

12/19

Job No. SE0044

Replaces Bridge No. S0291

Missouri Department of Transportation

Bridge Survey Location Request

Page 1 to be completed by District staff.

Bridge over: Whitewater Creek Route: N
 County: Cape Girardeau Section: 5 Township: 29 North Range: 12 East
 Latitude: 37°12'34.43"N Longitude: 89°44'53.80"W
 District Contact: Garrett Galyean (573-472-5221) Date: 5/3/2023

HIGH WATER ELEVATIONS AT PROPOSED BRIDGE SITE

Recorded high water elevations or elevation of high water marks

Extreme High Water (EHW) (Give date(s) of occurrence)		
Elevations and date(s) of same	Location	Source of information
4.8" Below (1986)	Below West End of Bridge	HW Book 8124A

Existing Bridge Overtopped <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	Existing Roadway Overtopped <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown
Approx. Overtopping Location(s):	

LOCATION OF NEW BRIDGE

Replace in Existing Location	<input checked="" type="checkbox"/>	Provide details of any proposed changes to profile grade below or as an attachment.
Relocation (near existing Structure)	<input type="checkbox"/>	Provide details of proposed location and grade of the roadway across the floodplain, any proposed/potential channel changes or modifications, etc. below or as an attachment.
New Route	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	

Additional Information:

page 2 & subsequent pages to be completed by Bridge Division

Note: Proposed elevations, distances, etc. are based on the best available data at the time the form was completed. Actual field conditions or recently acquired data may require deviation from the proposed values. Please contact the Bridge Division with concerns regarding the proposed values or if large deviations from these values are required.

Note: The information below supplements the survey requirements noted in the EPG, please consult EPG 238 for additional surveying requirements.

Bridge Contact: Garrett Hager, Garrett.Hager@modot.mo.gov, (573)751-7411

Survey Type: **1D Survey**

Stream Crossing Survey Location Details (1D)							
Item		Requirement	Standard Guidance		Specific Guidance		
Profiles* (EPG 238.3.36.1.3)	C/L Profile	Terminal Point	Limit of Longest offset Profile		Use Standard Guidance		
	Upstream Offset Profile	Terminal Point	Same as Valley Sections		Elevation =	350 ft	
		Offset Distance	On Natural Ground		Estimated Distance =	40 ft	
	Downstream Offset Profile	Terminal Point	Same as Valley Sections		Elevation =	350 ft	
		Offset Distance	On Natural Ground		Estimated Distance =	40 ft	
	Special	Please Provide Profile Along Median					
Streambed Profiles** (EPG 238.3.36.3.6)		Length	Natural Stream	Section limits (Min. of 1000' each side of crossing.)	Use Natural Stream Guidance (Downstream)		
			Drainage Ditch	500' Each Side of Crossing	Use Drainage Ditch Guidance (Upstream)		
		Elevation Intervals	Within 1000' of Crossing	Nat. Stream 25'	Use Natural Stream Guidance (see EPG 238.3.36.3.6 if a significant slope change is encountered)		
				Drain. Ditch 50'			
			Beyond 1000' from Crossing	At Vertical and Horizontal Break Points (200' max.)			
		Valley Sections (EPG 238.3.36.3.8), (EPG 750.3.1.1)		Terminal Point	Natural Stream	5' above EHW	Elevation =
Drainage Ditch	25' Beyond Bankside Toe of Levee				Distance =	N/A	

Item	Requirement	Standard Guidance		Specific Guidance
Water Surface Profile (EPG 238.3.36.3.7)	Water Surface Profile Data Needed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
	Locations with flowing water	Drainage Ditch	100' and 200' each side of Crossing	Use Water Surface Profile Standard Guidance

Item	Requirement	Standard Guidance	Specific Guidance
	Typical Channel Section Data Needed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Typical Channel Sections (EPG 238.3.36.3.9)	Within 300' each side of Centerline	Provide when Needed (i.e., Culvert on Perennial and Intermittent Stream)	
------------------------------------------------	-------------------------------------	-----------------------------------------------------------------------------	--

Item	Requirement	Standard Guidance	Specific Guidance
Existing Bridge Data	Existing Bridge Data Needed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
	Description	Provide General Description	N/A

Item	Requirement	Standard Guidance	Specific Guidance
Other Bridges (EPG 238.3.36.3.10)	Other Bridge Data Needed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
	Description	Provide General Description	N/A
	Profile Location	C/L Structure	N/A
	Profile Terminal Point	5' above EHW	Elevation = N/A

* additional profiles may be needed for relocated routes

** at confluent streams provide proposed data for both streams as appropriate.

Additional Information:

Valley Sections for each leg upstream, as well as a valley section between the structure and where the tributaries converge. Channel sections for each leg will be needed as well.

Additional Documents Provided:

Image & kmz file showing Valley Section Locations.

Roadway Design Notes for Bridge Survey:

The Bridge Survey should include all the pertinent items listed in [EPG 747](#) and the [Bridge Survey Checklist](#).

Bridge Design Notes:

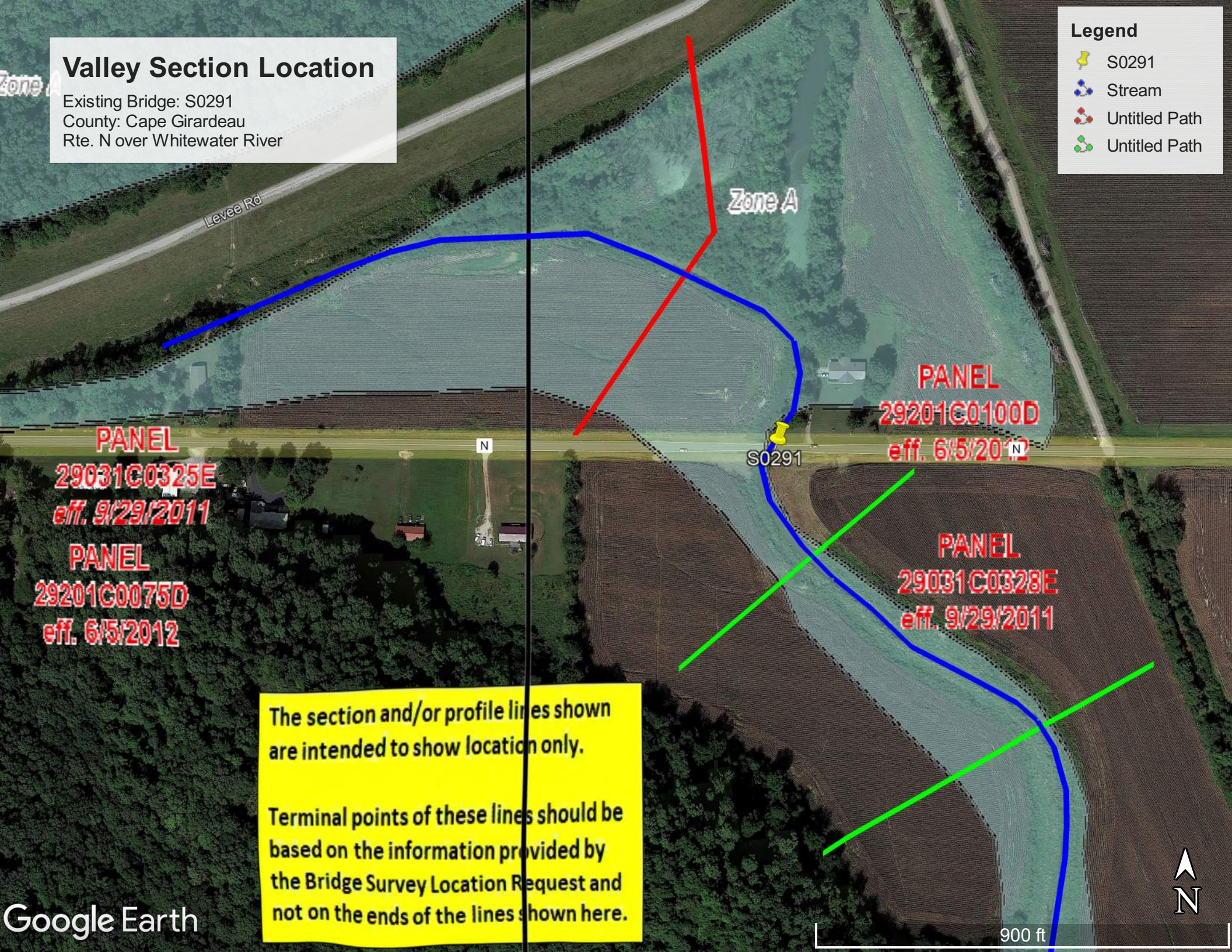
FEMA Zone A, FIRM Panel 29201C0100D eff. 6/5/2012

Valley Section Location

Existing Bridge: S0291
County: Cape Girardeau
Rte. N over Whitewater River

Legend

-  S0291
-  Stream
-  Untitled Path
-  Untitled Path



The section and/or profile lines shown
are intended to show location only.

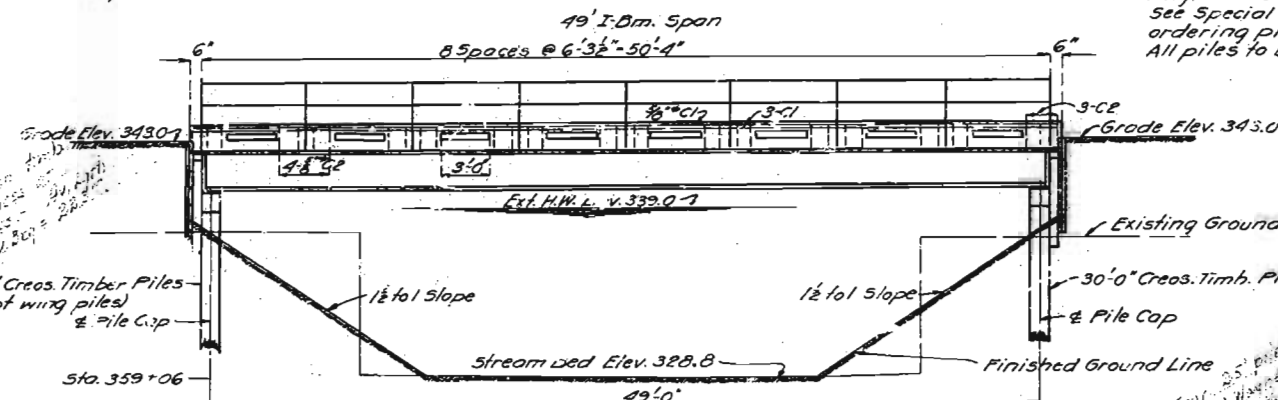
Terminal points of these lines should be
based on the information provided by
the Bridge Survey Location Request and
not on the ends of the lines shown here.

MISSOURI STATE HIGHWAY DEPARTMENT

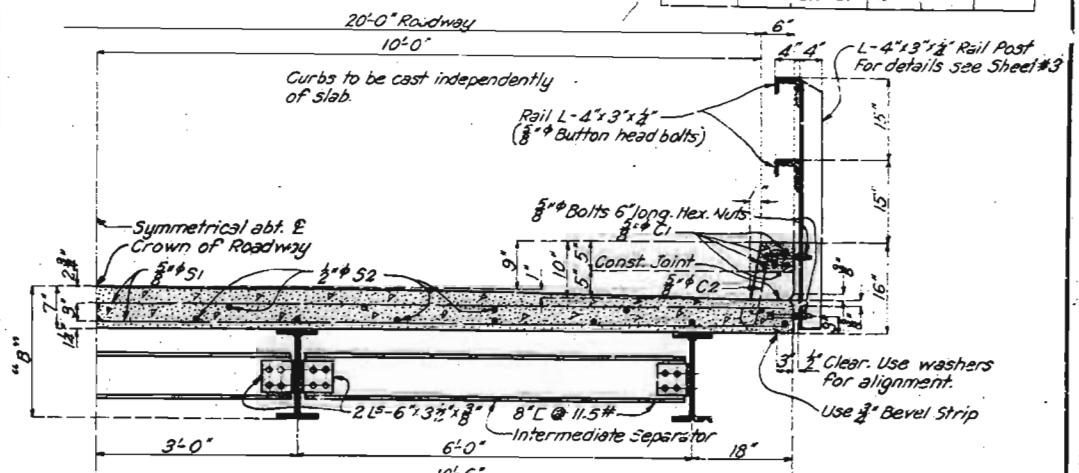
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISC. YEAR	SHEET NO.	TOTAL SHEETS
5	NO.	SN-SI	19		

Note: Outlets to be centered between rail posts.

Note: All piling to be creosoted timber piles. Required 8 Piles 30'-0" long and 4 Piles 15'-0" long (wing piles). Pile lengths include 12" cut-offs. See Special Provisions in regard to ordering piles. All piles to be driven to full penetration.

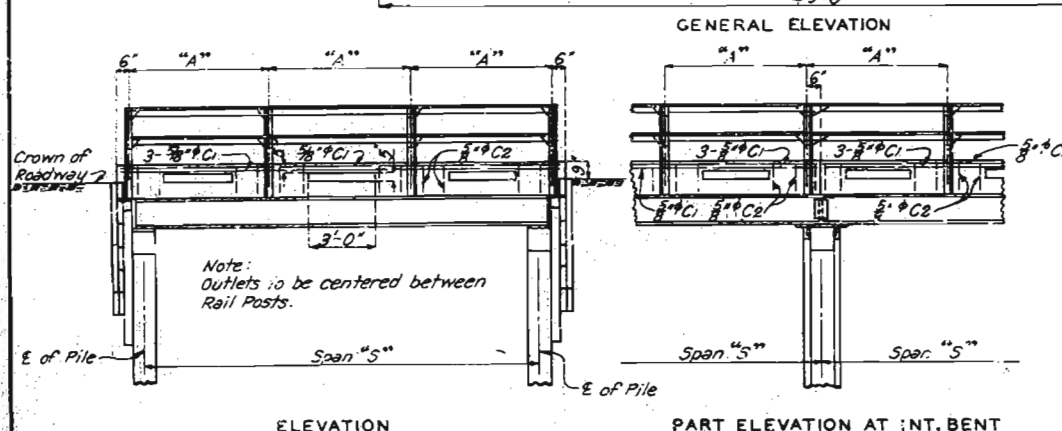


DIMENSION "B"	
SPAN "S"	"B"
15'-0"	20 3/4"
17'-0"	21"
19'-0"	22 1/4"
21'-0"	23"
23'-0"	23 3/4"
25'-0"	24 1/4"
27'-0"	24 3/4"
29'-0"	25 1/4"
31'-0"	26"
33'-0"	26 3/4"
35'-0"	27 1/4"
37'-0"	28"
39'-0"	28 3/4"
41'-0"	29 1/4"
43'-0"	30"
45'-0"	30 3/4"
47'-0"	31 1/4"
49'-0"	32"



Note: Top of channel separators at ends of each I-Beam Span to be flush with bottom of floor slab as shown in section thru end bent at E.

Note: Depth of outside stringers will in some cases be a fraction of an inch less than that of inside stringers and in order to keep bottom of slab horizontal it will be necessary to haunch slab down to top of outside stringers.



HANDRAIL SPACING					
"A" DIMENSIONS					
SPAN "S"	NO. PANELS	SINGLE SPAN	1ST END SPAN	ALL INT. SPANS	LAST END SPAN
15'-0"	3	5'-5 1/2" abt.	5'-0 1/2" abt.	5'-0"	5'-4 1/2" abt.
17'-0"	3	6'-1 1/2" abt.	5'-8 1/2" abt.	5'-8"	6'-0 1/2" abt.
19'-0"	3	6'-9 1/2" abt.	6'-4 1/2" abt.	6'-4"	6'-8 1/2" abt.
21'-0"	4	5'-7"	5'-3 1/2"	5'-3"	5'-6 1/2"
23'-0"	4	6'-1"	5'-9 1/2"	5'-9"	6'-0 1/2"
25'-0"	4	6'-7"	6'-3 1/2"	6'-3"	6'-6 1/2"
27'-0"	5	5'-8"	5'-5 1/2" abt.	5'-4 1/2" abt.	5'-7 1/2" abt.
29'-0"	5	6'-0 1/2" abt.	5'-1 1/2"	5'-3 1/2" abt.	6'-0 1/2" abt.
31'-0"	5	6'-5 1/2" abt.	5'-1 1/2"	6'-2 1/2" abt.	6'-5 1/2" abt.
33'-0"	6	5'-8 1/2" abt.	5'-6 1/2" abt.	5'-6"	5'-8 1/2" abt.
35'-0"	6	6'-0 1/2" abt.	5'-10 1/2" abt.	5'-10"	6'-0 1/2" abt.
37'-0"	6	6'-4 1/2" abt.	6'-2 1/2" abt.	6'-2"	6'-4 1/2" abt.
39'-0"	7	5'-9 1/2" abt.	5'-7 1/2" abt.	5'-6 1/2" abt.	5'-8 1/2" abt.
41'-0"	7	6'-0 1/2" abt.	5'-10 1/2" abt.	5'-10"	6'-0 1/2" abt.
43'-0"	7	6'-4"	6'-2"	6'-1 1/2" abt.	6'-3 1/2" abt.
45'-0"	8	5'-9 1/2"	5'-7 1/2"	5'-7 1/2"	5'-9 1/2"
47'-0"	8	6'-0 1/2"	5'-10 1/2"	5'-10"	6'-0 1/2"
49'-0"	8	6'-5 1/2"			6'-5 1/2"

TABLE OF STRINGERS						
SPAN "S"	PER PLANS		PERMISSIBLE SUBSTITUTIONS			
	CARNegie BEAMS		STANDARD I-BEAMS		BETHLEHEM BEAMS	
	Inside	Outside	Inside	Outside	Inside	Outside
15'-0"	14" @ 30"	14" @ 30"	12" @ 40.8"	12" @ 35"	14" @ 30"	14" @ 30"
17'-0"	14" @ 33"	14" @ 33"	15" @ 42.9"	15" @ 42.9"	14" @ 33"	14" @ 33"
19'-0"	16" @ 37"	16" @ 37"	15" @ 42.9"	15" @ 42.9"	16" @ 37"	16" @ 37"
21'-0"	16" @ 40"	16" @ 37"	15" @ 50"	15" @ 45"	16" @ 40"	16" @ 37"
23'-0"	16" @ 45"	16" @ 40"	18" @ 54.7"	18" @ 54.7"	16" @ 45"	16" @ 40"
25'-0"	18" @ 47"	18" @ 47"	18" @ 54.7"	18" @ 54.7"	18" @ 47"	18" @ 47"
27'-0"	18" @ 52"	18" @ 47"	18" @ 60"	18" @ 54.7"	18" @ 52"	18" @ 47"
29'-0"	20" @ 55"	20" @ 55"	20" @ 65.4"	20" @ 65.4"	20" @ 55"	20" @ 55"
31'-0"	21" @ 58"	21" @ 58"	20" @ 70"	20" @ 65.4"	22" @ 58"	22" @ 58"
33'-0"	21" @ 62"	21" @ 58"	20" @ 75"	20" @ 70"	22" @ 62"	22" @ 58"
35'-0"	21" @ 67"	21" @ 62"	20" @ 81.4"	20" @ 75"	22" @ 67"	22" @ 62"
37'-0"	24" @ 70"	24" @ 70"	24" @ 79.9"	24" @ 79.9"	24" @ 70"	24" @ 70"
39'-0"	24" @ 74"	24" @ 70"	24" @ 79.9"	24" @ 79.9"	24" @ 74"	24" @ 70"
41'-0"	24" @ 81"	24" @ 74"	24" @ 85"	24" @ 79.9"	24" @ 81"	24" @ 74"
43'-0"	24" @ 85"	24" @ 81"	24" @ 100"	24" @ 90"	26" @ 85"	26" @ 81"
45'-0"	27" @ 85"	27" @ 85"	24" @ 105.9"	24" @ 100"	26" @ 85"	26" @ 85"
47'-0"	27" @ 91"	27" @ 85"	24" @ 105.9"	24" @ 105.9"	28" @ 91"	26" @ 85"
49'-0"	27" @ 91"	27" @ 91"	24" @ 115"	24" @ 105.9"	28" @ 91"	28" @ 91"

GENERAL NOTES:
 Loading: One 10 Ton Truck, 80% of weight on rear axle, 30% impact, 14'-0" wheel base, 6'-0" gage, 10' fire.
 All concrete to be 1:2-3/4 mix "X".
 Exposed edges to be beveled 1/4" where no other bevel is noted.
 All timber to be creosoted Douglas Fir of the West Coast Region, Close-grained Structural Grade; creosoted Southern Yellow Pine, Dense Structural Square Edge and Sound Grade, or untreated California Redwood, Prime Structural Grade. All timber rough full-sawn except as noted in timber bill for pile caps. Slight variations in sawing to be in accordance with grading rules. All treated timber to be cut to lengths, shaped and bored as shown before treating. Backing plank are all billed 6' long and are to be fitted and cut in the field.
 Field holes for drift pins shall be field bored 3/8". Unless otherwise noted all other field holes in timber shall be field bored 3/8".
 When bolts with countersunk heads are indicated on plans cut washers shall be used under heads. O.G. washers shall be used under heads of all other bolts and under nuts of all bolts.
 Number of bolts, drift pins, nails and washers given exact; no allowance made for excess. Cost of substructure hardware to be included in price bid for timber in place.
 I-Beams with fastenings, spacers, handrail, handrail posts with fastenings, clip angles and cap plate on end bent with fastenings, will be paid for as structural steel. Cost of metallic edge moulding will be included in unit bid price for concrete.
 Rivets - 3/8" holes 1/2", except in handrail where rivets shall be 5/8", holes 1/2". Machine bolts 1/2" holes 1/2".
 Field connections, except handrail, shall be machine bolts, 1/2" holes.
 Detail shop drawings shall be submitted to the State Highway Department in duplicate and shall be approved before steel is fabricated.
 See Special Provisions in regard to permissible substitution of beams.
 Where bituminous felt is used in expansion or partition joints in concrete stitch felt in vertical joint securely to one face of concrete with copper wire.
 Paint: Shop, none; Field, contact surfaces or No other paint to be applied by contractor. All paint required will be furnished by the Missouri State Highway Department.

ESTIMATED QUANTITIES			
ITEM	SUPERSTR.	SUBSTR.	TOTAL
Bridge Excavation Class 1	Cu. Yds.	30	30
Bridge Excavation Class 2	Cu. Yds.	0	0
Concrete 1:2-4 mix "B"	Cu. Yds.	0	0
Concrete 1:2-3/4 mix "X"	Cu. Yds.	25.3	25.3
Fabricated Structural Steel	Lbs.	21090	21090
Reinforcing Steel	Lbs.	6350	6350
Creosoted Timber Piles	Lin. Ft.	280	280
Creosoted Timber Pile Caps	Lin. Ft.	12	12
Timber (See Special Provisions)	F.B.M.	159.2	159.2

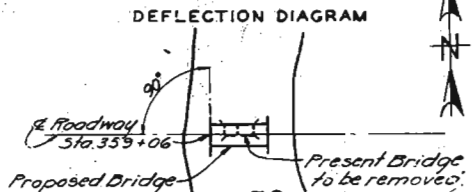
Note: Bridge excavation will be allowed for end bents within horizontal limits shown and noted on "Half Plan of End Bent" sheet # 2. This excavation will be computed from existing ground line to bottom and of 6'-6" backing supports.
 Excavation required to place superstructure allowing 2'-0" below bottom of beams and 4'-0" outside of curb lines will be paid for at unit price bid for roadway excavation.

B.M. Elev. 341.88 - Nail in Foot of 15' Elm. 45' Left of Sta. 359+90.

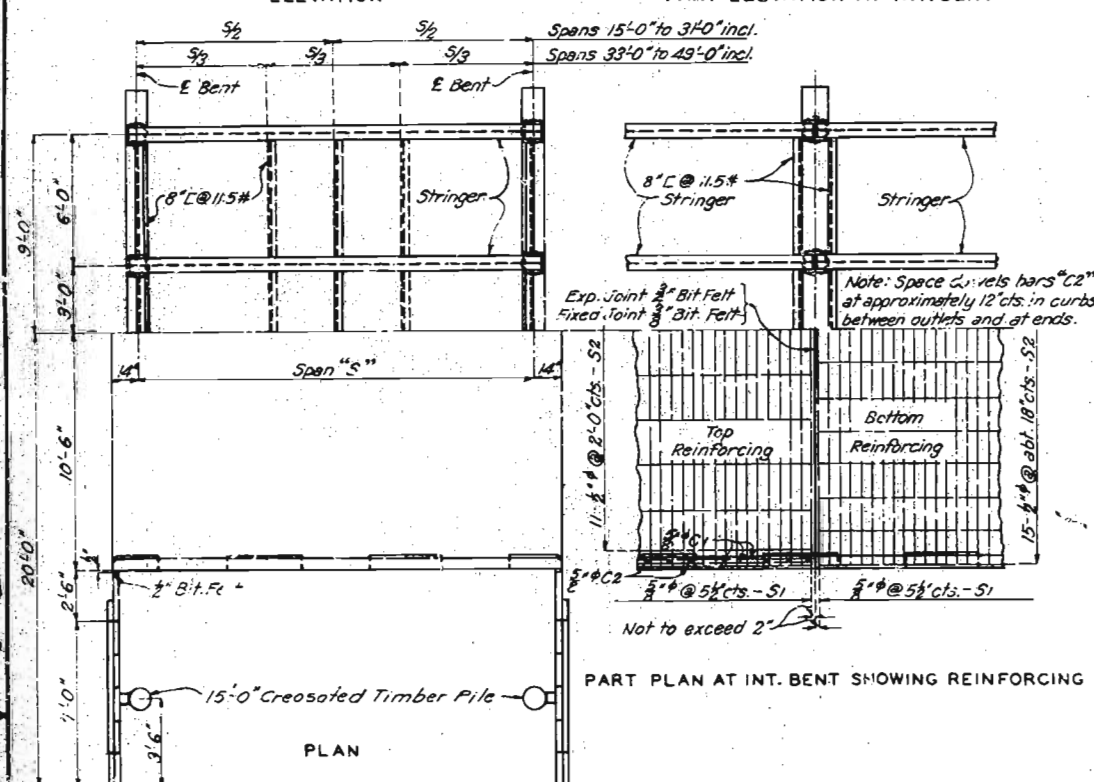
Sheet No. 1 of 3.

DEFLECTION	
SPANS "C" "D"	"C" "D"
15'-0"	1 1/2"
17'-0"	1 3/4"
19'-0"	2"
21'-0"	2 1/4"
23'-0"	2 1/2"
25'-0"	2 3/4"
27'-0"	3"
29'-0"	3 1/4"
31'-0"	3 1/2"
33'-0"	3 3/4"
35'-0"	4"
37'-0"	4 1/4"
39'-0"	4 1/2"
41'-0"	4 3/4"
43'-0"	5"
45'-0"	5 1/4"
47'-0"	5 1/2"
49'-0"	5 3/4"

Note: Floor slab to be brought to grade and dead load deflection taken care of by increasing slab thickness. Depth of slab at outside face of curb to be kept uniform and bottom surface of slab warped between curb and outside beam to obtain required thickness at beam. Payment will be allowed for additional concrete required for thickening slab. This additional concrete is included in "Estimated Quantities."



PART PLAN AT INT. BENT SHOWING REINFORCING



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

Designed Nov. 1929 By F.W.H.
 Drawn Mar. 1930 By R.J.G.
 Traced Dec. 1931 By R.J.G.
 Checked Dec. 1931 By J.T.M.
 Assembled June 1932 By H.E.U.
 Checked July 1932 By J.T.M.

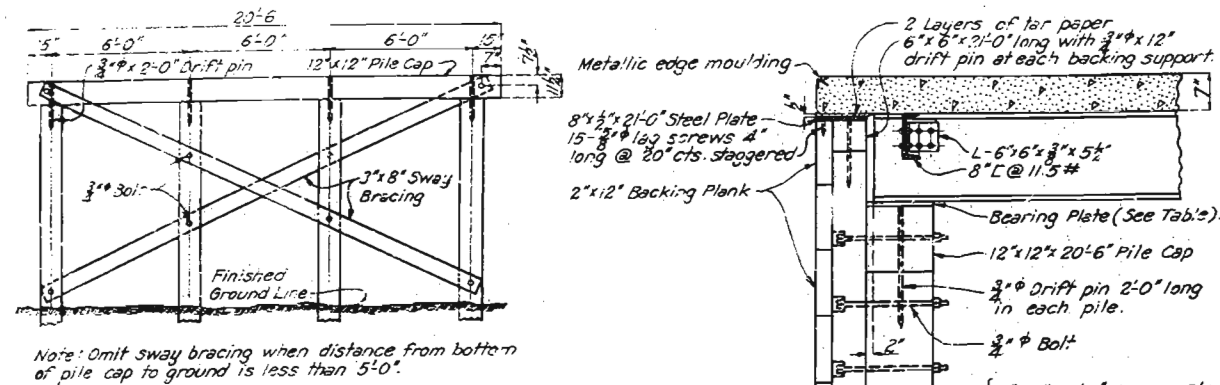
BRIDGE OVER OLD CHANNEL WHITEWATER RIVER
 STATE ROAD FROM DRUM TO DELTA
 ABOUT 0.7 MILE WEST OF DELTA
 PROJECT NO. SN-SI STA. 359+06
 CAPE GIRARDEAU COUNTY
 SUBMITTED BY [Signature] DATE 7/15/32
 APPROVED BY [Signature] DATE [Blank]
 CHIEF ENGINEER

FINISHED

S-291

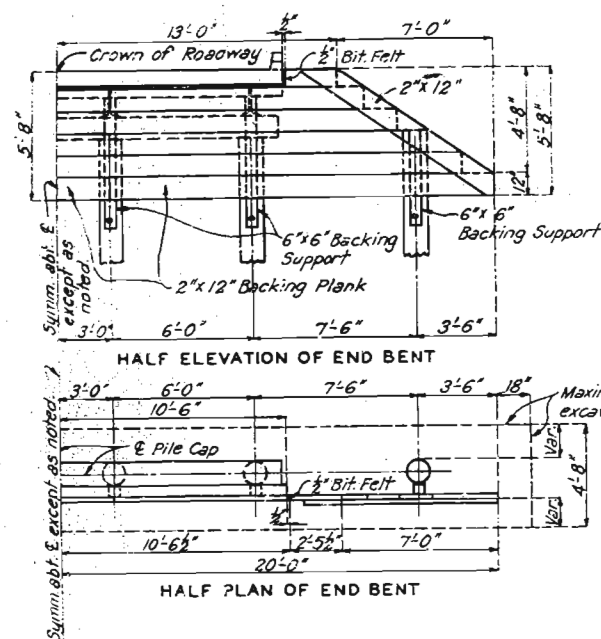
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	SN-51	19		



DETAIL OF INTERIOR BENTS

Note: Any irregularity in alignment of piling in end bents to be corrected by facing one surface of the 6" x 6" backing support or by varying the thickness of the backing in a true plane such as to place the surface of the backing in a true plane and eliminate any strain on the backing plank. Splice in backing plank to be made at center of 6" x 6" backing support and to be alternated on the two intermediate supports.



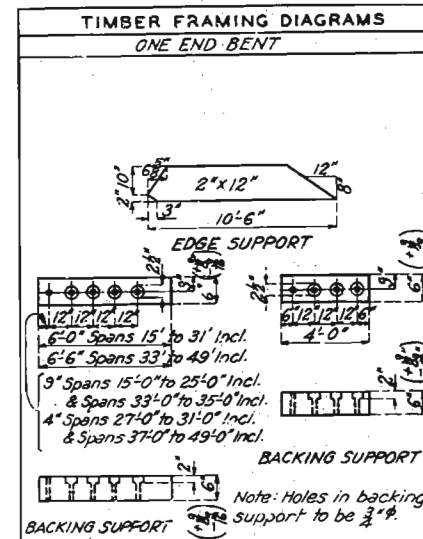
HALF PLAN OF END BENT

DIMENSIONS		
SPAN'S	6"	12"
15'-0"	21 1/2"	21 1/2"
17'-0"	21 1/2"	22"
19'-0"	23 1/2"	23 1/2"
21'-0"	23 1/2"	24"
23'-0"	23 1/2"	24 1/2"
25'-0"	25 1/2"	25 1/2"
27'-0"	25 1/2"	26"
29'-0"	25 1/2"	26 1/2"
31'-0"	27 1/2"	27 1/2"
33'-0"	27 1/2"	28"
35'-0"	27 1/2"	28 1/2"
37'-0"	27 1/2"	29"
39'-0"	27 1/2"	29 1/2"
41'-0"	27 1/2"	30"
43'-0"	27 1/2"	30 1/2"
45'-0"	27 1/2"	31"
47'-0"	27 1/2"	31 1/2"
49'-0"	27 1/2"	32"

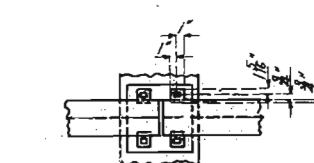
Note: Omit sway bracing when "E" is less than 5'-0".

NAILING SCHEDULE:

Backing plank to supports; 3-30d at each support at splices, 3-30d each side of splice. Pieces at ends of backwall to backing plank; 4-30d to each backing plank.

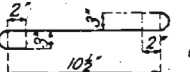


Note: Holes in backing support to be 3" x 8".



PLAN OF BEARING PLS.

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

BILL OF REINFORCING STEEL																		
NO.	SIZE	LENGTH	MARK	LOCATION	BENDING SKETCH													
"A"	3" ϕ	"B"	C1	Curb														
"C"	3" ϕ	2'-0"	C2	"														
"D"	3" ϕ	20'-9"	S1	Slab														
"E"	3" ϕ	"F"	S2	"														
SPAN		SINGLE SPAN					ONE END SPAN					ONE INT. SPAN						
"A"	"B"	"C"	"D"	"E"	"F"	"A"	"B"	"C"	"D"	"E"	"F"	"A"	"B"	"C"	"D"	"E"	"F"	
15'-0"	8	16'-9"	24	76	26	16'-9"	8	15'-9"	22	70	26	15'-9"	8	14'-9"	20	64	26	14'-9"
17'-0"	8	18'-9"	28	86	26	18'-9"	8	17'-9"	24	80	26	17'-9"	8	16'-9"	20	74	26	16'-9"
19'-0"	8	20'-9"	28	92	26	20'-9"	8	19'-9"	28	88	26	19'-9"	8	18'-9"	28	84	26	18'-9"
21'-0"	8	22'-9"	30	100	26	22'-9"	8	21'-9"	28	96	26	21'-9"	8	20'-9"	26	92	26	20'-9"
23'-0"	8	24'-9"	36	112	26	24'-9"	8	23'-9"	34	106	26	23'-9"	8	22'-9"	32	100	26	22'-9"
25'-0"	8	26'-9"	36	118	26	26'-9"	8	25'-9"	36	114	26	25'-9"	8	24'-9"	36	110	26	24'-9"
27'-0"	8	28'-9"	36	120	26	28'-9"	8	27'-9"	34	124	26	27'-9"	8	26'-9"	32	118	26	26'-9"
29'-0"	8	30'-9"	44	138	26	30'-9"	8	29'-9"	42	132	26	29'-9"	8	28'-9"	40	126	26	28'-9"
31'-0"	8	32'-9"	44	146	26	32'-9"	8	31'-9"	44	140	26	31'-9"	8	30'-9"	44	134	26	30'-9"
33'-0"	16	18'-6"	52	154	52	18'-6"	16	18'-0"	50	150	52	18'-0"	16	17'-6"	48	146	52	17'-6"
35'-0"	16	19'-6"	52	162	52	19'-6"	16	19'-0"	50	158	52	19'-0"	16	18'-6"	48	154	52	18'-6"
37'-0"	16	20'-6"	52	172	52	20'-6"	16	20'-0"	50	168	52	20'-0"	16	19'-6"	48	164	52	19'-6"
39'-0"	16	21'-6"	60	180	52	21'-6"	16	21'-0"	58	176	52	21'-0"	16	20'-6"	56	172	52	20'-6"
41'-0"	16	22'-6"	60	188	52	22'-6"	16	22'-0"	58	184	52	22'-0"	16	21'-6"	56	180	52	21'-6"
43'-0"	16	23'-6"	60	198	52	23'-6"	16	23'-0"	58	194	52	23'-0"	16	22'-6"	56	190	52	22'-6"
45'-0"	16	24'-6"	68	206	52	24'-6"	16	24'-0"	66	202	52	24'-0"	16	23'-6"	64	198	52	23'-6"
47'-0"	16	25'-6"	68	216	52	25'-6"	16	25'-0"	66	210	52	25'-0"	16	24'-6"	64	204	52	24'-6"
49'-0"	16	26'-6"	68	224	52	26'-6"	16	26'-0"	66	220	52	26'-0"	16	25'-6"	64	210	52	25'-6"

Note: Reinforcing bars in each span to be billed and tagged separately.

SUBSTRUCTURE TIMBER BILLS				
PIECE	MARKS	SIZE	LENGTH	REMARKS
Backing Plank	1	2" x 12"	23'-6"	Cut to length.
"	1	2" x 12"	17'-6"	"
"	1	2" x 12"	22'-0"	Cut to length.
"	1	2" x 12"	16'-0"	"
"	1	2" x 12"	20'-6"	"
"	1	2" x 12"	14'-6"	"
"	1	2" x 12"	19'-0"	"
"	1	2" x 12"	13'-0"	"
"	1	2" x 12"	17'-6"	"
"	1	2" x 12"	11'-6"	"
Shoulder Plank	2	2" x 8"	2'-5 1/2"	"
Edge Support	2	2" x 12"	10'-6"	Cut to length & shape.
Backing Support	4	6" x 6"	6'-0"	"
Backing Support	4	6" x 6"	6'-0"	"
Backing Support	2	6" x 6"	4'-0"	"
Backing Support Cap	1	6" x 6"	2'-0"	Cut to length.
Pile Cap	1	12" x 12"	20'-6"	"
Pile Cap	1	12" x 12"	20'-6"	Cut to length. **
Bracing	3	3" x 8"	"	"
"	3	3" x 8"	"	"
"	3	3" x 8"	"	"

Note: Pile caps to be classified as bents and stringers. All other timber to be classified as joist and plank.

** 52S to exact depth of 11 1/2".

SUBSTRUCTURE HARDWARE BILL						
PIECE	LOCATION	NO. PCS	SIZE	LENGTH	O.G. WASHERS	CUT WASHERS
Drift Pin	Backing Cap	4	3"	12"		
"	Pile Cap	4	3"	2'-0"		
Bolts	Backing Support	4	3"	22"	4	4
Nails	Backing	141	30d	4 1/2"		
Bolts	Backing Support	24	3"	2'-0"	30	18
Drift Pin	Pile Cap	1	3"	2'-0"		
Bolts	Bracing	3	3"	18"		
Bolts	Bracing	3	3"	22"		

\$ Omit when "E" is less than 5'-0".

Note: Bolts to be threaded 8" and sawed off 1/2" outside of nut after nut has been tightened.

SUPERSTRUCTURE HARDWARE BILL					
PIECE	LOCATION	MARKS	SIZE	LENGTH	REMARKS
Cap Plate	Under Slab	2	8" x 4"	2'-0"	See detail.
3" x 8" Lag Screws	Cap Pl.	30	3" x 3"	4"	Flat csk. heads.
Spacer Bolts	Spans 15' to 31' Incl.	48	3" x 3"	Varies	Turn bolts, washer for nut.
Spacer Bolts	Spans 33' to 49' Incl.	16	3" x 3"	Varies	Turn bolts, washer for nut.
Handrail Bolts	Spans 15'	64	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 19' Incl.	32	3" x 3"	12"	Button heads.
"	Spans 21'	20	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 25' Incl.	40	3" x 3"	12"	Button heads.
"	Spans 27'	24	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 31' Incl.	48	3" x 3"	12"	Button heads.
"	Spans 33'	28	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 37' Incl.	56	3" x 3"	12"	Button heads.
"	Spans 39'	32	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 43' Incl.	64	3" x 3"	12"	Button heads.
"	Spans 45'	36	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 49' Incl.	72	3" x 3"	12"	Button heads.
Bolts	Bearing Pls	16	3" x 3"	12"	Sq. heads, no threads.
Flange Clamps	Bearings	16	See Detail		Detailed on this sheet.
Spacer Bolts	Spans 15' to 31' Incl.	48	3" x 3"	Varies	Turn bolts, washer for nut.
Spacer Bolts	Spans 33' to 49' Incl.	16	3" x 3"	Varies	Turn bolts, washer for nut.
Handrail Bolts	Spans 15'	12	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 19' Incl.	32	3" x 3"	12"	Button heads.
"	Spans 21'	16	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 25' Incl.	40	3" x 3"	12"	Button heads.
"	Spans 27'	20	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 31' Incl.	48	3" x 3"	12"	Button heads.
"	Spans 33'	24	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 37' Incl.	56	3" x 3"	12"	Button heads.
"	Spans 39'	28	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 43' Incl.	64	3" x 3"	12"	Button heads.
"	Spans 45'	32	3" x 3"	6"	Sq. hds., washers, hex. nuts.
"	to 49' Incl.	72	3" x 3"	12"	Button heads.
Bolts	Bearing Pls	16	3" x 3"	12"	Sq. heads, no threads.
Splice Pl. Bolts	Spans 15' to 31'	40	3" x 3"	2"	Turn bolts, washer for nut.
"	Spans 33' to 49'	16	3" x 3"	2"	"
Flange Clamp	Bearings	16	See Detail		Detailed on this sheet.
Clip 15	At Bent	"	"	"	Sheet #3 of 3.
Bolts	Clip 15	"	3" x 3"	2"	Plain Bolts

* 2 Washers plus washers for fill required for alignment of railposts.

FINAL QUANTITIES		
Item	Quan.	Unit
Class I Bridge Exc.	10	Cu. Yd.
Class X Concrete	25.3	"
Lab. Str. Steel	1.55	100 LBS.
Reinforcing Steel	6,350	"
Crested Piles in Place	340	Lin. Ft.
" Cut-offs	32	"
" Timber	1,992	F.B.M.
Temporary Bridge	100	Lin. Ft.
Removal of Old Bridge	1	Sq. Yd.
Drilling State Furnace Piles	53	Lin. Ft.
Plan Timber Bridge in Place	100	"
Hauling piles and making drive	15.83	"

BRIDGE OVER OLD CHANNEL WHITEWATER RIVER

STATE ROAD FROM DRUM TO DELTA
ABOUT 0.7 MILE WEST OF DELTA
PROJECT NO. SN-SI STA. 359+06

CAPE GIRARDEAU COUNTY

SUBMITTED BY: *[Signature]* DATE: 9/2/32
APPROVED BY: *[Signature]* DATE: *[Blank]*
FINISHED

Designed Nov. 1929 By F.W.H.
Drawn Dec. 1930 By R.J.G. Assembled June 1932 By H.E.U.
Traced Dec. 1931 By R.J.G. Checked July 1932 By J.H.M.
Checked Dec. 1931 By J.H.M.

DETAILS OF BEARING ON PILE CAP

Note: Cast iron clamps used on bearing plates to have 1/8" clearance at flange of beam to allow for expansion. All clamps to have 3/8" cored holes. Use two clamps only on each I beam at pile caps on end bents.

EXPANSION

FIXED

TYPICAL JOINTS OVER INT. BENT

DETAILS OF FLANGE CLAMPS

FOR STD. & BETH. BEAMS

FOR CARNEGIE BEAMS

PLAN OF BEARING PLS.

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	SN-51	19		

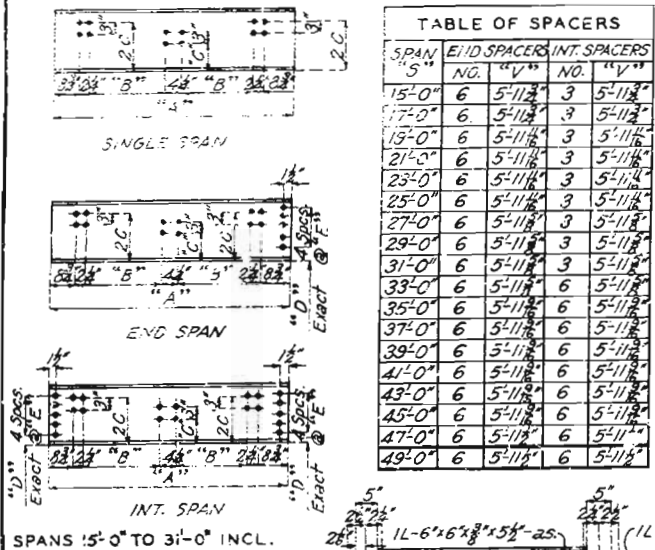
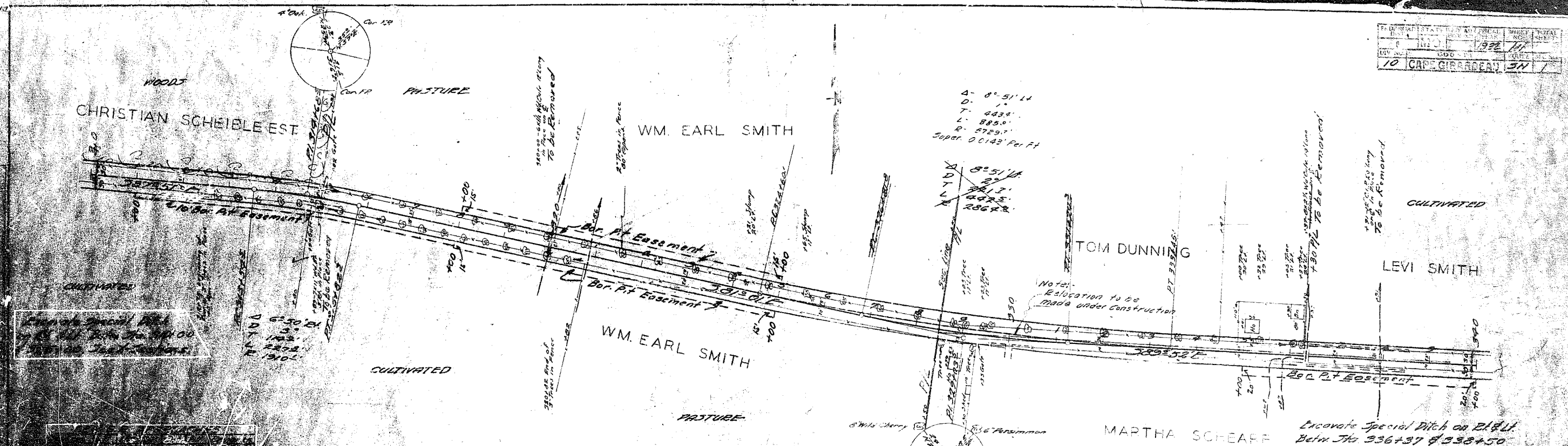


TABLE OF SPACERS					
SPAN "S"	NO.	END SPACERS (INT. SPACERS)			
		"V"	"W"	"X"	"Y"
15'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
17'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
19'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
21'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
23'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
25'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
27'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
29'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
31'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
33'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
35'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
37'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
39'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
41'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
43'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
45'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
47'-0"	6	5'-11 1/2"	3	5'-11 1/2"	
49'-0"	6	5'-11 1/2"	3	5'-11 1/2"	

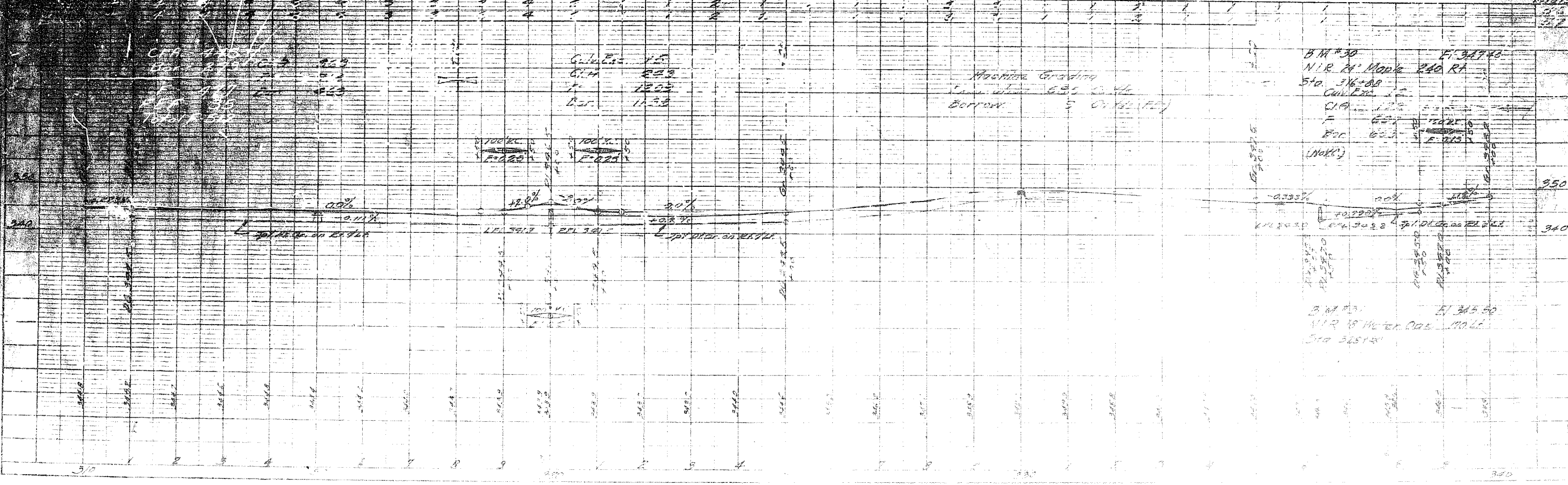
TABLE OF STRINGERS											
SPAN "S"	NO.	SIZE	SINGLE SPAN		END SPAN		INT. SPAN		"C"	"D"	"E"
			"A"	"B"	"A"	"B"	"A"	"B"			
15'-0"	4	14" C.B. @ 30"	15'-8"	6'-8"	15'-3"	6'-6"	14'-11"	6'-4"	5 1/2"	2"	2 1/2"
17'-0"	4	14" C.B. @ 33"	17'-8"	7'-8"	17'-3"	7'-6"	16'-11"	7'-4"	5 1/2"	2"	2 1/2"
19'-0"	4	16" C.B. @ 37"	19'-8"	8'-8"	19'-3"	8'-6"	18'-11"	8'-4"	6 1/2"	2 1/2"	2 1/2"
21'-0"	2	16" C.B. @ 37"	21'-8"	9'-8"	21'-3"	9'-6"	20'-11"	9'-4"	6 1/2"	2 1/2"	2 1/2"
23'-0"	2	16" C.B. @ 40"	23'-8"	10'-8"	23'-3"	10'-6"	22'-11"	10'-4"	6 1/2"	2 1/2"	2 1/2"
25'-0"	4	16" C.B. @ 40"	25'-8"	11'-8"	25'-3"	11'-6"	24'-11"	11'-4"	7 1/2"	3"	2 1/2"
27'-0"	2	18" C.B. @ 47"	27'-8"	12'-8"	27'-3"	12'-6"	26'-11"	12'-4"	7 1/2"	3"	2 1/2"
29'-0"	4	20" C.B. @ 55"	29'-8"	13'-8"	29'-3"	13'-6"	28'-11"	13'-4"	8 1/2"	4"	2 1/2"
31'-0"	4	21" C.B. @ 52"	31'-8"	14'-8"	31'-3"	14'-6"	30'-11"	14'-4"	9"	5"	2 1/2"
33'-0"	2	21" C.B. @ 62"	33'-8"	15'-8"	33'-3"	15'-6"	32'-11"	15'-4"	9"	5"	2 1/2"
35'-0"	2	21" C.B. @ 62"	35'-8"	16'-8"	35'-3"	16'-6"	34'-11"	16'-4"	9"	5"	2 1/2"
37'-0"	4	24" C.B. @ 70"	37'-8"	17'-8"	37'-3"	17'-6"	36'-11"	17'-4"	10 1/2"	4 1/2"	---
39'-0"	2	24" C.B. @ 74"	39'-8"	18'-8"	39'-3"	18'-6"	38'-11"	18'-4"	10 1/2"	4 1/2"	---
41'-0"	2	24" C.B. @ 74"	41'-8"	19'-8"	41'-3"	19'-6"	40'-11"	19'-4"	10 1/2"	4 1/2"	---
43'-0"	2	24" C.B. @ 81"	43'-8"	20'-8"	43'-3"	20'-6"	42'-11"	20'-4"	10 1/2"	4 1/2"	---
45'-0"	4	27" C.B. @ 85"	45'-8"	21'-8"	45'-3"	21'-6"	44'-11"	21'-4"	12"	6"	---
47'-0"	4	27" C.B. @ 85"	47'-8"	22'-8"	47'-3"	22'-6"	46'-11"	22'-4"	12"	6"	---
49'-0"	4	27" C.B. @ 91"	49'-8"	23'-8"	49'-3"	23'-6"	48'-11"	23'-4"	12"	6"	---

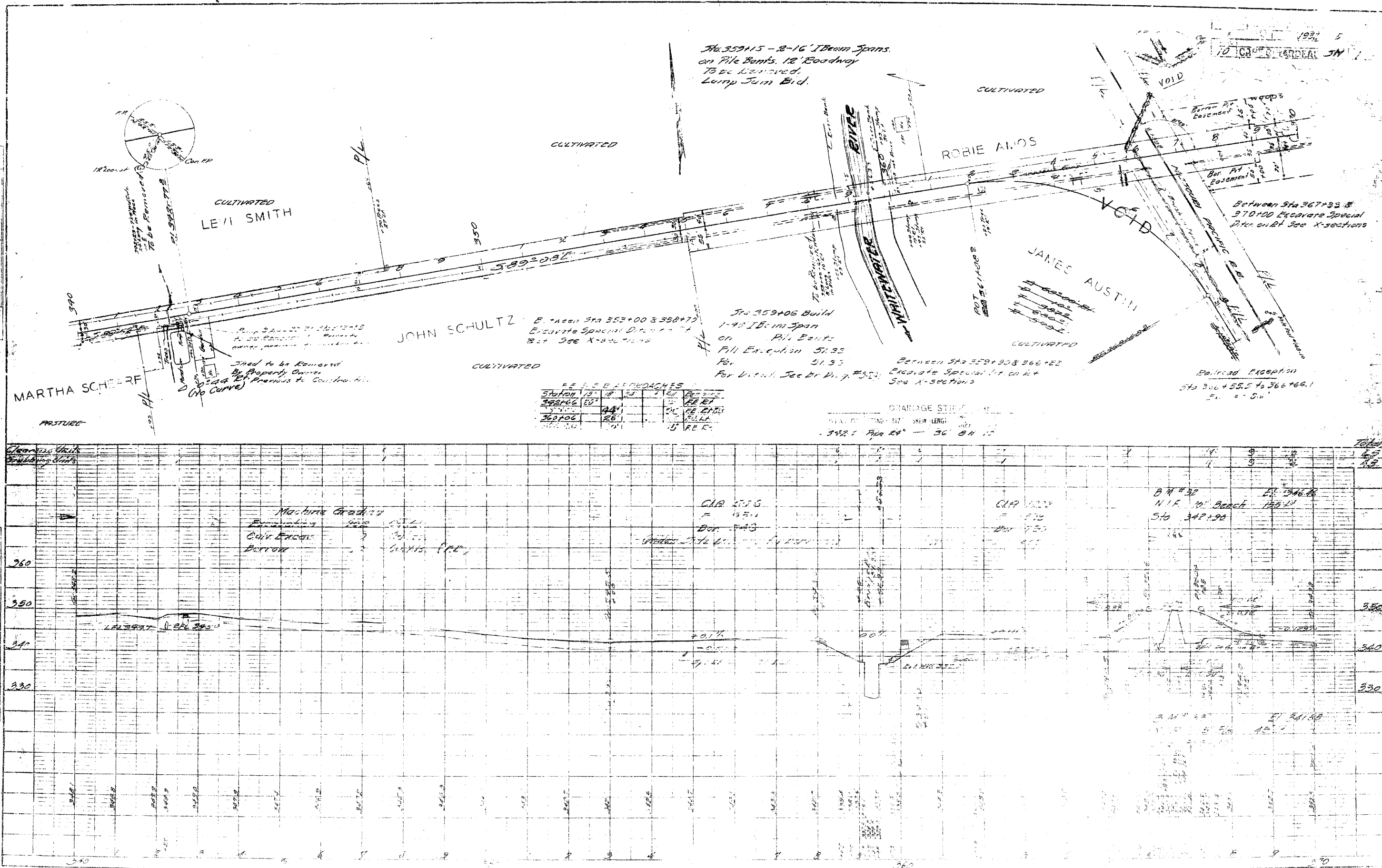
TABLE OF RAIL ANGLE DIMENSIONS																
SPAN	MARK	"L"	"M"	"N"	"O"	"P"	"R"	"S"	"T"	"U"	"V"	"W"	"X"	"Y"	"Z"	
15'-0"	RA1	16'-7 1/2"	5'-0"	0	0	0	0	0	0	5'-5 1/2"	0	0	0	0	5'-0"	0
17'-0"	"	18'-7 1/2"	5'-0"	0	0	0	0	0	0	6'-1 1/2"	0	0	0	0	5'-0"	0
19'-0"	"	20'-7 1/2"	5'-4"	0	0	0	0	0	0	6'-3 1/2"	0	0	0	0	6'-4"	0
21'-0"	"	22'-7 1/2"	5'-2"	0	0	0	0	5'-4 1/2"	23'-5 1/2"	5'-7"	0	0	0	0	5'-2"	0
23'-0"	"	24'-7 1/2"	5'-8"	0	0	0	0	5'-10 1/2"	23'-6 1/2"	6'-1"	0	0	0	0	5'-8"	0
25'-0"	"	26'-7 1/2"	6'-2"	0	0	0	0	6'-4 1/2"	23'-6 1/2"	6'-7"	0	0	0	0	6'-2"	0
27'-0"	"	28'-7 1/2"	5'-3"	0	0	0	0	5'-5 1/2"	23'-5 1/2"	5'-8"	23'-5 1/2"	5'-3"	0	0	5'-3"	0
29'-0"	"	30'-7 1/2"	5'-7 1/2"	0	0	0	0	5'-10 1/2"	23'-6 1/2"	6'-0 1/2"	23'-5 1/2"	5'-7 1/2"	0	0	5'-7 1/2"	0
31'-0"	"	32'-7 1/2"	6'-0 1/2"	0	0	0	0	6'-2 1/2"	23'-6 1/2"	6'-5 1/2"	23'-6 1/2"	6'-0 1/2"	0	0	6'-0 1/2"	0
33'-0"	"	34'-7 1/2"	5'-3 1/2"	5'-5 1/2"	23'-0	0	0	0	0	5'-8"	23'-5 1/2"	5'-3 1/2"	5'-5 1/2"	23'-0	5'-3 1/2"	0
35'-0"	"	36'-7 1/2"	5'-7 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-1 1/2"	23'-5 1/2"	5'-7 1/2"	5'-9 1/2"	23'-0	5'-7 1/2"	0
37'-0"	"	38'-7 1/2"	5'-11 1/2"	6'-1 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-11 1/2"	6'-1 1/2"	23'-0	5'-11 1/2"	0
39'-0"	"	40'-7 1/2"	5'-4 1/2"	5'-6 1/2"	23'-0	0	0	0	0	5'-9 1/2"	23'-5 1/2"	5'-4 1/2"	5'-6 1/2"	23'-0	5'-4 1/2"	0
41'-0"	"	42'-7 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-0 1/2"	23'-5 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	5'-9 1/2"	0
43'-0"	"	44'-7 1/2"	5'-11 1/2"	6'-1 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-11 1/2"	6'-1 1/2"	23'-0	5'-11 1/2"	0
45'-0"	"	46'-7 1/2"	5'-4 1/2"	5'-6 1/2"	23'-0	0	0	0	0	5'-9 1/2"	23'-5 1/2"	5'-4 1/2"	5'-6 1/2"	23'-0	5'-4 1/2"	0
47'-0"	"	48'-7 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-0 1/2"	23'-5 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	5'-9 1/2"	0
49'-0"	"	50'-7 1/2"	5'-10 1/2"	6'-0 1/2"	23'-0	0	0	0	0	6'-3 1/2"	23'-5 1/2"	5'-10 1/2"	6'-0 1/2"	23'-0	5'-10 1/2"	0
15'-0"	RA2	15'-4 1/2"	4'-7 1/2"	0	0	0	0	0	0	5'-0 1/2"	0	0	0	0	4'-7 1/2"	0
17'-0"	"	17'-4 1/2"	5'-3 1/2"	0	0	0	0	0	0	5'-5 1/2"	0	0	0	0	5'-3 1/2"	0
19'-0"	"	19'-4 1/2"	5'-11 1/2"	0	0	0	0	0	0	6'-1 1/2"	0	0	0	0	5'-11 1/2"	0
21'-0"	"	21'-4 1/2"	4'-10 1/2"	0	0	0	0	5'-0 1/2"	23'-5 1/2"	5'-3 1/2"	0	0	0	0	4'-10 1/2"	0
23'-0"	"	23'-4 1/2"	5'-0 1/2"	0	0	0	0	5'-6 1/2"	23'-5 1/2"	5'-9 1/2"	0	0	0	0	5'-0 1/2"	0
25'-0"	"	25'-4 1/2"	5'-10 1/2"	0	0	0	0	6'-0 1/2"	23'-5 1/2"	6'-3 1/2"	0	0	0	0	5'-10 1/2"	0
27'-0"	"	27'-4 1/2"	5'-0 1/2"	0	0	0	0	5'-2 1/2"	23'-5 1/2"	5'-5 1/2"	23'-5 1/2"	5'-0 1/2"	0	0	5'-0 1/2"	0
29'-0"	"	29'-4 1/2"	5'-5 1/2"	0	0	0	0	5'-7 1/2"	23'-5 1/2"	5'-10 1/2"	23'-5 1/2"	5'-5 1/2"	0	0	5'-5 1/2"	0
31'-0"	"	31'-4 1/2"	5'-9 1/2"	5'-11 1/2"	23'-0	0	0	6'-0 1/2"	23'-5 1/2"	6'-2 1/2"	23'-6 1/2"	5'-9 1/2"	5'-11 1/2"	23'-0	5'-9 1/2"	0
33'-0"	"	33'-4 1/2"	5'-11 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-2 1/2"	23'-5 1/2"	5'-11 1/2"	5'-9 1/2"	23'-0	5'-11 1/2"	0
35'-0"	"	35'-4 1/2"	5'-3 1/2"	5'-5 1/2"	23'-0	0	0	0	0	5'-8"	23'-5 1/2"	5'-3 1/2"	5'-5 1/2"	23'-0	5'-3 1/2"	0
37'-0"	"	37'-4 1/2"	5'-7 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-1 1/2"	23'-5 1/2"	5'-7 1/2"	5'-9 1/2"	23'-0	5'-7 1/2"	0
39'-0"	"	39'-4 1/2"	5'-11 1/2"	5'-11 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-11 1/2"	5'-11 1/2"	23'-0	5'-11 1/2"	0
41'-0"	"	41'-4 1/2"	5'-5 1/2"	5'-6 1/2"	23'-0	0	0	0	0	5'-9 1/2"	23'-5 1/2"	5'-5 1/2"	5'-6 1/2"	23'-0	5'-5 1/2"	0
43'-0"	"	43'-4 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-0 1/2"	23'-5 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	5'-9 1/2"	0
45'-0"	"	45'-4 1/2"	5'-11 1/2"	5'-11 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-11 1/2"	5'-11 1/2"	23'-0	5'-11 1/2"	0
47'-0"	"	47'-4 1/2"	5'-5 1/2"	5'-6 1/2"	23'-0	0	0	0	0	5'-9 1/2"	23'-5 1/2"	5'-5 1/2"	5'-6 1/2"	23'-0	5'-5 1/2"	0
49'-0"	"	49'-4 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-0 1/2"	23'-5 1/2"	5'-9 1/2"	5'-9 1/2"	23'-0	5'-9 1/2"	0
15'-0"	RA3	14'-11"	4'-5 1/2"	0	0	0	0	0	0	4'-9 1/2"	0	0	0	0	4'-5 1/2"	0
17'-0"	"	16'-11"	5'-1 1/2"	0	0	0	0	0	0	5'-5 1/2"	0	0	0	0	5'-1 1/2"	0
19'-0"	"	18'-11"	5'-9 1/2"	0	0	0	0	0	0	6'-1 1/2"	0	0	0	0	5'-9 1/2"	0
21'-0"	"	20'-11"	4'-8 1/2"	0	0	0	0	5'-0 1/2"	23'-5 1/2"	5'-0 1/2"	0	0	0	0	4'-8 1/2"	0
23'-0"	"	22'-11"	5'-2 1/2"	0	0	0	0	5'-6 1/2"	23'-5 1/2"	5'-6 1/2"	0	0	0	0	5'-2 1/2"	0
25'-0"	"	24'-11"	5'-8 1/2"	0	0	0	0	6'-0 1/2"	23'-5 1/2"	6'-0 1/2"	0	0	0	0	5'-8 1/2"	0
27'-0"	"	26'-11"	4'-10 1/2"	0	0	0	0	5'-2 1/2"	23'-5 1/2"	5'-2 1/2"	23'-5 1/2"	4'-10 1/2"	0	0	4'-10 1/2"	0
29'-0"	"	28'-11"	5'-3 1/2"	0	0	0	0	5'-6 1/2"	23'-5 1/2"	5'-6 1/2"	23'-5 1/2"	5'-3 1/2"	0	0	5'-3 1/2"	0
31'-0"	"	30'-11"	5'-7 1/2"	0	0	0	0	5'-10 1/2"	23'-5 1/2"	5'-10 1/2"	23'-5 1/2"	5'-7 1/2"	0	0	5'-7 1/2"	0
33'-0"	"	32'-11"	4'-11 1/2"	5'-3 1/2"	23'-0	0	0	0	0	5'-8"	23'-5 1/2"	4'-11 1/2"	5'-3 1/2"	23'-0	4'-11 1/2"	0
35'-0"	"	34'-11"	5'-3 1/2"	5'-7 1/2"	23'-0	0	0	0	0	6'-1 1/2"	23'-5 1/2"	5'-3 1/2"	5'-7 1/2"	23'-0	5'-3 1/2"	0
37'-0"	"	36'-11"	5'-7 1/2"	5'-11 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-7 1/2"	5'-11 1/2"	23'-0	5'-7 1/2"	0
39'-0"	"	38'-11"	5'-0 1/2"	5'-4 1/2"	23'-0	0	0	23'-5 1/2"	5'-4 1/2"	5'-4 1/2"	23'-5 1/2"	5'-0 1/2"	5'-4 1/2"	23'-0	5'-0 1/2"	0
41'-0"	"	40'-11"	5'-3 1/2"	5'-7 1/2"	23'-0	0	0	23'-5 1/2"	5'-7 1/2"	5'-7 1/2"	23'-5 1/2"	5'-3 1/2"	5'-7 1/2"	23'-0	5'-3 1/2"	0
43'-0"	"	42'-11"	5'-7 1/2"	5'-11 1/2"	23'-0	0	0	23'-5 1/2"	5'-10 1/2"	5'-10 1/2"	23'-5 1/2"	5'-7 1/2"	5'-11 1/2"	23'-0	5'-7 1/2"	0
45'-0"	"	44'-11"	5'-1 1/2"	5'-4 1/2"	23'-0	0	0	5'-4 1/2"	23'-5 1/2"	5'-4 1/2"	23'-5 1/2"	5'-1 1/2"	5'-4 1/2"	23'-0	5'-1 1/2"	0
47'-0"	"	46'-11"	5'-4 1/2"	5'-7 1/2"	23'-0	0	0	5'-7 1/2"	23'-5 1/2"	5'-7 1/2"	23'-5 1/2"	5'-4 1/2"	5'-7 1/2"	23'-0	5'-4 1/2"	0
49'-0"	"	48'-11"	5'-7 1/2"	5'-10 1/2"	23'-0	0	0	5'-10 1/2"	23'-5 1/2"	5'-10 1/2"	23'-5 1/2"	5'-7 1/2"	5'-10 1/2"	23'-0	5'-7 1/2"	0
15'-0"	RA4	16'-1 1/2"	4'-7 1/2"	0	0	0	0	0	0	5'-4 1/2"	0	0	0	0	4'-7 1/2"	0
17'-0"	"	18'-1 1/2"	5'-3 1/2"	0	0	0	0	0	0	6'-0 1/2"	0	0	0	0	5'-3 1/2"	0
19'-0"	"	20'-1 1/2"	5'-11 1/2"	0	0	0	0	0	0	6'-8 1/2"	0	0	0	0	6'-3 1/2"	0
21'-0"	"	22'-1 1/2"	4'-9 1/2"	0	0	0	0	5'-3 1/2"	23'-5 1/2"	5'-6 1/2"	0	0	0	0	5'-1 1/2"	0
23'-0"	"	24'-1 1/2"	5'-3 1/2"	0	0	0	0	5'-9 1/2"	23'-6 1/2"	6'-0 1/2"	0	0	0	0	5'-7 1/2"	0
25'-0"	"	26'-1 1/2"	5'-9 1/2"	0	0	0	0	6'-3 1/2"	23'-6 1/2"	6'-6 1/2"	0	0	0	0	6'-1 1/2"	0
27'-0"	"	28'-1 1/2"	4'-10 1/2"	0	0	0	0	5'-4 1/2"	23'-5 1/2"	5'-7 1/2"	23'-5 1/2"	4'-10 1/2"	0	0	4'-10 1/2"	0
29'-0"	"	30'-1 1/2"	5'-3 1/2"	0	0	0	0	5'-9 1/2"	23'-6 1/2"	6'-0 1/2"	23'-5 1/2"	5'-3 1/2"	0	0	5'-3 1/2"	0
31'-0"	"	32'-1 1/2"	5'-7 1/2"	0	0	0	0	6'-2 1/2"	23'-6 1/2"	6'-5 1/2"	23'-6 1/2"	6'-2 1/2"	0	0	6'-0 1/2"	0
33'-0"	"	34'-1 1/2"	4'-11 1/2"	5'-9 1/2"	23'-0	0	0	0	0	5'-8"	23'-5 1/2"	4'-11 1/2"	5'-9 1/2"	23'-0	4'-11 1/2"	0
35'-0"	"	36'-1 1/2"	5'-3 1/2"	5'-7 1/2"	23'-0	0	0	0	0	6'-1 1/2"	23'-5 1/2"	5'-3 1/2"	5'-7 1/2"	23'-0	5'-3 1/2"	0
37'-0"	"	38'-1 1/2"	5'-7 1/2"	6'-1 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-7 1/2"	6'-1 1/2"	23'-0	5'-7 1/2"	0
39'-0"	"	40'-1 1/2"	4'-11 1/2"	5'-6 1/2"	23'-0	0	0	0	0	5'-8 1/2"	23'-5 1/2"	4'-11 1/2"	5'-6 1/2"	23'-0	4'-11 1/2"	0
41'-0"	"	42'-1 1/2"	5'-3 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-1 1/2"	23'-5 1/2"	5'-3 1/2"	5'-9 1/2"	23'-0	5'-3 1/2"	0
43'-0"	"	44'-1 1/2"	5'-6 1/2"	6'-1 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-6 1/2"	6'-1 1/2"	23'-0	5'-6 1/2"	0
45'-0"	"	46'-1 1/2"	5'-0 1/2"	5'-6 1/2"	23'-0	0	0	0	0	5'-8 1/2"	23'-5 1/2"	5'-0 1/2"	5'-6 1/2"	23'-0	5'-0 1/2"	0
47'-0"	"	48'-1 1/2"	5'-3 1/2"	5'-9 1/2"	23'-0	0	0	0	0	6'-1 1/2"	23'-5 1/2"	5'-3 1/2"	5'-9 1/2"	23'-0	5'-3 1/2"	0
49'-0"	"	50'-1 1/2"	5'-6 1/2"	6'-1 1/2"	23'-0	0	0	0	0	6'-4 1/2"	23'-5 1/2"	5'-6 1/2"	6'-1 1/2"	23'-0	5'-6 1/2"	0



DRAINAGE STRUCTURES

STATION	STAND	SIZE	SKIN	LENGTH	DRAIN AREA	CULV. DATA	REMARKS
336+37	1	24"	12'	10'	1.2	12' x 12'	2-9" Manhole
338+50	2	30"	15'	10'	1.5	15' x 15'	2-9" Manhole





PLAN
 DATE
 BY
 CHECKED
 DATE
 BY

PROFILE
 DATE
 BY
 CHECKED
 DATE
 BY

MISSOURI STATE LIFE INS. CO.

MISSOURI STATE LIFE INS. CO.

