% SWELL IN CLASS "A" CONCRETE, 15% SWELL IN STRUCTURE EXCAVATION

LOCATION	LENGTH IN FEET	STRUCTURAL STEEL LBS.	REINFORCING STEEL LBS.	CLASS "A" CONCRETE CU. YDS.	CLASS "AD" CONCRETE CU. YDS.	STEEL BRIDGE RAIL LIN. FT.	STRUCTURE EXCAVATION CU. YDS.	SHORING AND CRIBS LUMP SUM	UNTR. TBR. FOUND. PILES LIN. FT.	TEST PILES LUMP SUM
BENT NO. 1			7,278	85			490		1,680	
PIER NO. 2		683	4,678	151			355		1,400	
PIER NO. 3		683	4,678	151			200	LUMP SUM	1,400	LUMP SUM
BENT NO. 4			7,278	85			550		1,680	
SUPERSTRUCTURE	250	192639	25,087		153.3	502.00				
TOTAL	250	194,005	48,999	472	153.3	502.00	1,595	LUMP SUM	6,160	LUMP SUM

Made by R.E.C. 8-15-53 Checked by J.R.B. 8-18-53

DRAWING NO. 3354 Q

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S-335(4)		1	7



PLAN

NOTES

SPECIFICATIONS:— Montana State Highway Commission Standard Specifications For Road and Bridge Construction, adopted Jan. 1, 1946, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.O. Specifications, 1953 Edition.

LIVE LOAD:— Standard H15-S12 Loading.

FINISHED GRADE:— Finished plan grade of bridge is same as profile grade shown on road plans.

CONCRETE:— All concrete in superstructure shall be Class "AD". All concrete in Bents and Piers shall be Class "A". An "Air Entraining Agent" shall be added to all concrete except Class "S". Chamfer all exposed corners ¾ inch and fillet entrant angles ¾ inch unless otherwise noted.

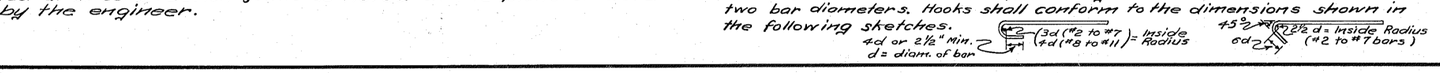
CONSTRUCTION JOINTS:— Construction joints shall be made only at locations shown on the plans or as approved by the engineer. Adequate keys shall be provided at all construction joints as noted on the plans or determined by the engineer.

REINFORCING STEEL:— All reinforcing bars shall be of intermediate grade billet steel. Deformations shall conform to A.S.T.M. Specification A305-50 except as otherwise approved.

Slab bars shall be supported on steel chairs placed sufficiently close together to maintain bars in proper position. All other bars shall be supported on either steel chairs or precast concrete blocks. The unit price bid for reinforcing steel shall include the cost of furnishing and placing chairs, precast blocks, and all other materials used to fasten reinforcing steel in place.

Splicing of main reinforcing bars shall not be permitted except as shown on the plans.

Bends in reinforcing bars shall be made to a radius of not less than four diameters of the bar except for stirrups and tie bars, which shall be bent around a pin having a diameter of not less than two bar diameters. Hooks shall conform to the dimensions shown in the following sketches.



REFERENCES	
Dwg No.	Description
3355	Footing Plan
3356	Bents Nos. 1 & 4
3357	Piers Nos. 2 & 3
3358	Girder Details
3359	Cross Section, Floor Joints & Slab Details.
3360	Bridge Rail & Shoe Details

DESIGNED		
DRAWN	C.A.M.	4-29-53
TRACED	F.L.S.	7-9-53
CHECKED	P.E.P.	7-17-53
REVISED	J.R.B.	6-26-54
REVISED		

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S335(4)
PHILLIPS COUNTY
GENERAL LAYOUT
Scale-1"=10'-0"

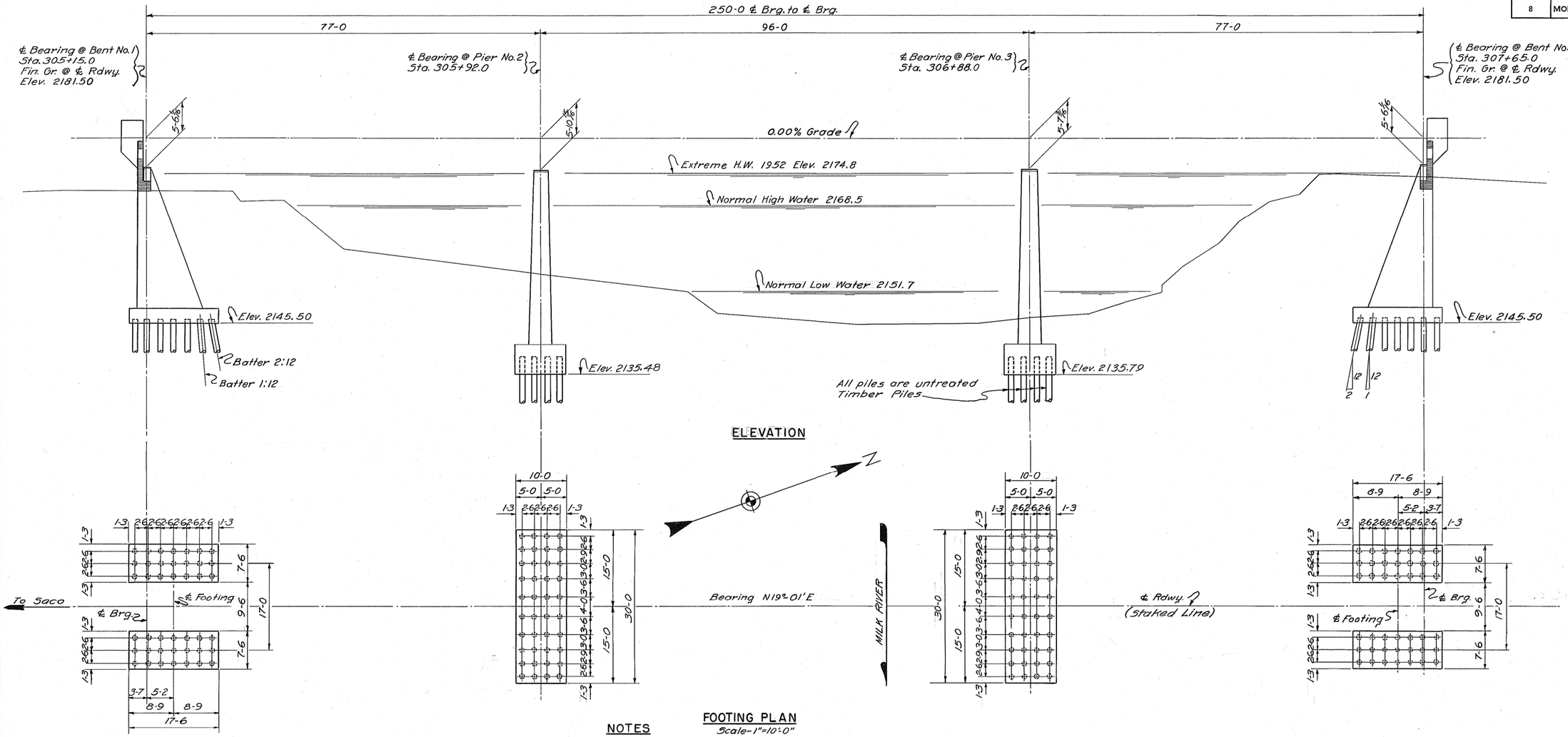
APPROVED BY _____ BRIDGE ENGINEER

STATE PRECONST. NUMBER 3335-04

DRAWING NO. 3354

J.R.B.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S-335(4)		2	7



NOTES

STRUCTURE EXCAVATION:— Structure Excavation for Bents No. 1 and No. 4 and Piers No. 2 and No. 3 shall be confined to the area inside the cofferdam from ground line to footing elevation.

BACKFILL:— The backfill at end bents may be complete up to the bottoms of the back-walls before superstructure is in place. The backfill against the back-walls shall not be placed until after the concrete roadway slab has been placed.

TEST PILES:— One test pile shall be driven to practical refusal in each of the footings of Piers No. 2 and No. 3 and of Bents No. 1 and No. 4 after the excavation has been made to plan grade.

Test piles shall comply with the requirements of the Standard Specifications and shall be driven so that the test pile can be utilized as a service pile in the structure.

The lump sum price bid for test piles shall constitute full compensation for all materials including labor, equipment, tools, and all incidentals necessary to complete the item.

FOUNDATION PILING:— All foundation piling shall be untreated timber and shall meet the requirements for untreated piling set forth in the Standard Specifications. All piling shall be driven to sustain safely the design load per pile as shown for the respective bents and piers in accordance with the Standard Specifications. The price bid per lineal foot shall be for piling in place, and payment shall be made only for the actual length of piling left in place below the cut-off.

PEELING OF PILING:— All piles shall be peeled in accordance with the Standard Specifications soon after cutting. All peeling shall be accomplished by such means as will not damage, destroy or remove any of the sapwood.

FINISHING:— Attention is directed particularly to the requirements of paragraph 49.05(m)(2) of the Standard Specifications for the finishing of concrete floor slab.

STRUCTURAL STEEL:— For requirements governing structural steels and their fabrication, see the Standard Specifications. To avoid oversight, these requirements shall be clearly noted on the shop drawings.

Structural steel shall receive one shop coat of red lead and two field coats consisting of first field or primer coat and one coat of aluminum paint as specified in the Standard Specifications, on all surfaces not in contact with concrete, except as noted under paragraph 45.10(d).

STRUCTURAL STEEL:— (METHOD OF MEASUREMENT AND PAYMENT) The structural steel shall be paid for at the unit price bid for structural steel and the weight paid for shall be the computed weight as obtained in accordance with the rules and assumptions specified in the Standard Specifications. The computed weight of each stripping unit shall be shown on the shop drawings. This weight may or may not be checked at the time the details are checked.

REINFORCING COVERING:— Minimum covering from surface of concrete to face of any reinforcing bar shall be 2 inches except in slabs, where the minimum covering shall be 1 inch. In footings of bents and piers the minimum covering shall be 3 inches.

PREFORMED EXPANSION JOINT MATERIAL:— Preformed expansion joint filler shall be Type "A" as specified in the Standard Specifications. Cost of furnishing and placing shall be included in the unit price bid for Class "AD" concrete.

OTHER NOTES:— For other notes see Drawing No. 3354.

DESIGNED		
DRAWN	H.E.S.	6-15-53
TRACED	J.W.A.	7-3-53
CHECKED	P.E.P.	7-20-53
REVISED		
REVISED		

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S 335 (4)
PHILLIPS COUNTY
FOOTING PLAN
Scale-1"=10'-0"

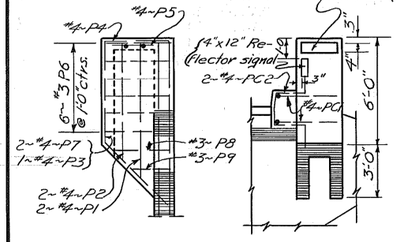
STATE PRECONST. NUMBER 3335-04

DRAWING NO. 3355

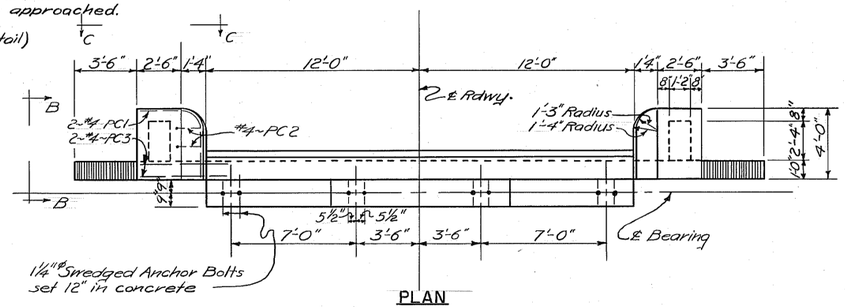
J.R.B.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S-335(4)		3	7

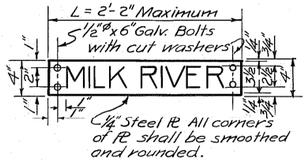
Marker to be placed on right hand end post as bridge is approached.



VIEW B-B VIEW C-C



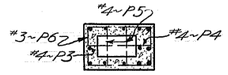
PLAN



L = Length required to make sign of Gothic Letters of proper proportions. For support set 4-½" ø x 6" Galv. bolts in concrete end post as shown.

Cost of markers complete in place shall be included in the unit price bid for Class "A" concrete.

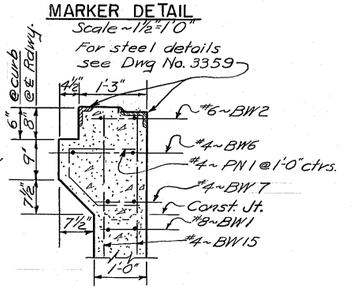
Painting of Markers: Letters shall be 2½" high, made with ⅜" stroke with space of about ½" between letters. Before paint is applied, plate shall be cleaned with gasoline. One coat of flat white paint and two coats of white enamel shall then be applied over the entire surface of the plate. "Silver Scotchlite" or equivalent reflectorizing material shall then be applied to entire face of the sign with the special waterproof adhesive recommended by the manufacturers of the reflectorizing material. Lettering and border shall be put on with signwriter's lettering black.



SECTION D-D

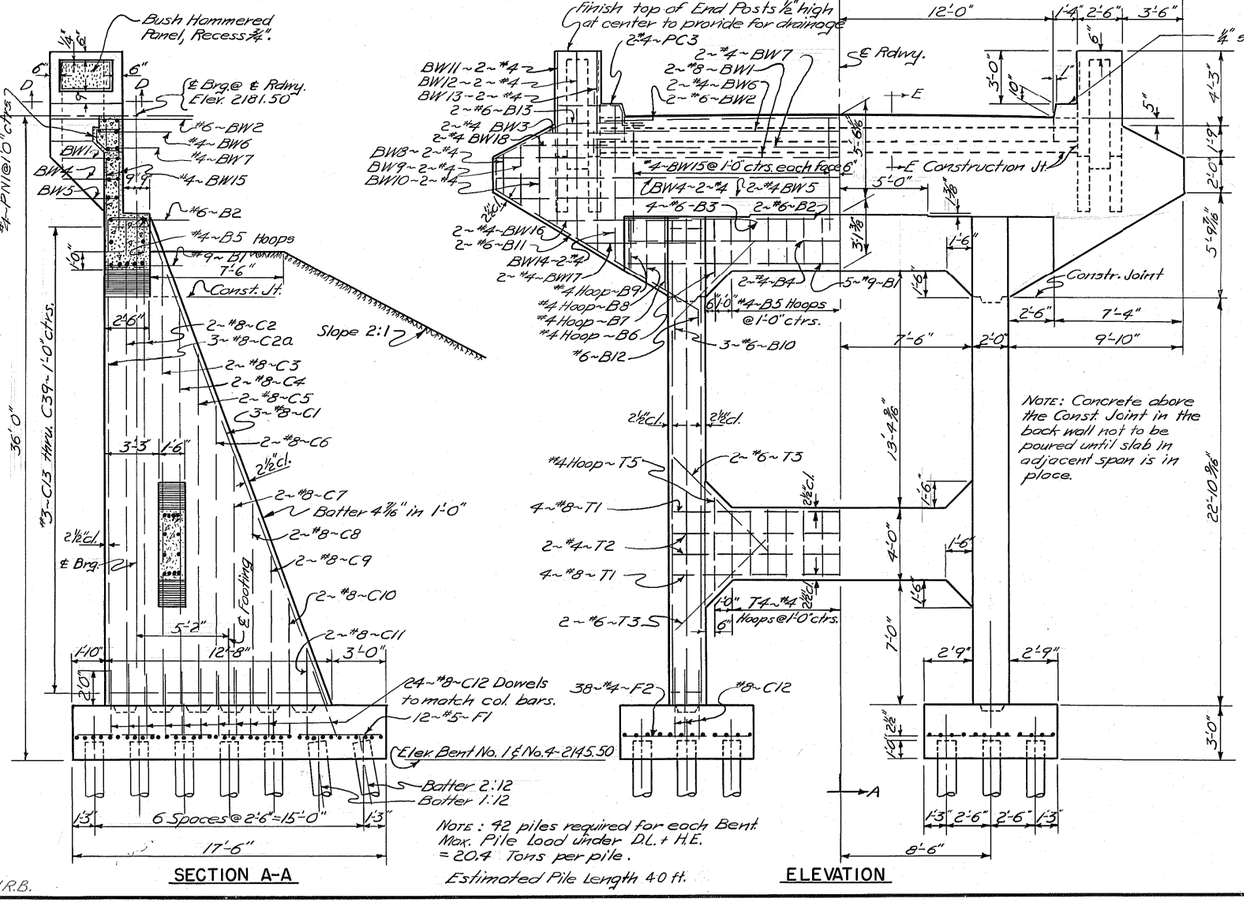
REFLECTOR SIGNALS:— Reflector signals shall be placed at all four corners of the bridge as shown. Reflector signals shall be 4" x 12" Silver Scotchlite Delineators or equal. For support set 2-⅜" ø x 6" Galv. bolts in posts.

Cost of furnishing and placing these signals shall be included in the unit price bid for Class "A" Concrete.



SECTION E-E
Scale ~ ¾" = 1'0"

NOTE: 2" Parabolic Crown in 24'-0"



NOTE: Concrete above the Const. Joint in the back wall not to be poured until slab in adjacent span is in place.

NOTE: 92 piles required for each Bent. Max. Pile Load under D.L. + H.E. = 20.4 Tons per pile.

Estimated Pile Length 40 ft.

SECTION A-A ELEVATION

CONCRETE:—All concrete of Bents No. 1 and No. 4 shall be Class "A".

Chamfer all exposed edges of concrete ¾ inches and fillet entrant angles ¾ inches unless otherwise noted.

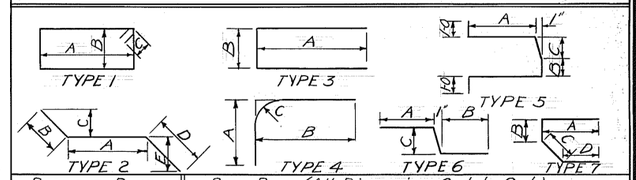
FORMS:— All forms for end bents above construction joint at bottom of beam haunches shall be made of tongue and groove matched lumber, surfaced inside, or shall be lined with plywood. See Special Provisions.

SETTING OF SHOES:— Care shall be taken in placing reinforcing steel so as to clear anchor bolts.

Contractor shall finish concrete under girder shoes slightly high and bush-hammer to exact elevations shown. Shoes shall be placed on three layers of canvas thoroughly swobbed with red lead as called for in Standard Specifications.

OTHER NOTES:— For other notes see Dwg. No. 3354 and Dwg. No. 3355.

BILL OF REINFORCING STEEL (For One Bent Only)



STRAIGHT BARS				BENT BARS (All Dimension Out to Out.)									
No.	Size	Length	Mark	No.	Size	Mark	Type	Length	A	B	C	D	E	F	G
5	#9	23'-8"	B1	2	#3	C13	1	28'-0"	12'-0"	1'-7"	0'-4"				
2	6	23'-8"	B2			C14		27'-3	11'-7½"						
8	6	7'-0"	B3			C15		26'-6	11'-3						
2	8	38'-4	BW1			C16		25'-9	10'-10½"						
2	6	26'-4	BW2			C17		25'-0	10'-6						
4	4	4'-7	BW3			C18		24'-3	10'-1½"						
2	4	38'-4	BW4			C19		23'-6	9'-9						
2	4	37'-0	BW5			C20		22'-9	9'-4½"						
2	4	26'-3	BW6			C21		22'-0	9'-0						
2	4	26'-3	BW7			C22		21'-3	8'-7½"						
4	4	2'-3	BW8			C23		20'-6	8'-3						
4	4	3'-4	BW9			C24		19'-9	7'-10½"						
4	4	4'-6	BW10			C25		19'-0	7'-6						
4	4	9'-9	BW11			C26		18'-3	7'-1½"						
4	4	10'-4	BW12			C27		17'-6	6'-9						
4	4	11'-0	BW13			C28		16'-9	6'-4½"						
4	4	8'-7	BW14			C29		16'-0	6'-0						
48 ~~24~~	4	6'-6	BW15			C30		15'-3	5'-7½"						
4	4	8'-5	BW16			C31		14'-6	5'-3						
4	4	6'-4	BW17			C32		13'-9	4'-10½"						
2	4	23'-8	B4			C33		13'-0	4'-6						
6	8	29'-0	C1			C34		12'-3	4'-1½"						
8	#8	27'-3	C2			C35		11'-6	3'-9						
4		24'-10	C3			C36		10'-9	3'-4½"						
		22'-3	C4			C37		10'-0	3'-0						
		19'-6	C5			C38		9'-3	2'-7½"						
		16'-10	C6	2	#3	C39	1	8'-6	2'-3	1'-8	0'-4				
		14'-1	C7	13	4	T4	1	10'-5	3'-8	1'-2	0'-4½"				
		11'-5	C8	2	4	T5	1	14'-5	5'-8	1'-2	0'-4½"				
		8'-8	C9	13	4	B5	1	10'-5	2'-8	2'-2	0'-4½"				
		8'-0	C10	2	4	B6	1	12'-5	3'-8	2'-2	0'-4½"				
4		5'-3	C11	2	4	B7	1	13'-1	4'-0	2'-2	0'-4½"				
48	#8	4'-0	C12	2	4	B8	1	11'-11	3'-5	2'-2	0'-4½"				
8	8	18'-8	T1	2	4	B9	1	10'-9	2'-10	2'-2	0'-4½"				
4	4	18'-8	T2	6	6	B10	2	8'-0	7'-0	1'-0	0'-8½"				
8	6	7'-0	T3	4	6	B11	2	16'-1	13'-3	1'-0	0'-10	1'-10	1'-6½"		
24	5	17'-0	F1	2	6	B12	2	8'-7	4'-10	1'-0	0'-10	2'-9	2'-5½"		
76	4	7'-0	F2	4	6	B13	2	7'-11	3'-4	4'-7	2'-1				
4	4	7'-9	P1	12	3	P6	1	12'-4	3'-8	2'-2	0'-4				
4	4	6'-9	P2	4	4	P7	2	10'-11	5'-9	5'-2	3'-8				
2	4	5'-9	P3	2	3	P8	3	8'-10	3'-4	2'-2					
2	4	3'-8	P4	2	3	P9	3	6'-8	2'-3	2'-2					
4	4	2'-2	P5	4	4	PC1	4	6'-8	3'-6	3'-8	1'-1				
4	4	6'-2	BW18	4	4	PC2	5	6'-11	1'-6	1'-0	0'-10				
6	#8	32'-9	C2a	4	4	PC3	6	5'-7	3'-4	1'-3	1'-0				
				24	#4	PW1	7	3'-3	1'-3	0'-6½"	0'-8½"	0'-9			

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S 335 (4)
PHILLIPS COUNTY
BENTS NO'S. 1 & 4
Scale ~ ¼" = 1'-0" except as noted

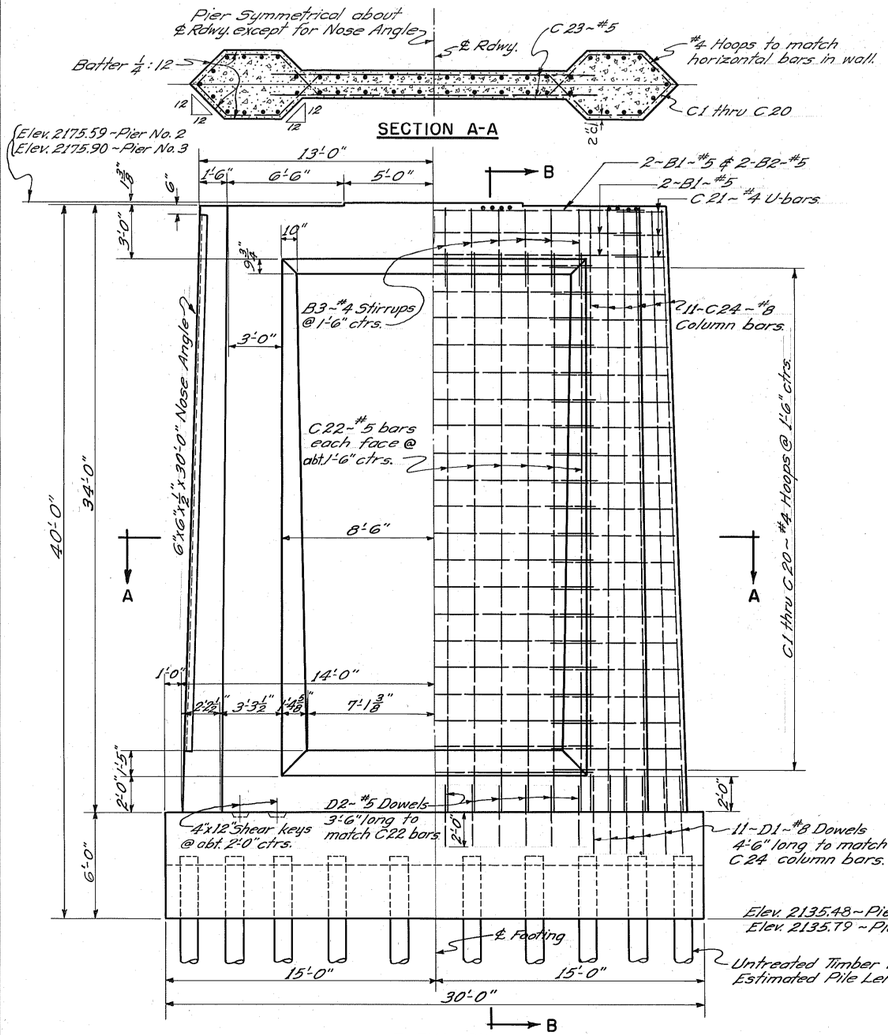
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DRAWN	H.E.S.	6-11-53
TRACED	R.E.C.	7-10-53
CHECKED	P.E.P.	7-20-53
REVISED		
REVISED		

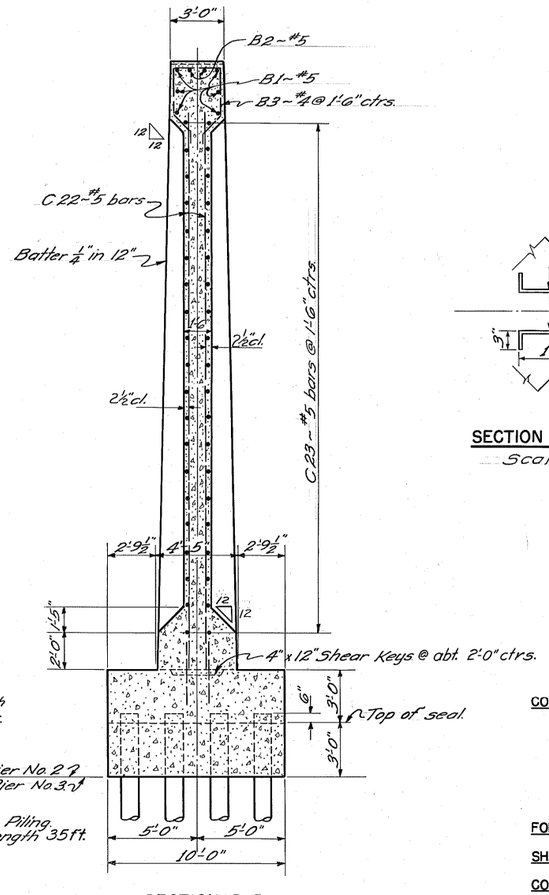
STATE PRECONST. NUMBER 3335-04

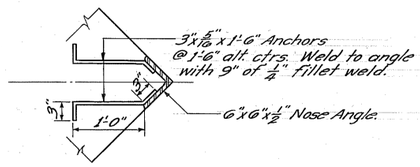
DRAWING NO. 3356

J.R.B.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S-335(4)		4	7

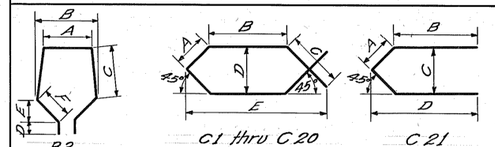






SECTION OF NOSE ANGLE
Scale - 1" = 1'-0"

BILL OF REINFORCING STEEL (For One Pier Only)



STRAIGHT BARS				BENT BARS (All Dimensions are Out to Out)								
No.	Size	Mark	Length	No.	Size	Mark	Length	A	B	C	D	E	F
6	#5	B1	23'-0"	12	#4	B3	12'-3"	2'-7"	2'-8½"	2'-8"	1'-0"	0'-10	1'-2"
2	5	B2	24-8										
16	4	B4	2-8	2	4	C1	18-7	2-10	3-1 5/8	3-4	3-11 3/8	7-6	
				↑	↑	C2	18-5	2-9½	3-1½	3-3½	3-11	7-5	
24	5	C22	32-0			C3	18-3	2-9	3-1⅜	3-3	3-10¼	7-4	
40	5	C23	18-0			C4	18-0	2-8½	3-1⅛	3-2½	3-9½	7-3	
22	8	C24	33-9			C5	17-10	2-8	3-1	3-2	3-8 3/8	7-2	
22	8	D1	4-6			C6	17-6	2-7	3-0⅞	3-1	3-8	7-1	
24	#5	D2	3-6			C7	17-3	2-6⅝	3-0⅝	3-1/16	3-7/16	7-0	
						C8	17-1	2-6	3-0⅛	3-0	3-6½	6-11	
						C9	16-10	2-5½	3-0⅜	2-11⅛	3-5 3/8	6-10½	
						C10	16-8	2-5	3-0¼	2-11	3-5	6-9½	
						C11	16-6	2-4½	3-0⅛	2-10⅝	3-4 7/16	6-8½	
						C12	16-4	2-4	3-0	2-10	3-3½	6-8	
						C13	16-1	2-3½	2-11 3/16	2-9½	3-2 3/8	6-7	
						C14	15-11	2-3	2-11⅛	2-9	3-2	6-6	
						C15	15-9	2-2½	2-11/16	2-8½	3-1/16	6-5	
						C16	15-7	2-2	2-11 3/16	2-8	3-0½	6-4	
						C17	15-4	2-1½	2-11/16	2-7½	2-11 3/8	6-3½	
						C18	15-2	2-1	2-11	2-7	2-11	6-2½	
				↓	↓	C19	15-0	2-0½	2-10⅜	2-6⅝	2-10 3/8	6-1½	
				2	4	C20	14-9	2-0	2-10⅜	2-6	2-9½	6-0½	
				6	#4	C21	6-3	1-10½	1-3	2-8	2-7		

NOTES

CONCRETE :— All concrete in piers shall be Class "A". The contractor will be permitted to deposit, for his convenience, a portion as shown of the pier base under water as a seal course if he desires, in which case he shall use Class "S" concrete for the concrete deposited under water, and he shall place it in accordance with the requirements for "Depositing Concrete Under Water," as called for in the Standard Specifications.
Concrete placed outside of neat lines shown on the plans, or neat lines as modified by the engineer, as well as the change in mix for the seal, will be for the contractor's convenience, and he shall include all cost connected therewith in the unit price bid for Class "A" concrete.

FORMS :— All forms for shafts of piers above top of footings shall be made of tongue and groove matched lumber, surfaced inside, or shall be lined with plywood. See Special Provisions.

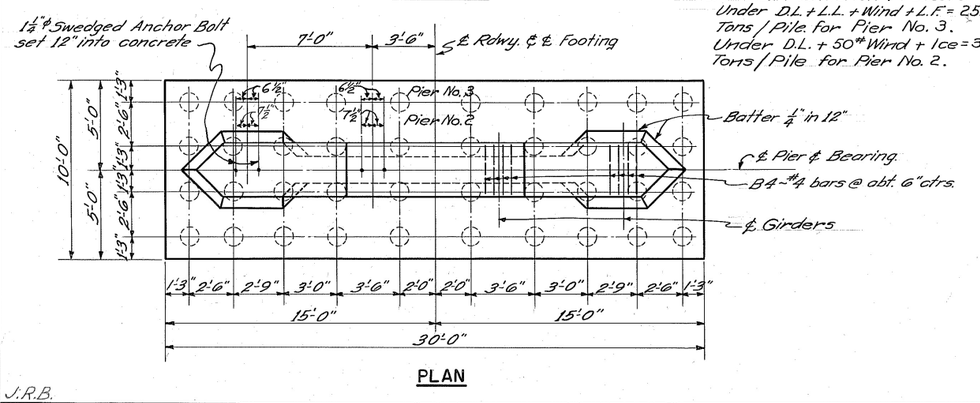
SHAFTS :— Shafts of piers shall be poured in not more than two continuous runs; other construction joints shall be made only as noted on the plans or as determined by the engineer.

CONSTRUCTION JOINTS :— Construction joints shall be made on a true horizontal line at the surfaces of the piers and left rough in the interior with satisfactory shear keys.

NOSE ANGLE :— Pier nose angles shall be paid for as structural steel. Two field coats of paint as specified for structural steel shall be applied to nose angles before erection.

CHAMFER :— Chamfer all exposed corners 1½" inches.

OTHER NOTES :— For other notes see Dwg. No. 3354, Dwg. No. 3355 and Dwg. No. 3356.



Note - Max. Foundation Pressure
Under D.L. + L.L. + Wind + L.F. = 25.5 Tons / Pile for Pier No. 3.
Under D.L. + 50% Wind + Ice = 31.0 Tons / Pile for Pier No. 2.

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S 335 (4)
PHILLIPS COUNTY
PIERS NOS. 2 & 3
Scale - ¼" = 1'-0" except as noted

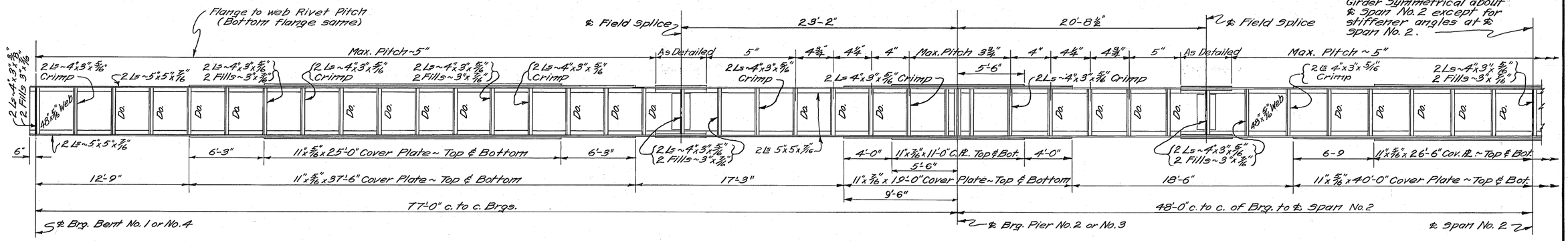
DESIGNED	H.E.S.	5-29-53
DRAWN	H.E.S.	6-3-53
TRACED	I.W.H.	7-10-53
CHECKED	P.E.P.	7-20-53
REVISED		
REVISED		

STATE PRECONST. NUMBER 3335-04

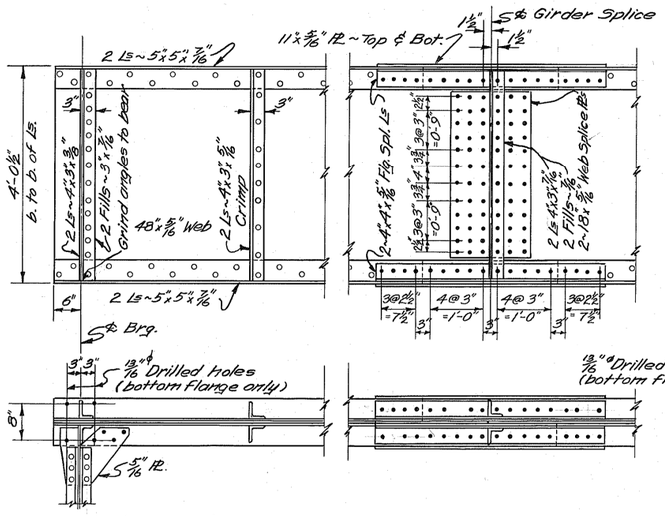
DRAWING NO. 3357

J.R.B.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S-335(4)		5	7



GIRDER ELEVATION
Scale: ½"=1'-0"



DETAIL AT BENT NO'S. 1 & 4

TYPICAL FIELD SPLICE

DETAIL AT PIER NO'S. 2 & 3

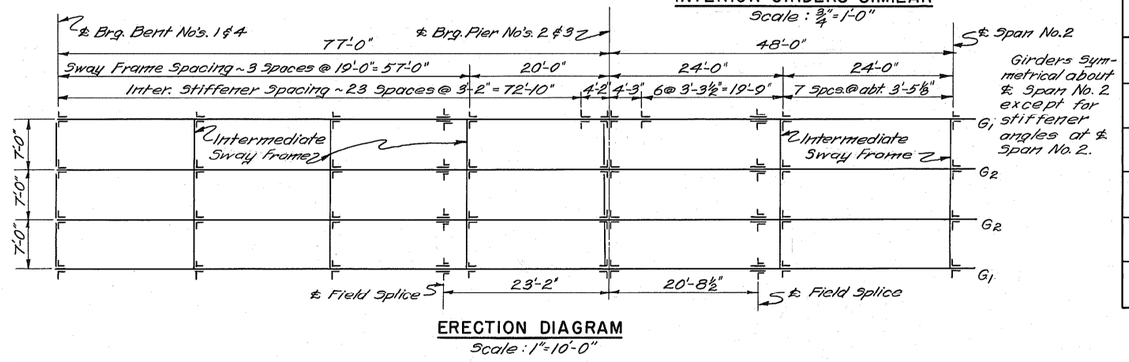
BOTTOM FLANGE CONNECTION FOR INTERMEDIATE SWAY FRAMES

TOP FLANGE CONNECTION FOR INTERMEDIATE SWAY FRAMES

NOTES

RIVETS: ¾" ø unless otherwise noted.
REAMING: All field holes in girder splices shall be sub-punched 1⅛" ø and reamed 1³⁄₁₆" ø or drilled in the shop, as called for in Standard Specifications. In reaming field holes in girder splices, the adjacent sections of the girder must be assembled in exact positions with sufficient support throughout the entire length to maintain girders in proper position. Where turned bolts are used, holes shall be sub-punched 1⅛" ø and reamed to 1³⁄₁₆" ø or drilled.
APPROVAL: Shop plans shall be approved by the Montana State Highway Department before fabrication is begun.
GIRDERS: Girders shall be fabricated without camber.
SPLICE ANGLES: Splice angles shall be ground to fit fillet of flange angles.
ERECTION: Girders shall be supported at splice points and at sufficient intermediate intervals throughout their entire length to maintain girders at exact elevation and proper alignment during riveting of field splices.
All splices shall be pinned and bolted in accordance with the Standard Specifications before riveting is started.
WELDS: All welds shall be continuous fillet strap welds unless otherwise noted. Welds shall be paid for at the unit price bid for structural steel and the weights shall be computed in accordance with the following: ³⁄₁₆" at .072 ᵐᵐ/ft., ¼" at .128 ᵐᵐ/ft., ⅜" at .287 ᵐᵐ/ft., and ½" at .510 ᵐᵐ/ft.
OTHER NOTES: For other notes see Dwg. No. 3354 and No. 3355

DETAILS FOR EXTERIOR GIRDERS
INTERIOR GIRDERS SIMILAR
Scale: ¾"=1'-0"



ERECTION DIAGRAM
Scale: 1"=10'-0"

DESIGN INFORMATION								
Moment in Ft. Kips Reactions & Shears in Kips Deflections in Inches					77' R1	96' R2	77' R3	R4
	END SPAN		INT. SPAN		R1 & R4		R2 & R3	
	G1	G2	G1	G2	G1	G2	G1	G2
Moment								
D.L.	359	307	350	300			-672	-575
L.L.	420	588	420	588			-383	-536
Shear @ R1 & R4								
D.L.	25.3	21.7						
L.L.	29.9	41.9						
Shear @ R2 & R3								
D.L.	-42.8	-36.6	42.6	36.4				
L.L.	-32.2	-45.1	32.3	45.3				
Reactions								
D.L.					25.3	21.7	85.3	73.1
L.L.					29.9	41.9	42.4	59.4
Deflections								
D.L.	.61	.52	.75	.64				
L.L.	.72	1.00	.96	1.35				

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S 335 (4)
PHILLIPS COUNTY
GIRDER DETAILS
Scale ~ As noted

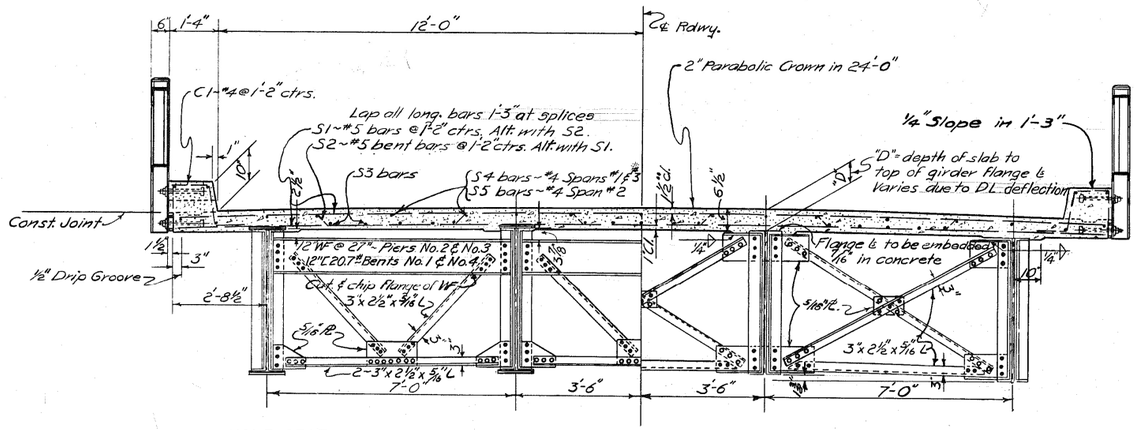
DESIGNED	H.E.S.	5-16-53
DRAWN	H.E.S.	5-27-53
TRACED	F.L.S.	7-8-53
CHECKED	PEP	7-17-53
REVISED		
REVISED		

STATE PRECONST. NUMBER 3335-04

DRAWING NO. 3358

J.R.B.

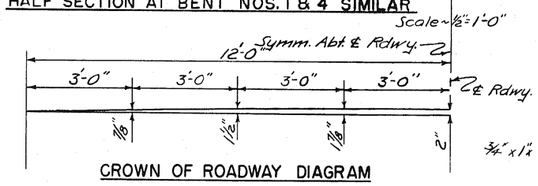
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S-335(4)		6	7



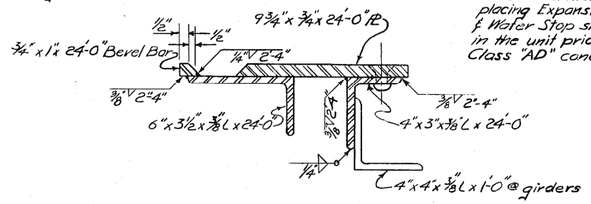
HALF SECTION AT PIER NOS. 2 & 3
HALF SECTION AT BENT NOS. 1 & 4 SIMILAR

HALF SECTION AT TYPICAL INTERMEDIATE SWAY FRAME

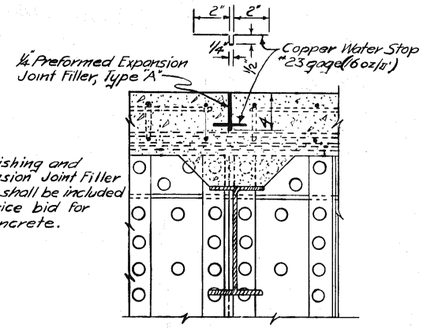
Scale ~ 1/2" = 1'-0"



CROWN OF ROADWAY DIAGRAM

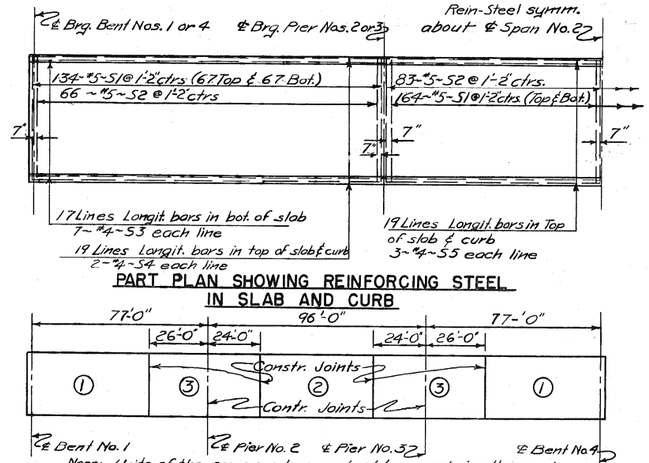


ENLARGED DETAIL OF EXPANSION JOINT
Scale : 3"=1'-0"



Cost of furnishing and placing Expansion Joint Filler & Water Stop shall be included in the unit price bid for Class "AD" concrete.

CONTRACTION JOINT AT PIER NO. 2
Contraction Joint at Pier No. 3 Similar.
Scale ~ 1/2" = 1'-0"

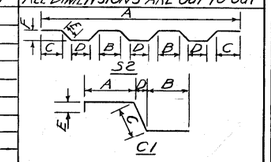


PART PLAN SHOWING REINFORCING STEEL IN SLAB AND CURB

NOTE: Units of the same number need not be poured simultaneously. A combination of units numbered successively may be poured continuously but all units of one number must be poured before pouring is started on any unit of the succeeding number. All slab reinforcing to be in place before pouring is started.

BILL OF REINFORCING STEEL (SLAB & CURB)

STRAIGHT BARS				BENT BARS										BENDING DIAGRAM
NO.	SIZE	LENGTH	MARK	NO.	SIZE	MARK	LENGTH	A	B	C	D	E	F	G	ALL DIMENSIONS ARE OUT TO OUT
432	#5	26'-1"	S1	215	#5	S2	26'-10"	26'-1"	2'-10"	3'-11⅛"	3'-7⅛"	0'-5½"	0'-4"		
119	#4	36'-10"	S3	432	#4	C1	4'-0"	1'-0"	1'-3"	1'-2"	0'-1¼"	0'-7"			
76	#4	39'-2"	S4												
57	#4	32'-9"	S5												

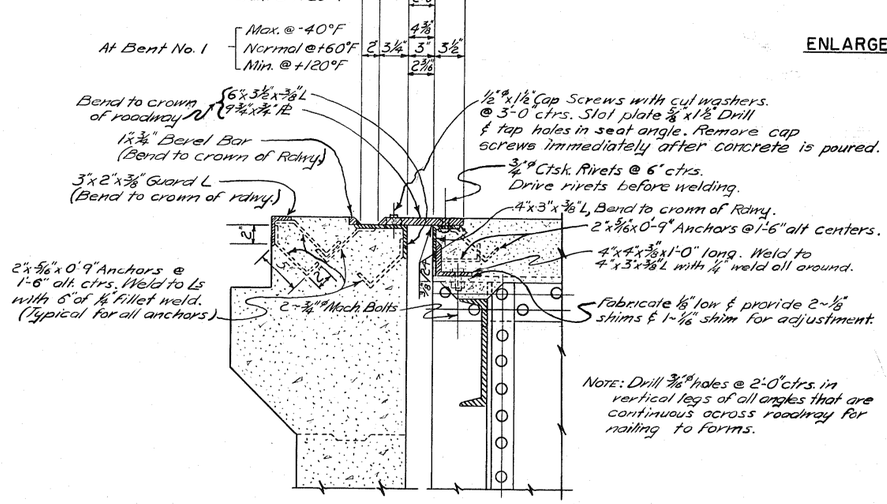


SLAB POURING DIAGRAM

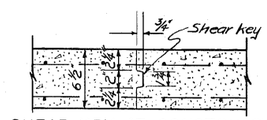
	DEPTH OF SLAB "D" (IN INCHES)															
	R1	.1	.2	.3	.4	.5	.6	.7	.8	.9	R2	.1	.2	.3	.4	.5
G1	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6½	6½	6½	6½	6½
G2	6⅜	6⅜	6¾	6¾	6¾	6¾	6¾	6¾	6¾	6¾	6¾	6¾	6¾	6¾	6¾	7

NOTE: Slab depth "D", symmetrical about ℄ of Span No. 2.

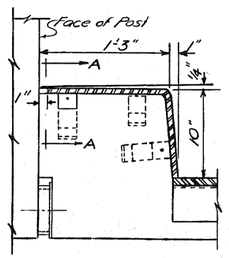
For notes, see Dwg No. 3354 and No. 3358



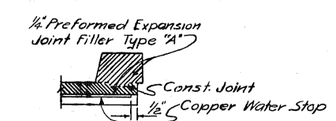
DETAIL OF EXPANSION JOINT AT BENT NO. 1 & NO. 4
Scale ~ 1 1/2" = 1'-0"



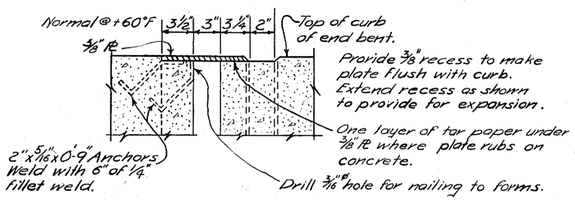
SHEAR KEY AT CONSTRUCTION JOINT IN SLAB
Scale ~ 1 1/2" = 1'-0"



TYPICAL CURB EXPANSION JOINT
Scale ~ 1 1/2" = 1'-0"



CONTRACTION JOINT AT PIER NOS. 2 & 3



SECTION A-A

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S 335 (4)
PHILLIPS COUNTY
CROSS SECTION, FLOOR JOINTS AND SLAB DETAILS
Scale - as noted

DESIGNED	H.E.S.	5-16-53
DRAWN	H.E.S.	6-1-53
TRACED	R.E.C.	7-1-53
CHECKED	P.E.P.	7-17-53
REVISED		
REVISED		

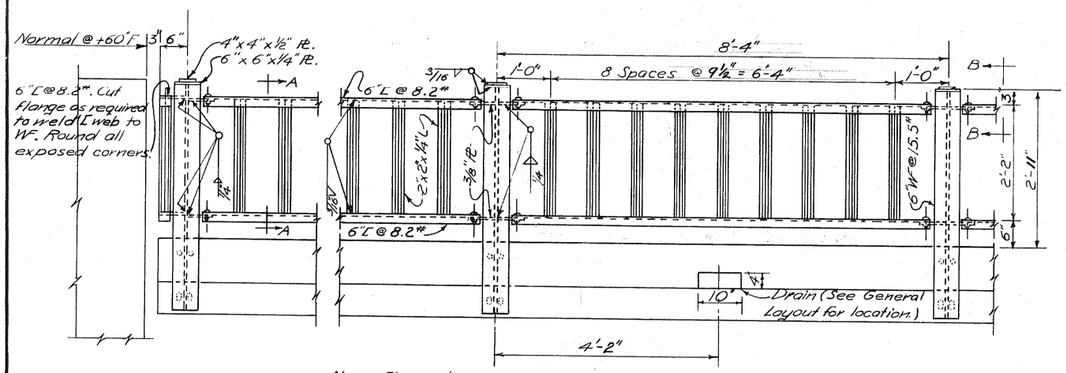
STATE PRECONST NUMBER 3335-04

DRAWING NO. 3359

J.R.B.

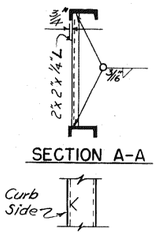
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S335(4)		7	7

NOTE: Steel rail units and posts shall receive one shop coat and two field coats of paint on all surfaces.



NOTE: The unit price bid per lineal foot of Steel Bridge Rail shall be full payment for all steel rail units, posts, shims and supporting bolts set in concrete curb, complete in place, including paint and all incidentals pertaining thereto.

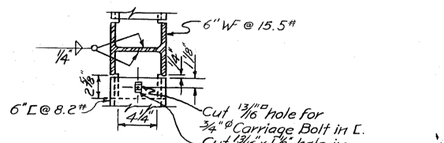
STEEL BRIDGE RAIL DETAILS
Scale ~ 3/4" = 1'-0"



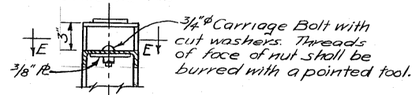
SECTION A-A

PLAN VIEW
Scale ~ 3/4" = 1'-0"

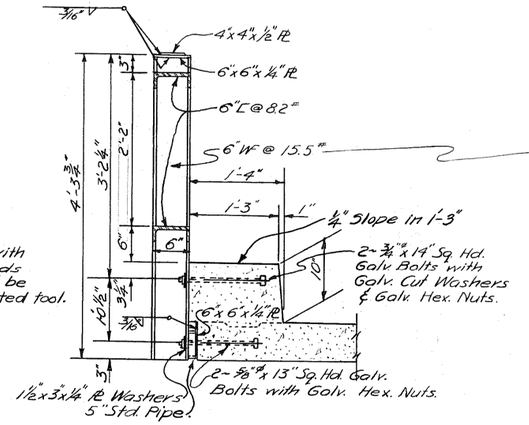
NOTE: Use 13/16" x ½" slotted holes in 3/8" Rts at each end of rail panels over Piers No. 2 & No. 3.

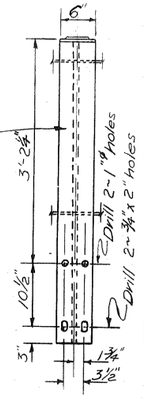


SECTION E-E
Scale ~ 1½" = 1'-0"

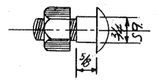


SECTION B-B
Scale ~ 1½" = 1'-0"





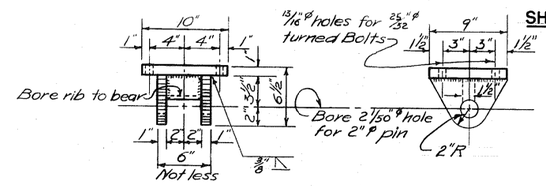
POST DETAIL
Scale ~ 1" = 1'-0"



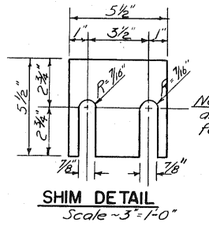
SHOULDERED BOLT DETAIL
Scale ~ 6" = 1'-0"

Provide 1~5½" x 5½" x ⅛" and 1~5⅛" x 5⅛" x 1/16" shims for each post to align rail. (See detail of shims.)

TYPICAL SECTION AT RAIL POST
Scale ~ 1" = 1'-0"

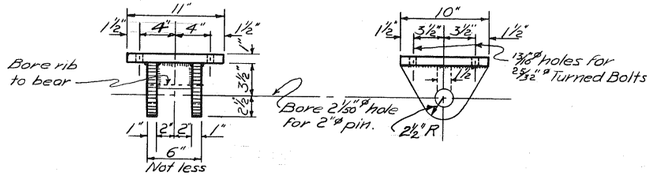


TOP SHOE AT BENT NO S. 1 & 4
Scale ~ 1½" = 1'-0"

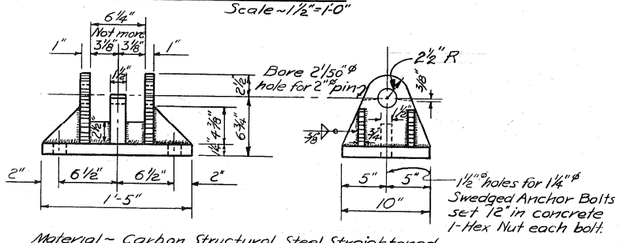


Note: Provide 1~5½" x 5½" x ⅛" and 1~5½" x 5½" x 1/16" Shims for each Post.

SHIM DETAIL
Scale ~ 3" = 1'-0"

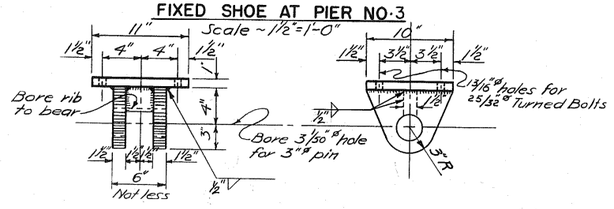


TOP SHOE AT PIER NO. 3
Scale ~ 1½" = 1'-0"

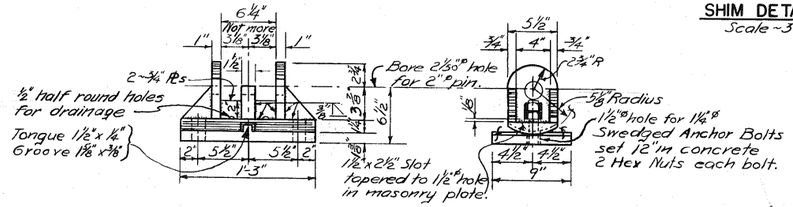


Material ~ Carbon Structural Steel Straightened.
Welds ~ Weld all around with ¼" Fillet welds except as noted.
(Top & bottom shoe at Pier No. 3.)

FIXED SHOE AT PIER NO. 3
Scale ~ 1½" = 1'-0"

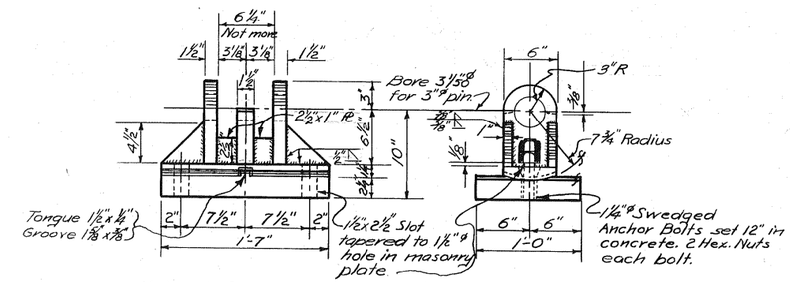


TOP SHOE AT PIER NO. 2
Scale ~ 1½" = 1'-0"



Material ~ Carbon Structural Steel Straightened.
Welds ~ Weld all around with ⅜" fillet weld except as noted. (Top & bottom shoe at Bents Nos. 1 & 4).

ROCKER SHOE AT BENTS NO S. 1 & 4
Scale ~ 1½" = 1'-0"



Material ~ Carbon Structural Steel, straightened.
Welds ~ Weld all around with ½" Fillet weld, except as noted.
(Top & bottom shoe at Pier No. 2.)

ROCKER SHOE AT PIER NO. 2
Scale ~ 1½" = 1'-0"

NOTES

FINISHING OF SHOES :— To assure full bearing, all surfaces in contact shall be edge planed or otherwise finished before welding.
Shoes are to be fully annealed after all welding is completed and before pin-holes are drilled or curved bearing surfaces are finished.
Base plates under rockers are to be hot straightened before finishing.

WELDING OF SHOES :- Welding is symmetrical about ℄ of shoes.

SETTING OF SHOES :— Rocker shoes shall be set vertical under full dead load at 60° F. If rockers are not in correct position with final dead load on spans, spans shall be jacked and adjustments made.

OTHER NOTES :— For other notes see Dwg. No. 3354, Dwg. No. 3355 & Dwg. No. 3358.

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MILK RIVER
NEAR SACO
FED. AID SECONDARY PROJ. NO. S 335 (4)
PHILLIPS COUNTY
BRIDGE RAIL & SHOE DETAILS
Scale ~ As noted

DESIGNED		
DRAWN	H.E.S.	5-29-53
TRACED	R.E.C.	7-8-53
CHECKED	P.E.P.	7-17-53
REVISED		
REVISED		

STATE PRECONST. NUMBER 3335-04

DRAWING NO. 3360

J.R.B.

STATE OF MONTANA

STATE HIGHWAY COMMISSION

BRIDGE PLANS & QUANTITIES

U.S. WORKS PROGRAM HIGHWAY PROJECT NO. WPSO 335B UNIT 2

SACO NORTH HIGHWAY

PHILLIPS COUNTY

Made by TCR 11-16-35 Checked by A.L.H. 11-16-35

LIST OF DRAWINGS

SHEET NO.	DWG. NO.	TITLE	STATION
1	1484	GENERAL LAYOUT	37+96.5 55+20.0 63+09.0 69+07.0 75+88.0 82+90.0 92+60.0 114+81.0
2	R 21-T 11 9	STANDARD TRESTLE	

BRIDGE QUANTITIES

STATION	LENGTH IN FEET	LUMBER M.F.B.M. TREATED	LUMBER M.F.B.M. UNTREATED	GRAVEL BALLAST CU. YDS.	TREATED TIMBER PILING 25'	30'	35'	REMOVAL OF EXISTING STRUCTURES	HAND LAID RIP RAP CU. YDS.
MAJOR STRUCTURES									
37+96.5	57	15.67	1.59	12	18			1	24
55+20.0	38	11.94	1.21	8		14	4	1	82
63+09.0	95	25.30	2.34	20		9	17	1	72
69+07.0	57	15.67	1.59	12	5	13		1	41
75+88.0	57	16.76	1.59	12	7	11	4	1	36
82+90.0	38	11.94	1.21	8	7	11		1	48
92+60.0	114	30.12	2.72	24	10	20		1	49
114+81.0	38	11.33	1.21	8		14		11	29
TOTAL	494	138.73	13.46	104	47	92	25	8	381

REMOVED

O.K. A.L.H. 11-16-35

DRAWING NO. 1484Q

FED. ROAD DIST. NO.	STATE	US PWH. PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MONT.				

REVISED	BY	
1-31-35	HL	4-16-35
REVISED	BY	
5-29-35	HL	6-25-35
REVISED	BY	
6-25-35	MMK	

10"x10"x8'-0" S4S, far side
10"x10"x9'-0" S4S, with stream marker near side. If no marker is called for, post shall be 10"x10"x8'-0" S4S, as on far side.

Treat set post below top of curb as specified in paragraph 34.6 of the standard construction specifications for untreated timber in contact with earth. Paint set post above top of curb same as handrail.

Add as many intermediate panels as required.

10"x10"x8'-0" S4S, near side.
10"x10"x9'-0" S4S, with stream marker far side. If no marker is called for post shall be 10"x10"x8'-0" S4S, as on near side.

$\frac{1}{2}$"ϕ x 13" Carriage bolts, with cut washers.

$\frac{3}{4}$"ϕ x 16½" Carriage bolts, with cut washers.

8"x8" S4S.

Lap joint in curb. See detail.

Lap joint in curb. See detail.

Gravel wearing surface.

3"x8" S4S

Curb, 6"x12" S1S1E

Hook bolt

Floor drain. See detail.

2"x4" Bridging at ℄ panel.

4"x 18" Solid bridging at caps.

2"x4"x22'-0" S1S1E, laminated floor.

1'-3" 1'-3" 1'-3" 1'-3" 1'-3"

6'-4" 6'-4" 6'-4" 6'-4" 6'-4" 6'-4" 6'-4" 6'-4" 6'-4"

19'-0" 19'-0" 19'-0"

Rail

Marker Plate.

10"x10" Post.

VIEW A-A

$\frac{1}{2}$"ϕ Bolts with cut washers. Weld bolts to back of marker. Plate and bolts to be considered hardware. Omit galvanizing on plate.

Dap post to set marker normal to ℄ Rdwy.

$\frac{3}{4}$"ϕ Bolts with O.G. washers

Use 3"x8" braces when indicated.

TYPE "B" END BENT

TYPE "A" END BENT

PART ELEVATION

8"x8" Struts to be used between outside piles when indicated. Tight fit between piles. Do not dap piles.

PART SECTION

PLAN OF POST WITH MARKER
Scale:- ½"=1'-0"

2-$\frac{3}{4}$"ϕ x 4'-0" Bolts with O.G. washers. Threaded both ends.

2-$\frac{3}{4}$"ϕ x 12½" Bolts with O.G. washers.

4"x 18" Solid bridging at all caps; Securely toe nailed to stringers with 20d. nails.

2-$\frac{3}{4}$"ϕ x 3'-6" Bolts with O.G. washers. Threaded both ends.

4"x 18"x 4'-0" Scab at butt joint, outside stringers.

2"x4" Bridging at ℄ panels. 2-10d nails each end.

1'-0" 11'-0" 13'-0"

5'-0"

Gravel Surfacing. 3 Coats hot tar.

2"x4" Deck.

℄ Rdwy.

11 Lines 6"x18" Stringers. Toe nailed to each cap with 2-40d nails.

PART PLAN

Symm. abt. ℄ for either type of bent specified.

6'-0" 13'-0" 13'-0" 2'-0"

2'-0" 11'-0" 11'-0" 2'-0"

Two end 2"x4" S1S1E, of laminated deck, extended as shown. (one splice permitted in each of these two pieces. Stagger splices)

8"x8" S4S Posts.

3"x8" S4S Rails.

6"x12" S1S1E; Curb.

1½"ϕ x 11" Carriage bolts, with cut washers.

¾"ϕ Hooked bolts, with cut washers. Hook end flattened; drill for ½"x5" lag screw. 1'-3" from ℄ of post.

¾"ϕ x 14½" Carriage bolts with cut washers.

4"x8"x1'-5½" S4S, Untreated timber fill. (Vary thickness to effect proper alignment of handrail)

¾"ϕ Bolts with O.G. washers. Threaded both ends

2-¾"ϕ Bolts with O.G. washers.

6"x12" Cap.

Fill slope, 1½:1

12"x12"x30'-0" Cap.

12"x12"x24'-0" Cap.

Fill Slope, 1½:1

Bevel C.I. washers.

¾"ϕ x 24" Drift pins.

3"x12" Plank.

¾"ϕ x 18" Drift pin.

Nail backing plank with 7 in. steel wire nails. Nailed to 6"x12" cap and each pile with 3 nails per plank. Nailed to 12"x12" cap and stringers as noted for Type "A" End Bents.

Nail backing plank with 7 in. steel wire nails. Top plank nailed to stringers with one nail each stringer; middle plank nailed to cap and stringers alternately, with one nail on ℄ stringer; bottom plank nailed to cap and piles with one nail in each on ℄ pile.

4'-0" 5'-6" 5'-6" 5'-6" 5'-6" 5'-6" 4'-0"

2'-6"

TYPE "B" TYPE "A"

END BENTS

Symm. abt. ℄ Rdwy.

11'-0" 11'-0"

2"x4"x22'-0" S1S1E, laminated deck, toe nailed to alternate stringers with 20d. nails, and nailed to adjacent strips with 20d. nails at 18" ctrs., staggered.

11 Lines 6"x18" stringers. Outside stringers butt jointed, and inside stringers lap jointed.

Gravel ballast.

12"x12"x24'-0" Cap.

¾"ϕ x 24" Drift pins

3'-11"

1'-0" 1'-0" 1'-0" 1'-0"

6'-6" 6'-4" 6'-6"

Outside piles to be battered 1" in 12" only on trestles of 15 ft. or more height.

¾"ϕ Bolts with O.G. Washers.

3"x8" Sway bracing to be used only on trestles of 10 ft. or more height.

TYPICAL INTERMEDIATE BENT

Note: 10"x16"-#12-½" mesh screen to be placed over drain opening at inside face of curb and fastened with wire staples.

Bend flashing sheet and screen.

6½" 10½" 1'-0"

Notch curb.

Bevel ends of 7 pcs. of flooring.

#16 G.I. flashing sheet 12"x16". Bend up 2" on sides and fasten to floor and curb with 8d. nails.

DRAIN DETAIL
Scale:- ¾"=1'-0"

When provision against uplift is called for on General Layout of bridge:

Replace drift pins through stringers with ¾"ϕ x 2'-6" machine bolts with O.G. washers as shown.

Except where sway bracing interferes, use 3"x ⅝"x 2'-0" iron straps as shown, in addition to drift pins, to tie caps to piles. (No straps on fill face of end bents.)

Holes in stringers to be counter bored to 3" diameter, 1½" deep, and filled with hot tar after bolts are in place.

12"x12" Cap.

Symm. abt. ℄

3"x⅝"x 2'-0" G.I. straps.

¾"ϕ x 4" Lag screws.

3"

PROVISION AGAINST UPLIFT
Scale:- ⅜"=1'-0"

5'-0"

6" 1'-0" 6" 1'-0" 6" 1'-0" 6"

¾"ϕ Bolts with O.G. washers

PLAN

Counter bore holes (Fill face of end bents & top of caps only) 3" diameter, 1½" deep. (Fill with hot tar after bolts are in place)

Splice caps if called for on General Layout of Bridge. Frame splice before treatment.

12"x12"x 5'-0" Block.

¾"ϕ x 24" Drift pin.

¾"ϕ x 25" Bolts with O.G. washers.

ELEVATION

CAP SPLICE
Scale:- ⅜"=1'-0"

Rail post.

Curb.

2-¾"ϕ x 14½" Carriage bolts, with cut washers.

Hook bolt

℄ Rail post at intermediate bent.

11" 3¼" 11" 8½"

DETAIL OF LAP JOINT IN CURB
Scale:- ½"=1'-0"

Waste corners.

Line of bends.

Cut.

Piling Assumed at 12" Diam.

Vary length of 8 radial cuts to match actual diameter of pile at cut-off.

After placing G.I. sheet on pile head, bend down alternate flaps first, then bend down remaining 4 alternate flaps so that all 8 fit pile neatly. Tack securely with large headed nails.

#22 Gage Galvd. Iron, 24"x24"

G.I. CAP FOR PILE HEAD
Scale:- ¾"=1'-0"

L

TROUT CREEK

¼" Steel plate. All corners of plate shall be smoothed and rounded.

L= Length required to make sign of Gothic letters of proper proportions.

If placing name on one line makes "L" exceed 2'-6", the name shall be placed in two lines as shown below.

For support, weld 2-¾" bolts to back of plate @ 2" and 6" from left end.

¼" Steel plate.

LITTLE BLACKFOOT RIVER

DETAIL OF MARKER

For name to be used on bridge see general layout.

GENERAL NOTES

SPECIFICATIONS: Montana State Highway Commission Standard Specifications for Road and Bridge Construction, revised April, 1935; Design Specifications for Highway structures, revised July, 1935, govern, unless otherwise noted.

LIVE LOAD: Standard H-15 loading.

UNTREATED LUMBER: All rails and rail posts shall be untreated and shall conform to the Standard Construction Specifications. They shall be painted with three coats of white lead and linseed oil paint, in accordance with the standard construction specifications. The first two coats of paint shall be applied immediately after this lumber is delivered at site, and one coat after erection. Where shimming is necessary to effect proper alignment of handrail posts, the shims shall be of untreated lumber, the full width of post, and shall be nailed securely to stringers or curbs. Shims shall be painted one coat or dipped in hot creosote before they are placed in final position.

Where cutting of rails or rail posts is found necessary during erection, cut ends shall be given two spot coats of paint before the final coat is applied to entire rail.

TREATED LUMBER: All piling shall be Douglas fir or long leaf southern pine timber, treated with an 8-lb empty cell treatment.

All lumber except rails and rail posts shall be Pacific Coast Douglas fir, treated with an 8-lb. empty cell treatment for timbers more than 5 in. thick, and a 10-lb empty cell treatment for those less than 5 in. thick. Grades of lumber shall be as called for in the Standard Construction Specifications. Grading and Dressing Rules of W.C.L.A. (July 1, 1934 Edition) shall govern grading of treated lumber. Treatment shall conform to Standard Specifications of American Wood Preservers Association.

Protect heads of piles after cut-off as specified in paragraph 35.4 C of the standard construction specifications. All caps, butt-jointed stringers and flooring shall be cut to proper length, bearings of stringers sized, and holes in caps and stringers bored before treatment.

All holes bored after treatment shall be treated with an approved pressure bolt hole treater. All cut ends, damaged or bruised spots in treated timber shall be given a thorough coating of hot creosote oil, and then a coating of hot tar. All holes remaining without bolts shall be plugged with treated timber plugs, entirely filling holes. Holes for drift pins shall be bored $\frac{1}{16}$ in. smaller than diameter of drift pins. Holes for bolts shall be bored exact diameter of bolts.

Holes for lag screws shall be bored exact diameter of lag screw, except that portion which engages the threads shall be bored $\frac{1}{8}$ in. smaller.

Heads of drift pins shall be driven ½ in. below surface of timber and sealed with hot tar.

HARDWARE: All hardware shall be galvanized. The contractor shall provide bolts of proper length to project beyond nuts not more than ½ in. nor less than ¼ in., and he shall do all cutting off and rethreading of bolts necessary to comply with this requirement. Dapping of piles to accommodate short bolts shall not be permitted. Use washers between all bolt heads and nuts and the wood, except that carriage bolts shall have washers under nuts only. All nuts shall be effectually checked against loosening. Payment for all hardware in place shall be included in the unit prices bid for lumber.

GRAVEL BALLAST: Gravel ballast shall be 3½ in. thick at center line of roadway and 2½ in. thick at curbs. It shall meet requirements for top course gravel surfacing in accordance with the standard construction specifications, except that crushing will not be required.

WATER PROOFING: After drains are in place and deck is thoroughly cleaned and dry, paint top of deck and inside face of curbs with three coats of hot tar in accordance with the standard specifications.

FLOOR DRAINS: Payment for floor drains complete shall be included in the unit price bid for treated lumber.

PAINTING OF MARKER: Before paint is applied, plates shall be cleaned with gasoline. One coat of flat white paint and one coat of white enamel shall then be applied over entire surface of plate. Lettering and border shall be put on with sign writer's lettering black. After marker is completed it shall be given one coat of clear spar varnish.

STATE OF MONTANA
STATE HIGHWAY COMMISSION

STANDARD 19 FT. PANELS
TREATED TIMBER PILE TRESTLE
22'-0" LAMINATED DECK-GRAVEL SURFACING

Scale:- ½"=1'-0" Unless Noted.

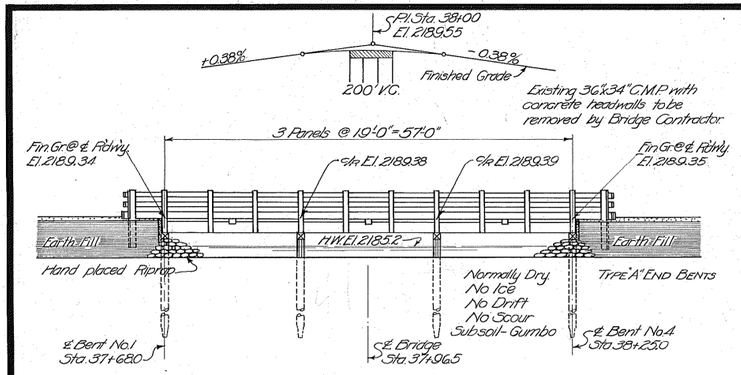
SUBMITTED BY B.J. Cranburn, BRIDGE ENGINEER

APPROVED BY R.D. Rader, STATE HIGHWAY ENGINEER

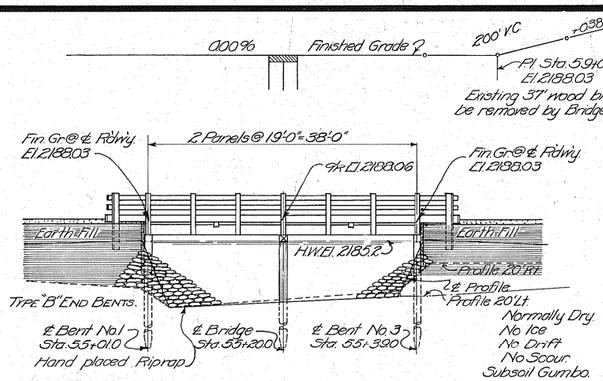
FILE NO.

DRAWING NO. R21-TT19

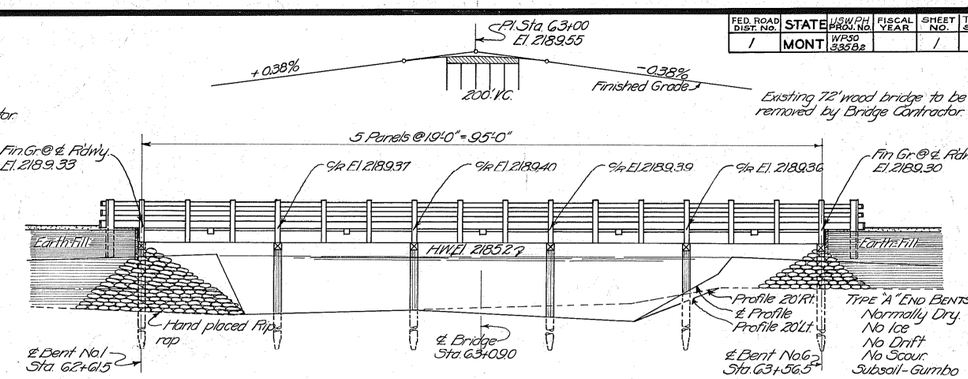
FED. ROAD DIST. NO.	STATE	U.S.W.P.H. PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MONT	WPSO 335B2		1	2



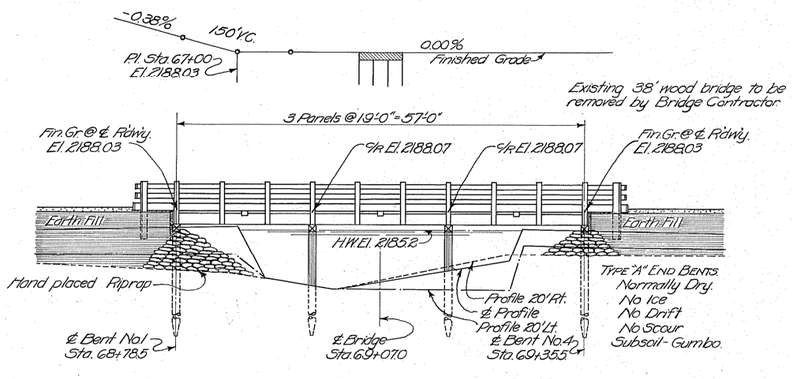
BRIDGE AT STA. 37+96.5 (Alignment: Tangent. Bearing N 0° 54' W.)
No Marker Required.



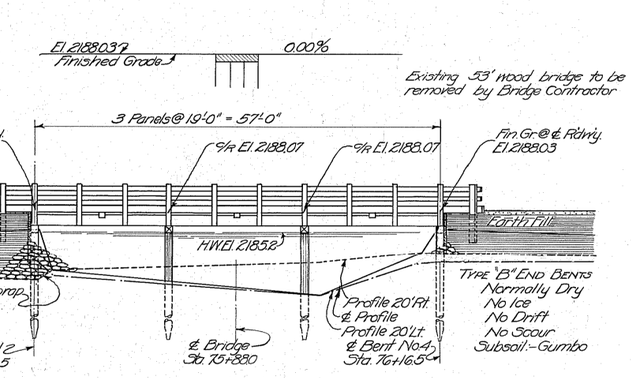
BRIDGE AT STA. 55+20.0 (Alignment: Tangent. Bearing N 0° 31' W.)
No Marker Required.



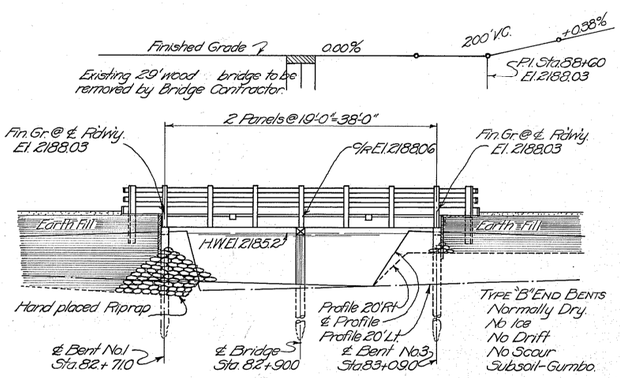
BRIDGE AT STA. 63+09.0 (Alignment: Tangent. Bearing N 0° 31' W.)
No Marker Required.



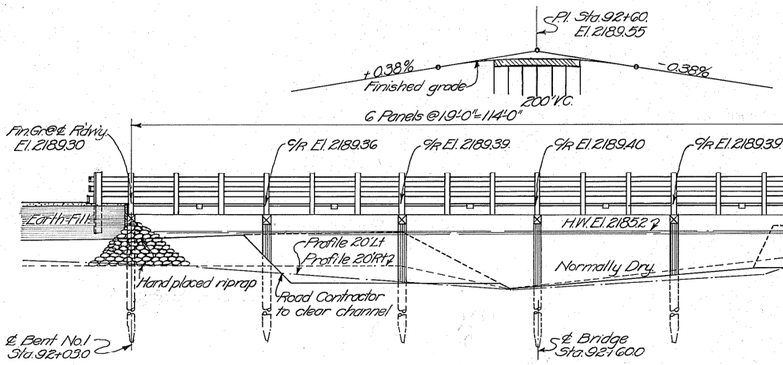
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No Marker Required.



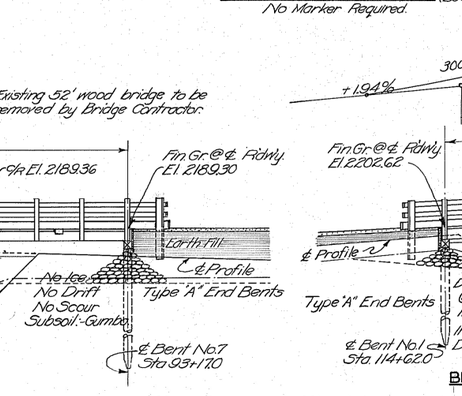
BRIDGE AT STA. 75+88.0 (Alignment: Tangent. Bearing N 0° 31' W.)
No Marker Required.



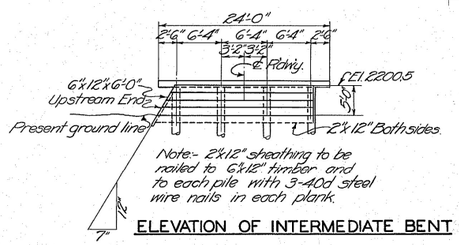
BRIDGE AT STA. 82+90.0 (Alignment: Tangent. Bearing N 0° 31' W.)
No Marker Required.



BRIDGE AT STA. 92+60.0 (Alignment: Tangent. Bearing N 0° 11' E.)
No Marker Required.



BRIDGE AT STA. 114+81.0 (Alignment: Tangent. Bearing N 0° 11' E.)
No Marker Required.



ELEVATION OF INTERMEDIATE BENT

PILING

STATION	25'	30'	35'
37+96.5	18		
55+20.0		14	4
63+09.0		9	17
69+07.0	5	13	
75+88.0	7	11	4
82+90.0	7	11	
92+60.0	10	20	
114+81.0		14	
Total	47	92	25

REFERENCES

DWG. NO.	DESCRIPTION
R21-TT.19	Standard Trestle

NOTES

SPECIFICATIONS: Montana State Highway Commission Standard Specifications for Road and Bridge Construction, revised April, 1935; Design Specifications for Highway Structures, revised July, 1935; and Special Provisions shall govern unless otherwise noted.

DETAILS: Except as modified on this sheet, structures shall be built in accordance with details shown on Dwg. No. R21-TT.19.

FINISHED GRADE: Finished plan grade of bridges is 0.50 ft. above profile grade shown on road plans.

CAMBER: Finished grade elevations shown at centerline of roadway at intermediate bents vary from finished plan grade to provide camber of structures.

GRAVEL BALLAST: Gravel ballast shall be placed by the bridge contractor. It shall meet requirements for top course gravel surfacing except that crushing will not be required.

PILE PENETRATION: In case 6 ft. of pile penetration cannot be obtained by ordinary driving, the contractor shall do the necessary spotting to obtain the required penetration, or he shall excavate and set the piles 6 ft. deep and strike the piles with the pile hammer to bring them to a firm bearing. No additional compensation shall be allowed for such work.

EXCAVATION: Payment for all excavation necessary to the driving and cutting off of piles and to the placing of caps, stringers, backing plank and drift protection shall be included in the unit price bid for treated lumber.

DESIGNED BY	LGH	11-9-35
DRAWN BY	LGH	11-9-35
TRACED BY	TCR	11-9-35
CHECKED BY	A.L.M.	11-16-35
REVISED BY		
REVISED BY		

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGES AT STA.: 37+96.5, 55+20.0, 63+09.0, 69+07.0, 75+88.0, 82+90.0, 92+60.0, 114+81.0

U.S.W.P.H. PROJ. NO. WPSO 335B UNIT 2
PHILLIPS COUNTY
GENERAL LAYOUT
Scale:- 1" = 10'-0"

APPROVED BY B. K. Onsum
BRIDGE DESIGNING ENGINEER

FILE NO. 694 DRAWING NO. 1484

OK. L.G.H. 11-16-35

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B1

BRIDGE BUREAU

CHECKED BY: NPH

PREPARED BY: KSTG

MONTANA
DEPARTMENT OF TRANSPORTATION

BRIDGE PLANS AND QUANTITIES

FEDERAL AID PROJECT NO. BR 243-1(5)20 P.E.
BR 243-1(7)20 CONST.

BRIDGE REPLACEMENTS - NORTH OF SACO
PHILLIPS COUNTY

LIST OF DRAWINGS

SHEET NO.	DRAWING NO.	TITLE
B2	18070	GENERAL LAYOUT AT STA. 11+57.24
B3	18071	FOOTING PLAN AT STA. 11+57.24
B4	18072	END BENT DETAILS AT STA. 11+57.24
B5	18073	INTERMEDIATE BENT DETAILS AT STA. 11+57.24
B6	18074	SLAB AND ERECTION PLAN AT STA. 11+57.24
B7	18075	GENERAL LAYOUT AT STA. 16+81.74
B8	18076	FOOTING PLAN AT STA. 16+81.74
B9	18077	END BENT DETAILS AT STA. 16+81.74
B10	18078	INTERMEDIATE BENT DETAILS AT STA. 16+81.74
B11	18079	SLAB AND ERECTION PLAN AT STA. 16+81.74
B12	18080	GENERAL LAYOUT AT STA. 19+23.24
B13	18081	FOOTING PLAN AT STA. 19+23.24
B14	18082	END BENT DETAILS AT STA. 19+23.24
B15	18083	INTERMEDIATE BENT DETAILS AT STA. 19+23.24
B16	18084	SLAB AND ERECTION PLAN AT STA. 19+23.24
B17	MB-1 (Revised 3-05-01)	STANDARD PRESTRESSED BEAM TYPE 1
B18	MSL-6 (Revised 3-05-01)	STANDARD SLAB, RAIL, AND DIAPHRAGM DETAILS
B19	MSBR-T101 (Revised 3-05-01)	STANDARD BRIDGE RAIL - TYPE T101

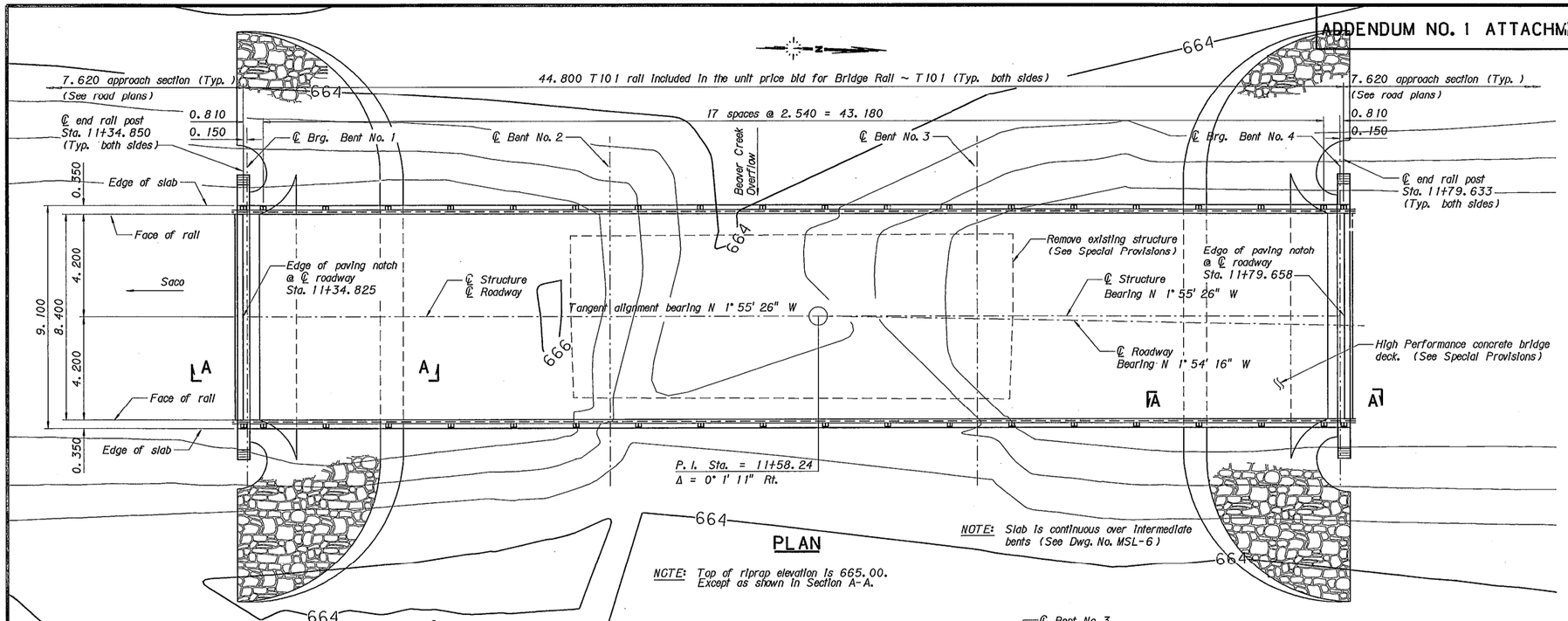
ESTIMATED BRIDGE PLAN QUANTITIES

	LOCATION	LENGTH IN METERS	CLASS DD CONCRETE (CU. M)	SPECIAL DECK CONCRETE (CU. M)	HIGH PERFORMANCE CONCRETE (CU. M)	TEST SLAB (LUMP SUM)	REINFORCING STEEL REGULAR (kg)	REINFORCING STEEL EPOXY COATED (kg)	BRIDGE RAIL T101 (LIN. M)	406 MM DIA. X 12.7 MM WALL THICKNESS STEEL PIPE PILES FURNISH (LIN. M)	406 MM DIA. X 12.7 MM WALL THICKNESS STEEL PIPE PILES DRIVE (LIN. M)	406 MM DIA. X 12.7 MM WALL THICKNESS STEEL PIPE PILES PILE CUTTING SHOES (EACH)	PRESTRESSED CONCRETE BEAMS TYPE I (LIN M)	TRANSEVERSE DECK GROOVING (SQ. M)
BRIDGE AT STA. 11+57.24 S00243020+08001	BENT NO. 1		13.8		0.8	1.0	595	155		106.9	105.7	4		
	BENT NO. 2		8.8				477			107.5	101.1	4		
	BENT NO. 3		8.8				477			107.5	101.1	4		
	BENT NO. 4		13.8		0.8		595	155		106.9	105.7	4		
	SUPERSTRUCTURE	44.50	4.7		87.1			11528	89.6				174	348
	SUB-TOTAL	44.50	49.9		88.7	1.0	2144	11838	89.6	428.8	413.6	16	174	348
BRIDGE AT STA. 16+81.74 S00243020+07001	BENT NO. 1		13.8	0.8			595	161		119.7	118.5	4		
	BENT NO. 2		8.8				477			120.3	112.3	4		
	BENT NO. 3		8.8				477			120.4	112.3	4		
	BENT NO. 4		13.8	0.8			595	161		119.8	118.6	4		
	SUPERSTRUCTURE	44.50	4.7	87.1				7849	89.6				174	348
	SUB-TOTAL	44.50	49.9	88.7			2144	8171	89.6	480.2	461.7	16	174	348
BRIDGE AT STA. 19+23.24 S00243020+06001	BENT NO. 1		13.8	0.8			595	155		112.3	111.1	4		
	BENT NO. 2		8.8				477			112.9	104.2	4		
	BENT NO. 3		8.8				477			112.9	104.2	4		
	BENT NO. 4		13.8	0.8			595	155		112.4	111.2	4		
	SUPERSTRUCTURE	44.50	4.7	87.1				11528	89.6				174	348
	SUB-TOTAL	44.50	49.9	88.7			2144	11838	89.6	450.5	430.7	16	174	348
	TOTAL	133.50	149.7	177.4	88.7	1.0	6432	31847	268.8	1359.5	1306.0	48	522	1044

FILENAME: 34210.BRG DRAWING NO. 18070Q

ADDENDUM NO. 1 ATTACHMENT NO. 3	STATE	PROJECT NUMBER	SHEET NO.
	MONTANA	BR 243-1(7)20	B2

BRIDGE RIPRAP



NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as the Profile Grade shown on Road Plans.

LIVE LOAD: Standard HL-93 loading.

SPECIFICATIONS: Montana Department of Transportation and the Montana Transportation Commission Standard Specifications for Road and Bridge Construction, 1995 edition, and any amendments thereto, and the Special Provisions govern unless otherwise noted. Design was prepared in accordance with AASHTO LRFD Bridge Design Specifications, 1998 edition, and any amendments thereto.

REINFORCING STEEL: Use new deformed type reinforcing steel meeting the requirements of AASHTO M 31M Grade 60 (420). Include all costs associated with furnishing and placing new reinforcing steel in the unit price bid for either Reinforcing Steel or Reinforcing Steel - Epoxy Coated.

CAST IN PLACE CONCRETE: Unless otherwise approved or specified, use Class DD for all substructure concrete and High Performance for all superstructure concrete.

CONCRETE STRENGTH: Use f'c for Class DD concrete = 21 MPa; f'c for High Performance concrete = 28 MPa for structural design purposes only. See Special Provisions for High Performance mix design requirements.

STRUCTURE EXCAVATION: Include structure Excavation in the unit price bid for Class DD concrete.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See Special Provisions.

UTILITIES: Call 1-800-424-5555 for utility locates at least two working days prior to starting any construction activity that could disturb the utility.

EXISTING STRUCTURE: Remove the existing structure (see Road Plans sheets and Special Provisions).

DIMENSIONS: All dimensions shown on the General Layout are in meters. All other drawings are dimensioned in millimeters except as noted. Stations and elevations are expressed in meters. Stations shown on the bridge plans are state plane grid stations based on state plane coordinates (NAD83-1992). Dimensions shown on the bridge plans are horizontal ground distances and not state plane grid distances. The combination scale factor (CSF) at this location is 0.99961362.

Horizontal ground distance x CSF = Grid Distance
Grid Distance/CSF = Distance to stake

FOUNDATIONS PILES BENT NO. 2 AND BENT NO. 3
Pile driving length will be measured from the excavated channel bottom elevation shown in the elevation view.

STREAM DATA

Drift:	None
Pier Scour (Q100):	0.66 m
Contraction Scour (Q100):	0.96 m
Ice:	Light
Drainage Area:	3302 sq. km
2-year Stage (Q2):	Normally Dry
Base Flood Flow (Q100):	106.08 m³/sec
* Base Flood Stage:	664.77
Base Flood Velocity:	3.14 m/sec
Low Beam Elevation:	664.993

* Also see Hydraulic Data Summary sheet.
Base Flood Stage elevation includes backwater

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 11+57.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

GENERAL LAYOUT

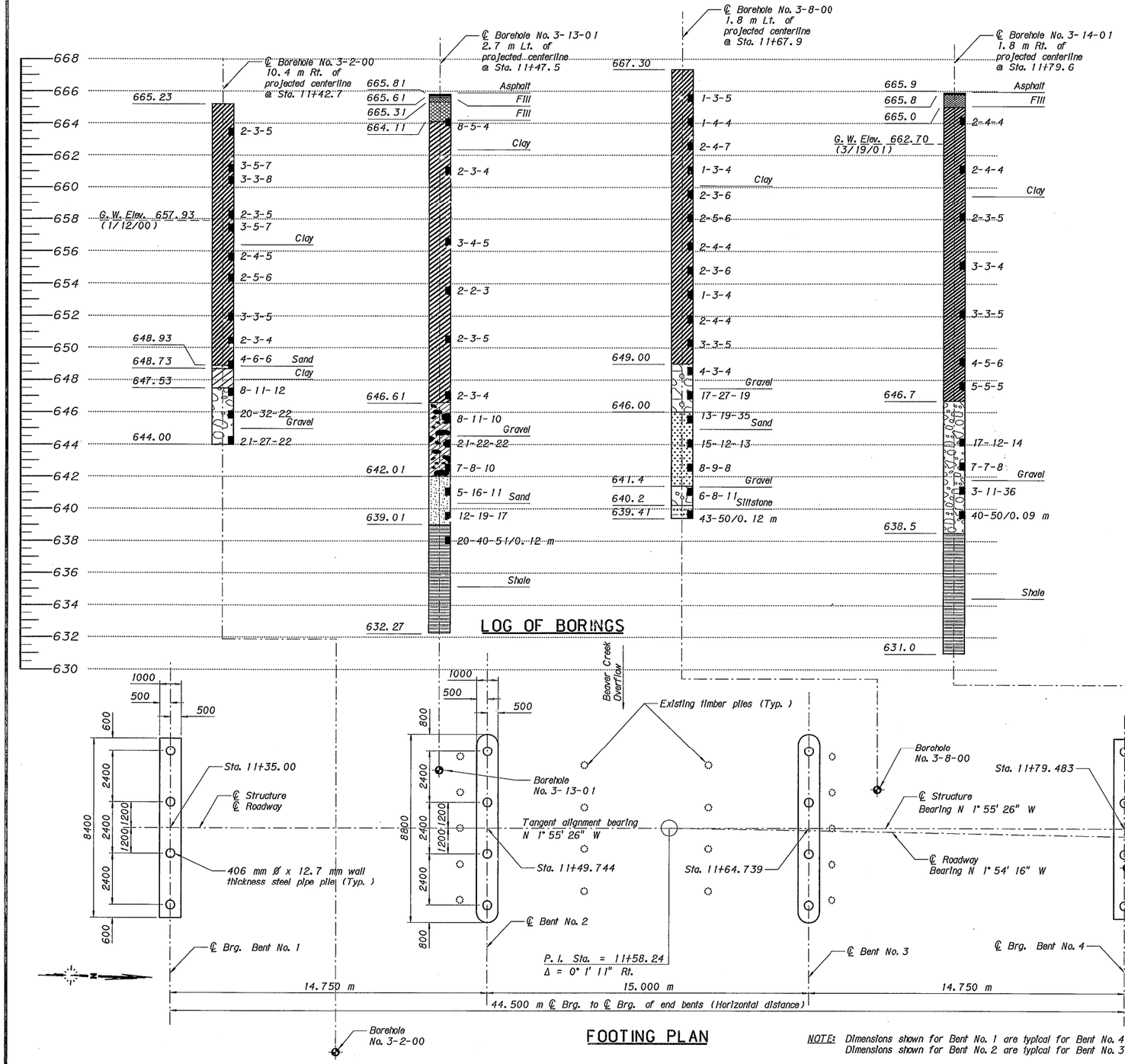
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DESIGNED	11/20/00	MBL
DRAWN	12/12/00	KSTG
CHECKED	8/6/01	MJS/MBL
APPROVED	10/3/01	JPK
REVISED		
REVISED		

FILENAME: 3421GL1.BRG DRAWING NO. 18070

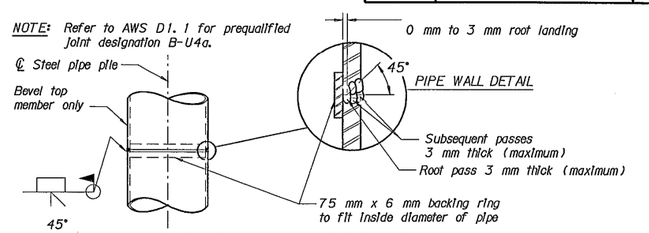
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01:09:39 PMCPS - U8472

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B3



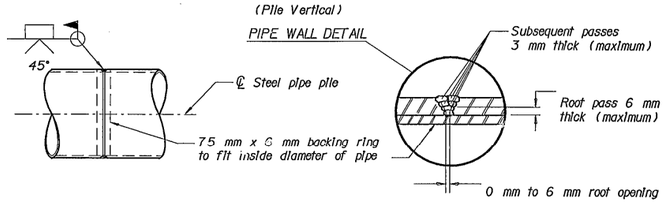
NOTE: Dimensions shown for Bent No. 1 are typical for Bent No. 4
Dimensions shown for Bent No. 2 are typical for Bent No. 3

NOTE: Refer to AWS D1.1 for prequalified joint designation B-U4a.



PILE EXTENSION AFTER DRIVING

(Pile Vertical)



PILE EXTENSION BEFORE DRIVING

(Rotate pile so that all welding is done in the flat position)

PERMISSIBLE WELDED SPLICE DETAILS FOR STEEL PIPE PILES

No Scale

NOTE: Use only E7018 or E7028 series electrodes. Maximum electrode size is 5 mm. Prepare the weld surfaces to a smooth, uniform finish. Remove all fins, tears, loose scale, slag, rust, grease, moisture and other material that would prevent proper welding.

NOTES

SOILS AND FOUNDATION MATERIALS: The Footing Plan shows points where the State of Montana, Department of Transportation, drilled boreholes.

The series of numbers on the Log of Borings shows the number of blows from a 63.5 kg hammer with a 0.760 m drop required to drive a 51 mm split spoon sampler 0.150 m (Standard Penetration Test). The length of the split spoon sampler is 0.450 m. The sampler length is measured as three 0.150 m intervals. If the split spoon sampler did not penetrate 0.150 m after 50 blows, the Log of Borings shows the measured penetration within that particular interval.

The State of Montana, Department of Transportation, assumes no responsibility for any variation or misinterpretation of the classes of materials and will make no adjustment in bid prices if site conditions differ from the Log of Borings.

See the Special Provisions for original boring logs and additional subsurface information.

FOUNDATION PILES: Pile lengths shown have been estimated for bidding purposes only.

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 11+57.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

FOOTING PLAN

Scale ~ 1:100

DESIGNED	11/20/00	MBL
DRAWN	2/13/00	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 3421FP1.BRG DRAWING NO. 18071

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01:09:43 PMCPS - U8472

BRIDGE BUREAU

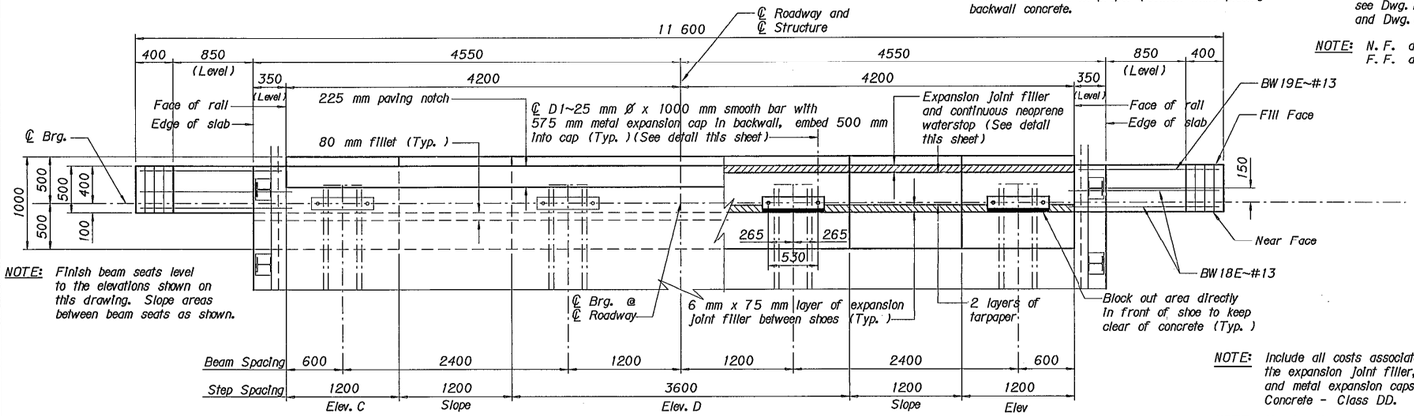
NOTE: Securely nail expansion joint filler to pile cap concrete and hold in proper position while placing backwall concrete.

NOTE: Slab and beam reinforcing steel is omitted for clarity. For details see Dwg. No. MSL-6, Dwg. No. MB-1, and Dwg. No. 18074 for details.

NOTE: N. F. denotes near face. F. F. denotes fill face.

NOTE: Lap #13 bars 410 mm minimum. Lap #16 bars 510 mm minimum.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B4



PLAN

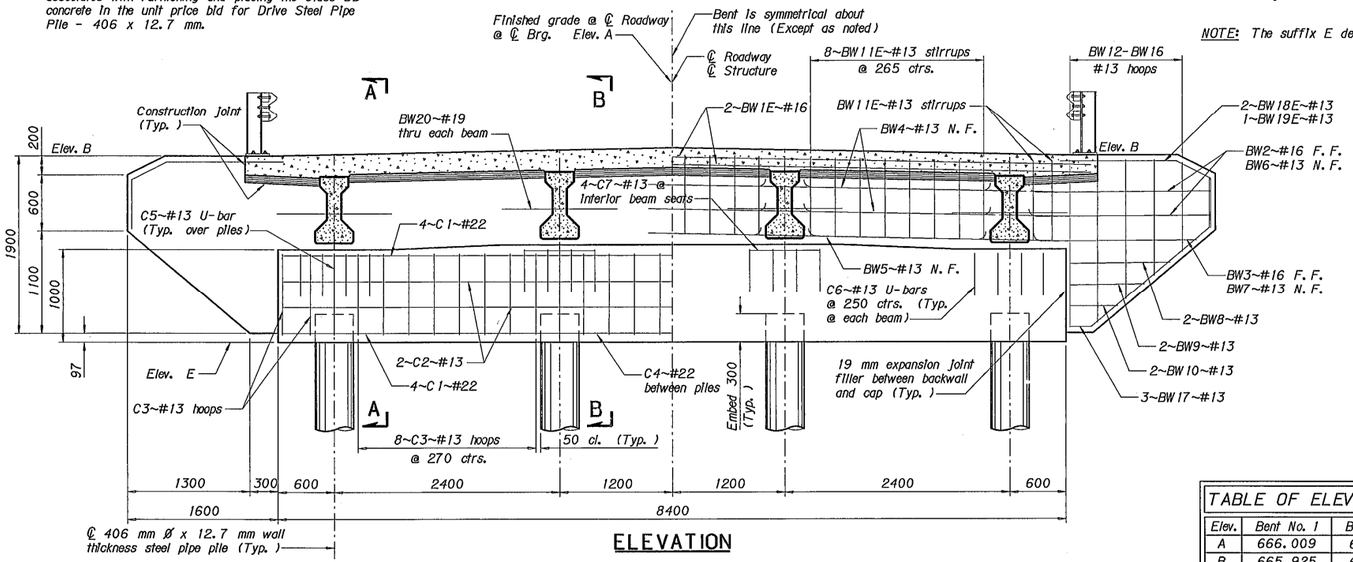
NOTE: Slab and beam reinforcing steel is omitted for clarity. For details see Dwg. No. MSL-6, Dwg. No. MB-1, and Dwg. No. 18074 for details.

NOTE: Include all costs associated with furnishing and placing the expansion joint filler, tarpaper, neoprene waterstop and metal expansion caps in the unit price bid for Concrete - Class DD.

NOTE: Mount rail posts on end bents with M20 x 600 mm galvanized high tensile strength stud bolts (ASTM F 568M Class 8.8) (50 mm of thread) embedded into the backwall. See General Layout Dwg. No. 18070 for additional rail post spacing.

NOTE: The suffix E denotes epoxy coated reinforcing steel.

NOTE: Fill the steel pipe piles with Class DD concrete to the bottom of cap elevation. Wait a minimum of one day before placing the pile cap concrete. Include all costs associated with furnishing and placing the Class DD concrete in the unit price bid for Drive Steel Pipe Pile - 406 x 12.7 mm.



ELEVATION

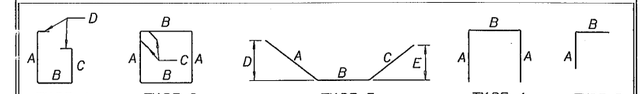
(Bent No. 1 ~ Back on line)
(Bent No. 4 ~ Ahead on line)

NOTE: Maximum pile reaction under:
D.L. + L.L. = 476.4 kN/pile
Design pile tip Elevevation: 637.5 m

Contact the MDT Geotechnical Section at (406)444-6280 if pile tip elevations deviate 300 mm for the elevation indicated.

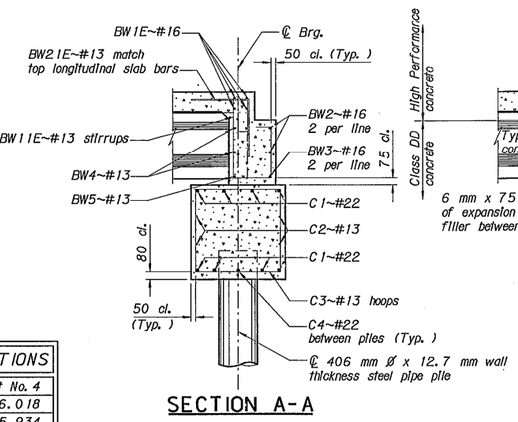
TABLE OF ELEVATIONS		
Elev.	Bent No. 1	Bent No. 4
A	666.009	666.018
B	665.925	665.934
C	664.928	664.937
D	664.976	664.985
E	663.928	663.937

BILL OF REINFORCING STEEL

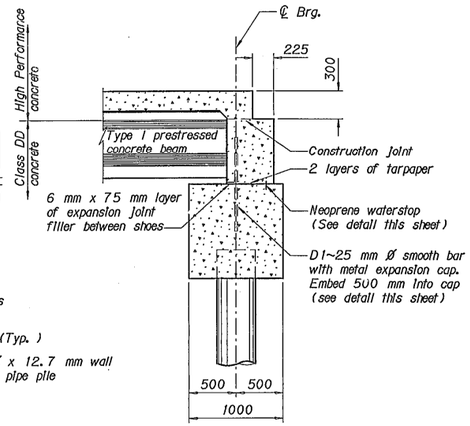


STRAIGHT BARS				BENT BARS (All dimensions are out to out)								
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C	D	E
BW1E	16	4	8950	BW11E	13	28	1	2120	850	400	550	160	
BW2	16	4	6010	BW12	13	2	2	4720	1800	400	160		
BW3	16	2	5810	BW13	13	2	2	4600	1740	400	160		
BW4	13	6	1990	BW14	13	2	2	4100	1490	400	160		
BW5	13	3	1850	BW15	13	2	2	3580	1230	400	160		
BW6	13	4	1950	BW16	13	2	2	3020	950	400	160		
BW7	13	2	1750	BW17	13	6	3	2410	230	1650	530	150	400
BW8	13	4	1070	BW18E	13	4	3	2190	1250	410	530	560	480
BW9	13	4	790	BW19E	13	2	3	2080	1140	410	530	510	480
BW10	13	4	510	BW21E	13	23	5	1220	610	610			
BW20	19	4	1220										
C1	22	8	8300	C3	13	28	2	3860	870	900	160		
C2	13	4	8300	C5	13	4	4	2640	870	900			
C4	22	3	1890	C6	13	16	4	1800	450	900			
C7	13	8	850										
D1 *	25Ø	8	1000										

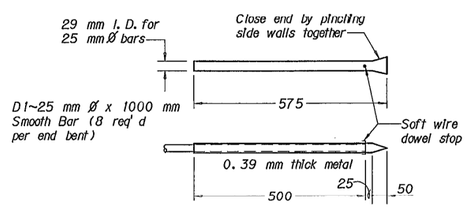
*NOTE: Use D1~25 mm Ø smooth bars meeting the requirements of AASHTO M 270M Grade 250.



SECTION A-A

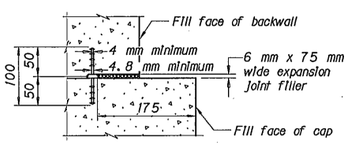


SECTION B-B



METAL EXPANSION CAP DETAIL

No Scale



WATERSTOP DETAIL

No Scale

NOTE: Hold waterstop in accurate position while placing concrete.

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 11+57.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

BENTS NO. 1 AND NO. 4

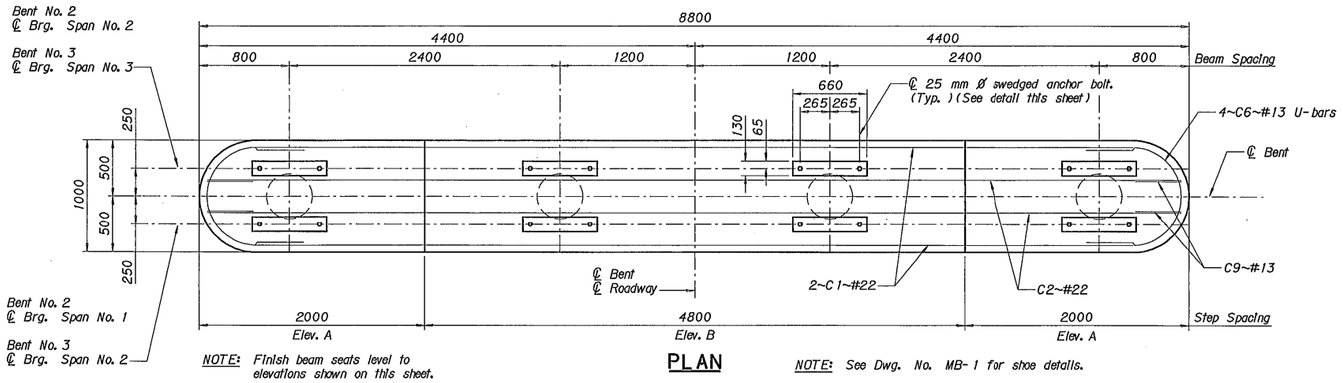
Scale ~ 1:30

DESIGNED	1/2/01	MBL
DRAWN	1/2/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 3421EB1.BRG DRAWING NO. 18072

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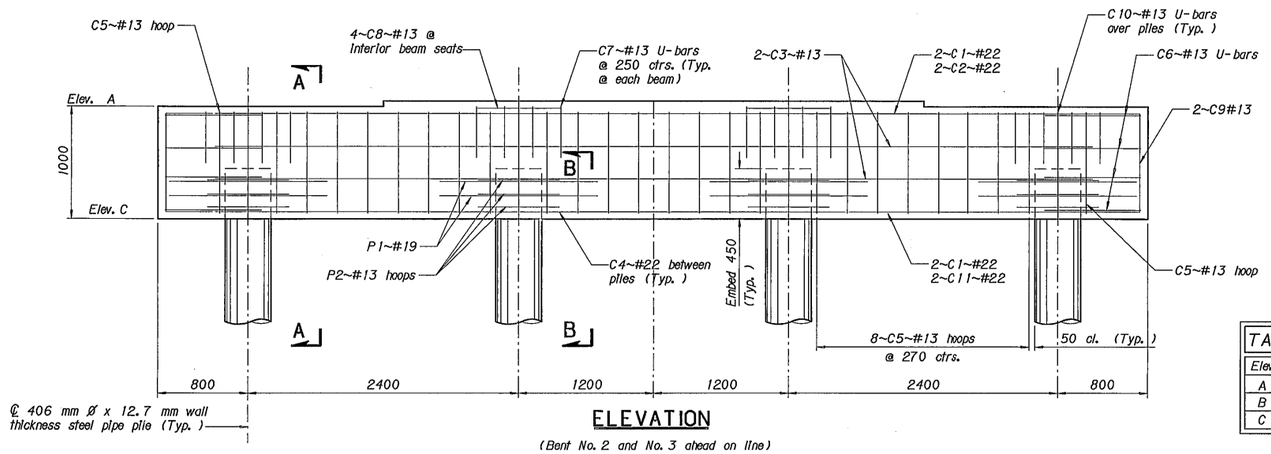
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B5



NOTE: Finish beam seats level to elevations shown on this sheet.

PLAN

NOTE: See Dwg. No. MB-1 for shoe details.

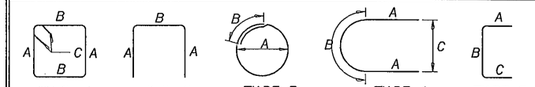


ELEVATION

(Bent No. 2 and No. 3 ahead on line)

TABLE OF ELEVATIONS		
Elev.	Bent No. 2	Bent No. 3
A	664.931	664.934
B	664.979	664.982
C	663.931	663.934

BILL OF REINFORCING STEEL



STRAIGHT BARS				BENT BARS (All dimensions are out to out)						
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C
C1	#22	4	7800	C5	#13	26	1	3920	900	900	160
C2	22	2	8650	C6	13	8	4	2180	410	1360	870
C3	13	4	7800	C7	13	16	2	1800	450	900	
C4	22	3	1890	C9	13	4	5	1810	410	870	530
C8	13	8	850	C10	13	4	2	2700	900	900	
C11	22	2	8540								
P1	#19	8	1400	P2	#13	12	3	2660	720	400	

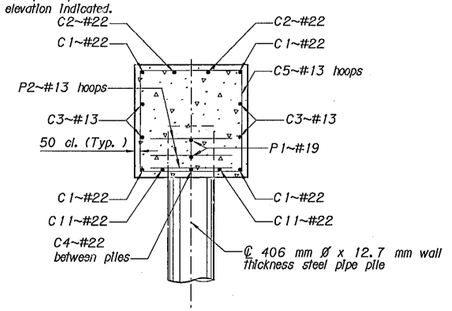
NOTES:

Fill the steel pipe piles with Class DD concrete to the bottom of cap elevation. Wait a minimum of one day before placing the pile cap concrete. Include all costs associated with furnishing and placing the Class DD concrete in the unit price bid for Drive Steel Pipe Pile - 406 x 12.7 mm.

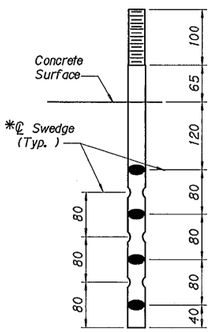
A variation of 6 mm per 300 mm of pile is allowable in the direction of the piles. The total allowable variation in the transverse or longitudinal location of the top of the piles is 75 mm. Provide adequate templates or other means to hold the piles within these tolerances. Any variation in excess of said tolerances constitutes cause for remedial action, as determined by the Engineer, at no additional cost to the State.

Maximum pile reaction under:
D.L. + L.L. + B + SF = 590.6 kN/pile
Design pile tip Elevevation: 637.5 m

Contact the MDT Geotechnical Section at (406)444-6280 if pile tip elevations deviate 300 mm for the elevation indicated.



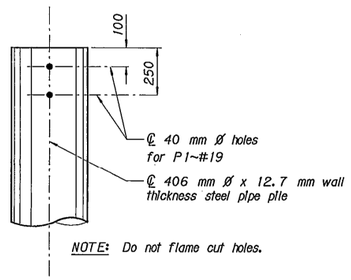
SECTION A - A



ANCHOR BOLT DETAIL

No Scale

*Make swedge deformations approximately 5 mm deep without removing metal.



NOTE: Do not flame cut holes.

VIEW B - B

Scale ~ 1: 15

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW AT STA. 11+57.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

BENTS NO. 2 AND NO. 3

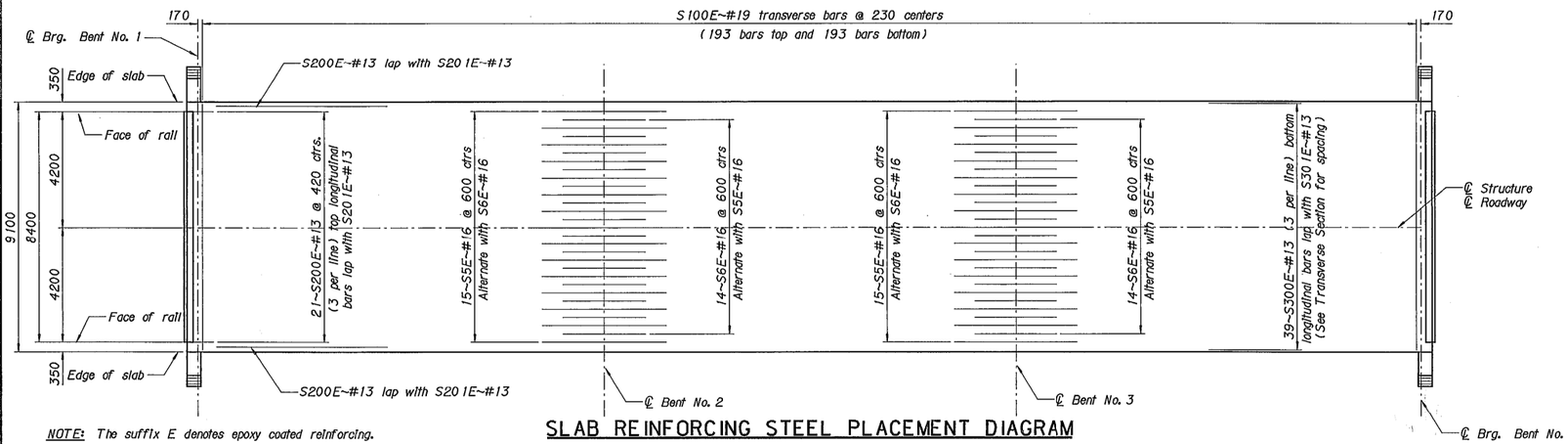
Scale ~ 1: 25

DESIGNED	1/4/01	MJL
DRAWN	1/4/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 34211B1.BRG DRAWING NO. 18073

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08/14/02
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B6



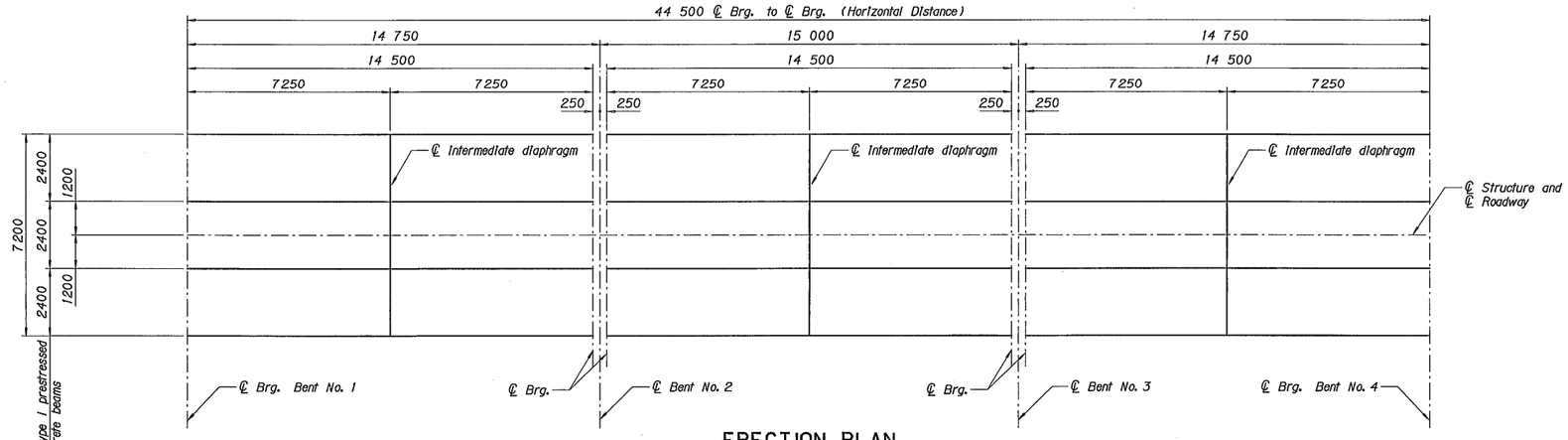
SLAB REINFORCING STEEL PLACEMENT DIAGRAM

NOTE: The suffix E denotes epoxy coated reinforcing.

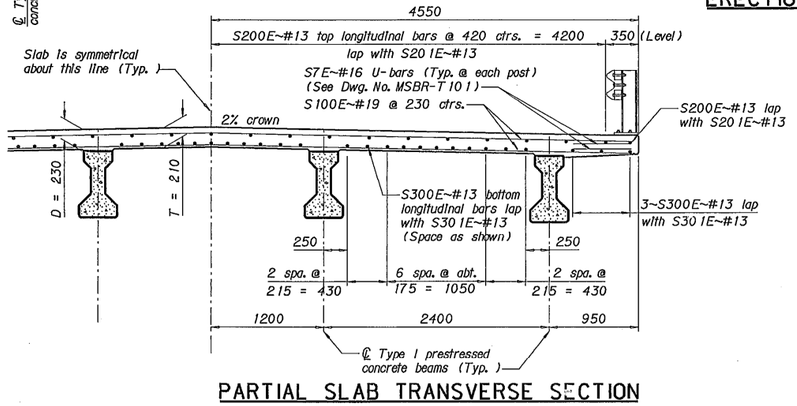
NOTE: Lap #13 bars 610 mm minimum.

NOTE: See Std. Dwg. No. MSL-6 for additional slab and rail details .

NOTE: See Special Provisions for Coordination and Installation of Bridge Deck Instrumentation with the Research Project.

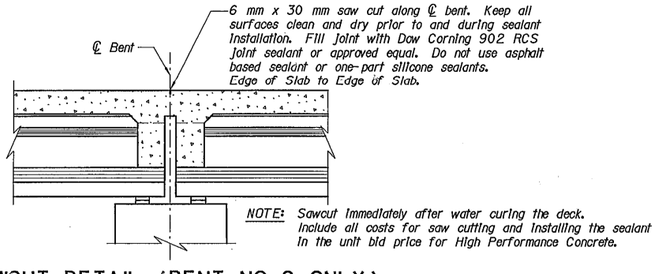


ERECTION PLAN



PARTIAL SLAB TRANSVERSE SECTION

Scale ~ 1:30

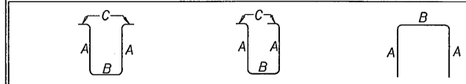


NOTE: Sawcut immediately after water curing the deck. Include all costs for saw cutting and installing the sealant in the unit bid price for High Performance Concrete.

SAWCUT DETAIL (BENT NO. 2 ONLY)

Scale ~ 1:25

BILL OF REINFORCING STEEL



STRAIGHT BARS				BENT BARS (All dimensions are out to out)						
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C
S100E	#19	386	8950	S7E	#16	72	3	1520	610	300	
S200E	13	69	12 190	D4E	13	84	2	1570	570	170	130
S201E	13	23	10 200	D7E	#13	63	1	1570	570	170	130
S300E	13	117	12 190								
S301E	13	39	10 200								
D3E	19	12	2040								
D5E	13	18	2040								
D6E	19	18	2040								
D8E	19	6	1220								
S5E	16	30	4500								
S6E	#16	28	3000								

PRESTRESSED CONCRETE BEAMS: Fabricate the prestressed concrete beams in accordance with Dwg. No. MB-1 except as indicated on this drawing. Maximum f'c (Compressive strength of concrete in 28 days) for design is 48 MPa . Design stresses without prestress are as shown in the table below.

*NOTE: The nominal moment strength of the section (Mn) must be greater than or equal to Mu/Ø where Ø = 1.0.

BEAM DESIGN STRESSES

Beam Length (℄ Brg. to ℄ Brg.)(Horizontal Distance)		14 500
Beam D.L. Stresses (MPa @ .5 pt.)	Ft	4.56
	Fb	-3.74
Total D.L. + L.L. + I. Design Stresses (MPa)	Ft	20.18
Total D.L. + 0.80(L.L.+I) Design Stresses (MPa)	Fb	-26.58
Compression Zone ~ Full D.L. (MPa)	Ft	18.66
Compression Zone ~ 0.5 D.L. + L.L. + I. (MPa)	Ft	10.85
Factored Moment @ Section (kN-m)	*Mu	2111

*Mu = 1.0 [1.25 D.C. + 1.50 D.W. + 1.75 (L.L. + I.)]

DEAD LOAD DEFLECTION TABLE

TYPE I PRESTRESSED CONCRETE BEAM

Span Length		Tenth Point				
		.1	.2	.3	.4	.5
14 500 Span	Int.	8	15	20	24	25
	Ext.	7	13	18	21	22

NOTE: Deflections symmetrical about 0.5 point and do not include beam dead load.

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 11+57.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

SLAB DETAILS & ERECTION PLAN

Scale ~ 1:100

DESIGNED	2/01/01	MBL
DRAWN	2/02/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 342ISI.BRG DRAWING NO. 18074

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ADDENDUM NO. 1 ATTACHMENT NO. 4	STATE	PROJECT NUMBER	SHEET NO.
	MONTANA	BR 243-1(7)20	B7

BRIDGE RIPRAP

7.620 approach section (Typ.)
(See road plans)

44.800 T101 rail included in the unit price bid for Bridge Rail ~ T101 (Typ. both sides)

℄ end rail post
Sta. 16+59.350
(Typ. both sides)

0.810
0.150

17 spaces @ 2.540 = 43.180

℄ Brg. Bent No. 1 | ℄ Bent No. 2 | Beaver Creek Overflow | ℄ Bent No. 3 | ℄ Brg. Bent No. 4

0.350 Edge of slab
Face of rail
4.200
8.400
4.200
9.100
Face of rail
0.350 Edge of slab

Saco

Edge of paving notch @ ℄ roadway Sta. 16+59.325

Slab is continuous over intermediate bents (See Dwg. No. MSL-6)

℄ Structure
℄ Roadway

664

Tangent alignment bearing N 1° 54' 16" W

Remove existing structure (See Special Provisions)

Edge of paving notch @ ℄ roadway Sta. 17+04.158

Non Standard Slab Reinforcing steel (See Dwg. No. 18079)

℄ end rail post
Sta. 17+04.133
(Typ. both sides)

7.620 approach section (Typ.)
(See road plans)

0.810
0.150

A A A A

PLAN

664

NOTE: Top of riprap elevation is 665.00. Except as shown in Section A-A.

℄ Brg. @ Bent No. 1
Sta. 16+59.500
Finished Grade @ ℄
Roadway Elev. 666.114

℄ Bent No. 2
Sta. 16+74.244
Finished Grade @ ℄
Roadway Elev. 666.117

℄ Bent No. 3
Sta. 16+89.239
Finished Grade @ ℄
Roadway Elev. 666.120

℄ Brg. @ Bent No. 4
Sta. 17+03.983
Finished Grade @ ℄
Roadway Elev. 666.123

44.500 ℄ Brg. to ℄ Brg. of end bents (Horizontal distance)

14.750 | 15.000 | 14.750

668
666
664
662
660
658

Type I prestressed concrete beams

T101 railing (See Dwg. No. MSBR-T101

℄ Profile
6 m Left
6 m Right

Fix | Fix | Fix | Fix

Elev. 664.033

Toe Elev. 662.48

Seasonal water may be present due to irrigation water

* High water Elev. 664.77

406 mm Ø x 12.7 mm wall thickness steel pipe piles (Typ.)

Channel cut (See detail this sheet)

Channel bottom Elev. 662.48

Excavation (See Road Plans)

Elev. 664.042

ELEVATION

P.I. Sta. 20+40.00
Elev. 666.190

+0.020%

-0.200%

100 m V.C.

PROFILE GRADE

Scale ~ None

Channel bottom Elev. 662.48

0.300
0.200

3:1
3:1

Sta. 16+81.74

1.500 | 1.500

3.000

CHANNEL CUT DETAIL

Scale ~ None

℄ Brg.

Type I prestressed concrete beam

1.500

10:1 berm

2:1 slope

Class I riprap with Class I Geotextile erosion control (See road plans)

Toe Elev. 662.48

0.700
0.450
0.750
0.600

℄ 406 mm Ø x 12.7 mm wall thickness steel pipe pile

SECTION A-A

Scale ~ 1:50

NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as the Profile Grade shown on Road Plans.

LIVE LOAD: Standard HL-93 loading.

SPECIFICATIONS: Montana Department of Transportation and the Montana Transportation Commission Standard Specifications for Road and Bridge Construction, 1995 edition, and any amendments thereto, and the Special Provisions govern unless otherwise noted. Design was prepared in accordance with AASHTO LRFD Bridge Design Specifications, 1998 edition, and any amendments thereto.

REINFORCING STEEL: Use new deformed type reinforcing steel meeting the requirements of AASHTO M 31M Grade 60 (420). Include all costs associated with furnishing and placing new reinforcing steel in the unit price bid for either Reinforcing Steel or Reinforcing Steel - Epoxy Coated.

CAST IN PLACE CONCRETE: Unless otherwise approved or specified, use Class DD for all substructure concrete and Class Special Deck for all superstructure concrete.

CONCRETE STRENGTH: Use f'c for Class DD concrete = 21 MPa; f'c for Class Special Deck concrete = 28 MPa for structural design purposes only. See Special Provisions for Special Deck mix design requirements.

STRUCTURE EXCAVATION: Include structure Excavation in the unit price bid for Class DD concrete.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See Special Provisions.

UTILITIES: Call 1-800-424-5555 for utility locates at least two working days prior to starting any construction activity that could disturb the utility.

EXISTING STRUCTURE: Remove the existing structure (see Road Plans sheets and Special Provisions).

DIMENSIONS: All dimensions shown on the General Layout are in meters. All other drawings are dimensioned in millimeters except as noted. Stations and elevations are expressed in meters. Stations shown on the bridge plans are state plane grid stations based on state plane coordinates (NAD83-1992). Dimensions shown on the bridge plans are horizontal ground distances and not state plane grid distances. The combination scale factor (CSF) at this location is 0.99961362.

Horizontal ground distance x CSF = Grid Distance
Grid Distance/CSF = Distance to stake

FOUNDATIONS PILES BENT NO. 2 AND BENT NO. 3
Pile driving length will be measured from the excavated channel bottom elevation shown in the elevation view.

STREAM DATA

Drift:	None
Pier Scour (Q100):	0.98 m
Contraction Scour (Q100):	1.06 m
Ice:	Light
Drainage Area:	3302 sq. km
2-year Stage (Q2):	Normally Dry
Base Flood Flow (Q100):	121.15 m³/sec
*Base Flood Stage:	664.77
Base Flood Velocity:	3.17 m/sec
Low Beam Elevation:	665.098

*Also see Hydraulic Data Summary sheet.
Base Flood Stage elevation includes backwater

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW
AT STA. 16+81.74
FEDERAL AID PROJECT NO. BR 243-1(7)20
PHILLIPS COUNTY
GENERAL LAYOUT

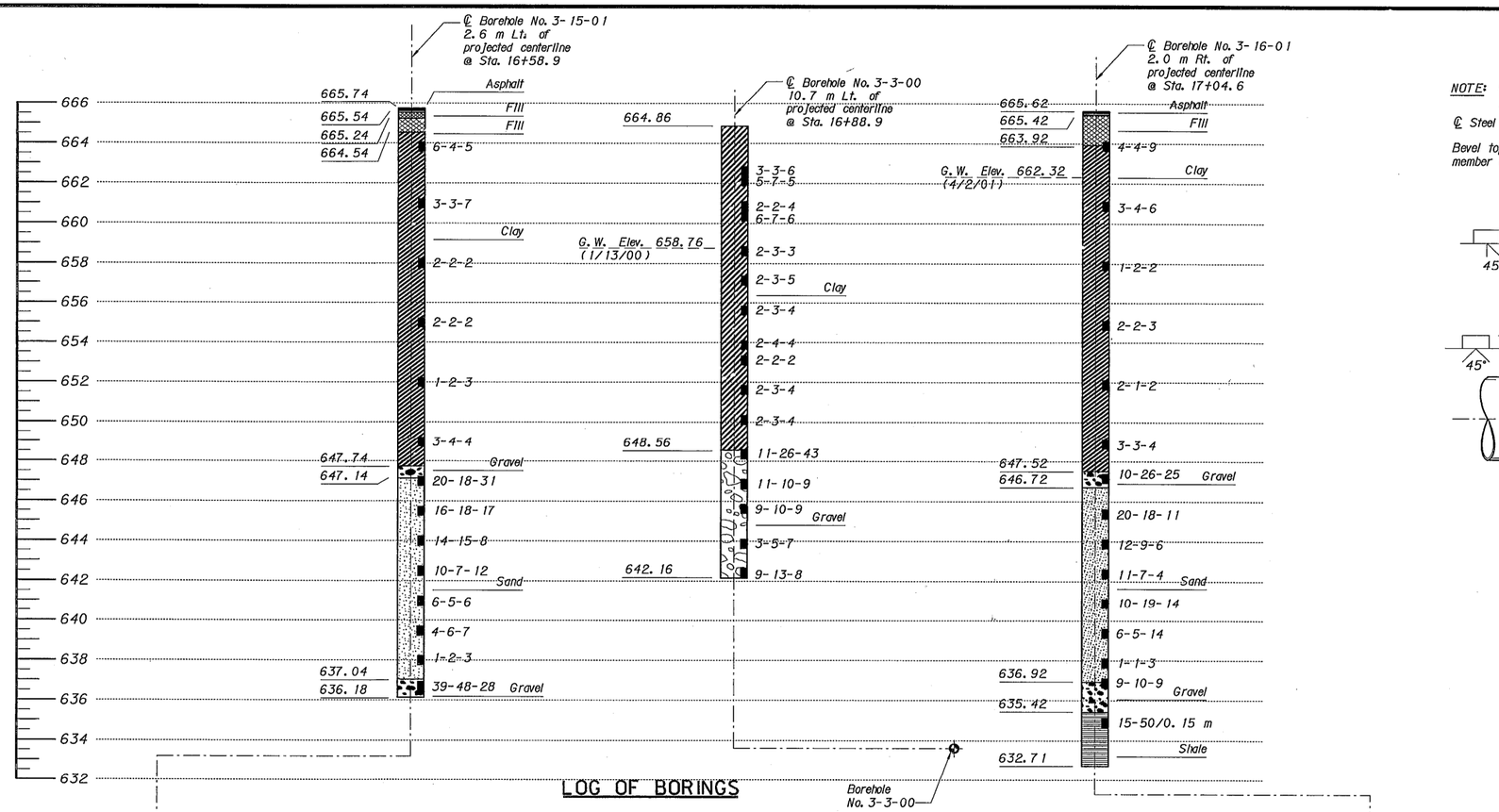
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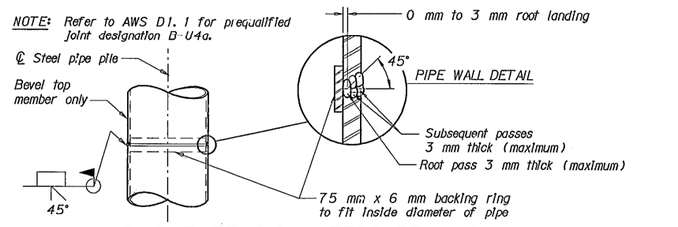
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DRAWN	12/28/00	KSTG
CHECKED	8/6/01	MJS/MBL
APPROVED	10/3/01	JPK
REVISED		
REVISED		

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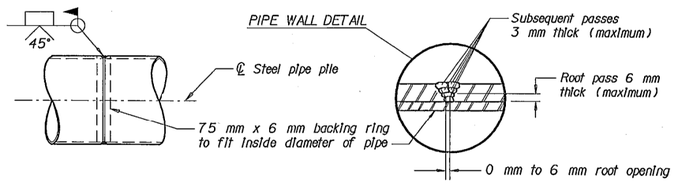
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B8





PILE EXTENSION AFTER DRIVING

(Pile Vertical)



PILE EXTENSION BEFORE DRIVING

(Rotate pile so that all welding is done in the flat position)

PERMISSIBLE WELDED SPLICE DETAILS FOR STEEL PIPE PILES

No Scale

NOTE: Use only E7018 or E7028 series electrodes. Maximum electrode size is 5 mm. Prepare the weld surfaces to a smooth, uniform finish. Remove all fins, tears, loose scale, slag, rust, grease, moisture and other material that would prevent proper welding.

NOTES

SOILS AND FOUNDATION MATERIALS: The Footing Plan shows points where the State of Montana, Department of Transportation, drilled boreholes.

The series of numbers on the Log of Borings shows the number of blows from a 63.5 kg hammer with a 0.760 m drop required to drive a 51 mm split spoon sampler 0.150 m (Standard Penetration Test). The length of the split spoon sampler is 0.450 m. The sampler length is measured as three 0.150 m intervals. If the split spoon sampler did not penetrate 0.150 m after 50 blows, the Log of Borings shows the measured penetration within that particular interval.

The State of Montana, Department of Transportation, assumes no responsibility for any variation or misinterpretation of the classes of materials and will make no adjustment in bid prices if site conditions differ from the Log of Borings.

See the Special Provisions for original boring logs and additional subsurface information.

FOUNDATION PILES: Pile lengths shown have been estimated for bidding purposes only.

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW
AT STA. 16+81.74
FEDERAL AID PROJECT NO. BR 243-1(7)20
PHILLIPS COUNTY
FOOTING PLAN

Scale ~ 1: 100

DESIGNED	11/20/00	MBL
DRAWN	2/13/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

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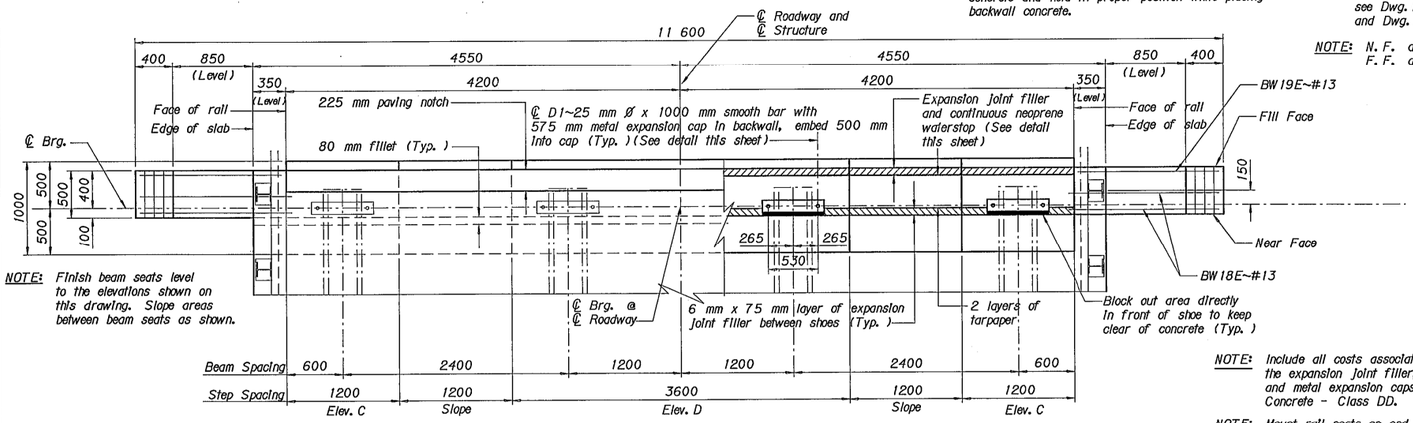
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B9

NOTE: Securely nail expansion joint filler to pile cap concrete and hold in proper position while placing backwall concrete.

NOTE: Slab and beam reinforcing steel is omitted for clarity. For details see Dwg. No. MSL-6, Dwg. No. MB-1, and Dwg. No. 18079 for details.

NOTE: N. F. denotes near face. F. F. denotes fill face.

NOTE: Lap #13 bars 410 mm minimum. Lap #16 bars 510 mm minimum.



NOTE: Finish beam seats level to the elevations shown on this drawing. Slope areas between beam seats as shown.

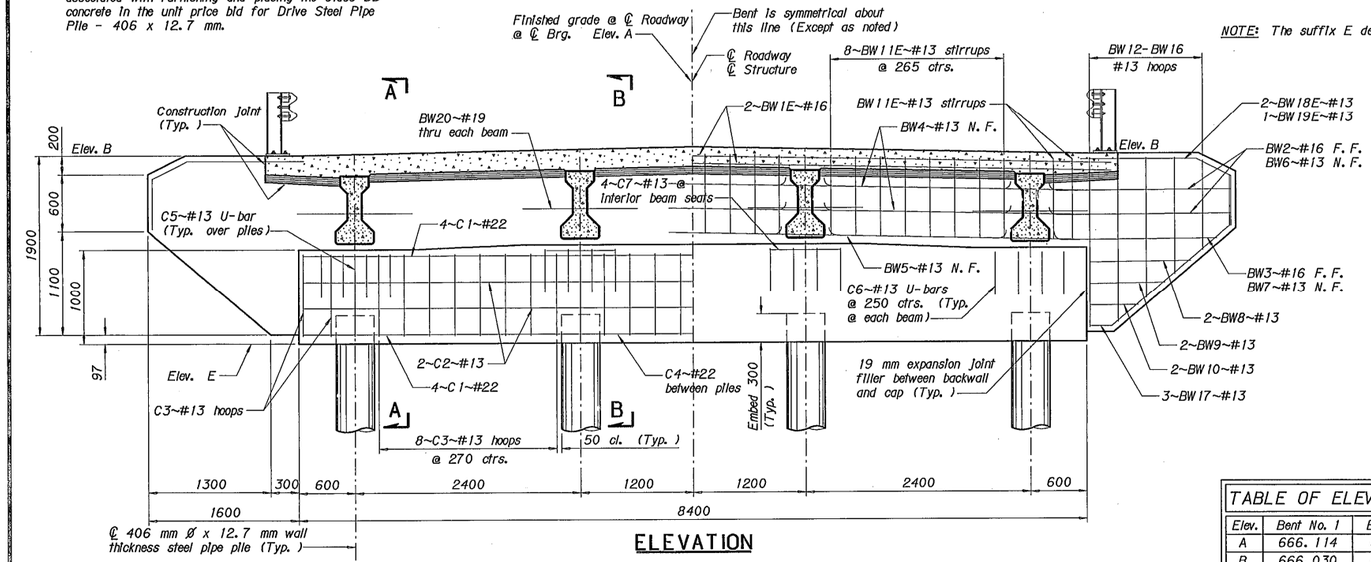
PLAN

NOTE: Include all costs associated with furnishing and placing the expansion joint filler, tarpaper, neoprene waterstop and metal expansion caps in the unit price bid for Concrete - Class DD.

NOTE: Mount rail posts on end bents with M20 x 600 mm galvanized high tensile strength stud bolts (ASTM F 568M Class 8.8) (50 mm of thread) embedded into the backwall. See General Layout Dwg. No. 18075 for additional rail post spacing.

NOTE: The suffix E denotes epoxy coated reinforcing steel.

NOTE: Fill the steel pipe piles with Class DD concrete to the bottom of cap elevation. Wait a minimum of one day before placing the pile cap concrete. Include all costs associated with furnishing and placing the Class DD concrete in the unit price bid for Drive Steel Pipe Pile - 406 x 12.7 mm.



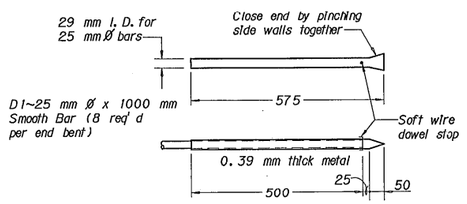
ELEVATION

(Bent No. 1 ~ Back on line)
(Bent No. 4 ~ Ahead on line)

NOTE: Maximum pile reaction under:
D. L. + L. L. = 476.4 kN/pile
Design pile tip Elevation: 634.4 m

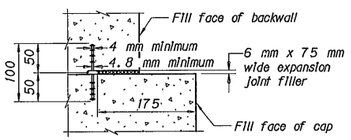
Contact the MDT Geotechnical Section at (406)444-6280 if pile tip elevations deviate 300 mm for the elevation indicated.

TABLE OF ELEVATIONS		
Elev.	Bent No. 1	Bent No. 4
A	666.114	666.123
B	666.030	666.039
C	665.033	665.042
D	665.081	665.090
E	664.033	664.042



METAL EXPANSION CAP DETAIL

No Scale

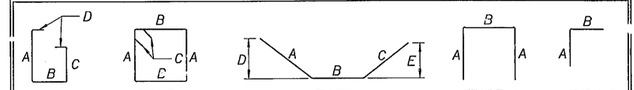


WATERSTOP DETAIL

No Scale

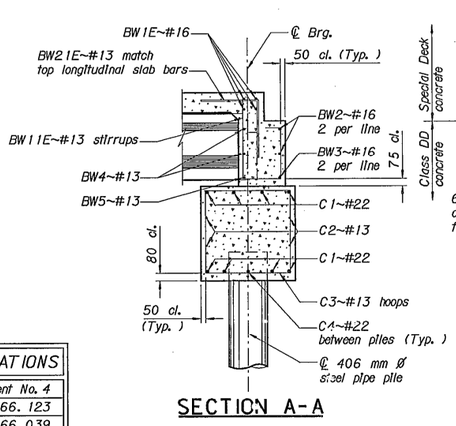
NOTE: Hold waterstop in accurate position while placing concrete.

BILL OF REINFORCING STEEL

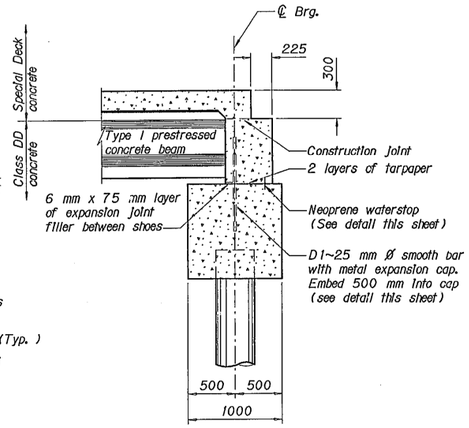


STRAIGHT BARS				BENT BARS (All dimensions are out to out)								
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C	D	E
BW1E	16	4	8950	BW11E	13	28	1	2120	850	400	550	160	
BW2	16	4	6010	BW12	13	2	2	4720	1800	400	160		
BW3	16	2	5810	CW13	13	2	2	4600	1740	400	160		
BW4	13	6	1990	BW14	13	2	2	4100	1490	400	160		
BW5	13	3	1890	BW15	13	2	2	3580	1230	400	160		
BW6	13	4	1950	BW16	13	2	2	3020	950	400	160		
BW7	13	2	1750	BW17	13	6	3	2410	230	1650	530	150	400
BW8	13	4	1070	BW18E	13	4	3	2190	1250	410	530	560	480
BW9	13	4	790	BW19E	13	2	3	2080	1140	410	530	510	480
BW10	13	4	510	BW21E	13	28	5	1220	610	610			
BW20	19	4	1220										
C1	22	8	9300	C3	13	28	2	3860	870	900	160		
C2	13	4	8300	C5	13	4	4	2640	870	900			
C4	22	3	1890	C6	13	16	4	1800	450	900			
C7	13	8	850										
*													
D1 *	25Ø	8	1000										

NOTE: Use D1~25 mm Ø smooth bars meeting the requirements of AASHTO M 270M Grade 250.



SECTION A-A



SECTION B-B

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 16+81.74

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

BENTS NO. 1 AND NO. 4

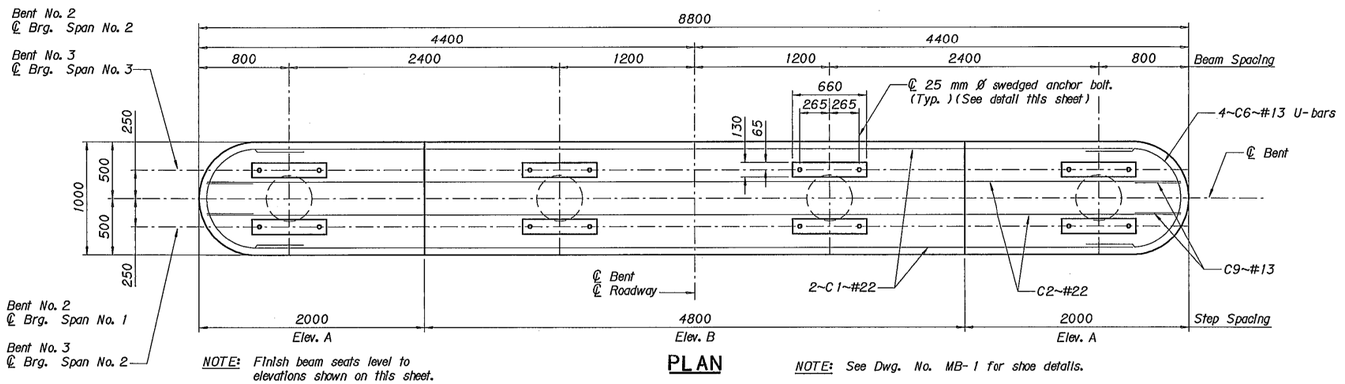
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DRAWN	1/2/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

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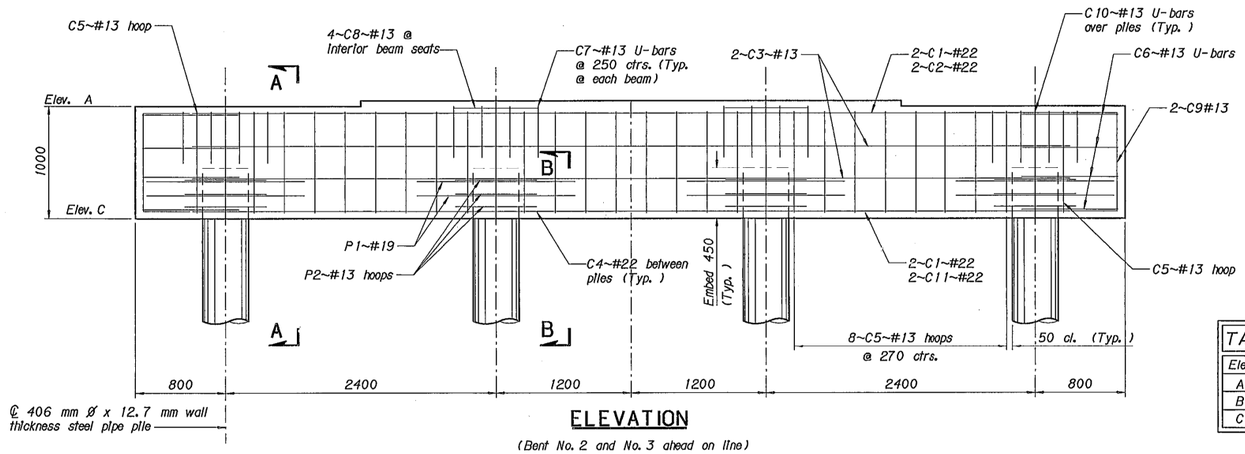
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B10



NOTE: Finish beam seats level to elevations shown on this sheet.

PLAN

NOTE: See Dwg. No. MB-1 for shoe details.

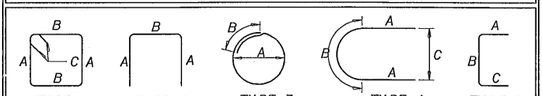


ELEVATION

(Bent No. 2 and No. 3 ahead on line)

TABLE OF ELEVATIONS		
Elev.	Bent No. 2	Bent No. 3
A	665.036	665.039
B	665.084	665.087
C	664.036	664.039

BILL OF REINFORCING STEEL



STRAIGHT BARS				BENT BARS (All dimensions are out to out)						
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C
C1	#22	4	7800	C5	#13	26	1	3920	900	900	160
C2	22	2	8650	C6	13	8	4	2180	410	1360	870
C3	13	4	7800	C7	13	16	2	1800	450	900	
C4	22	3	1890	C9	13	4	5	1810	410	870	530
C8	13	8	850	C10	13	4	2	2700	900	900	
C11	22	2	8540								
P1	#19	8	1400	P2	#13	12	3	2660	720	400	

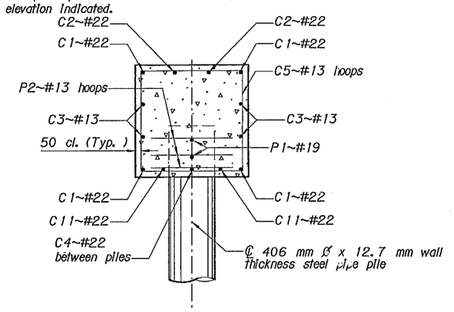
NOTES:

Fill the steel pipe piles with Class DD concrete to the bottom of cap elevation. Wait a minimum of one day before placing the pile cap concrete. Include all costs associated with furnishing and placing the Class DD concrete in the unit price bid for Drive Steel Pipe Pile - 406 x 12.7 mm.

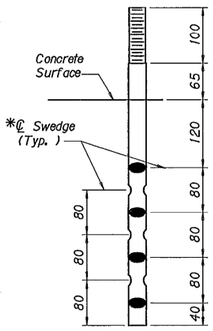
A variation of 6 mm per 300 mm of pile is allowable in the direction of the piles. The total allowable variation in the transverse or longitudinal location of the top of the piles is 75 mm. Provide adequate templates or other means to hold the piles within these tolerances. Any variation in excess of said tolerances constitutes cause for remedial action, as determined by the Engineer, at no additional cost to the State.

Maximum pile reaction under:
D.L. + L.L. + B + SF = 590.6 kN/pile
Design pile tip Elevevation: 634.4 m

Contact the MDT Geotechnical Section at (406)444-6280 if pile tip elevations deviate 300 mm for the elevation indicated.



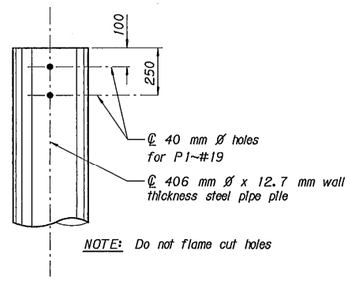
SECTION A - A



ANCHOR BOLT DETAIL

No Scale

*Make swedge deformations approximately 5 mm deep without removing metal.



NOTE: Do not flame cut holes

VIEW B - B

Scale ~ 1: 15

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 16+81.74

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

BENTS NO. 2 AND NO. 3

Scale ~ 1: 25

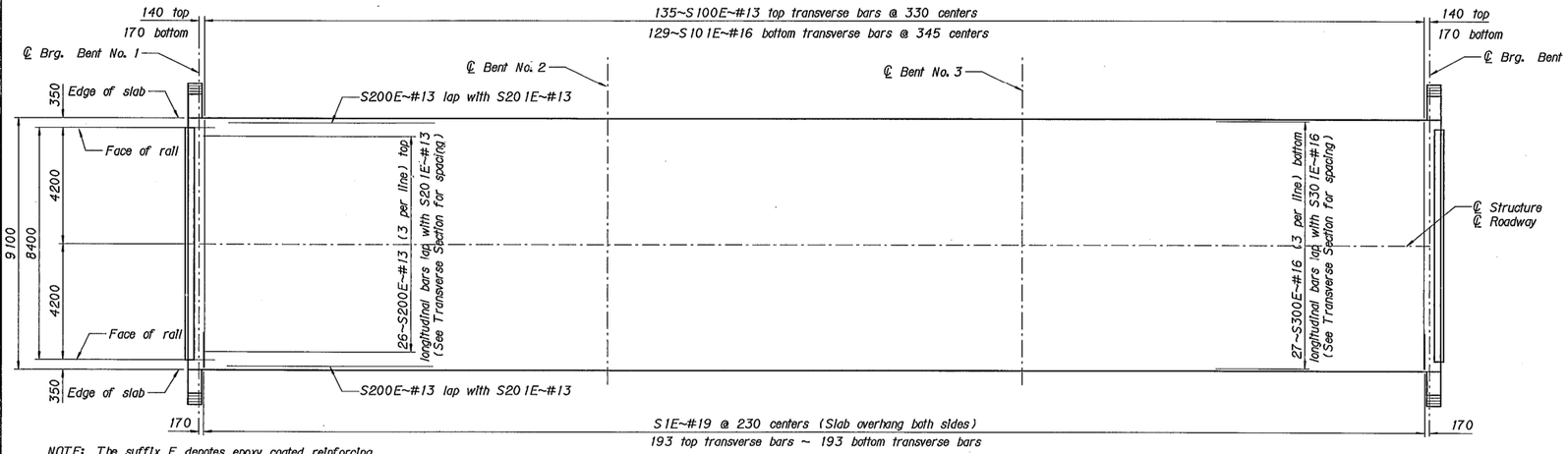
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DRAWN	1/4/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 34211B2.BRG DRAWING NO. 18078

BRIDGE BUREAU

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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B11



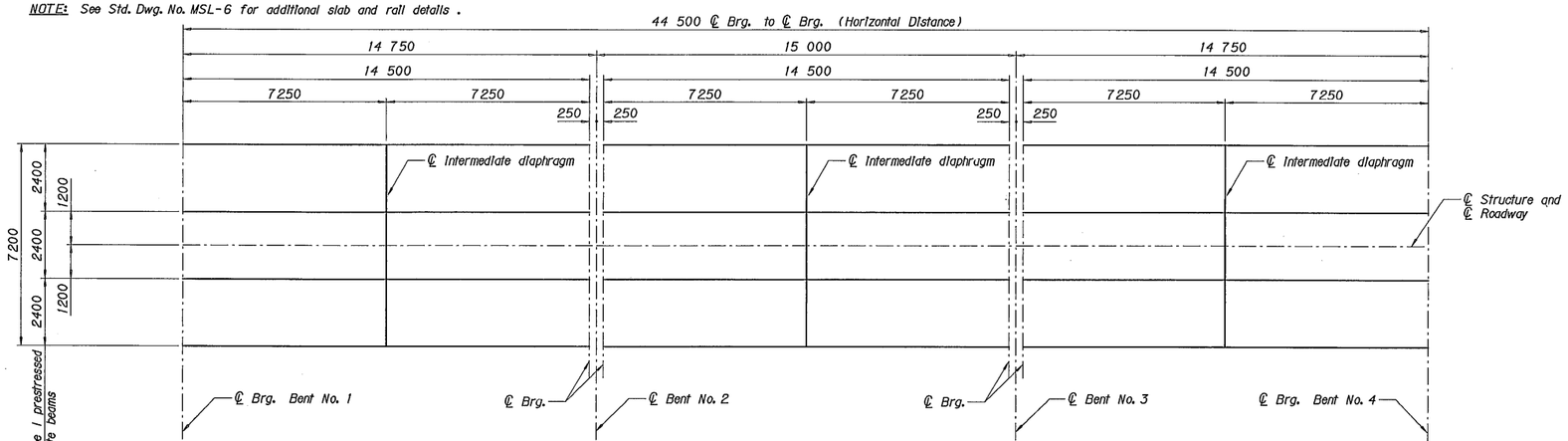
SLAB REINFORCING STEEL PLACEMENT DIAGRAM

NOTE: The suffix E denotes epoxy coated reinforcing.

NOTE: Lap #13 bars 610 mm minimum.
Lap #16 bars 610 mm minimum.

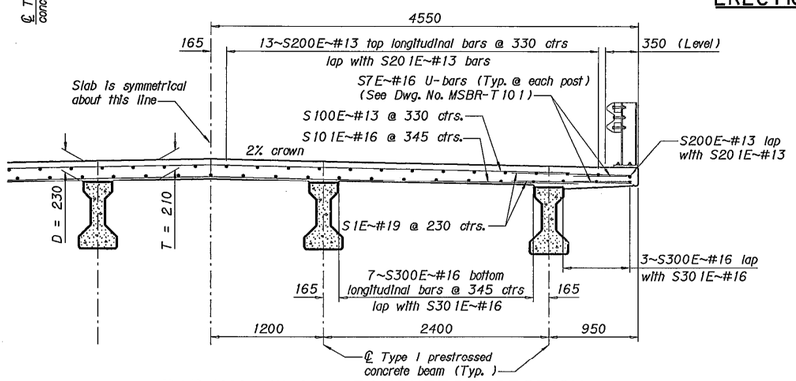
NOTE: See Std. Dwg. No. MSL-6 for additional slab and rail details .

NOTE: See Special Provisions for Coordination and Installation of Bridge Deck Instrumentation with the Research Project.



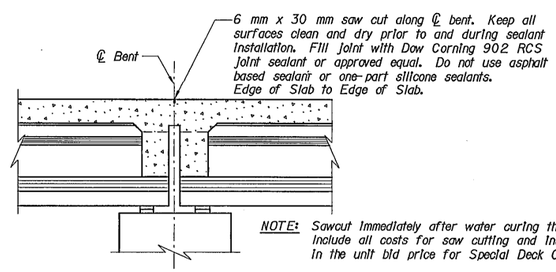
ERECTION PLAN

NOTE: See Dwg. No. MSL-6 for interior diaphragm reinforcing and bent diaphragm reinforcing steel.



PARTIAL SLAB TRANSVERSE SECTION

Scale ~ 1:30

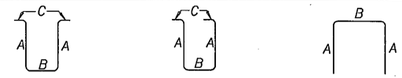


NOTE: Sawcut immediately after water curing the deck. Include all costs for saw cutting and installing the sealant in the unit bid price for Special Deck Concrete.

SAWCUT DETAIL (BENT NO. 2 ONLY)

Scale ~ 1:25

BILL OF REINFORCING STEEL



STRAIGHT BARS				BENT BARS (All dimensions are out to out)						
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C
S100E	#13	135	7640	S7E	#16	72	3	1520	610	300	
S101E	16	129	7820								
S200E	13	78	12 190	D4E	13	84	2	1570	570	170	130
S201E	13	26	10 200	D7E	#13	63	1	1570	570	170	130
S300E	13	81	12 190								
S301E	13	27	10 200								
D3E	19	12	2040								
D5E	13	18	2040								
D6E	19	18	2040								
D8E	19	6	1220								
S1E	#19	772	1280								

PRESTRESSED CONCRETE BEAMS: Fabricate the prestressed concrete beams in accordance with Dwg. No. MB-1 except as indicated on this drawing. Maximum f'c (Compressive strength of concrete in 28 days) for design is 48 MPa . Design stresses without prestress are as shown in the table below.

*NOTE: The nominal moment strength of the section (Mn) must be greater than or equal to Mu/Ø where Ø = 1.0.

BEAM DESIGN STRESSES

Beam Length (℄ Brg. to ℄ Brg.) (Horizontal Distance)		14 500
Beam D.L. Stresses (MPa @ .5 pt.)	F_t	4.56
	F_b	-3.74
Total D.L. + L.L. + I. Design Stresses (MPa)	F_t	20.18
Total D.L. + 0.80(L.L. + I) Design Stresses (MPa)	F_b	-26.58
Compression Zone ~ Full D.L. (MPa)	F_t	18.66
Compression Zone ~ 0.5 D.L. + L.L. + I. (MPa)	F_t	10.85
Factored Moment @ Section (kN-m)	$*M_u$	2111

$*M_u$ = 1.0 [1.25 D.C. + 1.50 D.W. + 1.75 (L.L. + I.)]

DEAD LOAD DEFLECTION TABLE

TYPE I PRESTRESSED CONCRETE BEAM

Span Length		Tenth Point				
		.1	.2	.3	.4	.5
14 500 Span	Int.	8	15	20	24	25
	Ext.	7	13	18	21	22

NOTE: Deflections symmetrical about 0.5 point and do not include beam dead load.

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 16+81.74

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

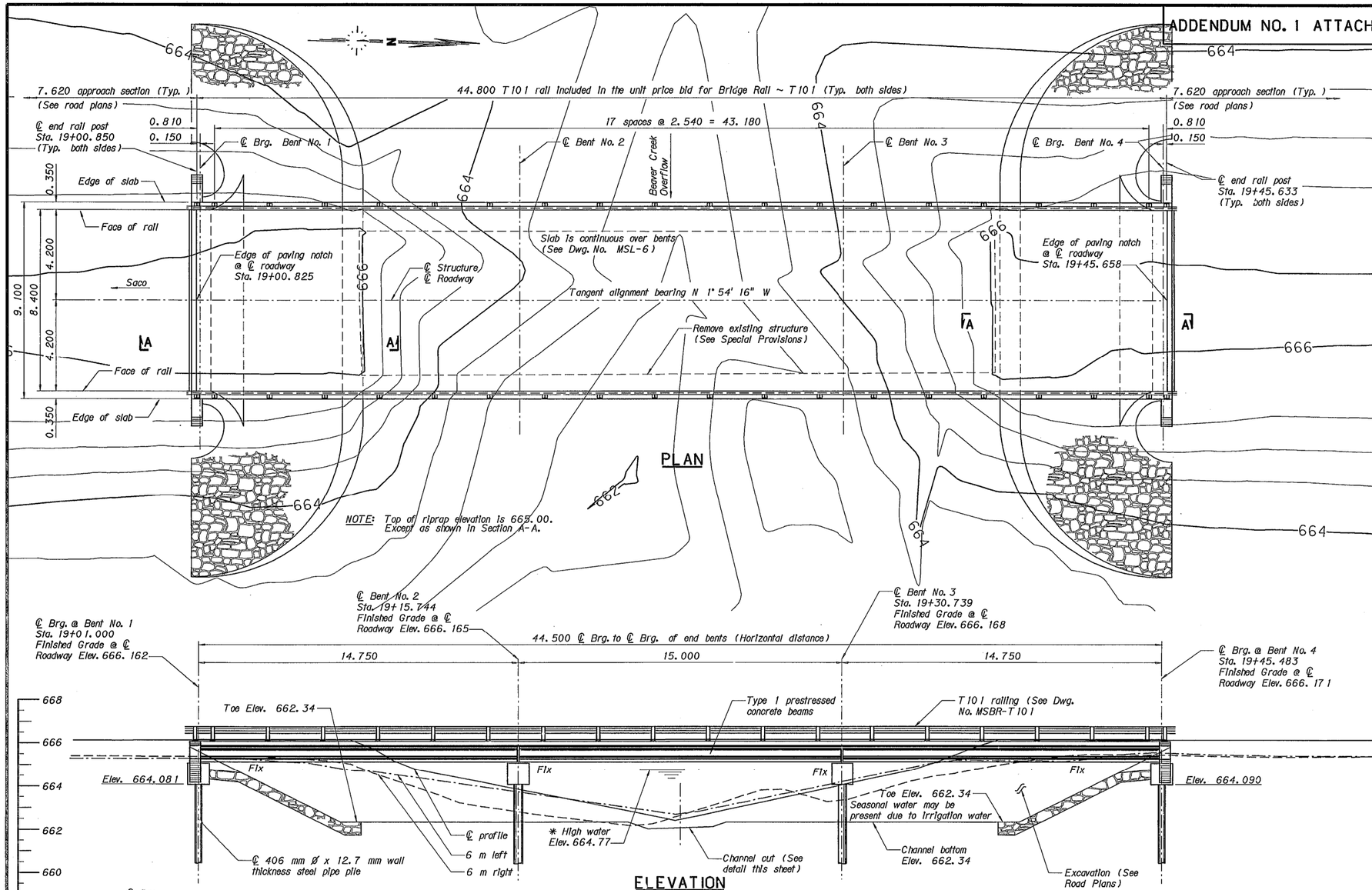
SLAB DETAILS & ERECTION PLAN

Scale ~ 1:100

DESIGNED	2/1/01	MBL
DRAWN	2/6/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 3421S2.BRG DRAWING NO. 18079

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NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as the Profile Grade shown on Road Plans.

LIVE LOAD: Standard HL-93 loading.

SPECIFICATIONS: Montana Department of Transportation and the Montana Transportation Commission Standard Specifications for Road and Bridge Construction, 1995 edition, and any amendments thereto, and the Special Provisions govern unless otherwise noted. Design was prepared in accordance with AASHTO LRFD Bridge Design Specifications, 1998 edition, and any amendments thereto.

REINFORCING STEEL: Use new deformed type reinforcing steel meeting the requirements of AASHTO M 31M Grade 60 (420). Include all costs associated with furnishing and placing new reinforcing steel in the unit price bid for either Reinforcing Steel or Reinforcing Steel - Epoxy Coated.

CAST IN PLACE CONCRETE: Unless otherwise approved or specified, use Class DD for all substructure concrete and Class Special Deck for all superstructure concrete.

CONCRETE STRENGTH: Use f'c for Class DD concrete = 21 MPa; f'c for Class Special Deck concrete = 28 MPa for structural design purposes only. See Special Provisions for Special Deck mix design requirements.

STRUCTURE EXCAVATION: Include structure Excavation in the unit price bid for Class DD concrete.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See Special Provisions.

UTILITIES: Call 1-800-424-5555 for utility locates at least two working days prior to starting any construction activity that could disturb the utility.

EXISTING STRUCTURE: Remove the existing structure (see Road Plans sheets and Special Provisions).

DIMENSIONS: All dimensions shown on the General Layout are in meters. All other drawings are dimensioned in millimeters except as noted. Stations and elevations are expressed in meters. Stations shown on the bridge plans are state plane grid stations based on state plane coordinates (NAD83-1992). Dimensions shown on the bridge plans are horizontal ground distances and not state plane grid distances. The combination scale factor (CSF) at this location is 0.9996 1362.

Horizontal ground distance x CSF = Grid Distance
Grid Distance/CSF = Distance to stake

FOUNDATIONS PILES BENT NO. 2 AND BENT NO. 3
Pile driving length will be measured from the excavated channel bottom elevation shown in the elevation view.

STREAM DATA

Drift:	None
Pier Scour (Q100):	1.02 m
Contraction Scour (Q100):	0.91 m
Ice:	Light
Drainage Area:	3302 sq. km
2-year Stage (Q2):	Normally Dry
Base Flood Flow (Q100):	134.59 m³/sec
*Base Flood Stage:	664.77
Base Flood Velocity:	3.30 m/sec
Low Beam Elevation:	665.146

*Also see Hydraulic Data Summary sheet.
Base Flood Stage elevation includes backwater

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 19+23.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

GENERAL LAYOUT

Scale ~ 1:100

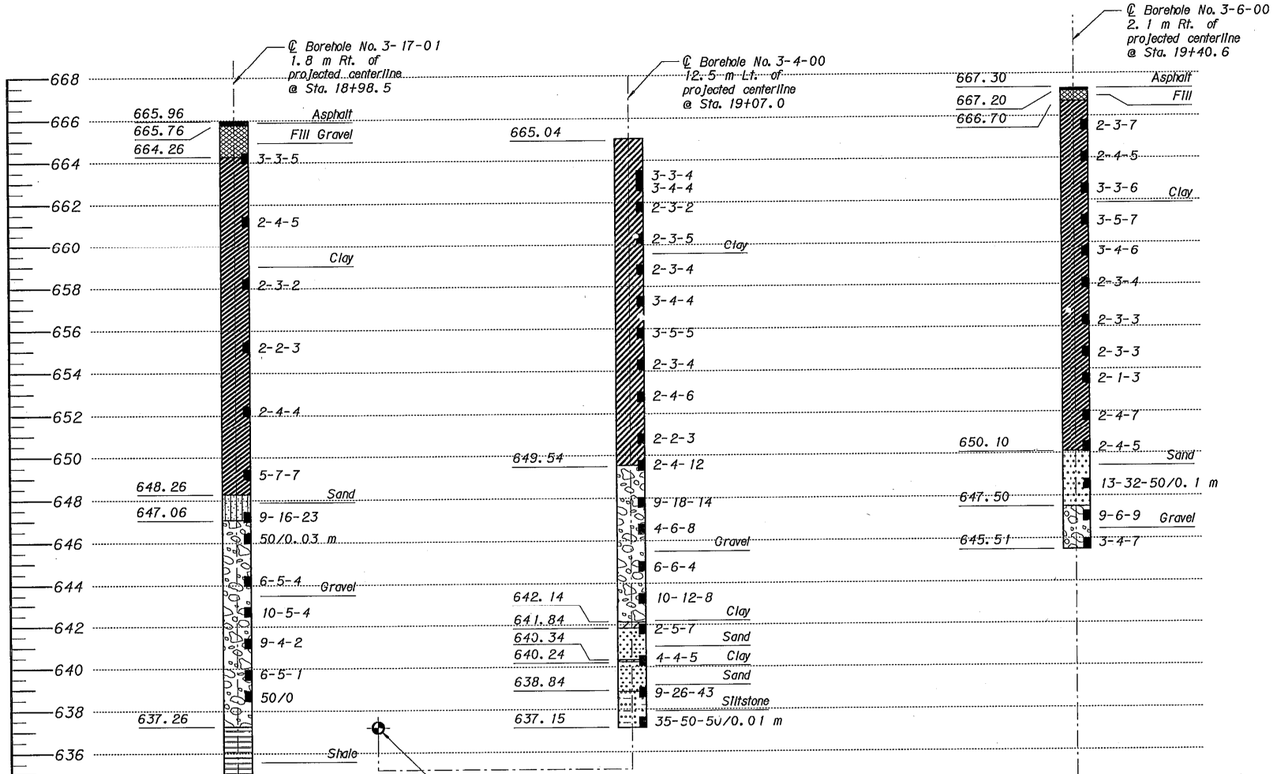
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DRAWN	12/28/00	KSTG
CHECKED	8/6/01	MJS/MBL
APPROVED	10/3/01	JPK
REVISED		
REVISED		

FILENAME: 3421GL3.BRG DRAWING NO. 18080

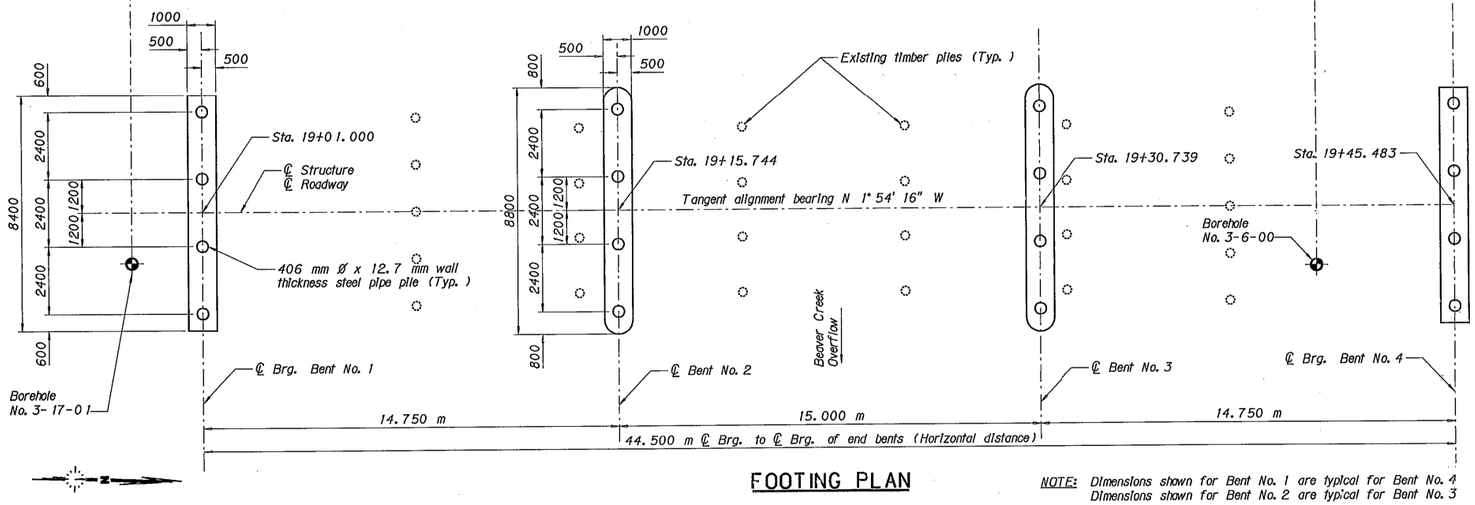
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08/14/02
01:10:22 PWCPS - U8472

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B13

BRIDGE BUREAU

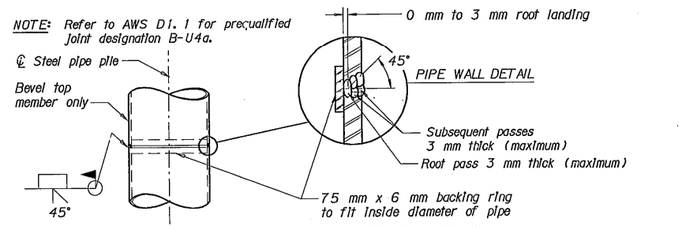


LOG OF BORINGS



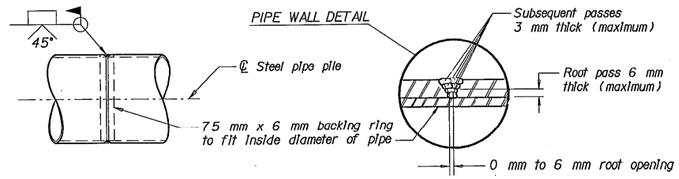
FOOTING PLAN

NOTE: Dimensions shown for Bent No. 1 are typical for Bent No. 4
Dimensions shown for Bent No. 2 are typical for Bent No. 3



PILE EXTENSION AFTER DRIVING

(Pile Vertical)



PILE EXTENSION BEFORE DRIVING

(Rotate pile so that all welding is done in the flat position)

PERMISSIBLE WELDED SPLICE DETAILS FOR STEEL PIPE PILES

No Scale

NOTE: Use only E7018 or E7028 series electrodes. Maximum electrode size is 5 mm. Prepare the weld surfaces to a smooth, uniform finish. Remove all fins, tears, loose scale, slag, rust, grease, moisture and other material that would prevent proper welding.

NOTES

SOILS AND FOUNDATION MATERIALS: The Footing Plan shows points where the State of Montana, Department of Transportation, drilled boreholes.

The series of numbers on the Log of Borings shows the number of blows from a 63.5 kg hammer with a 0.760 m drop required to drive a 51 mm split spoon sampler 0.150 m (Standard Penetration Test). The length of the split spoon sampler is 0.450 m. The sampler length is measured as three 0.150 m intervals. If the split spoon sampler did not penetrate 0.150 m after 50 blows, the Log of Borings shows the measured penetration within that particular interval.

The State of Montana, Department of Transportation, assumes no responsibility for any variation or misinterpretation of the classes of materials and will make no adjustment in bid prices if site conditions differ from the Log of Borings.

See the Special Provisions for original boring logs and additional subsurface information.

FOUNDATION PILES: Pile lengths shown have been estimated for bidding purposes only.

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 19+23.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

FOOTING PLAN

Scale ~ 1: 100

DESIGNED	11/20/00	MBL
DRAWN	2/15/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 3421FP3.BRG DRAWING NO. 18081

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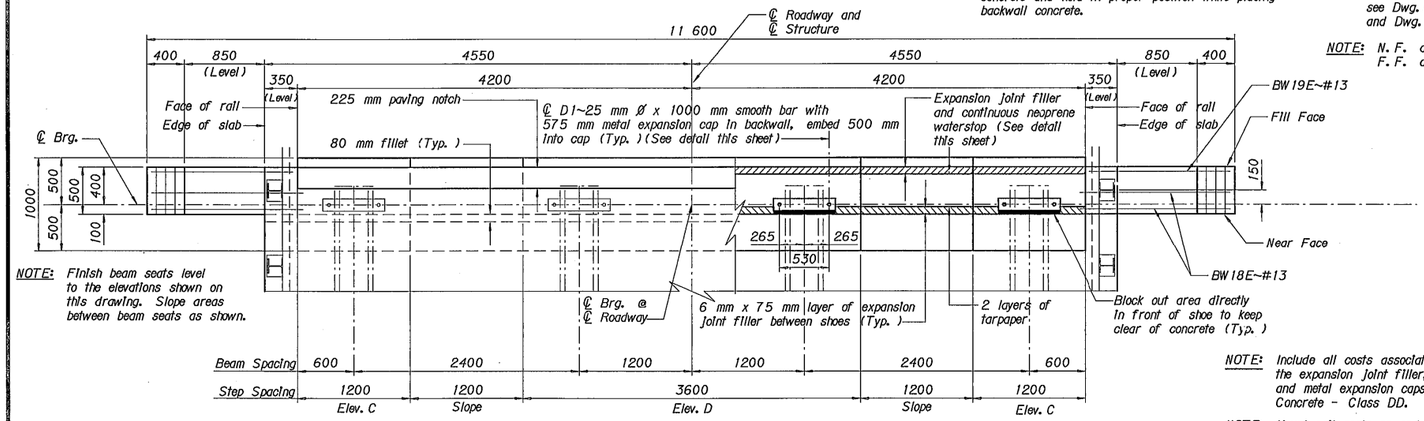
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B14

NOTE: Securely nail expansion joint filler to pile cap concrete and hold in proper position while placing backwall concrete.

NOTE: Slab and beam reinforcing steel is omitted for clarity. For details see Dwg. No. MSL-6, Dwg. No. MB-1, and Dwg. No. 18084 for details.

NOTE: N. F. denotes near face. F. F. denotes fill face.

NOTE: Lap #13 bars 410 mm minimum. Lap #16 bars 510 mm minimum.



NOTE: Finish beam seats level to the elevations shown on this drawing. Slope areas between beam seats as shown.

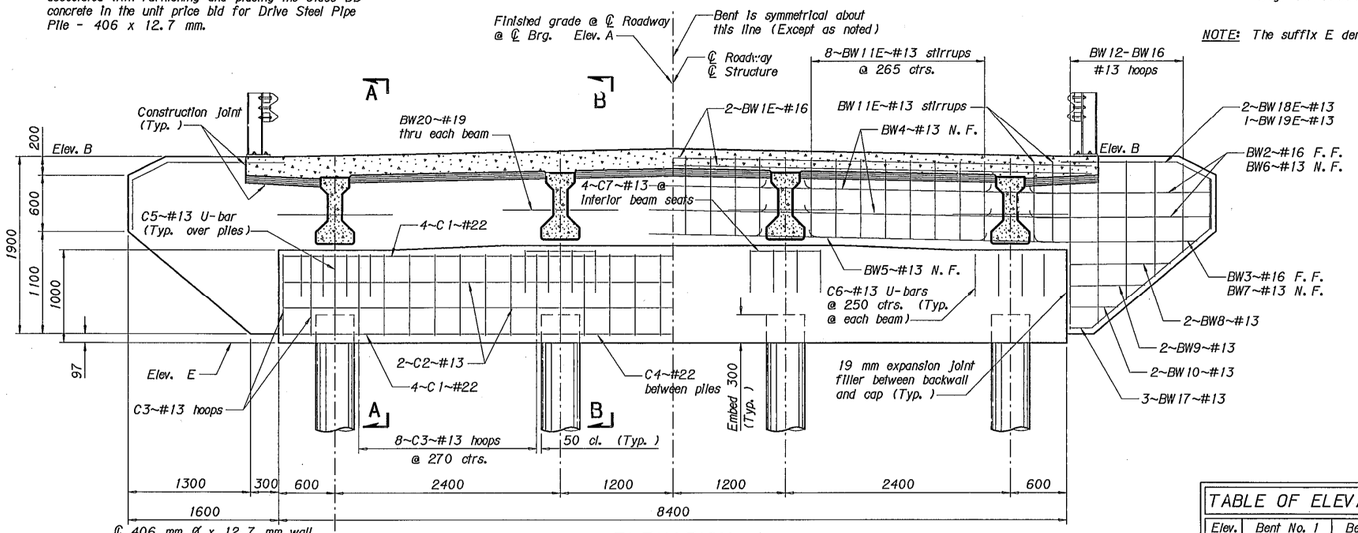
PLAN

NOTE: Include all costs associated with furnishing and placing the expansion joint filler, tarpaper, neoprene waterstop and metal expansion caps in the unit price bid for Concrete - Class DD.

NOTE: Mount rail posts on end bents with M20 x 600 mm galvanized high tensile strength stud bolts (ASTM F 568M Class 8.8) (50 mm of thread) embedded into the backwall. See General Layout Dwg. No. 18080 for additional rail post spacing.

NOTE: The suffix E denotes epoxy coated reinforcing steel.

NOTE: Fill the steel pipe piles with Class DD concrete to the bottom of cap elevation. Wait a minimum of one day before placing the pile cap concrete. Include all costs associated with furnishing and placing the Class DD concrete in the unit price bid for Drive Steel Pipe Pile - 406 x 12.7 mm.

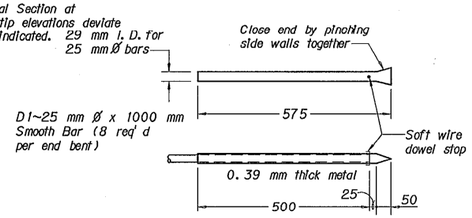


ELEVATION

(Bent No. 1 ~ Back on line)
(Bent No. 4 ~ Ahead on line)

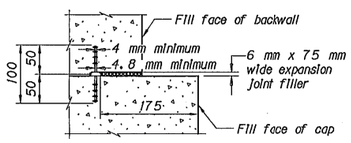
NOTE: Maximum pile reaction under:
D.L. + L.L. = 476.4 kN/pile
Design pile tip Elevevation: 636.3 m

Contact the MDT Geotechnical Section at (406)444-6280 if pile tip elevations deviate 300 mm for the elevation indicated. 29 mm I. D. for 25 mm Ø bars



METAL EXPANSION CAP DETAIL

No Scale



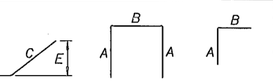
WATERSTOP DETAIL

No Scale

NOTE: Hold waterstop in accurate position while placing concrete.

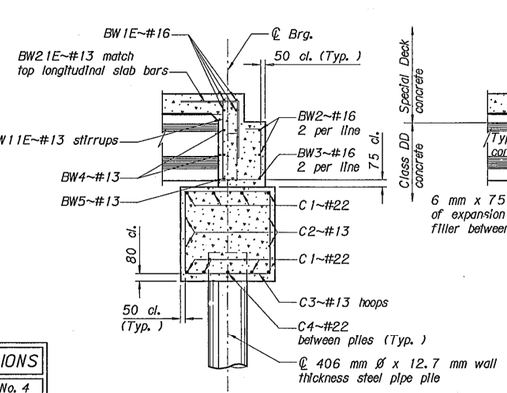
TABLE OF ELEVATIONS		
Elev.	Bent No. 1	Bent No. 4
A	666.162	666.171
B	666.078	665.087
C	665.081	665.090
D	665.129	665.138
E	664.081	664.090

BILL OF REINFORCING STEEL

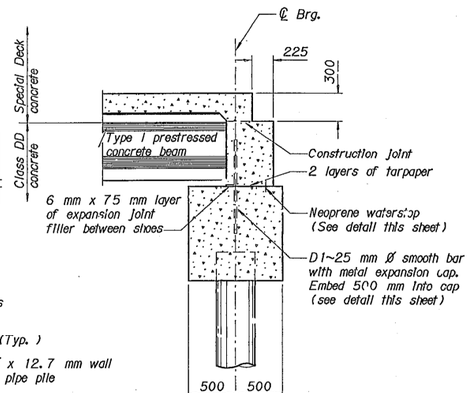


STRAIGHT BARS				BENT BARS (All dimensions are out to out)								
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C	D	E
BW1E	16	4	8950	BW11E	13	28	1	2120	850	400	550	160	
BW2	16	4	6010	BW12	13	2	2	1720	1800	400	160		
BW3	16	2	5810	BW13	13	2	2	4600	1740	400	160		
BW4	13	6	1990	BW14	13	2	2	4100	1490	400	160		
BW5	13	3	1890	BW15	13	2	2	3080	1230	400	160		
BW6	13	4	1950	BW16	13	2	2	3020	950	400	160		
BW7	13	2	1750	BW17	13	6	3	2410	230	1650	530	150	400
BW8	13	4	1070	BW18E	13	4	3	2190	1250	410	530	560	480
BW9	13	4	790	BW19E	13	2	3	2080	1140	410	530	510	480
BW10	13	4	510	BW21E	13	23	5	1220	610	610			
BW20	19	4	1220										
C1	22	8	8300	C3	13	28	2	3860	870	900	160		
C2	13	4	8300	C5	13	4	4	2640	870	900			
C4	22	3	1890	C6	13	16	4	1800	450	900			
C7	13	8	850										
*													
D1 *	250	8	1000										

NOTE: Use D1~25 mm Ø smooth bars meeting the requirements of AASHTO M 270M Grade 250.



SECTION A-A



SECTION B-B

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 19+23.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

BENTS NO. 1 AND NO. 4

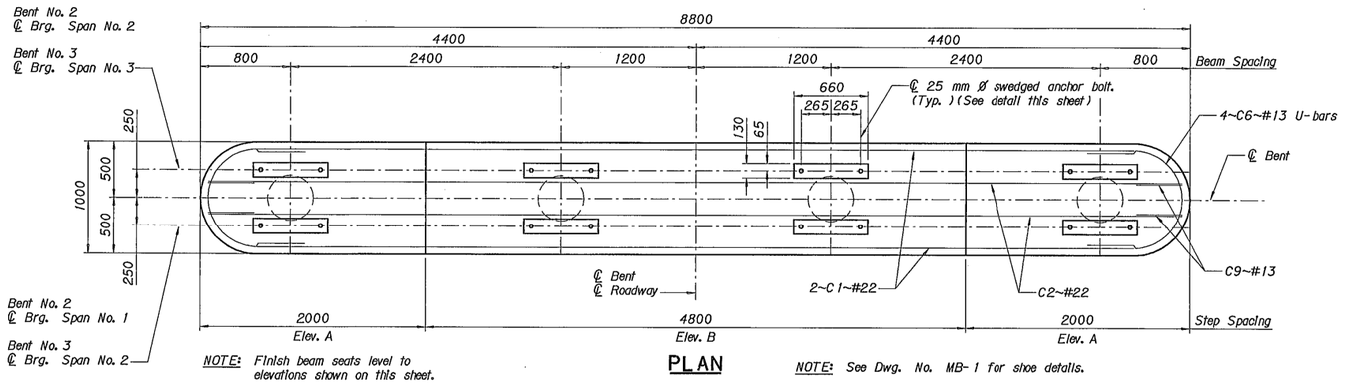
Scale ~ 1:30

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DRAWN	1/2/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

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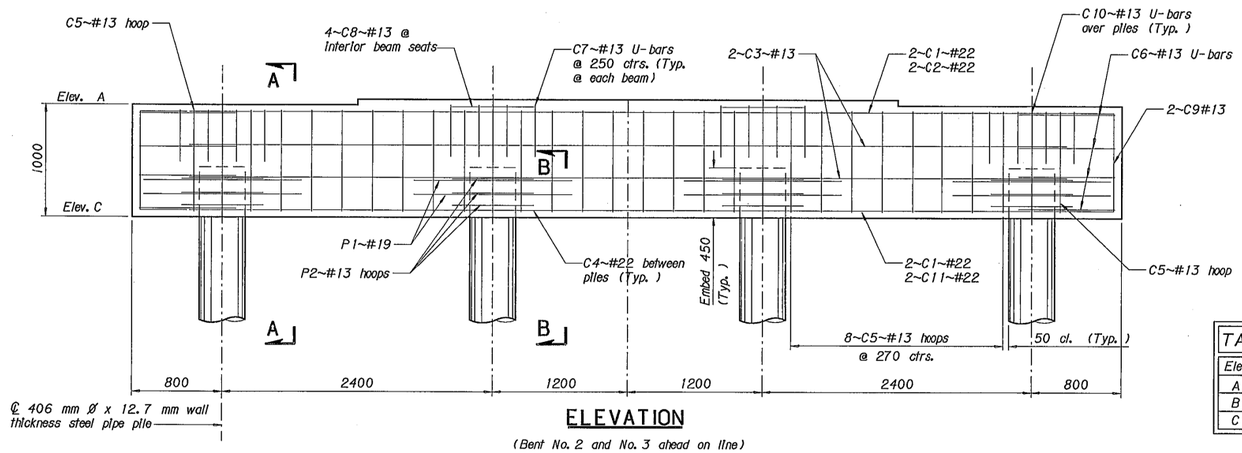
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B15



NOTE: Finish beam seats level to elevations shown on this sheet.

PLAN

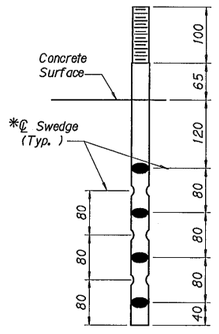
NOTE: See Dwg. No. MB-1 for shoe details.



ELEVATION

(Bent No. 2 and No. 3 ahead on line)

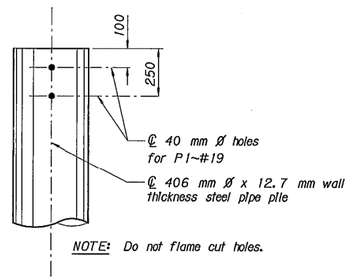
TABLE OF ELEVATIONS		
Elev.	Bent No. 2	Bent No. 3
A	665.084	665.087
B	665.132	665.135
C	664.084	664.087



ANCHOR BOLT DETAIL

No Scale

*Make swedge deformations approximately 5 mm deep without removing metal.

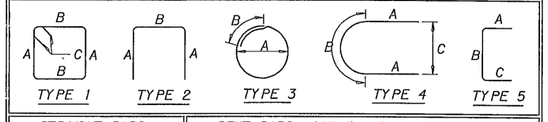


NOTE: Do not flame cut holes.

VIEW B - B

Scale ~ 1: 15

BILL OF REINFORCING STEEL



STRAIGHT BARS				BENT BARS (All dimensions are out to out)							
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C
C1	#22	4	7800	C5	#13	26	1	3920	900	900	160
C2	22	2	8650	C6	13	8	4	2180	410	1360	870
C3	13	4	7800	C7	13	16	2	1800	450	900	
C4	22	3	1890	C9	13	4	5	1810	410	870	530
C8	13	8	850	C10	13	4	2	2700	900	900	
C11	22	2	8540								
P1	#19	8	1400	P2	#13	12	3	2660	720	400	

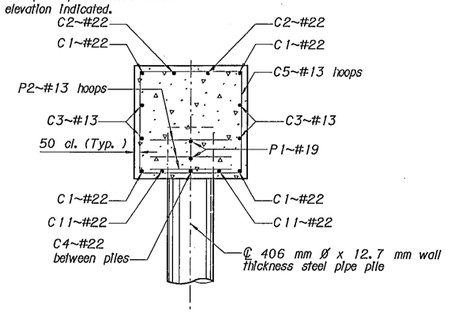
NOTES:

Fill the steel pipe piles with Class DD concrete to the bottom of cap elevation. Wait a minimum of one day before placing the pile cap concrete. Include all costs associated with furnishing and placing the Class DD concrete in the unit price bid for Drive Steel Pipe Pile - 406 x 12.7 mm.

A variation of 6 mm per 300 mm of pile is allowable in the direction of the piles. The total allowable variation in the transverse or longitudinal location of the top of the piles is 75 mm. Provide adequate templates or other means to hold the piles within these tolerances. Any variation in excess of said tolerances constitutes cause for remedial action, as determined by the Engineer, at no additional cost to the State.

Maximum pile reaction under:
D.L. + L.L. + B + SF= 590.6 kN/pile
Design pile tip Elevevation: 636.3 m

Contact the MDT Geotechnical Section at (406)444-6280 if pile tip elevations deviate 300 mm for the elevation indicated.



SECTION A - A

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW AT STA. 19+23.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

BENTS NO. 2 AND NO. 3

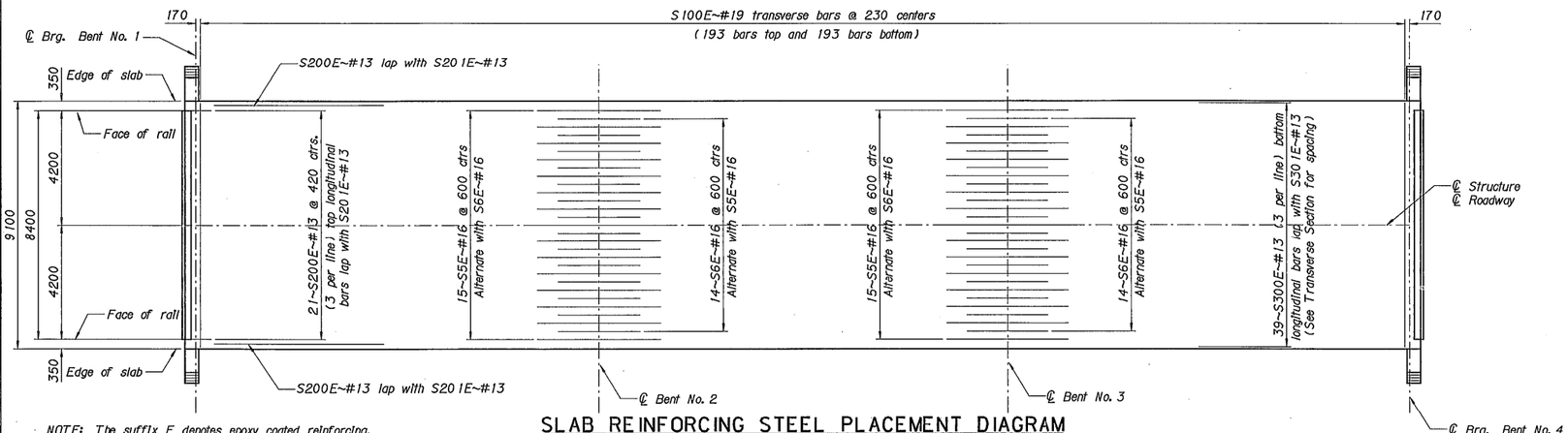
Scale ~ 1: 25

DESIGNED	1/4/01	MBL
DRAWN	1/4/01	KSTG
CHECKED	8/6/01	MJS/MBL
REVISED		
REVISED		
REVISED		

FILENAME: 3421IB3.BRG DRAWING NO. 18083

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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 243-1(7)20	B16



SLAB REINFORCING STEEL PLACEMENT DIAGRAM

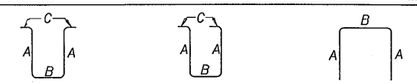
NOTE: The suffix E denotes epoxy coated reinforcing.

NOTE: Lap #13 bars 610 mm minimum.

NOTE: See Std. Dwg. No. MSL-6 for additional slab and rail details . .

NOTE: See Special Provisions for Coordination and Installation of Bridge Deck Instrumentation with the Research Project.

BILL OF REINFORCING STEEL



STRAIGHT BARS				BENT BARS (All dimensions are out to out)						
Mark	Size	No.	Length	Mark	Size	No.	Type	Length	A	B	C
S100E	#19	386	8950	S7E	#16	72	3	1520	610	300	
S200E	13	69	12 100	D4E	13	84	2	1570	570	170	130
S201E	13	23	10 200	D7E	#13	63	1	1570	570	170	130
S300E	13	117	12 190								
S301E	13	39	10 200								
D3E	19	12	2040								
D5E	13	18	2040								
D6E	19	18	2040								
D8E	19	6	1220								
S5E	16	30	4500								
S6E	#16	28	3000								

PRESTRESSED CONCRETE BEAMS: Fabricate the prestressed concrete beams in accordance with Dwg. No. MB-1 except as indicated on this drawing. Maximum f'c (Compressive strength of concrete in 28 days) for design is 48 MPa . Design stresses without prestress are as shown in the table below.

*NOTE: The nominal moment strength of the section (Mn) must be greater than or equal to Mu/ø where ø = 1.0.

BEAM DESIGN STRESSES

Beam Length (℄ Brg. to ℄ Brg.)(Horizontal Distance)		14 500
Beam D.L. Stresses (MPa @ .5 pt.)	Ft	4.56
	Fb	-3.74
Total D.L. + L.L. + I. Design Stresses (MPa)	Ft	20.18
Total D.L. + 0.80(L.L. + I) Design Stresses (MPa)	Fb	-26.58
Compression Zone ~ Full D.L. (MPa)	Ft	18.66
Compression Zone ~ 0.5 D.L. + L.L. + I. (MPa)	Ft	10.85
Factored Moment @ Section (kN-m)	*M_u	2111

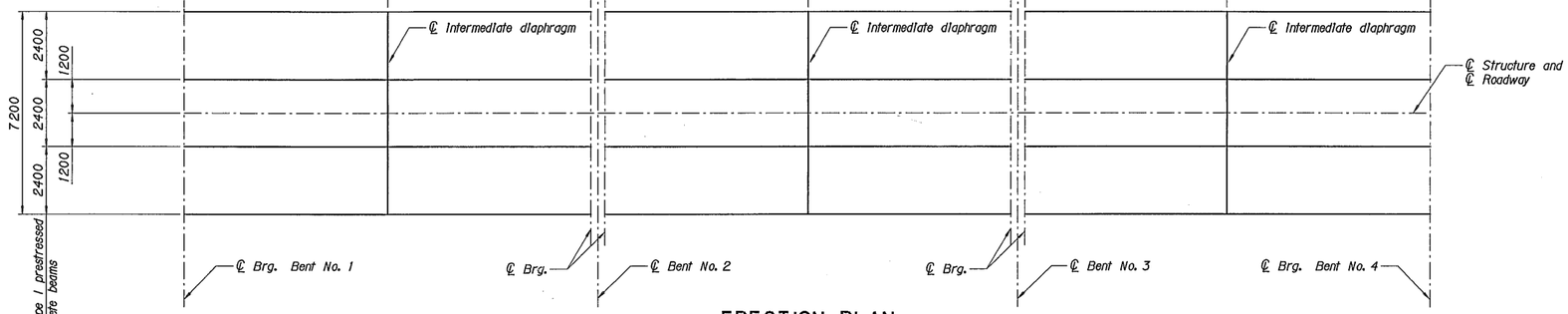
*M_u = 1.0 [1.25 D.C. + 1.50 D.W. + 1.75 (L.L. + I.)]

DEAD LOAD DEFLECTION TABLE

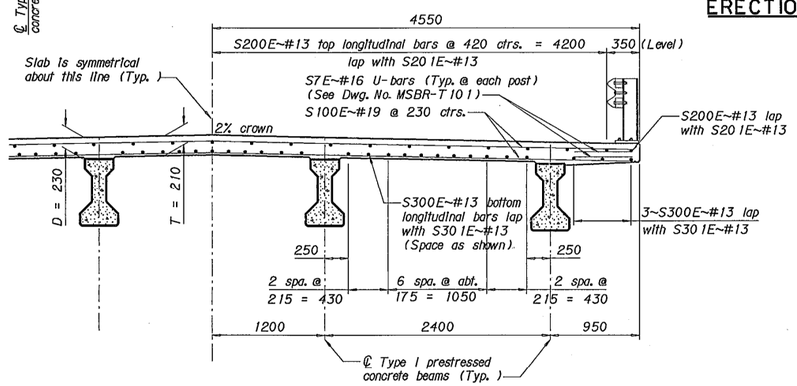
TYPE I PRESTRESSED CONCRETE BEAM

Span Length		Tenth Point				
		.1	.2	.3	.4	.5
14 500 Span	Int.	8	15	20	24	25
	Ext.	7	13	18	21	22

NOTE: Deflections symmetrical about 0.5 point and do not include beam dead load.

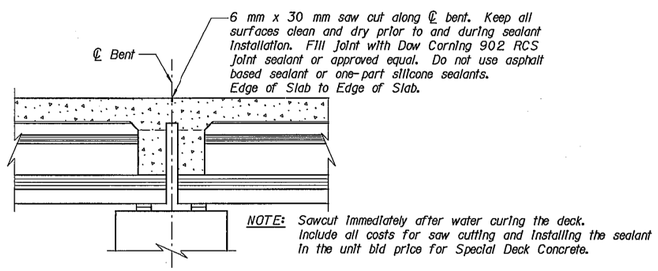


ERECTION PLAN



PARTIAL SLAB TRANSVERSE SECTION

Scale ~ 1:30



NOTE: Sawcut immediately after water curing the deck. Include all costs for saw cutting and installing the sealant in the unit bid price for Special Deck Concrete.

SAWCUT DETAIL (BENT NO. 2 ONLY)

Scale ~ 1:25

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER BEAVER CREEK OVERFLOW

AT STA. 19+23.24

FEDERAL AID PROJECT NO. BR 243-1(7)20

PHILLIPS COUNTY

SLAB DETAILS & ERECTION PLAN

Scale ~ 1:100

DESIGNED	2/01/01	MBL
DRAWN	2/02/01	KSTG
CHECKED	8/6/01	MJS/MJL
REVISED		
REVISED		
REVISED		

FILENAME: 342153.BRG DRAWING NO. 18084

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