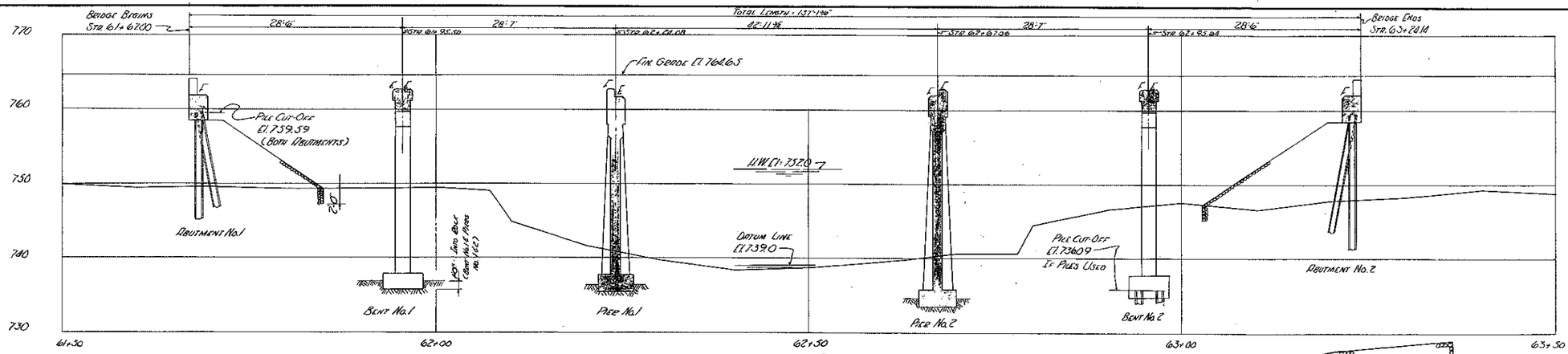
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19	13	21

F-031-1(8)



Section Along ℄ Roadway

Design Data

Design Load 22.280 Kips
H Factor In Talbots Formula Of C=0.35 Gives:
Area Required = 100.2 Sq. In.
Area Provided = 100.4 Sq. In.

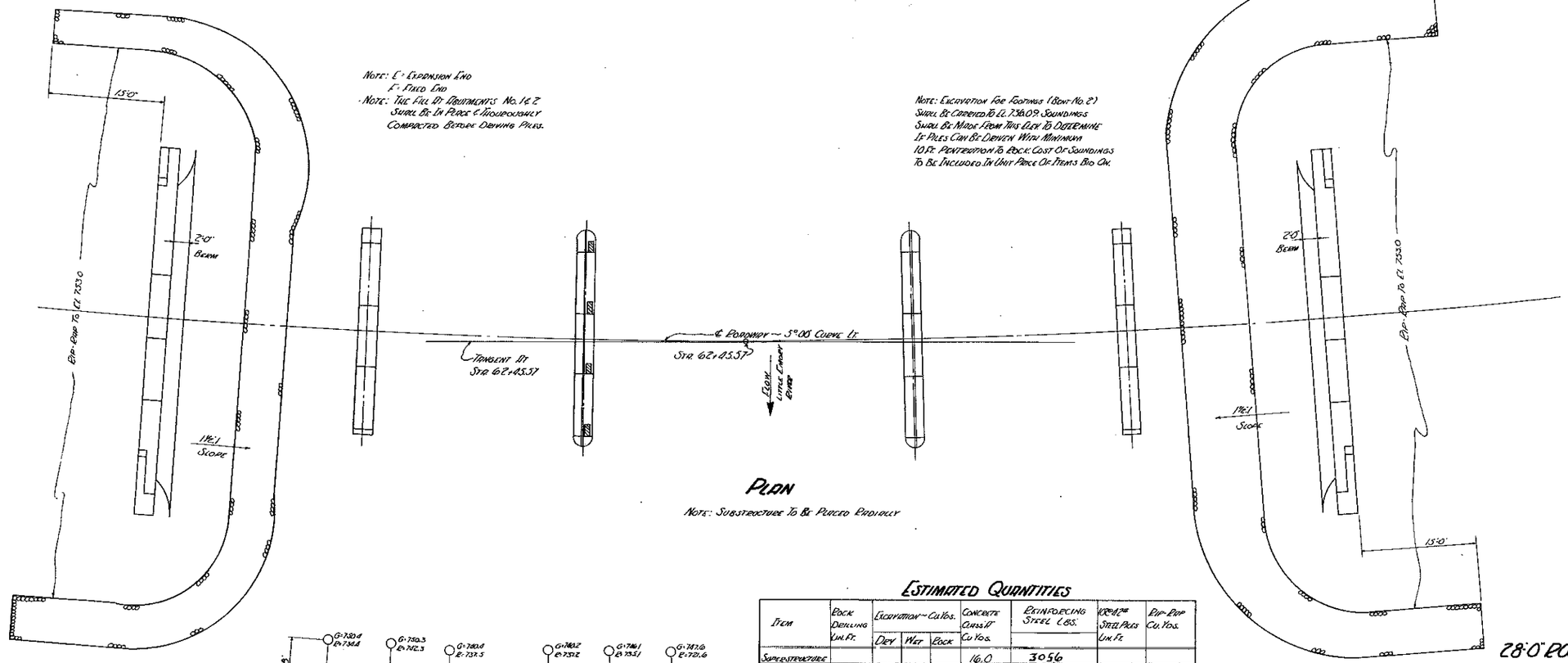
General Notes

Specifications: Standard Road & Bridge Specifications Of The Tennessee Department Of Highways & Public Works.
Loading: H 20-S16-44
Concrete: To Be Class 'A'
Reinforcing Steel: See Specifications.
Formsaf Finish: See Specifications.
Rip-Rap: See Specifications.
Piles: To Be 10"@42.7# Steel Piles.
Rock Foundations: See Specifications.
Neoprene Bearing Pads: See Special Provisions.

Handrail Note

Build Handrail According To Std. Dwg. E-12-105 And To The Following Dimensions:
Spans No. 1 & 5 - Build According To Std. For 26'-0 Cl. End Span Except:
Short Side Make M = 28'-0⅞"
X = ⅞", & L = 4 @ 8'-1"
Long Side Make M = 28'-11⅛"
X = 1⅛", & L = 4 @ 8'-1½"
Spans No. 2 & 4 - Build According To Std. For 26'-0 Cl. Interm. Span Except:
Short Side Make M = 28'-0⅞"
L1 = 2 @ 5'-1⅛" & 2 @ 5'-1⅜".
Long Side Make M = 28'-11⅛"
L1 = 3 @ 5'-4⅛", & 1 @ 5'-3⅜"
Span No. 3 Build According To Std. For 40'-0 Cl. Interm. Span Except:
Short Side Make M = 42'-8⅛"
L1 = 5 @ 5'-3⅜", & 1 @ 5'-3½"
Long Side Make M = 43'-7⅜"
L1 = 5 @ 5'-6⅛" & 1 @ 5'-6½".

Note: Use Bill Of Steel On Std. Dwg. E-12-105 Except On Short Side Shorten Bars Tag 2", & On Long Side Lengthen Bars Tag 2".

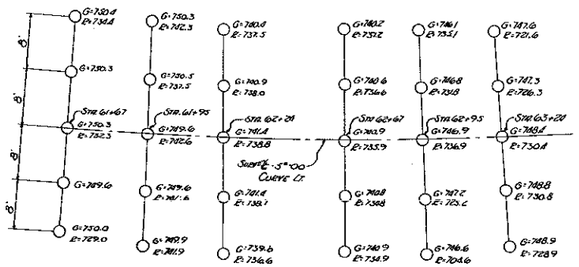


Note: 'E' Expansion End
'F' Fixed End
Note: The Fill In Abutments No. 1 & 2 Shall Be In Place & Thoroughly Compacted Before Driving Piles.

Note: Excavation For Footings (Bent No. 2) Shall Be Checked To El. 736.09 Soundings Shall Be Made From This Elev. To Determine If Piles Can Be Driven With Minimum 10 Ft. Penetration In Rock. Cost Of Soundings To Be Included In Unit Price Of Items Bid On.

Plan

Note: Substructure To Be Placed Radially



Note: Rotter Rock Foundation Hole Uncovered, Holes 6' Deep Shall Be Drilled At Points Designated By The Engineer.

Note: G = Ground Elevation
E = Rock Elevation

Rock Soundings

Estimated Quantities

Item	Rock Drilling Lin. Ft.	Excavation — Cu. Yds. Dry	Excavation — Cu. Yds. Wet	Excavation — Cu. Yds. Rock	Concrete Class 'A' Cu. Yds.	Reinforcing Steel Lbs.	10"@42.7# Steel Piles Lin. Ft.	Rip-Rap Cu. Yds.
Superstructure					160	3056		
Deck 4@26 Cl.					145.2	3846		
Girders 1@40 Cl.					61.1	1856		
Substructure								
Abutment No. 1					16.8	1319	180	41
Bent No. 1			57	6	17.3	383.1		
Pier No. 1		18	22	12	52.9	2061		
Pier No. 2		40	22	13	59.1	2678		
Bent No. 2		79	50	3	*18.3	3815	100	
Abutment No. 2					16.8	1319	210	61
Totals	60	133	151	34	403.8	7503.0	490	102

* Includes 1.0 Cu. Yds. For Piles Encasement One Footing.

Note: The Cost Of 3"ϕ Borehole Drains, Transite Or Approved Equal, Joints-Manville Sleeve Packing No. 60, Or Approved Equal, Neoprene Bearing Pads, & Joint Material To Be Included In The Unit Price Bid For Class 'A' Concrete.

Note: No Reinforcing Steel Shall Be Checked For Bents No. 1 & 2 Piles No. 1 & 2 Until Rock Foundations Are Determined.

Special Note — Piles

The Piles In Abutments No. 1 & 2 To Be Driven To A Minimum Bearing Of 30 Tons Or Refusal On Rock.
The Piles In Bent No. 2, If Required, To Be Driven To A Minimum Bearing Of 23 Tons Or Refusal On Rock.

List Of Dwgs. Dwg. 1

Handrail ------ See Note This Sheet & E-12-105
Deck Girders { 4@26 Cl. Span ------ G
1@40 Cl. Span ------ G
Abutment No. 1 & 2 ------ G
Bents No. 1 & 2 ------ G
Pier No. 1 (L = 26'-0", Type 4, Tot. Lt. = 23'-7") ------ F-10-14 & G
Pier No. 2 (L = 26'-0", Type 4, Tot. Lt. = 26'-7") ------ F-10-14 & G

Note: Omit Drains Over Rip-Rap Area Required: 19'-3" Roadway Drains, Transite Or Approved Equal (8" Long)

28'-0" Roadway With Safety Curbs

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

Layout Of Bridge Over Little Emory River Sta. 61+67 Roane-Morgan County 1959

DESIGNED BY _____ DATE _____
DRAWN BY H. Burke DATE 11-12-58
TRACED BY H. H. Sorrell DATE 11-26-58
CHECKED BY _____ DATE _____

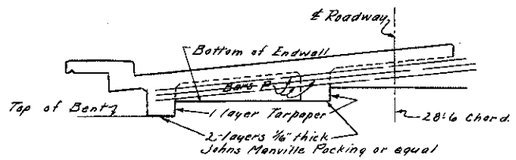
CORRECT Fred Grove
BRIDGE ENGINEER
APPROVED Charles D. Mc Coles
STATE HIGHWAY ENGINEER

6-9-14

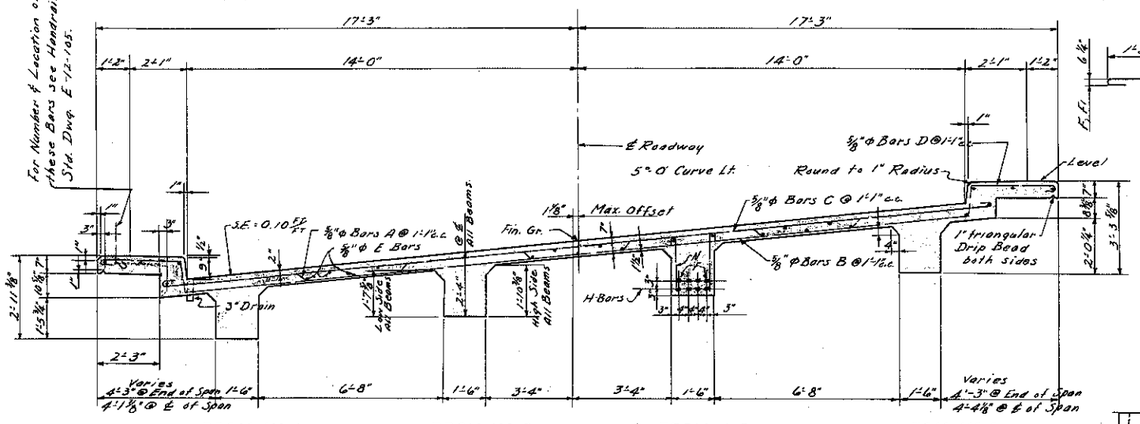
TVA, CES, RG, Bunton 12/9/58

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19	22	25

F-031-1(6)

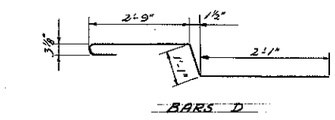


PART END ELEVATION
Expansion Side.

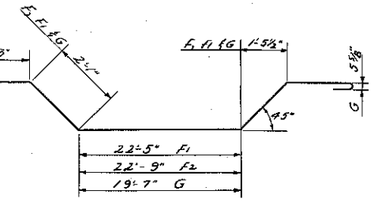


BEAM NO.1 BEAM NO.2 BEAM NO.3 BEAM NO.4

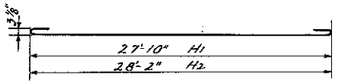
SECTION A-A
Note: Reinforcement in all beams same.



BARS D

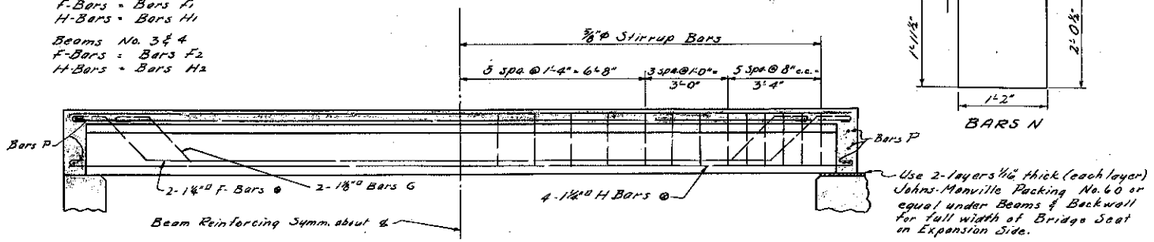


BARS F, F1 & G



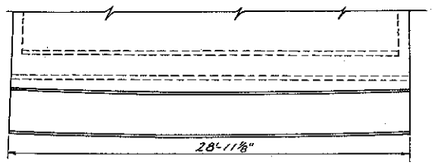
BARS H & H1

Note: Bars ⊛
Beams No. 1 & 2
F-Bars = Bars F1
H-Bars = Bars H1
Beams No. 3 & 4
F-Bars = Bars F2
H-Bars = Bars H2

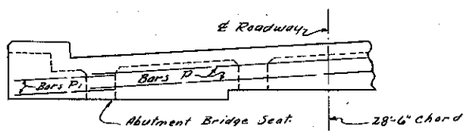


SECTION B-B
Typical for all Beams.

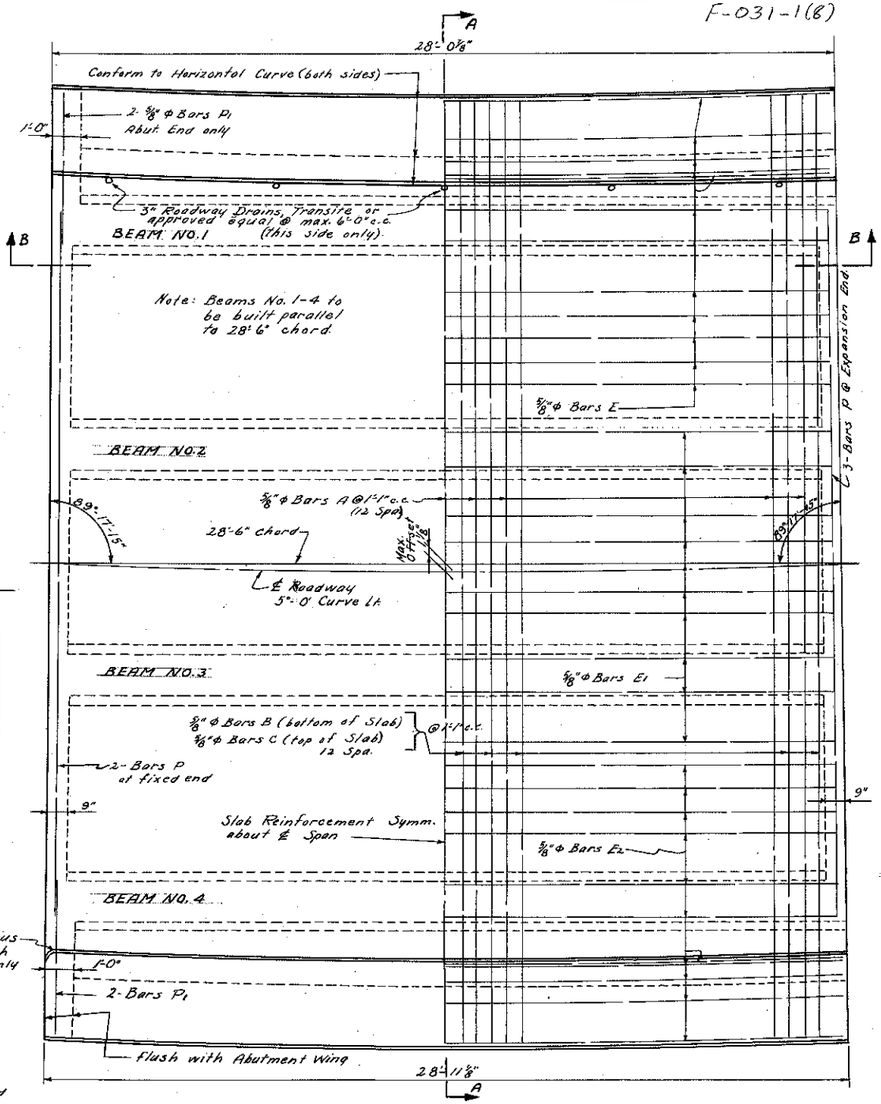
BARS N



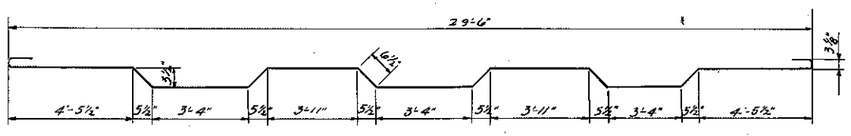
PART INTERMEDIATE SPAN
Note: Details not shown same as for end span.



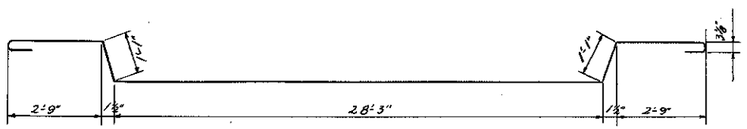
PART END ELEVATION
Abutment End



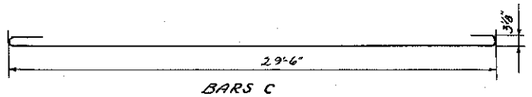
PLAN
Note: Beams to be built parallel to chord.



BARS A



BARS B



BARS C

BILL OF STEEL

Bar	No.	Size	Length
A	25	5/8"ϕ	31'-0"
B	26	"	36'-11"
C	26	"	30'-6"
D	50	"	6'-5"
E	12	"	27'-9"
E1	10	"	28'-0"
E2	11	5/8"ϕ	28'-3"
F1	4	1 1/4"ϕ	31'-1"
F2	4	1 1/4"ϕ	31'-5"
G	8	1 1/8"ϕ	28'-1"
H1	8	1 1/4"ϕ	29'-10"
H2	8	1 1/4"ϕ	30'-2"
N	108	5/8"ϕ	6'-2"
P	5	7/8"ϕ	25'-6"
Add for Abutment End			
P1	4	7/8"ϕ	6'-4"

ESTIMATED QUANTITIES

ITEM	Concrete Class "A" Cu. Yds.	Reinforcing Steel Lbs.
Intermediate Span	35.8	9591
End Span	36.8	9617

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

SPANS 1, 2, 4 & 5
OVER LITTLE EMORY RIVER
STA. 61+67
ROANE-MORGAN CO.
1958

DESIGNED BY
DRAWN BY R. G. Bingham DATE 9-8-58
TRACED BY A. Kelley DATE 12-12-58
CHECKED BY DATE

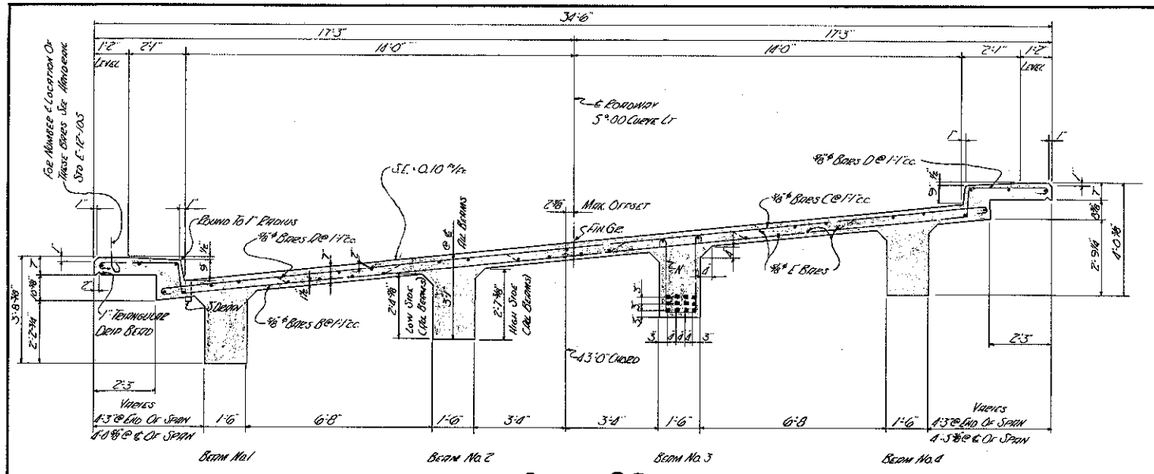
TRA. C.K.D. Bingham 12/19/58

CORRECT Fred Greve BRIDGE ENGINEER
APPROVED Harold M. Gates STATE HIGHWAY ENGINEER

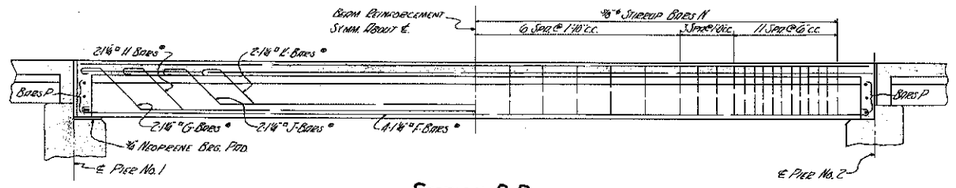
G-9-A

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19	23	25

F-031-1(8)

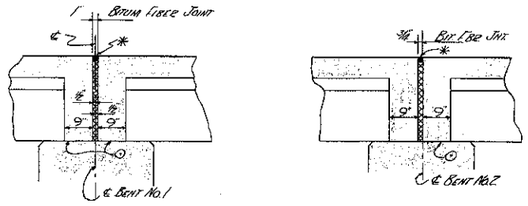


SECTION A-A

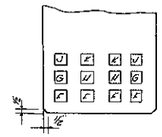


SECTION B-B
Typical For All Beams

Note: Bars ⑧
Beam No.1
F Bars - Bars I J Bars - Bars J
G Bars - Bars G L Bars - Bars L
H Bars - Bars H
Beams No. 2 & 3
F Bars - Bars I1 J Bars - Bars J1
G Bars - Bars G1 L Bars - Bars L1
H Bars - Bars H1
Beam No.4
F Bars - Bars I2 J Bars - Bars J2
G Bars - Bars G2 L Bars - Bars L2
H Bars - Bars H2

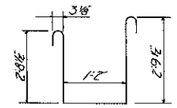


JOINT LOCATION SKETCHES



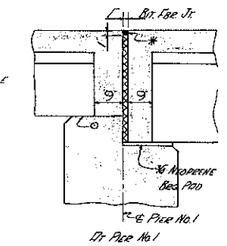
BAR LOCATION SKETCH

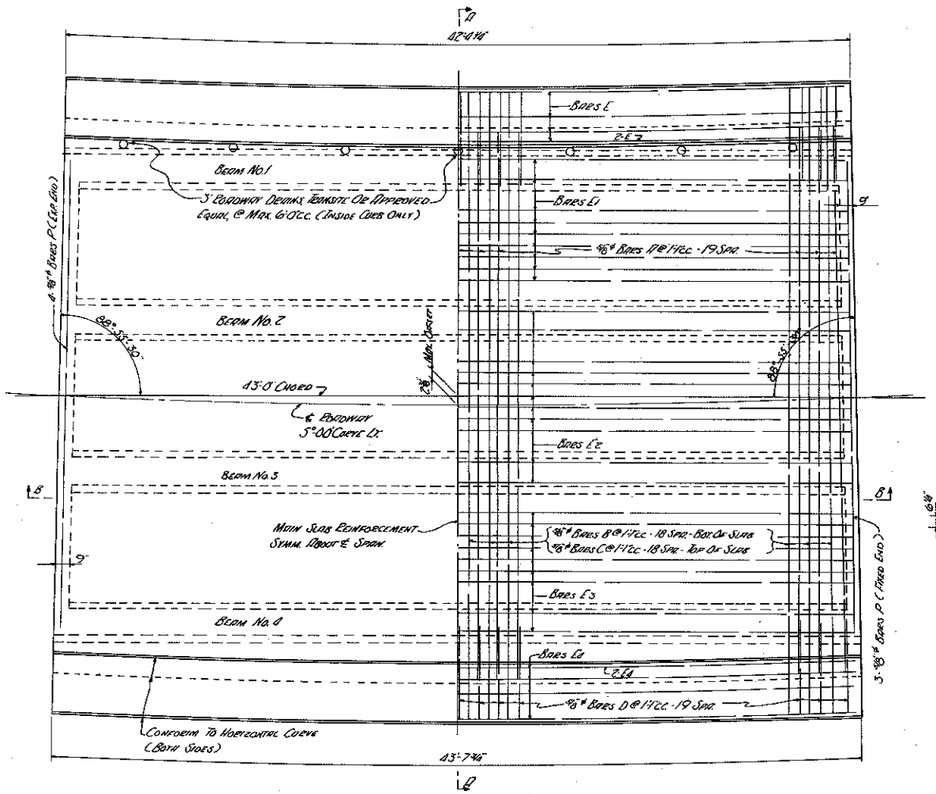
Note: Chamfer Bottom Corners Of Beams ½" Ea. Side Unless Shown.



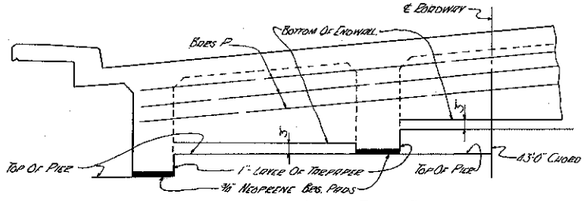
BARS N

* Top Of Joint Filled To ½" Depth Or 1" With Rubber Asphalt Joint Compound - Federal Specifications SS-S-164.
Or 2 Layers (⅛" Each Layer) Johns-Manville Sheet Packing No. 60, Or Approved Equal, For Full Width Of Expansion Portion Of Bridge Seats, Graphite Surfaces In Contact.
Note: Square Joint Material To One Building Up Pier No.1

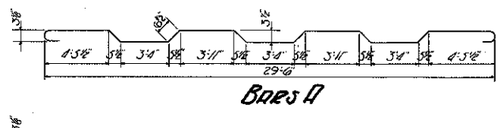




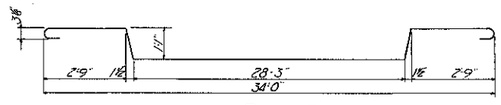
PLAN
Note: Beams To Be Built Parallel To Chord.



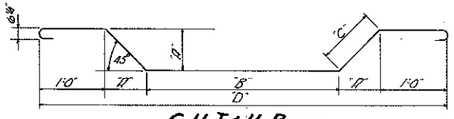
PART END ELEVATION
Expansion End @ Pier No.1
Note: Fixed End @ Pier No.2 Similar - Endwall Sets On Pier Caps.



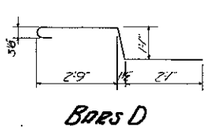
BARS A



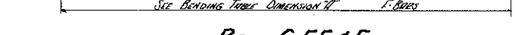
BARS B



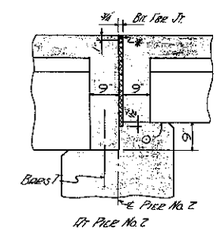
G, H, J & L Bars
See Bending Table



BARS D



BARS C, F, I1, & F2



SECT. ALONG ℄ ROADWAY
Showing Joint Location

BENDING TABLE

Bars	"L"	"B"	"C"	"D"
F	42'0"	–	–	–
F1	42'6"	–	–	–
F2	43'0"	–	–	–
G	2'3½"	35'5"	3'3"	42'0"
G1	2'3½"	35'11"	3'3"	42'6"
G2	2'3½"	36'5"	3'3"	43'0"
H	2'3½"	30'10"	3'3"	37'5"
H1	2'3½"	31'4"	3'3"	37'11"
H2	2'3½"	31'10"	3'3"	38'5"
J	2'0½"	26'9"	2'10½"	32'10"
J1	2'0½"	27'3"	2'10½"	33'4"
J2	2'0½"	27'9"	2'10½"	33'10"
K	2'0½"	22'8"	2'10½"	28'9"
K1	2'0½"	23'2"	2'10½"	29'3"
K2	2'0½"	23'8"	2'10½"	29'9"

BILL OF STEEL

Bars	Size	No.	Length	Bars	Size	No.	Length
A	⅝" ⊡	39	31'0"	G1	1⅛" ○	4	46'5"
B	⅝" ⊡	38	36'11"	G2	1⅛" ○	2	46'11"
C	⅝" ⊡	38	30'6"	H	1⅛" ○	2	31'4"
D	⅝" ⊡	19	6'5"	H1	"	4	31'10"
E	⅝" ⊡	5	42'0"	H2	1⅛" ○	2	32'4"
E1	"	9	42'5"	J	1⅛" ○	2	36'6"
E2	"	11	42'6"	J1	"	4	37'0"
E3	"	9	42'9"	J2	1⅛" ○	2	37'6"
E4	⅝" ⊡	5	43'0"	K	1⅛" ○	2	32'5"
F	1⅛" ○	4	41'0"	K1	"	4	32'11"
F1	"	8	41'6"	K2	1⅛" ○	2	33'5"
F2	1⅛" ○	4	42'0"	N	⅝" ⊡	160	7'8"
G	1⅛" ○	2	45'11"	P	⅝" ⊡	7	25'6"

ESTIMATED QUANTITIES

Concrete Class "A" Cu. Yds.	Reinforcing Steel Lbs.
611	18139

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

SPAN NO. 3
FOR BRIDGE OVER LITTLE EMORY RIVER
STA. 61+67
ROANE-MORGAN CO.
1959

CORRECT Fred Gore
BRIDGE ENGINEER
APPROVED
STATE HIGHWAY ENGINEER

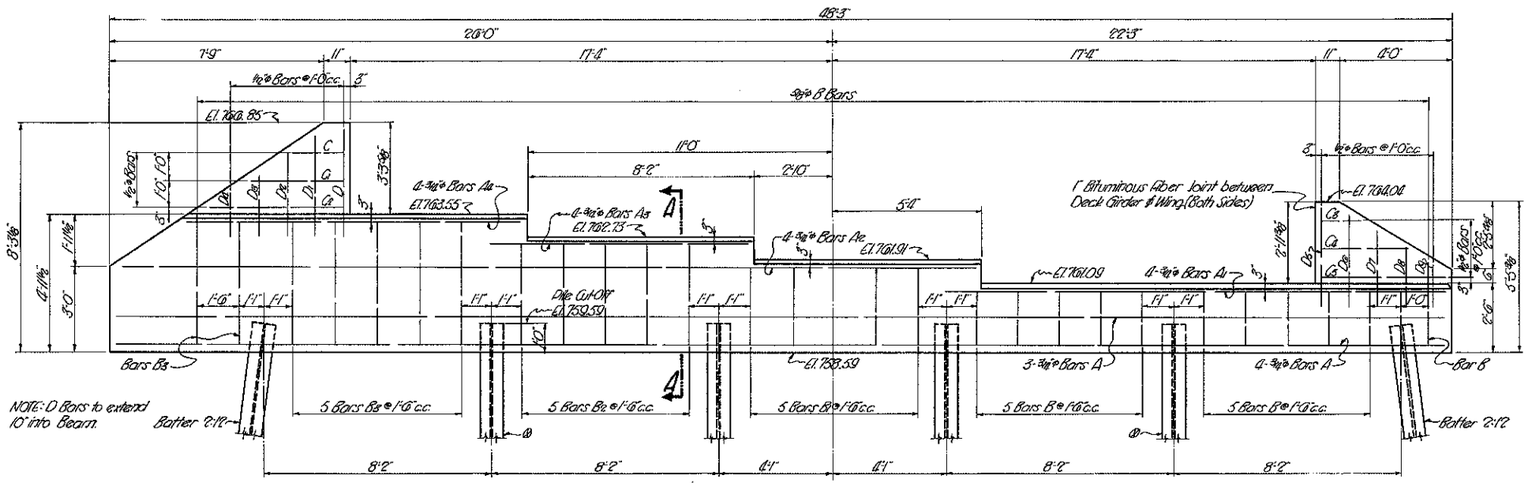
G-9-14

DESIGNED BY ____ DATE ____
DRAWN BY A. BUEKE DATE 9-11-58
TRACED BY H.E. STRETTON DATE 12-30-58
CHECKED BY ____ DATE ____

Tr. Checked 1-2-59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOT SHEE
8	TENN.		19	24	25

F-031-1(8)



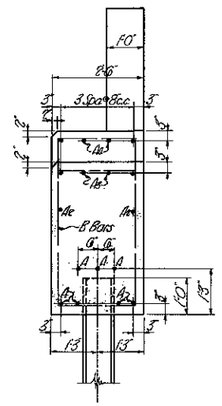
FRONT ELEVATION ~ ABUTMENT No. 1

LOOKING BACK ON SURVEY

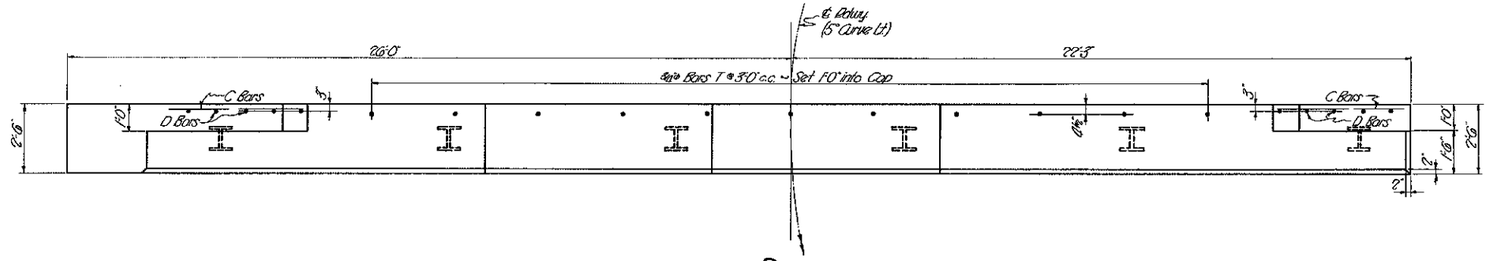
@ Batter Pile Forward 2:12

BILL OF STEEL (ABUT #1 & 2 EACH)

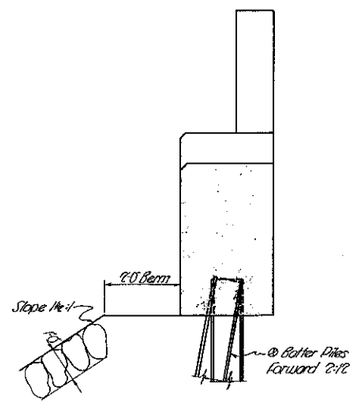
Bar	No.	Size	Length
A	7	¾"ø	47'-9"
Aa	4	-	17'-3"
Ab	4	-	30'-10"
Ac	4	-	9'-3"
Ad	4	⅝"ø	12'-0"
B	11	¾"ø	9'-6"
Ba	5	-	11'-2"
Bb	5	-	12'-3"
Bc	7	¾"ø	14'-5"
C	1	⅝"ø	1'-9"
Ca	1	-	3'-3"
Cb	1	-	4'-6"
Cc	1	-	1'-6"
Cd	1	-	3'-0"
Ce	1	⅝"ø	4'-6"
D	1	⅝"ø	3'-10"
Da	1	-	3'-6"
Db	1	-	3'-0"
Dc	1	-	2'-3"
Dd	1	-	1'-6"
De	1	-	3'-6"
Df	1	-	3'-3"
Dg	1	-	2'-9"
Dh	1	-	2'-3"
Di	1	½"ø	1'-6"
T	11	⅜"ø	2'-0"



SECTION A-A

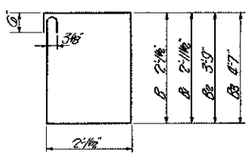


PLAN

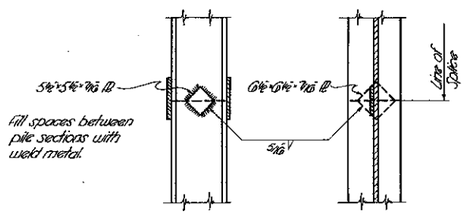


SECTION A-A

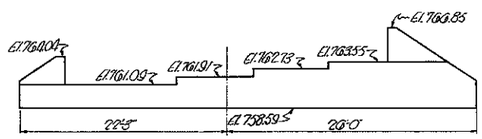
Showing Rip-Rap & Pile Batter



BARS B-B3



DETAIL OF PILE SPLICE



FRONT ELEVATION ~ ABUTMENT No. 2

LOOKING FORWARD ON SURVEY

Details not shown same as for Abutment No. 1

ESTIMATED QUANTITIES

	Concrete Class 'A' Cu. Yds.	Reinforcing Steel Lbs.
Abutment No. 1	16.8	1319
Abutment No. 2	16.8	1319

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

ABUTMENTS NO. 1 & 2

FOR BRIDGE OVER LITTLE EMORY RIVER
STA. 61+67.0
DOANE-MORGAN CO'S.
1959

DESIGNED BY WD DATE
DRAWN BY WD DATE 9-27-58
TRACED BY DATE 12-1-58
CHECKED BY A.B. DATE

CORRECT Fred Gabbard BRIDGE ENGINEER

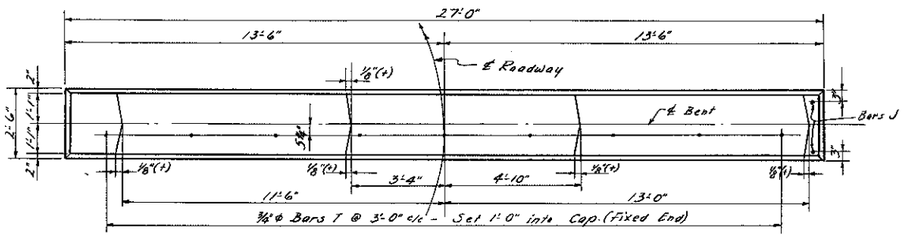
APPROVED Herbert B. Bates STATE HIGHWAY ENGINEER

G-9-A

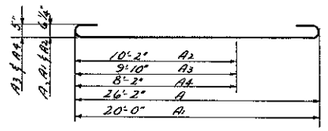
Checked 12-5-58

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TO SHT
8	TENN.		19	25	2

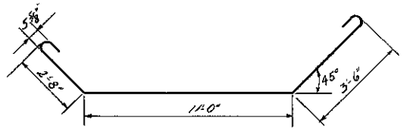
F-031-1(8)



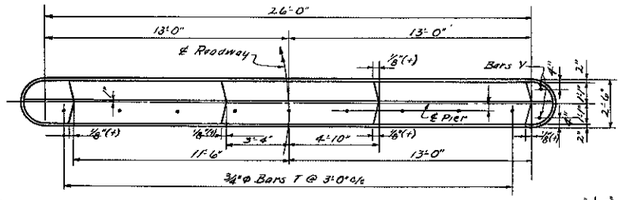
CAP PLAN- BENT NO. 2
Bent No 1 Same except omit Bars T.



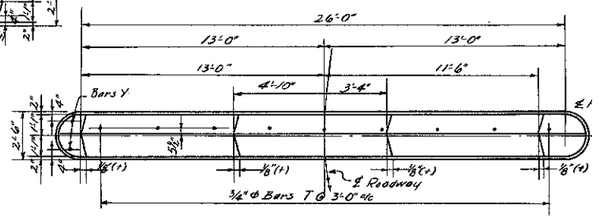
BARS A- A4



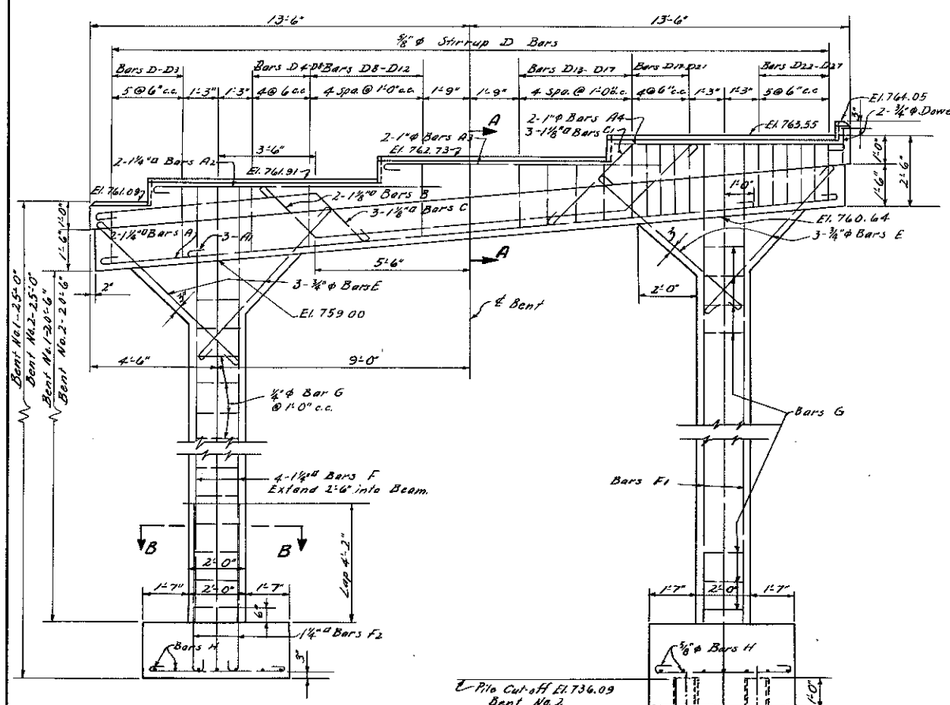
BARS B



PLAN- PIER NO. 2

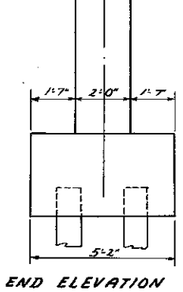


PLAN- PIER NO.1

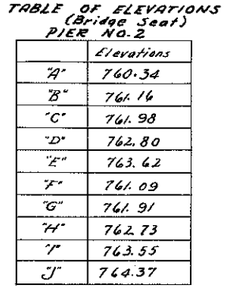


Note: Bridge Seat Elevations Same for Bents No 1 & 2

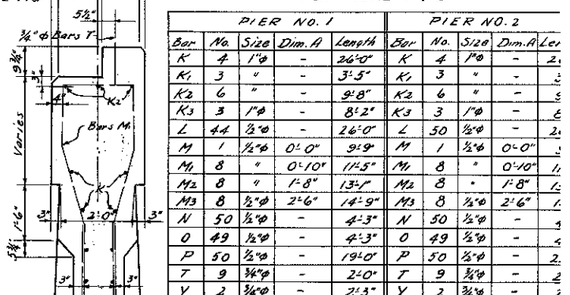
ELEVATION-BENTS 1 & 2
Looking Forward on Survey



END ELEVATION



ELEVATION- PIER NO.2
Looking forward on Survey



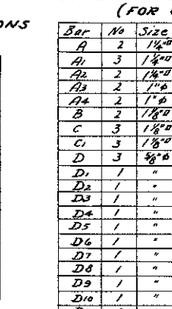
ELEVATION- PIER NO.1
Looking Back on Survey

TABLE of ELEVATIONS (Bridge Seat) PIER NO. 1

	Elevations
A	760.28
B	761.10
C	761.92
D	762.74
E	763.56
F	761.09
G	761.91
H	762.73
I	763.55
J	764.37

TABLE OF ELEVATIONS (Bridge Seat) PIER NO.2

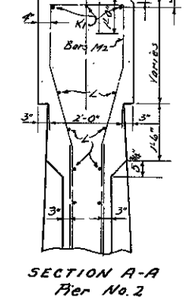
	Elevations
"A"	760.34
"B"	761.16
"C"	761.98
"D"	762.80
"E"	763.62
"F"	761.09
"G"	761.91
"H"	762.73
"I"	763.55
"J"	764.37



M BARS

CONSTANT BILL OF STEEL (FOR ONE BENT)

Bar	No	Size	DIM "A"	Length
A	2	1¼" ϕ		28'-2"
A1	3	1¾" ϕ		2.2'-0"
A2	2	1⅛" ϕ		11'-2"
A3	2	1" ϕ		10'-8"
A4	2	1" ϕ		9'-0"
B	2	1⅛" ϕ		19'-0"
C	3	1⅛" ϕ		12'-1"
C1	3	1⅛" ϕ		13'-3"
D	3	⅝" ϕ	2'-0"	8'-4"
D1	1	"	2'-9½"	9'-11"
D2	1	"	2'-9"	9'-10"
D3	1	"	2'-8½"	9'-9"
D4	1	"	2'-5½"	9'-3"
D5	1	"	2'-5"	9'-2"
D6	1	"	2'-4½"	9'-1"
D7	1	"	2'-4"	9'-0"
D8	1	"	2'-3½"	8'-11"
D9	1	"	2'-2½"	8'-9"
D10	1	"	2'-3½"	8'-11"
D11	1	"	2'-10"	10'-0"
D12	1	"	2'-9"	9'-10"
D13	1	⅝" ϕ	2'-5"	9'-2"
D14	1	"	2'-4"	9'-0"
D15	1	"	2'-3"	8'-10"
D16	1	"	2'-2"	8'-8"
D17	1	"	2'-10½"	10'-1"
D18	1	"	2'-10"	10'-0"
D19	1	"	2'-9½"	9'-11"
D20	1	"	2'-9"	9'-10"
D21	1	"	2'-8½"	9'-9"
D22	1	"	2'-6"	9'-4"
D23	1	"	2'-5"	9'-2"
D24	1	"	2'-4½"	9'-1"
D25	1	"	2'-4"	9'-0"
D26	1	"	2'-3½"	8'-11"
D27	1	⅝" ϕ	2'-3"	8'-10"
E	12	¾" ϕ		8'-3"
H	60	⅜" ϕ		5'-9"
F2	16	1¼" ϕ		6'-11"
J	2	¾" ϕ		1'-0"



SECTION A-A
Pier No.2

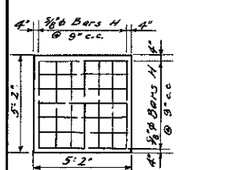
SECTION B-B
pier No.1

BILL OF STEEL
FOR PIERS 1 & 2

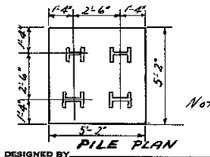
PIER NO. 1					PIER NO. 2				
Bar	No.	Size	Dim. A	Length	Bar	No.	Size	Dim. A	Length
K	4	1" ϕ	-	26'-0"	K	4	1" ϕ	-	2[illegible]
K1	3	"	-	3'-5"	K1	3	"	-	[illegible]
K2	6	"	-	9'-8"	K2	6	"	-	[illegible]
K3	3	1" ϕ	-	8'-2"	K3	3	1" ϕ	-	6
L	44	½" ϕ	-	24'-0"	L	50	½" ϕ	-	2[illegible]
M	1	½" ϕ	0'-0"	9'-9"	M	1	½" ϕ	0'-0"	[illegible]
M1	8	"	0'-10"	11'-5"	M1	8	"	0'-10"	1[illegible]
M2	8	"	1'-8"	13'-1"	M2	8	"	1'-8"	1[illegible]
M3	8	½" ϕ	2'-6"	14'-9"	M3	8	½" ϕ	2'-6"	1[illegible]
N	50	½" ϕ	-	4'-3"	N	50	½" ϕ	-	[illegible]
O	49	½" ϕ	-	4'-3"	O	49	½" ϕ	-	[illegible]
P	50	½" ϕ	-	19'-0"	P	50	½" ϕ	-	2[illegible]
T	9	¾" ϕ	-	2'-0"	T	9	¾" ϕ	-	2[illegible]
Y	2	¾" ϕ	-	2'-3"	Y	2	¾" ϕ	-	2[illegible]

ESTIMATED QUANTITIES

	Concrete Class "A" Cu. Yds.	Reinforcing Steel - Lbs
PIER No.1	52.9	2461
PIER No.2	59.4	2674

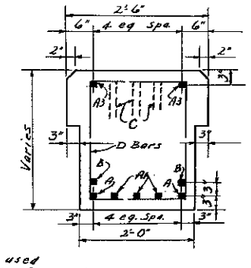


PLAN OF REINFORCEMENT IN FOOTING

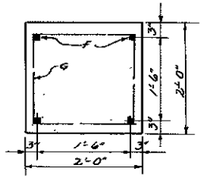


PILE PLAN

Note Piles to be used for Bent 2 if found necessary.

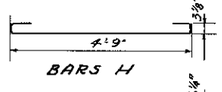


SECTION A-A

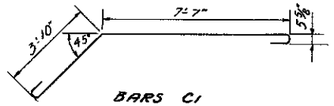


SECTION B-B

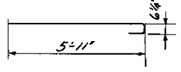
BARS C



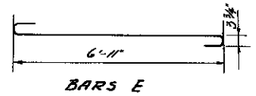
BARS H



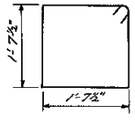
BARS C1



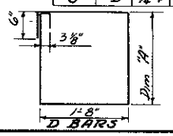
BARS F2



BARS E



BARS G



BILL OF STEEL

	Bars F 4-1½" ϕ Length	Bars F1 4-1¼" ϕ Length	Bars G ⅝" ϕ @ 1'-0" No.
Bent No1	23'-6"	25'-0"	43
Bent No2	23'-6"	23'-0"	43

Note Add 9 - ¾" ϕ X 2'-0" Bars T for Bent No. 2.

ESTIMATED QUANTITIES

	Concrete-Class "A" Cu. Yds.	Reinforcing Steel-Lbs.
Bent No.1	17.3	3831
Bent No.2	⊛ 18.3	3815

⊛ Includes 1.0 Cu. Yds. for Pile encasement one footing

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

PIERS NO. 1 & 2
BENTS NO. 1 & 2
OVER LITTLE EMORY RIVER
STA. 61+67
ROANE-MORGAN CO'S.
1959

DESIGNED BY
DRAWN BY R.C. Bingham DATE 11-17-58
TRACED BY A Kelley DATE 12-8-58
CHECKED BY DATE

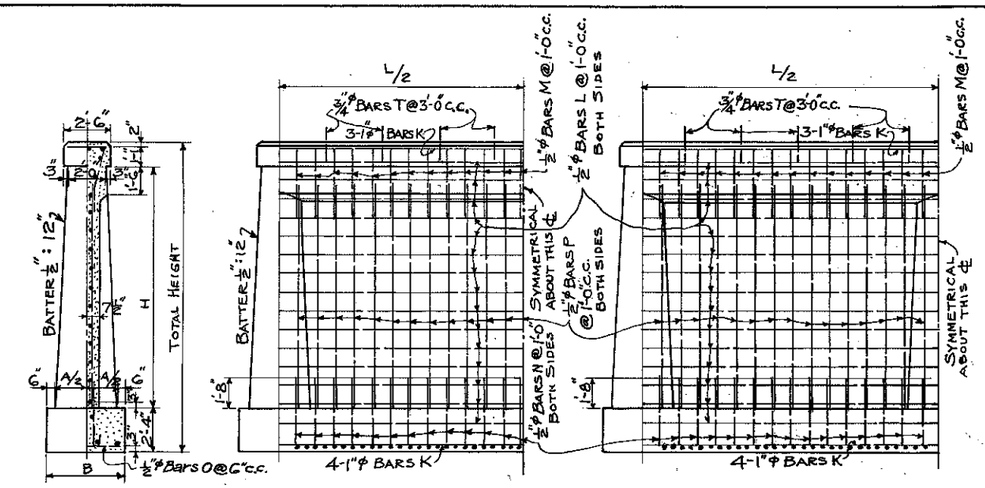
TRACING CK. H.A.S. 12-12-58

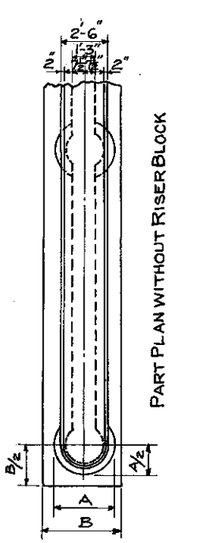
CORRECT Fred Gore BRIDGE ENGINEER
APPROVED Herbert M. Hutcheson STATE HIGHWAY ENGINEER

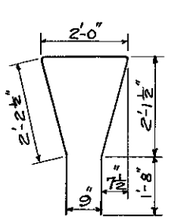
G-9-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	TENN.		19	17	85

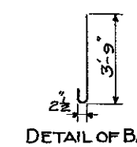
F-031-1(6)



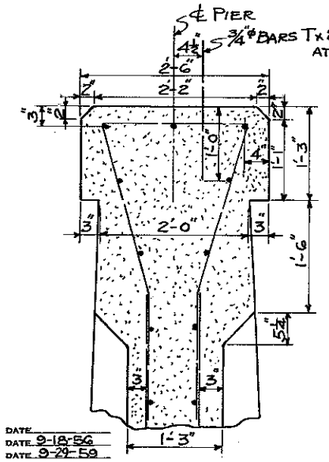




DETAIL OF BARS M



DETAIL OF BARS N



GENERAL NOTES:

SPECIFICATIONS: STANDARD ROAD & BRIDGE SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF HIGHWAYS & PUBLIC WORKS.
CONCRETE: SHALL BE CLASS "A".
REINFORCING STEEL:
FORMS & FINISH: } SEE SPECIFICATIONS.
ROCK FOUNDATION:

RULE FOR LENGTH OF PIER:
OUTSIDE BEAM OF GIRDER SHALL HAVE FULL BEARING ON PIER & RISER BLOCK. THE RISER BLOCK SHALL NOT BE CURVED AT THE ENDS.

DESIGNED BY
DRAWN BY MADDUX DATE 9-18-56
RETRACED BY DATE 9-29-59
CHECKED BY DATE

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES

TYPE A - L=26'-0" *

TOTAL HEIGHT	DIMENSIONS H	A	B	STEEL REINFORCEMENT BARS K=1"ϕ BARS L-M-N-O-P=1/2"ϕ BARS K-M-N	BARS L NO.	BARS L LGTH.	BARS O NO.	BARS O LGTH.	BARS P NO.	BARS P LGTH.	TOTAL QUANTITIES REINF. POUNDS	TOTAL QUANTITIES CONC. CU.YDS.
9'-7"	6'	2'-6"	3'-6"		16	26'-0"	49	3'-0"	50	5'-0"	1336	21.8
10'-7"	7'	2'-7"	3'-7"		18	26'-0"	49	3'-0"	50	6'-0"	1405	23.5
11'-7"	8'	2'-8"	3'-8"		20	26'-0"	49	3'-3"	50	7'-0"	1481	25.2
12'-7"	9'	2'-9"	3'-9"		22	26'-0"	49	3'-3"	50	8'-0"	1550	27.0
13'-7"	10'	2'-10"	3'-10"		24	26'-0"	49	3'-3"	50	9'-0"	1618	28.7
14'-7"	11'	2'-11"	3'-11"		26	26'-0"	49	3'-6"	50	10'-0"	1694	30.5
15'-7"	12'	3'-0"	4'-0"		28	26'-0"	49	3'-6"	50	11'-0"	1763	32.4
16'-7"	13'	3'-1"	4'-1"		30	26'-0"	49	3'-6"	50	12'-0"	1831	34.2
17'-7"	14'	3'-2"	4'-2"		32	26'-0"	49	3'-9"	50	13'-0"	1908	36.1
18'-7"	15'	3'-3"	4'-3"		34	26'-0"	49	3'-9"	50	14'-0"	1976	38.0
19'-7"	16'	3'-4"	4'-4"		36	26'-0"	49	3'-9"	50	15'-0"	2044	39.9
20'-7"	17'	3'-5"	4'-5"		38	26'-0"	49	4'-0"	50	16'-0"	2121	41.9
21'-7"	18'	3'-6"	4'-6"		40	26'-0"	49	4'-0"	50	17'-0"	2189	43.9
22'-7"	19'	3'-7"	4'-7"		42	26'-0"	49	4'-0"	50	18'-0"	2258	45.9
23'-7"	20'	3'-8"	4'-8"		44	26'-0"	49	4'-3"	50	19'-0"	2334	47.9
24'-7"	21'	3'-9"	4'-9"		46	26'-0"	49	4'-3"	50	20'-0"	2402	50.0
25'-7"	22'	3'-10"	4'-10"		48	26'-0"	49	4'-3"	50	21'-0"	2471	52.1
26'-7"	23'	3'-11"	4'-11"		50	26'-0"	49	4'-6"	50	22'-0"	2547	54.3
27'-7"	24'	4'-0"	5'-0"		52	26'-0"	49	4'-6"	50	23'-0"	2616	56.5
28'-7"	25'	4'-1"	5'-1"		54	26'-0"	49	4'-6"	50	24'-0"	2684	58.7
29'-7"	26'	4'-2"	5'-2"		56	26'-0"	49	4'-9"	50	25'-0"	2761	61.0
30'-7"	27'	4'-3"	5'-3"		58	26'-0"	49	4'-9"	50	26'-0"	2829	63.3
31'-7"	28'	4'-4"	5'-4"		60	26'-0"	49	4'-9"	50	27'-0"	2897	65.6
32'-7"	29'	4'-5"	5'-5"		62	26'-0"	49	5'-0"	50	28'-0"	2974	68.0
33'-7"	30'	4'-6"	5'-6"		64	26'-0"	49	5'-0"	50	29'-0"	3042	70.4
34'-7"	31'	4'-7"	5'-7"		66	26'-0"	49	5'-0"	50	30'-0"	3111	72.8
35'-7"	32'	4'-8"	5'-8"		68	26'-0"	49	5'-3"	50	31'-0"	3187	75.4
36'-7"	33'	4'-9"	5'-9"		70	26'-0"	49	5'-3"	50	32'-0"	3255	77.9
37'-7"	34'	4'-10"	5'-10"		72	26'-0"	49	5'-3"	50	33'-0"	3324	80.5
38'-7"	35'	4'-11"	5'-11"		74	26'-0"	49	5'-6"	50	34'-0"	3400	83.1
39'-7"	36'	5'-0"	6'-0"		76	26'-0"	49	5'-6"	50	35'-0"	3469	85.8
40'-7"	37'	5'-1"	6'-1"		78	26'-0"	49	5'-6"	50	36'-0"	3537	88.5
41'-7"	38'	5'-2"	6'-2"		80	26'-0"	49	5'-9"	50	37'-0"	3614	91.3
42'-7"	39'	5'-3"	6'-3"		82	26'-0"	49	5'-9"	50	38'-0"	3682	94.1
43'-7"	40'	5'-4"	6'-4"		84	26'-0"	49	5'-9"	50	39'-0"	3750	97.0
44'-7"	41'	5'-5"	6'-5"		86	26'-0"	49	6'-0"	50	40'-0"	3827	99.9
45'-7"	42'	5'-6"	6'-6"		88	26'-0"	49	6'-0"	50	41'-0"	3895	102.9
46'-7"	43'	5'-7"	6'-7"		90	26'-0"	49	6'-0"	50	42'-0"	3963	105.9
47'-7"	44'	5'-8"	6'-8"		92	26'-0"	49	6'-3"	50	43'-0"	4040	109.0
48'-7"	45'	5'-9"	6'-9"		94	26'-0"	49	6'-3"	50	44'-0"	4108	112.1
49'-7"	46'	5'-10"	6'-10"		96	26'-0"	49	6'-3"	50	45'-0"	4177	115.3
50'-7"	47'	5'-11"	6'-11"		98	26'-0"	49	6'-6"	50	46'-0"	4253	118.5

7 BARS K 1"ϕ x 26'-0"
25 BARS M 1/2"ϕ x 5'-9"
50 BARS N 1/2"ϕ x 4'-3"

* L=26'-0" BASED ON 28' ROADWAY DECKGIRDER 90° SKEW

TYPE A - L=27'-6" *

BARS K-M-N	BARS L NO.	BARS L LGTH.	BARS O NO.	BARS O LGTH.	BARS P NO.	BARS P LGTH.	TOTAL QUANTITIES REINF. POUNDS	TOTAL QUANTITIES CONC. CU.YDS.
	16	27'-6"	53	3'-0"	54	5'-0"	1426	22.9
	18	27'-6"	53	3'-0"	54	6'-0"	1499	24.7
	20	27'-6"	53	3'-3"	54	7'-0"	1581	26.5
	22	27'-6"	53	3'-3"	54	8'-0"	1654	28.4
	24	27'-6"	53	3'-3"	54	9'-0"	1727	30.1
	26	27'-6"	53	3'-6"	54	10'-0"	1809	32.0
	28	27'-6"	53	3'-6"	54	11'-0"	1882	34.0
	30	27'-6"	53	3'-6"	54	12'-0"	1955	35.9
	32	27'-6"	53	3'-9"	54	13'-0"	2037	37.9
	34	27'-6"	53	3'-9"	54	14'-0"	2110	39.8
	36	27'-6"	53	3'-9"	54	15'-0"	2183	41.8
	38	27'-6"	53	4'-0"	54	16'-0"	2265	43.9
	40	27'-6"	53	4'-0"	54	17'-0"	2338	46.0
	42	27'-6"	53	4'-0"	54	18'-0"	2411	48.1
	44	27'-6"	53	4'-3"	54	19'-0"	2493	50.1
	46	27'-6"	53	4'-3"	54	20'-0"	2566	52.3
	48	27'-6"	53	4'-3"	54	21'-0"	2639	54.5
	50	27'-6"	53	4'-6"	54	22'-0"	2721	56.8
	52	27'-6"	53	4'-6"	54	23'-0"	2794	59.1
	54	27'-6"	53	4'-6"	54	24'-0"	2867	61.3
	56	27'-6"	53	4'-9"	54	25'-0"	2949	63.7
	58	27'-6"	53	4'-9"	54	26'-0"	3022	66.1
	60	27'-6"	53	4'-9"	54	27'-0"	3095	68.5
	62	27'-6"	53	5'-0"	54	28'-0"	3177	71.0
	64	27'-6"	53	5'-0"	54	29'-0"	3250	73.4
	66	27'-6"	53	5'-0"	54	30'-0"	3323	76.0
	68	27'-6"	53	5'-3"	54	31'-0"	3405	78.6
	70	27'-6"	53	5'-3"	54	32'-0"	3478	81.2
	72	27'-6"	53	5'-3"	54	33'-0"	3551	83.9
	74	27'-6"	53	5'-6"	54	34'-0"	3633	86.6
	76	27'-6"	53	5'-6"	54	35'-0"	3706	89.3
	78	27'-6"	53	5'-6"	54	36'-0"	3779	92.1
	80	27'-6"	53	5'-9"	54	37'-0"	3861	95.0
	82	27'-6"	53	5'-9"	54	38'-0"	3934	97.9
	84	27'-6"	53	5'-9"	54	39'-0"	4007	100.8
	86	27'-6"	53	6'-0"	54	40'-0"	4089	103.8
	88	27'-6"	53	6'-0"	54	41'-0"	4162	106.9
	90	27'-6"	53	6'-0"	54	42'-0"	4235	110.0
	92	27'-6"	53	6'-3"	54	43'-0"	4317	113.2
	94	27'-6"	53	6'-3"	54	44'-0"	4390	116.4
	96	27'-6"	53	6'-3"	54	45'-0"	4463	119.6
	98	27'-6"	53	6'-6"	54	46'-0"	4545	122.9

7 BARS K 1"ϕ x 27'-6"
27 BARS M 1/2"ϕ x 5'-9"
54 BARS N 1/2"ϕ x 4'-3"

* L=27'-6" BASED ON 28' ROADWAY DECKGIRDER - 75° SKEW

TYPE B - L=31'-6" *

BARS K-M-N	BARS L NO.	BARS L LGTH.	BARS O NO.	BARS O LGTH.	BARS P NO.	BARS P LGTH.	TOTAL QUANTITIES REINF. POUNDS	TOTAL QUANTITIES CONC. CU.YDS.
	16	31'-6"	58	3'-0"	60	5'-0"	1611	26.1
	18	31'-6"	58	3'-0"	60	6'-0"	1694	28.2
	20	31'-6"	58	3'-3"	60	7'-0"	1786	30.3
	22	31'-6"	58	3'-3"	60	8'-0"	1868	32.4
	24	31'-6"	58	3'-3"	60	9'-0"	1951	34.6
	26	31'-6"	58	3'-6"	60	10'-0"	2043	36.8
	28	31'-6"	58	3'-6"	60	11'-0"	2125	39.0
	30	31'-6"	58	3'-6"	60	12'-0"	2208	41.3
	32	31'-6"	58	3'-9"	60	13'-0"	2300	43.6
	34	31'-6"	58	3'-9"	60	14'-0"	2382	45.9
	36	31'-6"	58	3'-9"	60	15'-0"	2464	48.3
	38	31'-6"	58	4'-0"	60	16'-0"	2537	50.7
	40	31'-6"	58	4'-0"	60	17'-0"	2639	53.2
	42	31'-6"	58	4'-0"	60	18'-0"	2721	55.7
	44	31'-6"	58	4'-3"	60	19'-0"	2814	58.3
	46	31'-6"	58	4'-3"	60	20'-0"	2896	60.9
	48	31'-6"	58	4'-3"	60	21'-0"	2978	63.6
	50	31'-6"	58	4'-6"	60	22'-0"	3071	66.3
	52	31'-6"	58	4'-6"	60	23'-0"	3153	69.0
	54	31'-6"	58	4'-6"	60	24'-0"	3235	71.8
	56	31'-6"	58	4'-9"	60	25'-0"	3327	74.7
	58	31'-6"	58	4'-9"	60	26'-0"	3410	77.6
	60	31'-6"	58	4'-9"	60	27'-0"	3492	80.6
	62	31'-6"	58	5'-0"	60	28'-0"	3584	83.6
	64	31'-6"	58	5'-0"	60	29'-0"	3667	86.7
	66	31'-6"	58	5'-0"	60	30'-0"	3749	89.8
	68	31'-6"	58	5'-3"	60	31'-0"	3841	93.0
	70	31'-6"	58	5'-3"	60	32'-0"	3924	96.3
	72	31'-6"	58	5'-3"	60	33'-0"	4006	99.6
	74	31'-6"	58	5'-6"	60	34'-0"	4098	103.0
	76	31'-6"	58	5'-6"	60	35'-0"	4181	106.5
	78	31'-6"	58	5'-6"	60	36'-0"	4263	110.0
	80	31'-6"	58	5'-9"	60	37'-0"	4355	113.6
	82	31'-6"	58	5'-9"	60	38'-0"	4438	117.3
	84	31'-6"	58	5'-9"	60	39'-0"	4520	121.0
	86	31'-6"	58	6'-0"	60	40'-0"	4612	124.8
	88	31'-6"	58	6'-0"	60	41'-0"	4695	128.7
	90	31'-6"	58	6'-0"	60	42'-0"	4777	132.6
	92	31'-6"	58	6'-3"	60	43'-0"	4869	136.6
	94	31'-6"	58	6'-3"	60	44'-0"	4952	140.7
	96	31'-6"	58	6'-3"	60	45'-0"	5034	144.9
	98	31'-6"	58	6'-6"	60	46'-0"	5126	149.2

7 BARS K 1"ϕ x 31'-6"
30 BARS M 1/2"ϕ x 5'-9"
60 BARS N 1/2"ϕ x 4'-3"

* L=31'-6" BASED ON 28' ROADWAY DECKGIRDER - 60° SKEW

TYPE B - L= 39'-0" *

BARS K-M-N	BARS L NO.	BARS L LGTH.	BARS O NO.	BARS O LGTH.	BARS P NO.	BARS P LGTH.	TOTAL QUANTITIES REINF. POUNDS	TOTAL QUANTITIES CONC. CU.YDS.
	16	39'-0"	74	3'-0"	76	5'-0"	2015	31.7
	18	39'-0"	74	3'-0"	76	6'-0"	2119	34.2
	20	39'-0"	74	3'-3"	76	7'-0"	2234	36.7
	22	39'-0"	74	3'-3"	76	8'-0"	2337	39.2
	24	39'-0"	74	3'-3"	76	9'-0"	2441	41.8
	26	39'-0"	74	3'-6"	76	10'-0"	2556	44.4
	28	39'-0"	74	3'-6"	76	11'-0"	2659	47.0
	30	39'-0"	74	3'-6"	76	12'-0"	2762	49.7
	32	39'-0"	74	3'-9"	76	13'-0"	2878	52.4
	34	39'-0"	74	3'-9"	76	14'-0"	2981	55.1
	36	39'-0"	74	3'-9"	76	15'-0"	3084	57.9
	38	39'-0"	74	4'-0"	76	16'-0"	3200	60.7
	40	39'-0"	74	4'-0"	76	17'-0"	3303	63.6
	42	39'-0"	74	4'-0"	76	18'-0"	3406	66.5
	44	39'-0"	74	4'-3"	76	19'-0"	3522	69.5
	46	39'-0"	74	4'-3"	76	20'-0"	3625	72.5
	48	39'-0"	74	4'-3"	76	21'-0"	3728	75.6
	50	39'-0"	74	4'-6"	76	22'-0"	3844	78.7
	52	39'-0"	74	4'-6"	76	23'-0"	3947	81.8
	54	39'-0"	74	4'-6"	76	24'-0"	4050	85.0
	56	39'-0"	74	4'-9"	76	25'-0"	4166	88.3
	58	39'-0"	74	4'-9"	76	26'-0"	4269	91.6
	60	39'-0"	74	4'-9"	76	27'-0"	4372	95.0
	62	39'-0"	74	5'-0"	76	28'-0"	4488	98.4
	64	39'-0"	74	5'-0"	76	29'-0"	4591	101.9
	66	39'-0"	74	5'-0"	76	30'-0"	4694	105.4
	68	39'-0"	74	5'-3"	76	31'-0"	4810	109.0
	70	39'-0"	74	5'-3"	76	32'-0"	4913	112.7
	72	39'-0"	74	5'-3"	76	33'-0"	5016	116.4
	74	39'-0"	74	5'-6"	76	34'-0"	5132	120.2
	76	39'-0"	74	5'-6"	76	35'-0"	5235	124.1
	78	39'-0"	74	5'-6"	76	36'-0"	5338	128.0
	80	39'-0"	74	5'-9"	76	37'-0"	5454	132.0
	82	39'-0"	74	5'-9"	76	38'-0"	5557	136.1
	84	39'-0"	74	5'-9"	76	39'-0"	5660	140.2
	86	39'-0"	74	6'-0"	76	40'-0"	5775	144.4
	88	39'-0"	74	6'-0"	76	41'-0"	5879	148.7
	90	39'-0"	74	6'-0"	76	42'-0"	5982	153.0
	92	39'-0"	74	6'-3"	76	43'-0"	6097	157.5
	94	39'-0"	74	6'-3"	76	44'-0"	6201	162.0
	96	39'-0"	74	6'-3"	76	45'-0"	6304	166.6
	98	39'-0"	74	6'-6"	76	46'-0"	6419	171.3

7 BARS K 1"ϕ x 39'-0"
38 BARS M 1/2"ϕ x 5'-9"
76 BARS N 1/2"ϕ x 4'-3"

* BASED ON 28' ROADWAY DECKGIRDER - 45° SKEW

QUANTITIES PER FT. OF LGTH. SAME FOR ALL TYPES

TOTAL QUANTITIES REINF. POUNDS	TOTAL QUANTITIES CONC. CU.YDS.
52.4	0.747
55.0	0.801
56.1	0.854
60.7	0.908
63.4	0.961
66.1	1.015
69.1	1.068
71.8	1.122
74.8	1.175
77.5	1.229
80.2	1.282
83.2	1.336
85.9	1.389
88.6	1.443
91.6	1.496
94.3	1.550
97.0	1.603
99.7	1.657
102.6	1.710
105.3	1.764
108.3	1.817
111.0	1.871
113.7	1.924
116.4	1.977
119.4	2.031
122.1	2.085
125.1	2.138
127.8	2.192
130.5	2.245
133.5	2.298
136.2	2.352
139.2	2.406
141.9	2.459
144.5	2.512
147.5	2.566
150.2	2.619
153.2	2.672
155.9	2.726
158.6	2.780
161.6	2.833
164.3	2.886
167.3	2.940

TOTAL

NOTE: FOR NUMBER OF BARS T SEE TABLE AT LEFT.

TABLE OF BARS F FOR ONE FIXED END

LENGTH L	NO.
26'-0"	9
27'-0" To 30'-0"	10
30'-0" To 33'-0"	11
33'-0" To 36'-0"	12
36'-0" To 39'-0"	13
39'-0" To 42'-0"	14
42'-0" To 45'-0"	15
45'-0" To 48'-0"	16
48'-0" To 51'-0"	17
51'-0" To 54'-0"	18

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

STANDARD CONCRETE PIERS

DUMBELL TYPE
HEIGHTS 10'-50'
1956

CORRECT Fred Green BRIDGE ENGINEER
APPROVED [illegible] STATE HIGHWAY ENGINEER

F-10-14

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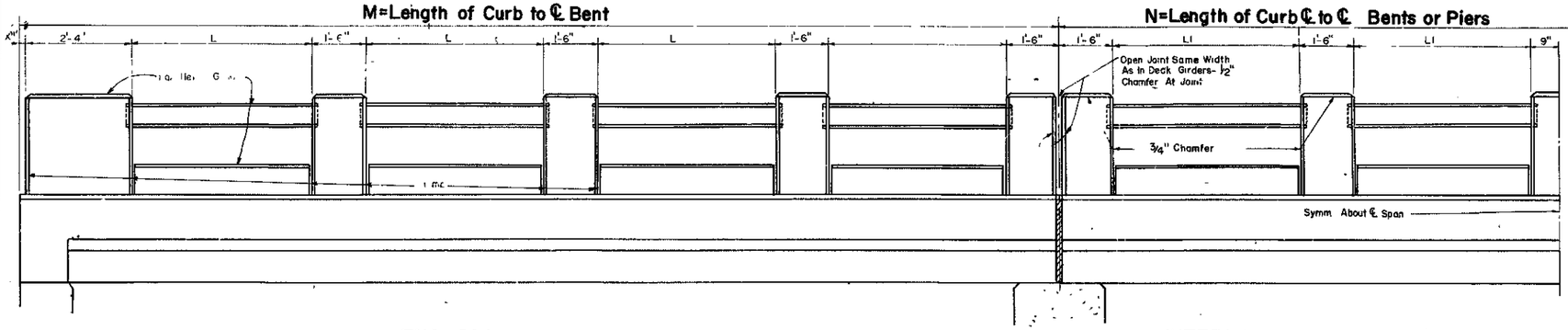
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET
3	TENN.			

M=Length of Curb to ℄ Bent



N=Length of Curb ℄ to ℄ Bents or Piers

END SPAN

INTERMEDIATE SPAN

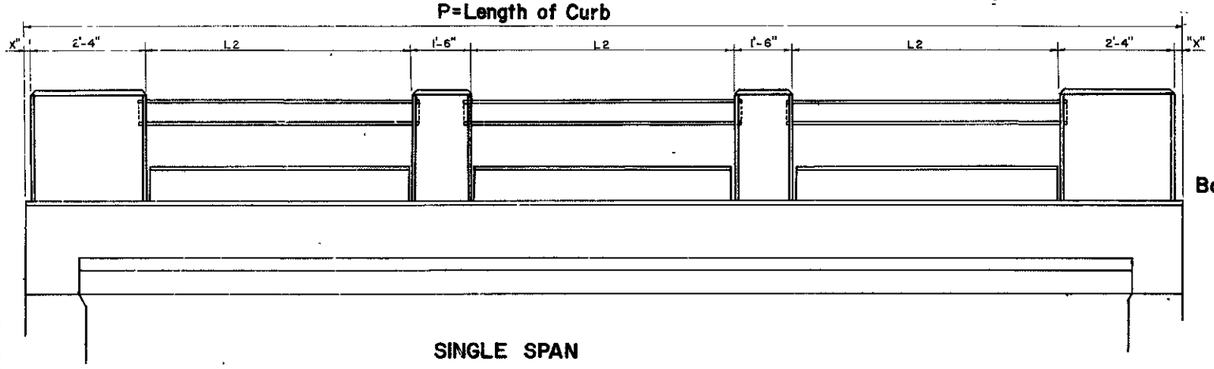
END SPAN

Clear Span Feet	Dimensions M	X	L	Reinforcing Steel Bars A ⅝"ø x 4'-2" NO	Bars B ½"ø x 6'-4" NO	Bars C ⅜"ø x 4'-4" NO	Bars D ½"ø x 4'-8" NO	Bars E ⅜"ø x 2'-6" NO	Bars F ½" ø NO	Bars F ½" ø Length	Bars G ½" ø NO	Bars G ½" ø Length	Quan Concret Class "A" Cu Yds
16	18'-6"	2"	2 @ 6'-6"	28	6	28	12	28	8	6'-2"	16	6'-8"	19
18	20'-6"	2"	3 @ 4'-6"	36	6	30	18	30	12	4'-2"	24	4'-8"	23
20	22'-6"	2"	3 @ 5'-2"	36	6	36	18	36	12	4'-10"	24	5'-4"	24
22	24'-6"	2"	3 @ 5'-10"	36	6	36	18	36	12	5'-6"	24	6'-0"	25
24	26'-6"	2"	3 @ 6'-6"	36	6	42	18	42	12	6'-2"	24	6'-8"	26
26	28'-6"	2"	4 @ 5'-0"	44	6	40	24	40	16	4'-8"	32	5'-2"	30
28	31'-0"	2"	4 @ 5'-7½"	44	6	48	24	48	16	5'-3"	32	5'-10"	31
30	33'-0"	2"	4 @ 6'-1½"	44	6	56	24	56	16	5'-9"	32	6'-4"	33
32	35'-0"	2"	4 @ 6'-7½"	44	6	56	24	56	16	6'-3"	32	6'-10"	34
34	37'-0"	2¼"	5 @ 5'-4¾"	52	6	60	30	60	20	5'-1"	40	5'-7"	37
36	39'-0"	2½"	5 @ 5'-9½"	52	6	60	30	60	20	5'-5"	40	6'-0"	38
38	41'-0"	2¾"	5 @ 6'-2¾"	52	6	70	30	70	20	5'-10"	40	6'-6"	40
40	43'-0"	2"	6 @ 5'-3"	60	6	72	36	72	24	4'-11"	48	5'-5"	43
50	53'-0"	2"	6 @ 6'-11"	60	6	84	36	84	24	6'-7"	48	7'-1"	49
60	63'-0"	2"	8 @ 6'-0¾"	76	6	96	48	96	32	5'-9"	64	6'-3"	60

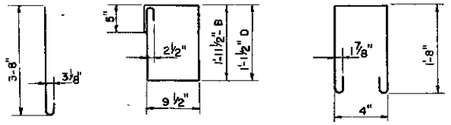
INTERMEDIATE SPAN

Clear Span Feet	Dimensions N	L1	Reinforcing Steel Bars A ⅝"ø x 4'-2" NO	Bars B ½"ø x 6'-4" NO	Bars C ⅜"ø x 4'-4" NO	Bars D ½"ø x 4'-8" NO	Bars E ⅜"ø x 2'-6" NO	Bars F ½" ø NO	Bars F ½" ø Length	Bars G ½" ø NO	Bars G ½" ø Length	Quant Concrete Class "A" Cu Yds
16	18'-6"	2 @ 7'-0"	24	—	28	18	28	8	6'-8"	16	7'-2"	18
18	20'-6"	3 @ 4'-10"	32	—	30	24	30	12	4'-6"	24	5'-0"	22
20	22'-6"	3 @ 5'-6"	32	—	36	24	36	12	5'-2"	24	5'-8"	23
22	24'-6"	3 @ 6'-2"	32	—	42	24	42	12	5'-10"	24	6'-4"	24
24	26'-6"	3 @ 6'-10"	32	—	42	24	42	12	6'-6"	24	7'-0"	25
26	28'-6"	4 @ 5'-3"	40	—	48	30	48	16	4'-11"	32	5'-5	29
28	31'-0"	4 @ 5'-10½"	40	—	48	30	48	16	5'-6"	32	6'-1"	30
30	33'-0"	4 @ 6'-4½"	40	—	56	30	56	16	6'-0"	32	6'-7"	32
32	35'-0"	4 @ 6'-10½"	40	—	56	30	56	16	6'-6"	32	7'-1"	33
34	37'-0"	4 @ 5'-7¼" 1 @ 5'-7"	48	—	60	36	60	20	5'-3"	40	5'-9"	36
36	39'-0"	5 @ 6'-0"	48	—	60	36	60	20	5'-8"	40	6'-2"	37
38	41'-0"	4 @ 6'-4¾" 1 @ 6'-5"	48	—	70	36	70	20	6'-1"	40	6'-7"	39
40	43'-0"	6 @ 5'-5"	56	—	72	42	72	24	5'-1"	48	5'-7"	42
50	53'-0"	6 @ 7'-1"	56	—	84	42	84	24	6'-9"	48	7'-3"	48
60	63'-0"	8 @ 6'-2¼"	72	—	96	54	96	32	5'-10"	64	6'-4"	59

P=Length of Curb



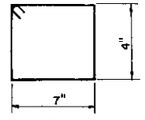
SINGLE SPAN



Bars A

Bars B & D

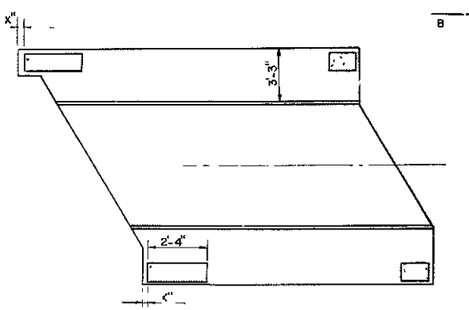
Bars C

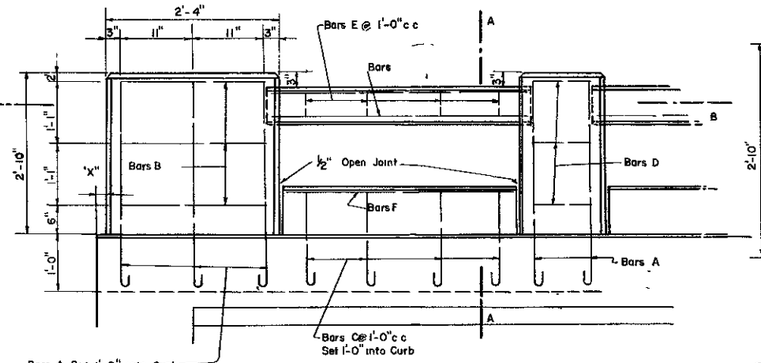


Bars E

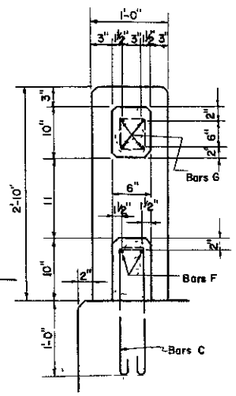
SINGLE SPAN

Clear Span Feet	Dimensions P	X	L2	Reinforcing Steel Bars A ⅝"ø x 4'-2" NO	Bars B ½"ø x 6'-4" NO	Bars C ⅜"ø x 4'-4" NO	Bars D ½"ø x 4'-8" NO	Bars E ⅜"ø x 2'-6" NO	Bars F ½" ø NO	Bars F ½" ø Length	Bars G ½" ø NO	Bars G ½" ø Length	Quan Concrete Class "A" Cu Yds
16	18'-6"	2"	2 @ 6'-0"	32	12	24	6	24	8	5'-8"	16	6'-2"	20
18	20'-6"	2"	3 @ 4'-2"	40	12	30	12	30	12	3'-10"	24	4'-4"	24
20	22'-6"	2"	3 @ 4'-10"	40	12	30	12	30	12	4'-6"	24	5'-0"	25
22	24'-6"	2"	3 @ 5'-6"	40	12	36	12	36	12	5'-2"	24	5'-8"	26
24	26'-6"	2"	3 @ 6'-2"	40	12	42	12	42	12	5'-10"	24	6'-4"	27
26	28'-6"	2"	3 @ 6'-10"	40	12	42	12	42	12	6'-6"	24	7'-0"	29
28	31'-0"	2"	4 @ 5'-4½"	48	12	48	16	48	16	5'-0"	32	5'-7"	32
30	33'-0"	2"	4 @ 5'-10½"	48	12	48	18	48	16	5'-6"	32	6'-1"	34
32	35'-0"	2"	4 @ 6'-4½"	48	12	56	18	56	16	6'-0"	32	6'-7"	35
34	37'-0"	2"	4 @ 6'-10½"	48	12	56	18	56	16	6'-6"	32	7'-1"	36
36	39'-0"	2½"	5 @ 5'-7"	56	12	60	24	60	20	5'-3"	40	5'-9"	40
38	41'-0"	2"	5 @ 6'-0"	56	12	60	24	60	20	5'-8"	40	6'-2"	41
40	43'-0"	2"	6 @ 5'-1"	64	12	60	30	60	24	4'-9"	48	5'-3"	44
50	53'-0"	2"	6 @ 6'-9"	64	12	84	30	84	24	6'-5"	48	6'-11"	50
60	63'-0"	2"	8 @ 5'-11¼"	80	12	96	42	96	32	5'-7"	64	6'-1"	61





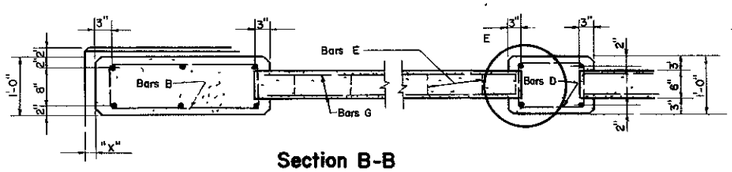
NOTE: When Curb Thickness is Shown 7", Bend Bars A & C into Curb



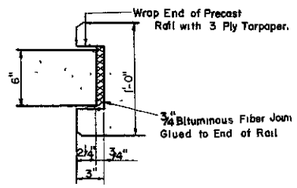
Section A-A

END POST on SKEWED DECK GIRDER
With Safety Curbs

DECK GIRDER with SIDEWALK



Section B-B

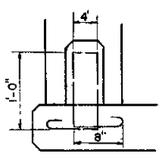


Detail At "E"

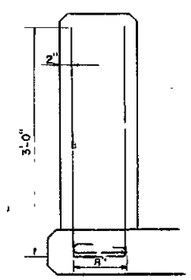
NOTE: Chamfer all Handrail Edges ½" Except as Shown at Split Rail Post

GENERAL NOTES:

Specifications Standard Road & Bridge Specifications of the Tennessee Department of Highways
Concrete To be Class "A"
Reinforcing Steel See Specification
Forms & Finish See Specifications



Bars C



Bars A

BAR DETAIL for "7" CURB

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS
NASHVILLE
STANDARD
CONCRETE HANDRAIL
RAIL TYPE
1953

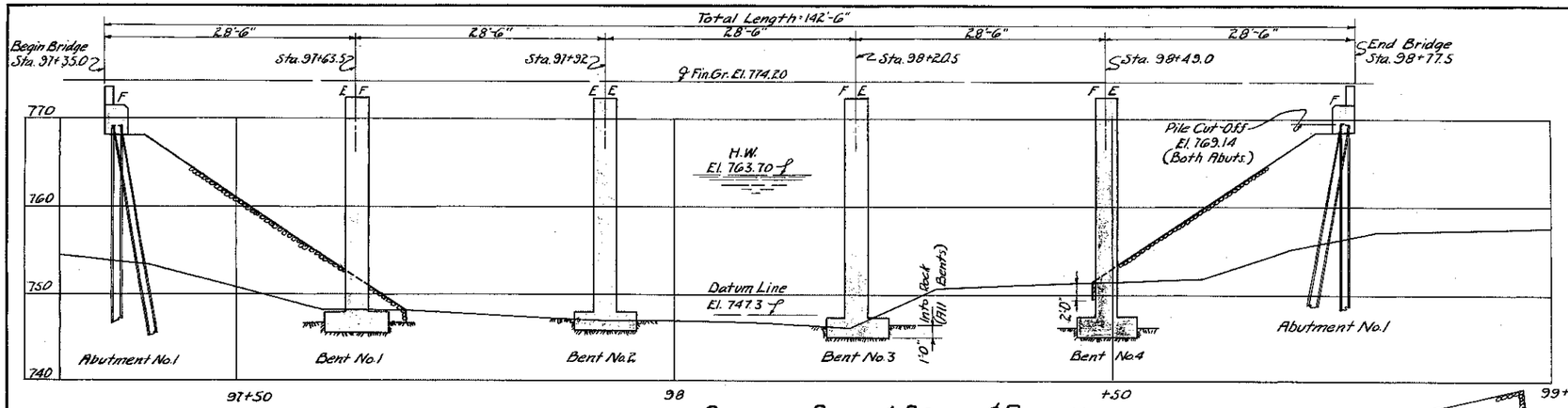
DESIGNED BY _____ DATE _____
DRAWN BY W W DATE 5-10-49
RETRACED BY Kelley & Skaggs DATE 3-7-62
CHECKED BY _____ DATE _____

CORRECT Fred Greene BRIDGE ENGINEER
APPROVED Cecil D Long STATE HIGHWAY ENGINEER

E-

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOT. SHEETS
8	TENN.		19	15	25

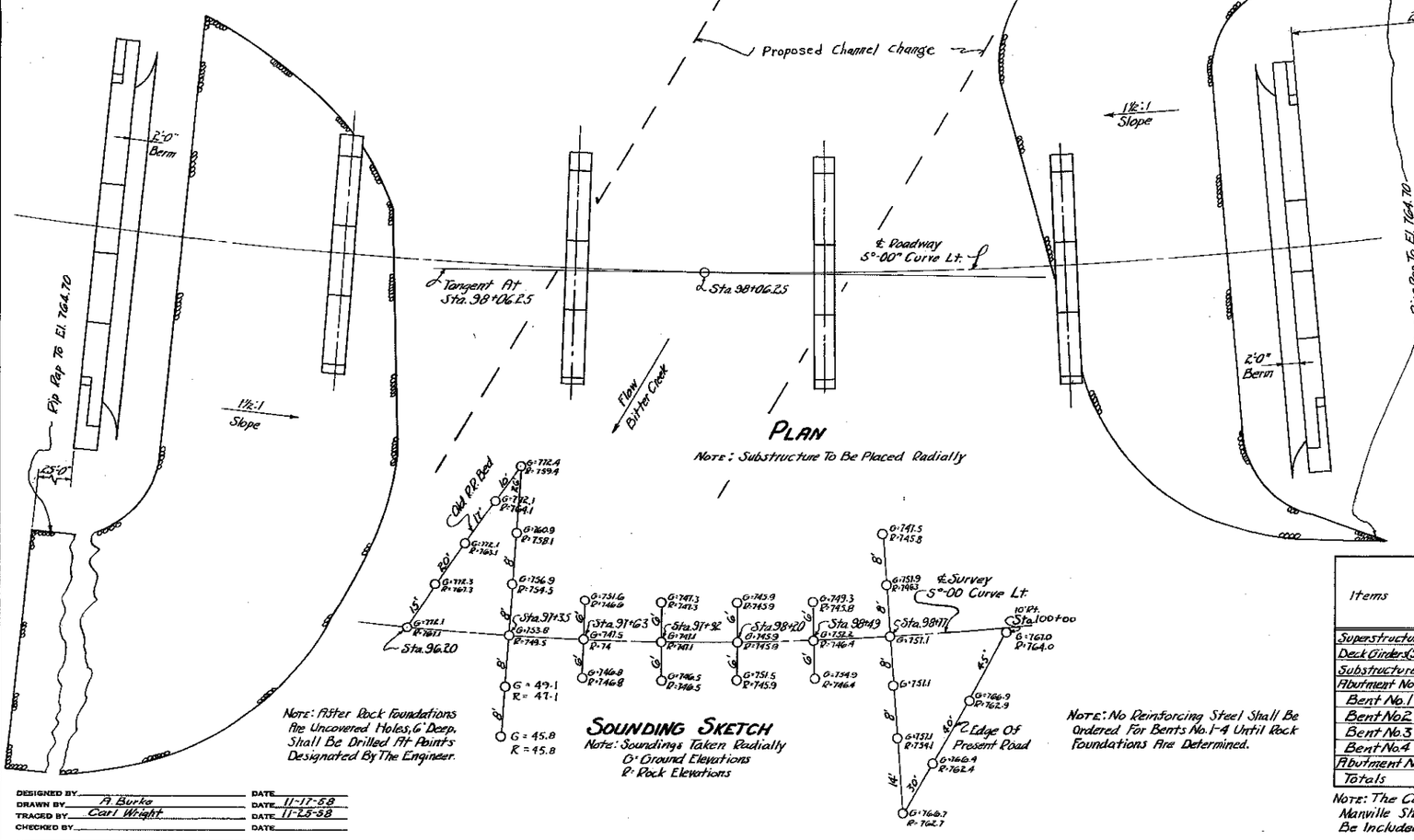
F-031-1(8)



SECTION ALONG ℄ BRIDGE & ROADWAY

Note: Before The Fill Is Made At Abutments No.1&2, Sounding Shall Be Made At The Points Where Piles Are To Be Driven, (Cost Of Soundings To Be Included In Unit Price Of Items Bid On). Unless A Minimum Of 3 Ft. (Natural Ground To Rock) Exists For Pile Penetration It Will Be Required To Design A Different Type Abutment.

Note: E = Expansion End
F = Fixed End
Note: The Fill At Abutment 1&2 Shall Be In Place & Thouroughly Compacted Before Driving Piles (If Required)



PLAN

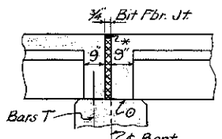
Note: Substructure To Be Placed Radially

Note: After Rock Foundations Are Uncovered Holes, 6' Deep, Shall Be Drilled At Points Designated By The Engineer.

SOUNDING SKETCH

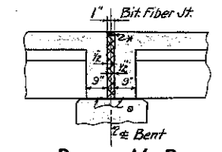
Note: Soundings Taken Radially
G = Ground Elevations
R = Rock Elevations

Note: No Reinforcing Steel Shall Be Ordered For Bents No.1-4 Until Rock Foundations Are Determined.



BENTS No. 3 & 4

Note: Bent No.1 Same But Opposite Hand.



BENT No. 2

SECTIONS ALONG ℄ BRIDGE & ROADWAY

SHOWING JOINT LOCATIONS

* Fill Top Of Joint To Depth Of 1" With Rubber-Asphalt Joint Compound, Federal Specifications SS-S-164 @ 2 Layers, 1/16" Thick Each Layer, Johns-Manville Sheet Packing No. 60, Or Approved Equal, For Full Width Of Expansion Portion Of Bridge Seat. Graphite Surfaces In Contact.

HANDRAIL NOTE:

Build Handrail According To Std. Dwg. E-12-105 And To The Following Dimensions.
Span No. 1 & 5 - Build According To Std. For 26' Clear End Span Except:
Short Side: Make M = 28'-0 1/8", X = 1/8" & L = 4@4'-11"
Long Side: Make M = 28'-11 1/8", X = 1/8", & L = 4@5'-1 1/2"
Spans No. 2, 3 & 4 - Build According To Std. For 26' Clear Intermediate Span Except
Short Side: Make N = 28'-0 1/8", L1 = 2@5'-1 1/16" & 2@5'-1 3/4"
Long Side: Make N = 28'-11 1/8", L1 = 3@5'-4 1/4" & 1@5'-4 3/16"

Note: Use Bill Of Steel On Std. Dwg E-12-105 Except On Short Side Shorten Bars G & F 2", & On Long Side Lengthen Bars G & F 2"

DESIGN DATA:

The Size Of Bridge Was Determined By Bank Conditions.

Drainage Area = 8180 Acres.

GENERAL NOTES:

Specifications: Standard Road & Bridge Specifications Of The Tennessee Department Of Highways & Public Works.
Loading: H20-S16-44
Reinforcing Steel: See Specifications
Forms & Finish: See Specifications
Rip-Rap: See Specifications
Piles: To Be 10" @ 42# Steel Piles
Rock Foundations: See Specifications.

SPECIAL NOTE ~ PILES

The Piles In Abutments No. 1 & 2 (If Required) Shall Be Driven To 30 Tons or refusal on Roc...

LIST OF DWGS.

	DWG. No.
Handrail	See Note This Sheet + E-12-105
Deck Girders (5@26'CL)	G-9-153
Abutments No. 1 & 2	G-9-154
Bents No. 1-4	G-9-155

Note: Omit Drains Over Rip-Rap Area. Required: 15-3" Roadway Drains, Transite Or Approved Equal (8" Long)

ESTIMATED ~ QUANTITIES

Items	Rock Drilling Lin. Ft.	Excavation Cu. Yds. Wet	Dry	Rock	Concrete Class "A" Cu. Yds.	Reinforcing Steel Lbs.	10"@42# Steel Piles-Lin. Ft.	Rip-Rap Cu. Yds.
Superstructure					141.7	27.95		
Deck Girders (3@26')					181.0	48.001		
Substructure								
Abutment No. 1					16.8	1319	120	135
Bent No. 1		5	10	7	27.3	5122		
Bent No. 2				7	27.3	5096		
Bent No. 3		10	3	7	27.1	5195		
Bent No. 4		8	35	7	27.7	5195		
Abutment No. 2					16.8	1319	120	112
Totals	24	23	48	28	339.3	74048	240	247

Note: The Cost Of 3" Roadway Drains, Transite Or Approved Equal, Johns-Manville Sheet Packing No. 60, Or Approved Equal, & Joint Material To Be Included In Unit Cost Bid For Class "A" Concrete.

DESIGNED BY
DRAWN BY A. Burke DATE 11-17-58
TRACED BY Carl Wright DATE 11-25-58
CHECKED BY DATE

Tr. checked 12-30-58

28'-0" ROADWAY WITH SAFETY CURBS

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

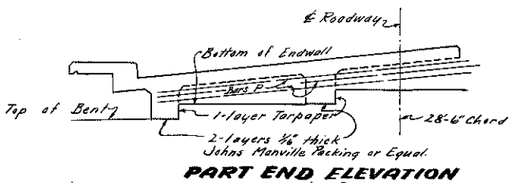
LAYOUT OF BRIDGE OVER BITTER CREEK STA. 97+35.0 ROANE-MORGAN COUNTIES 1958

CORRECT Fred Greve
BRIDGE ENGINEER
APPROVED Harold M. Sykes
STATE HIGHWAY ENGINEER

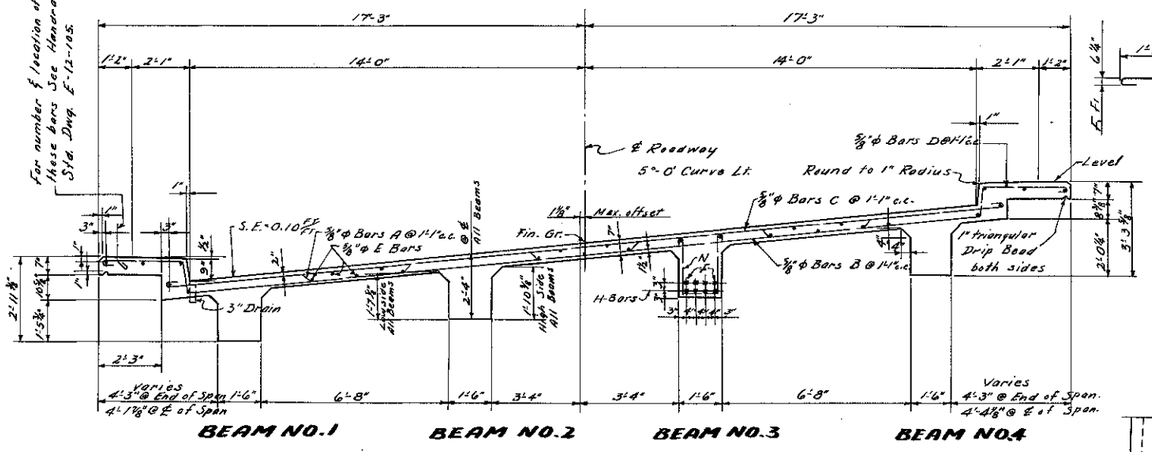
G-9-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19	30	25

F-031-1(6)

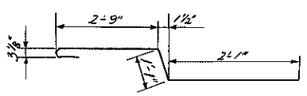


PART END ELEVATION
Expansion Side

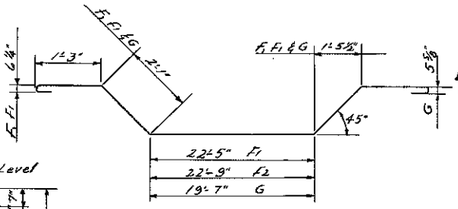


BEAM NO.1 **BEAM NO.2** **BEAM NO.3** **BEAM NO.4**

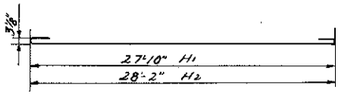
SECTION A-A
Note: Reinforcement in all Beams same.



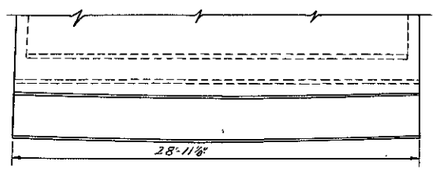
BARS D



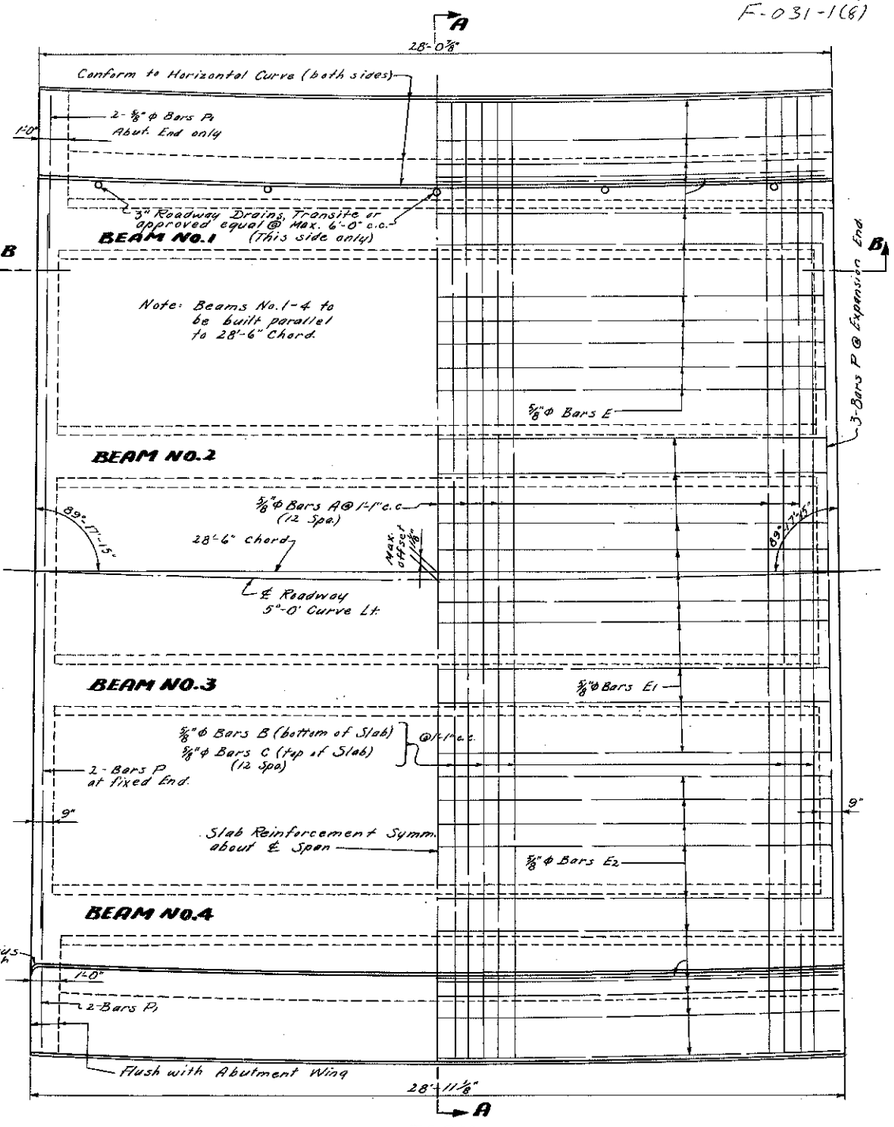
BARS F, F1 & G



BARS H & H1

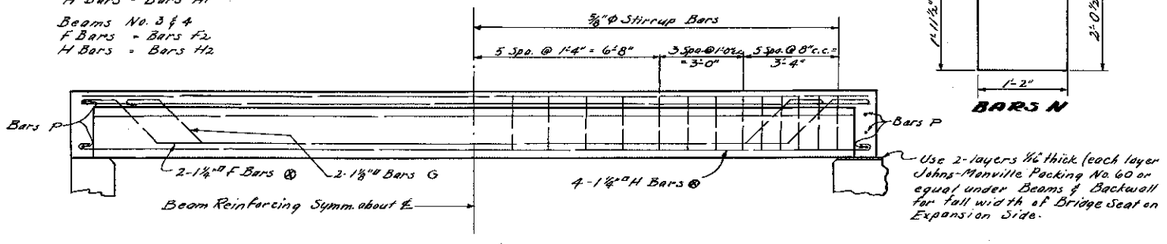


PART INTERMEDIATE SPAN
Note: Details not shown same as for End Span.

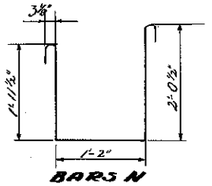


PLAN
Note: Beams to be built parallel to chord.

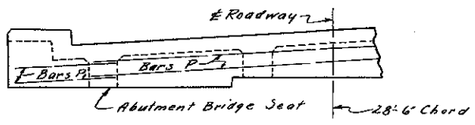
Note: Bars ⊗
Beams No. 1 & 2
F Bars = Bars F
H Bars = Bars H
Beams No. 3 & 4
F Bars = Bars F2
H Bars = Bars H2



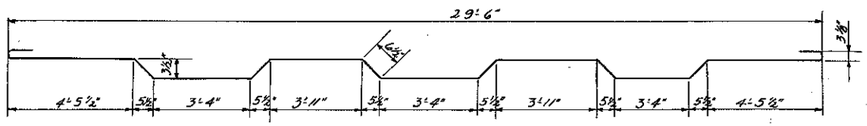
SECTION B-B
Typical for all beams



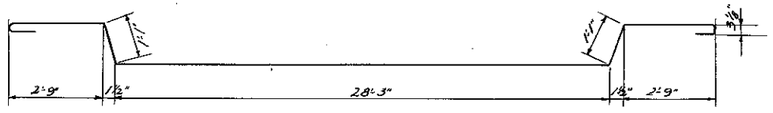
BARS N



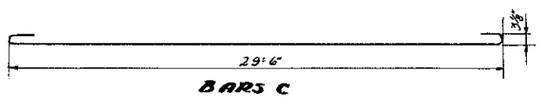
PART END ELEVATION
Abutment End.



BARS A



BARS B



BARS C

BILL OF STEEL

Bar	No.	Size	Length
A	25	⅝"ϕ	31'-0"
B	26	"	36'-11"
C	26	"	30'-6"
D	50	"	6'-5"
E	12	"	27'-9"
E1	10	"	28'-0"
E2	11	⅝"ϕ	28'-3"
F1	4	1¼"ϕ	31'-1"
F2	4	1¼"ϕ	31'-5"
G	8	1⅜"ϕ	28'-1"
H1	8	1¼"ϕ	29'-10"
H2	8	1¼"ϕ	30'-2"
N	108	⅝"ϕ	6'-2"
P	5	⅝"ϕ	25'-6"
Add For Abutment End			
P1	4	⅝"ϕ	6'-4"

ESTIMATED QUANTITIES

ITEM	Concrete Class "A" Cu. Yds.	Reinforcing Steel Lbs.
Intermediate Span	35.8	9591
End Span.	36.8	9617

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

SPANS 1, 2, 3, 4 & 5
OVER BITTER CREEK
STA. 97+35
ROANE-MORGAN CO'S.
1958

DESIGNED BY _____ DATE _____
DRAWN BY _____ DATE _____
TRACED BY _____ DATE _____
CHECKED BY _____ DATE _____

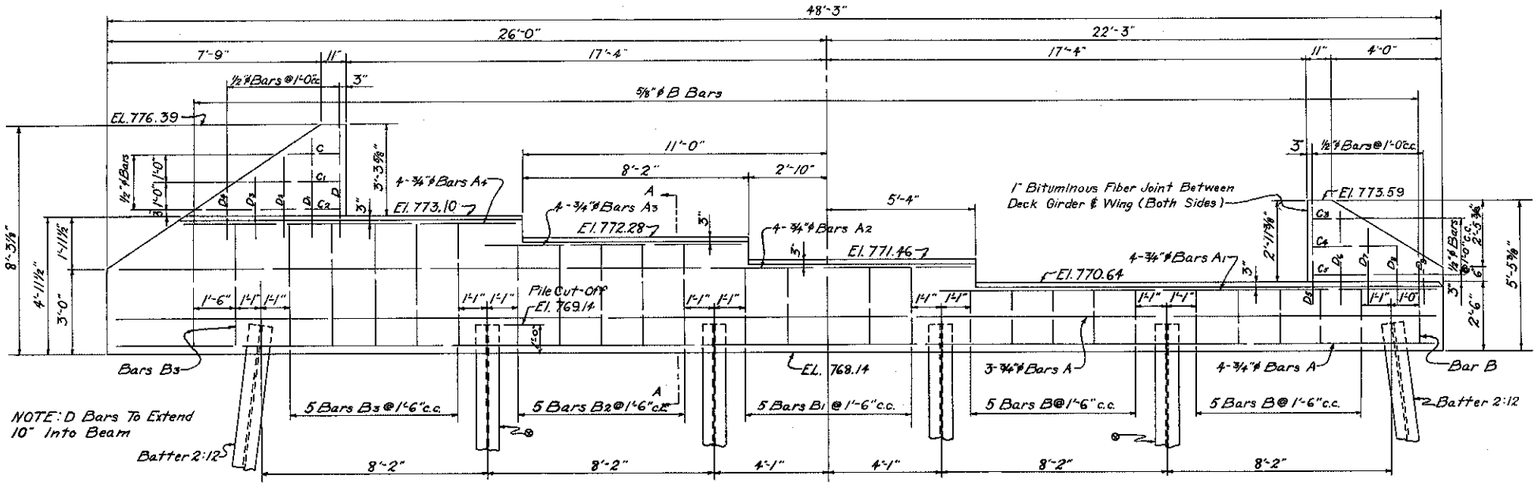
CORRECT Fred Greve
BRIDGE ENGINEER
APPROVED _____
STATE HIGHWAY ENGINEER

6-9-

TRA. CKD. 12/30/58 Bingham

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		59	31	2[illegible]

F-031-1(8)

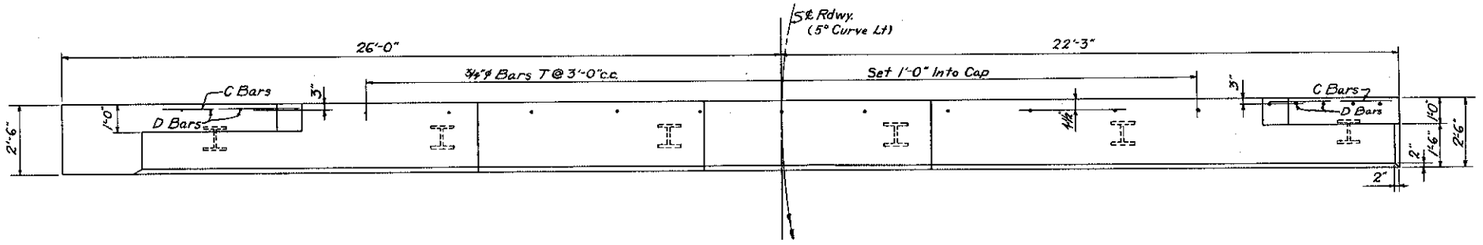


FRONT ELEVATION-ABUTMENT NO.1
LOOKING BACK ON SURVEY
⊗ BATTER PILE FORWARD 2:12

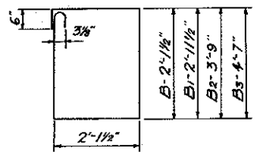
BILL OF STEEL
* ABUTMENT NO. 1

BAR	NO.	SIZE	LENGTH
A	7	¾"ϕ	47'-9"
A1	4	"	17'-3"
A2	4	"	30'-10"
A3	4	"	9'-3"
A4	4	¾"ϕ	12'-0"
B	11	⅝"ϕ	9'-6"
B1	5	"	11'-2"
B2	5	"	12'-9"
B3	7	⅝"ϕ	14'-5"
C	1	½"ϕ	1'-9"
C1	1	"	3'-3"
C2	1	"	4'-6"
C3	1	"	1'-6"
C4	1	"	3'-0"
C5	1	½"ϕ	4'-6"
D	1	½"ϕ	3'-10"
D1	1	"	3'-6"
D2	1	"	3'-0"
D3	1	"	2'-3"
D4	1	"	1'-6"
D5	1	"	3'-6"
D6	1	"	3'-3"
D7	1	"	2'-9"
D8	1	"	2'-3"
D9	1	½"ϕ	1'-6"
T	11	¾"ϕ	2'-0"

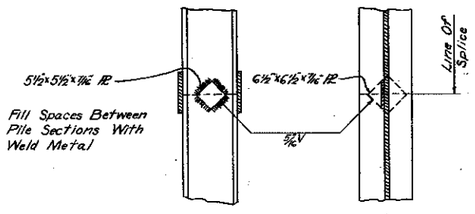
*Bill Of Steel For Abutment No. 2 Same.



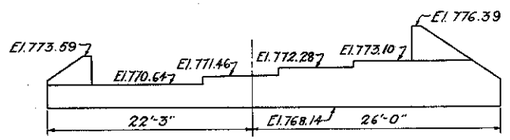
PLAN



BARS B-B3



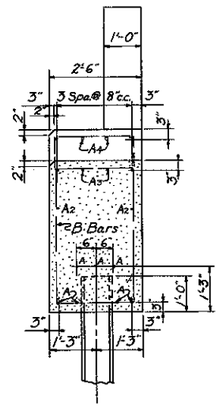
DETAIL OF PILE SPLICE



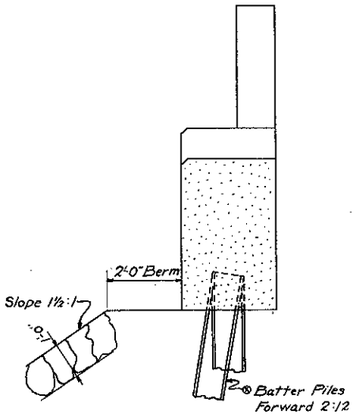
FRONT ELEVATION-ABUTMENT NO.2
LOOKING FORWARD ON SURVEY
Details Not Shown Same As For Abutment No. 1

ESTIMATED QUANTITIES

	CONCRETE CLASS "A" CU. YDS.	REINFORCING STEEL LBS.
ABUTMENT NO.1	16.8	1319
ABUTMENT NO.2	16.8	1319



SECTION A-A



SECTION A-A
Showing Rip-Rap & Pile Batter

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

ABUTMENTS NO. 1 & 2 OVER BITTER CREEK STA. 97+35.0 ROANE-MORGAN CO'S. 1959

DESIGNED BY _____ DATE _____
DRAWN BY W.D. DATE 9-22-58
TRACED BY E.P.D. DATE 11-18-58
CHECKED BY _____ DATE _____

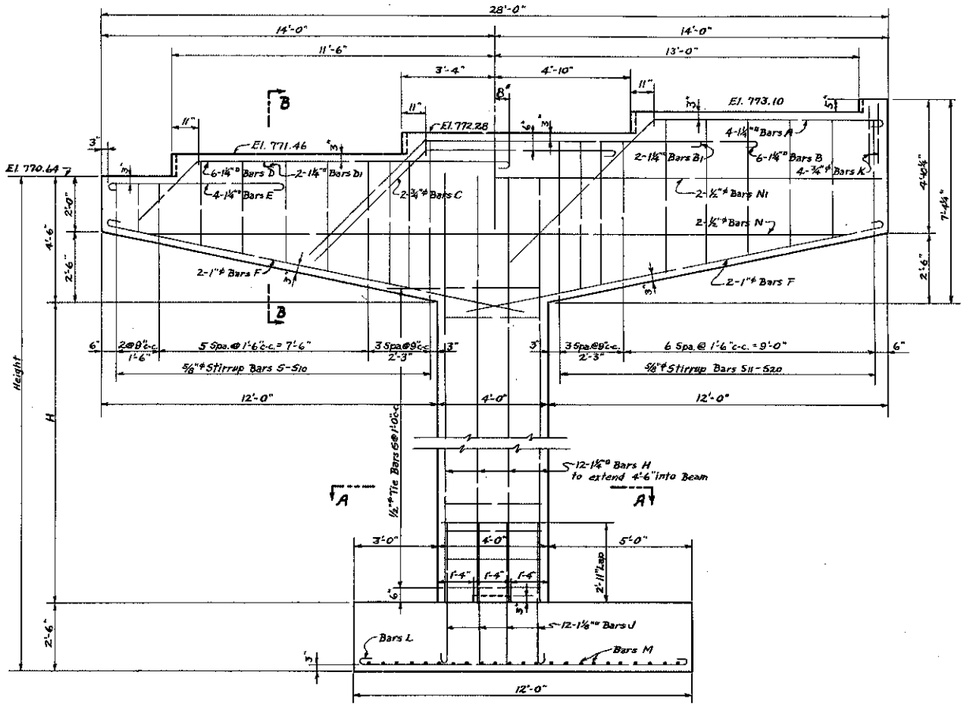
CORRECT Fred Gore
BRIDGE ENGINEER
APPROVED [signature]
STATE HIGHWAY ENGINEER

G-9-1

Tech. Cfd. 12/30/58 Rip-Rap

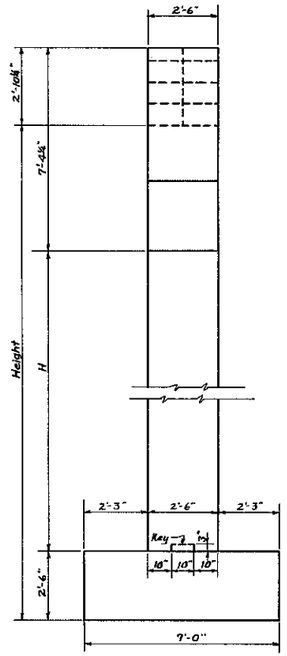
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOT SHE
8	TENN.		19	32	2

F-031-1(8)

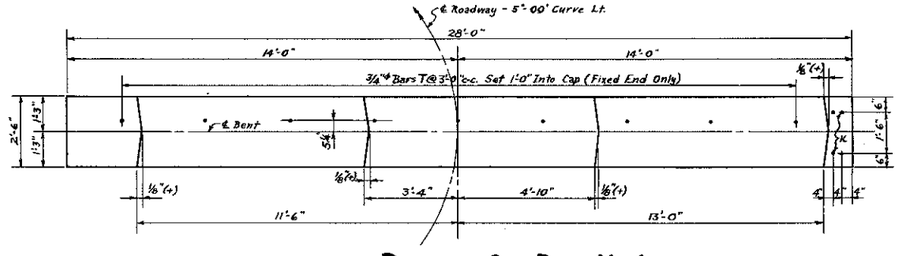


Elevation

Looking Forward on Survey

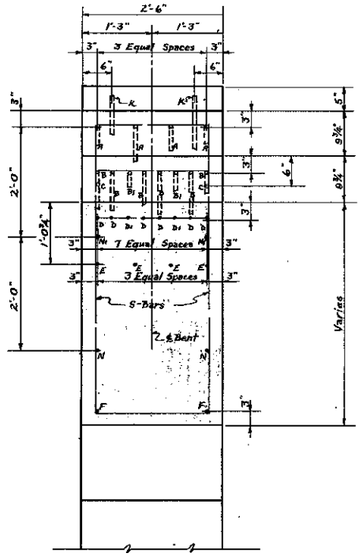


End Elevation



Plan of Cap Bent No. 1

NOTE: Bents No. 3 & 4 Same Except Bars T on Opposite Side of ℄ Bent No. 2 Same Except Omit Bars T.



Section B-B

Bill of Steel

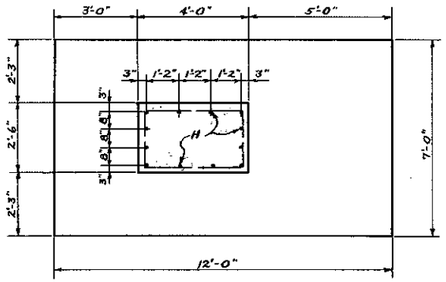
Constant for Each Bent

Bar	No.	Size	Length	Bar	No.	Size	Dimension X	Length	Bar	No.	Size	Dimension X	Length
A	4	1⅛"□	16'-5"	N	2	1½"ϕ	—	25'-0"	S10	1	⅝"ϕ	5'-9"	16'-10"
B	6	1⅛"□	18'-6"	N1	2	1½"ϕ	—	13'-9"	S11	1	"	5'-9"	16'-10"
B1	2	1⅛"□	14'-3"	S	1	⅝"ϕ	1'-9"	6'-10"	S12	1	"	5'-7"	16'-6"
C	2	¾"ϕ	12'-10"	S1	1	"	1'-11"	9'-2"	S13	1	"	5'-5"	16'-2"
D	6	1⅛"□	15'-3"	S2	1	"	2'-1"	9'-6"	S14	1	"	5'-3"	15'-10"
D1	2	1⅛"□	10'-10"	S3	1	"	3'-2½"	11'-5"	S15	1	"	5'-1"	16'-10"
E	4	1⅛"□	8'-3"	S4	1	"	3'-6"	12'-4"	S16	1	"	5'-5½"	16'-3"
F	4	1"ϕ	15'-10"	S5	1	"	3'-10"	13'-0"	S17	1	"	5'-2"	15'-6"
J	12	1⅛"□	6'-0"	S6	1	"	4'-2"	13'-8"	S18	1	"	4'-10"	15'-0"
K	4	⅜"ϕ	2'-0"	S7	1	"	4'-5½"	14'-3"	S19	1	"	4'-6"	14'-4"
L	13	1"ϕ	13'-2"	S8	1	"	4'-7½"	14'-7"	S20	1	⅝"ϕ	4'-2½"	13'-9"
M	23	⅜"ϕ	7'-10"	S9	1	⅝"ϕ	4'-9"	14'-10"					

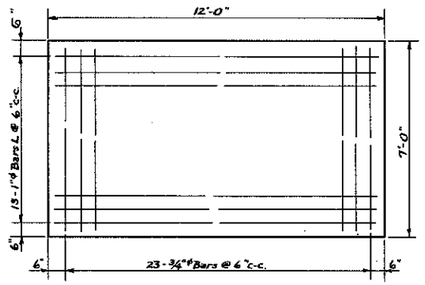
Table of Dimensions & Estimated Quantities

	Height	H	Reinforcement: Bars G ½"ϕ x 12'-6" No.	Reinforcement: Bars H 12-1⅛"□ Length	Estimated Quantities: Concrete Class "A" Cu. Yds.	Estimated Quantities: Reinforcing Steel Lbs.
Bent No. 1	25'-0"	18'-0"	19	22'-6"	27.3	5122
Bent No. 2	25'-0"	18'-0"	19	22'-6"	27.3	5086
Bent No. 3	26'-0"	19'-0"	20	23'-6"	27.7	5195
Bent No. 4	26'-0"	19'-0"	20	23'-6"	27.7	5195

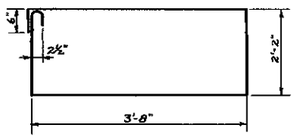
NOTE: For Each Fixed End Add 9-⅜"ϕ x 2'-0" Bars T.



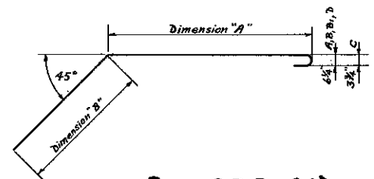
Section A-A



Footing Reinforcement



Bars G

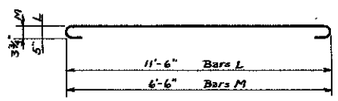


Bars A, B, B1, C & D

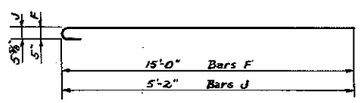
See Bending Table For Dimension "A" & "B"

Bending Table

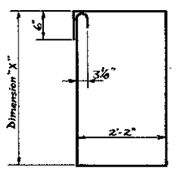
Bar	Dimension "A"	Dimension "B"
A	8'-2"	7'-3"
B	11'-9"	5'-9"
B1	9'-9"	5'-9"
C	6'-8"	5'-6"
D	11'-3"	3'-0"



Bars L & M

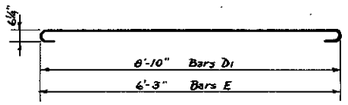


Bars F & J



Bars S-S20

See Bill of Steel for Dimension "X"



Bars D1 & E

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

Bents No. 1, 2, 3 & 4
Over Bitter Creek
Sta. 97+35.0
Roane-Morgan Co's
1959

DESIGNED BY W. H. Dorris DATE
DRAWN BY A. Burke DATE
TRACED BY H. M. Brooks DATE 12-1-58
CHECKED BY DATE

Tr. Chckd 12-4-58

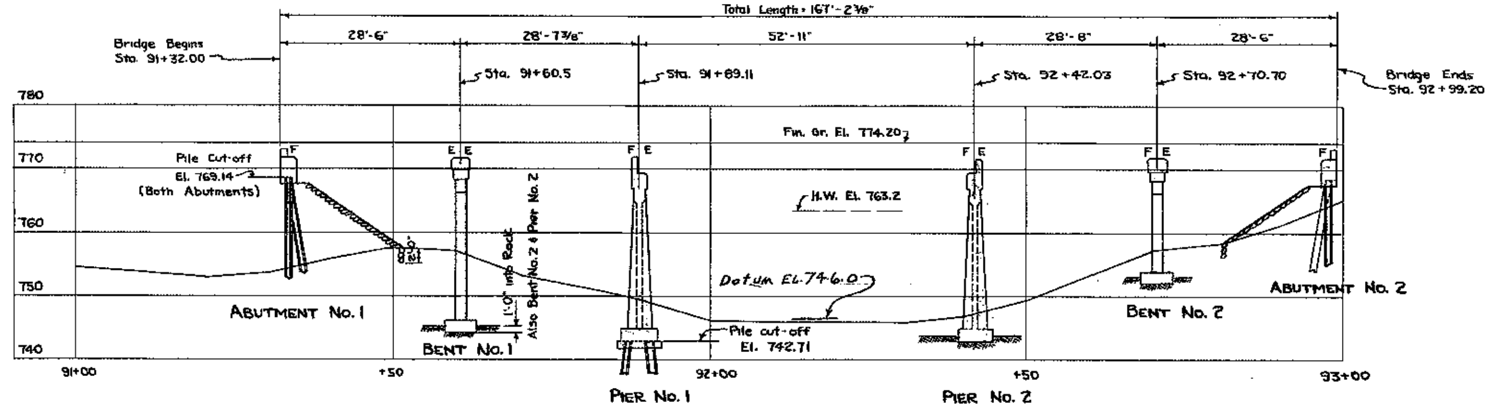
CORRECT Fred Greve
BRIDGE ENGINEER
APPROVED Herbert M. Bates
STATE HIGHWAY ENGINEER

G-9-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TO SH
8	TENN.		19	14	2

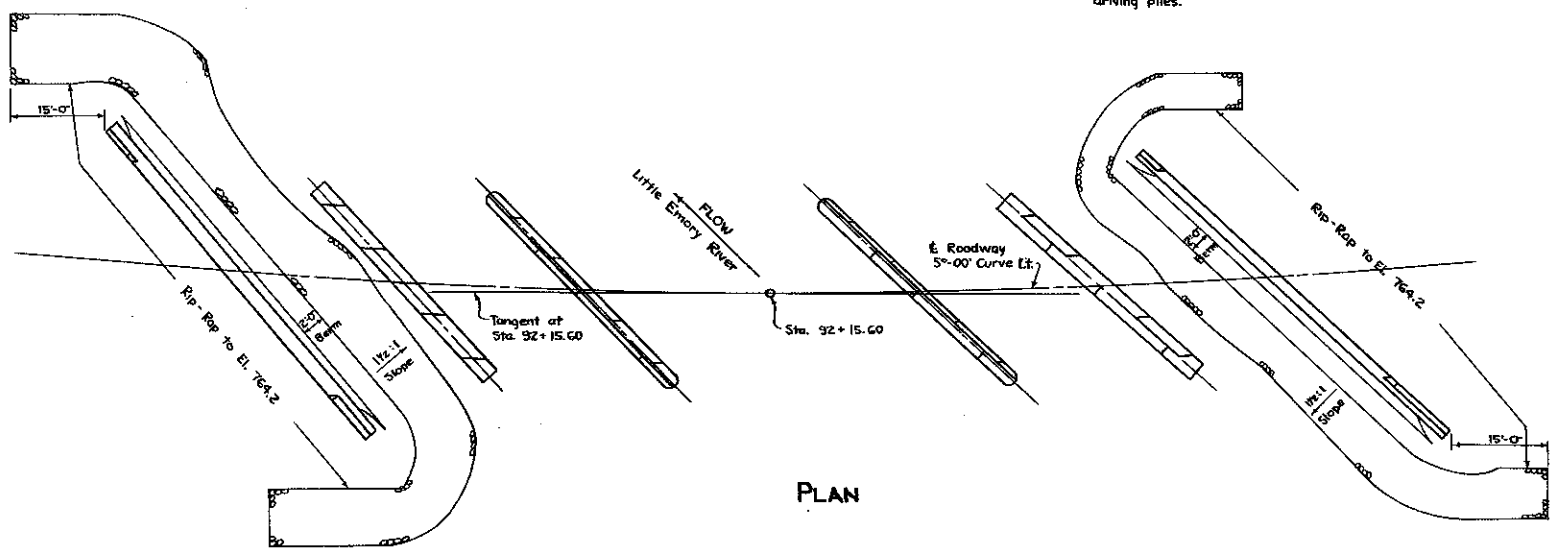
F-031-1(8)

NOTE:
E - Expansion End
F - Fixed End

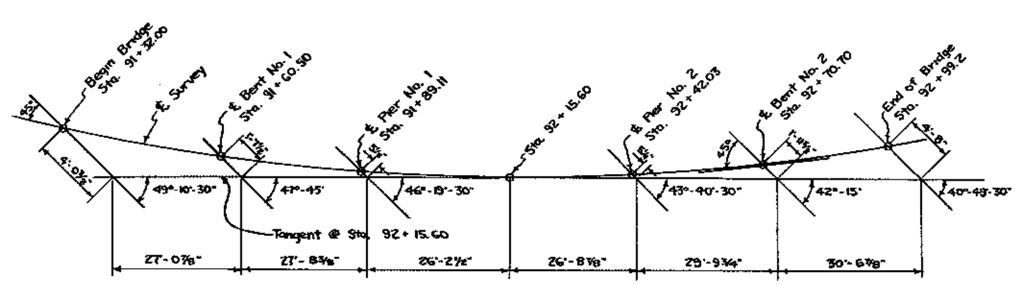


Section Along ℄ Roadway

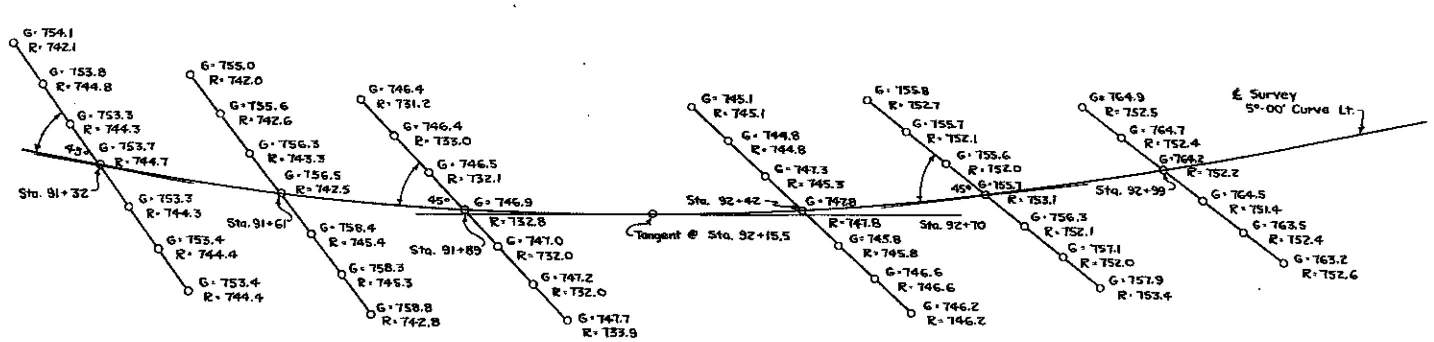
NOTE: Fill at Abuts. No. 1 & 2 to be in place and thoroughly compacted before driving piles.



Plan



Sketch for Bridge Layout



NOTE: All points 5'-0" apart.

Sounding Sketch

G = Ground Elevations
R = Rock Elevations

NOTE: After rock foundations are uncovered, holes 6 ft. deep shall be drilled at points designated by the engineer.

Handrail Note:

Build Handrail according to Std. Dwg. E-12-105 for 26'-0" clear End and Intermediate Spans and 50'-0" Intermediate Span with alterations in rail spacing and steel length as follows:

26'-0" Span No. 1 - End Span

Long Side: M = 31'-6", X = 2", Make 4L @ 5'-9"
Use 16 Bars G @ 5'-11"
Use 8 Bars F @ 5'-7"
Short Side: M = 28'-11⅛", X = 3⅛", Make 4L @ 5'-1"
Use 16 Bars G @ 5'-3"
Use 8 Bars F @ 4'-9"

26'-0" Spans No. 2 & 4, - Intermediate Spans

Long Side: N = 28'-11⅛", Make 4L @ 5'-4¼"(+)
Use 16 Bars G @ 5'-6"
Use 8 Bars F @ 5'-0"
Short Side: N = 28'-0⅞", Make 4L1 @ 5'-1¾"(-)
Use 16 Bars G @ 5'-4"
Use 8 Bars F @ 4'-10"

50'-0" Span No. 3 - Intermediate Span

Long Side: N = 53'-9⅝", Make 6L1 @ 7'-2⅝"(-)
Use 24 Bars G @ 7'-4"
Use 12 Bars F @ 6'-10"
Short Side: N = 52'-2⅞", Make 6L1 @ 6'-11⅜"(+)
Use 24 Bars G @ 7'-1"
Use 12 Bars F @ 6'-7"

26'-0" Span No. 5 - End Span

Long Side: M = 32'-1", X = 2", Make 4L @ 5'-10¾"
Use 16 Bars G @ 6'-1"
Use 8 Bars F @ 5'-7"
Short Side: M = 28'-0⅞", X = 2⅛", Make 4L @ 4'-10½"
Use 16 Bars G @ 5'-0"
Use 8 Bars F @ 4'-8"

Design Data

Bank Conditions govern size of Bridge.
Drainage Area = 21,861 Acres.
A Factor of 0.70 in Talbott's Formula gives:

Area Required = 1256
Area Provided = 1376 @ Rt. ∠ to channel.

General Notes

SPECIFICATIONS: Standard Road & Bridge Specifications of the Tennessee Department of Hwys. & Public Works.
LOADING: H20 - S16 - 44.
CONCRETE: To be Class "A".
REINFORCING STEEL: See Specifications.
FORMS & FINISH: See Specifications.
RIP-RAP: See Specifications.
PILES: To be 10" @ 42# Steel Piles.
ROCK FOUNDATIONS: See Specifications.
NEOPRENE BEARING PADS: See Special Provision.

Special Note - Piles

The piles in Abutments No. 1 & 2 to be driven to a minimum bearing of 30 Tons or Refusal on rock. The piles in Pier No. 1 to be driven to a minimum bearing of 21 Tons or Refusal on rock.

List of Dwgs.

		Dwg. No.
Handrail	See Note this sheet &	E-12-105
Deck Girders	4 @ 26'-0" Cl. Span	G-9-148
	1 @ 53'-0" Cl. Span	G-9-149
Abutments No. 1 & 2		G-9-150
Bents No. 1 & 2		G-9-151
Pier No. 1 (L = 39'-6", Type B)	Total Height = 25'-7"	F-10-14 & G-9-151
Pier No. 2 (L = 39'-6", Type B)	Total Height = 27'-7"	F-10-14 & G-9-151

NOTE: Omit Drains over Rip-Rap Area.
Required: 21 - 3" Roadway Drains, Transite or approved equal (8" Long).

Estimated Quantities

Items		Excavation Cu. Yds. Dry	Wet	Rock	Concrete Class "A" Cu. Yds.	Reinforcing Steel Lbs.	Steel Piles 10" @ 42# Lin. Ft.	Rip-Rap Cu. Yds.	Rock Drilling Lin. Ft.
Superstructure					16.8	3195			
Deck Girders	4 @ 26' cl.				149.4	39064			
	1 @ 50' cl.				96.0	22475			
Substructure									
Abutment No. 1					23.1	2105	210	71	
Bent No. 1		73	17	7	29.2	4506			
Pier No. 1		16	77		93.7	3998	270		
Pier No. 2		4	1	18	82.3	4206			
Bent No. 2		25		7	25.6	4117			
Abutment No. 2					24.8	2185	147	47	
Totals		118	95	32	540.9	85851	627	118	42

NOTE: The cost of 3" Roadway Drains, Transite or approved equal, Johns-Manville Sheet Packing No. 60, or approved equal, Neoprene Bearing Pads & Joint Material to be included in the unit price bid for Class "A" Concrete.

28'-0" Roadway with Safety Curbs

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS
AND PUBLIC WORKS
NASHVILLE

Layout of Bridge
Over Little Emory River
Sta. 91+32.0
Roane County
1959

CORRECT Fred Greve — BRIDGE ENGINEER
APPROVED Herbert M. Bates — STATE HIGHWAY ENGINEER

G-9-1

DESIGNED BY		DATE	
DRAWN BY	R. Bingham	DATE	12-2-58
TRACED BY	R. Sykes	DATE	12-10-58
CHECKED BY		DATE	

Tra. Ckd. Bingham 12/19/58

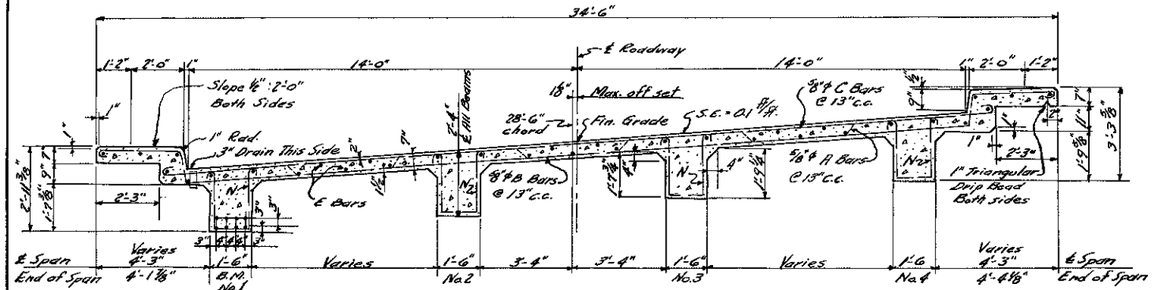
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEET
8	TENN.		19	26	25

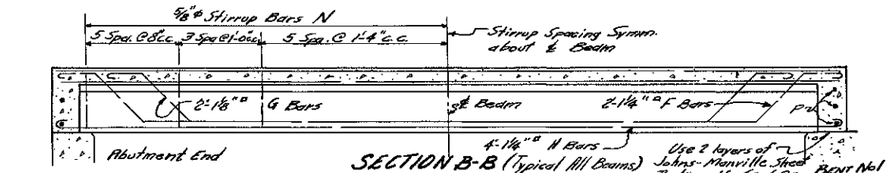
F-031-1(8)

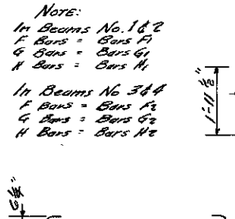
BILL OF STEEL

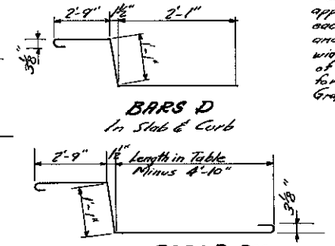
Constant each Span

Bar	No.	Size	Length
A	2	7/8" ϕ	29'-6"
A1	2	"	28'-5"
A2	2	"	27'-3"
A3	2	"	26'-2"
A4	2	"	25'-1"
A5	2	"	24'-1"
A6	2	"	23'-11"
A7	2	"	21'-10"
A8	2	"	20'-10"
A9	2	"	19'-8"
A10	2	"	18'-8"
A11	2	"	17'-7"
A12	2	"	16'-6"
A13	2	"	15'-5"
A14	2	"	14'-3"
A15	2	"	13'-2"
A16	2	"	12'-2"
A17	2	"	11'-0"
A18	2	"	9'11"
A19	2	"	8'-10"
A20	2	"	7'-9"
B	1	5/8" ϕ	32'-9"
B1	2	"	31'-8"
B2	2	"	30'-7"
B3	2	"	29'-7"
B4	2	"	28'-6"
B5	2	"	27'-5"
B6	2	"	26'-5"
B7	2	"	25'-4"
B8	2	"	24'-3"
B9	2	"	23'-2"
B10	2	"	22'-2"
B11	2	"	21'-1"
B12	2	"	20'-0"
B13	2	"	18'-11"
B14	2	"	17'-10"
B15	2	"	16'-10"
B16	2	"	15'-9"
B17	2	"	14'-8"
B18	2	"	13'-7"
B19	2	"	12'-6"
B20	2	"	11'-5"
B21	2	"	10'-4"
B22	2	3/4" ϕ	9'-3"
C	1	5/8" ϕ	29'-6"
C1	2	"	28'-6"
C2	2	"	27'-5"
C3	2	"	26'-5"
C4	2	"	25'-4"
C5	2	"	24'-3"
C6	2	"	23'-3"
C7	2	"	22'-2"
C8	2	"	21'-1"
C9	2	"	20'-0"
C10	2	"	18'-0"
C11	2	"	17'-11"
C12	2	"	16'-10"
C13	2	"	15'-9"
C14	2	"	14'-8"
C15	2	"	13'-8"
C16	2	"	12'-7"
C17	2	"	11'-6"
C18	2	"	10'-5"
C19	2	"	9'-4"
C20	2	"	8'-3"
C21	2	"	7'-2"
C22	2	"	6'-2"
C23	2	"	5'-1"
C24	2	"	4'-0"
C25	2	"	4'-11"
C26	2	"	4'-5"
C27	2	"	4'-3"
C28	2	5/8" ϕ	4'-0"



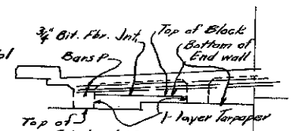




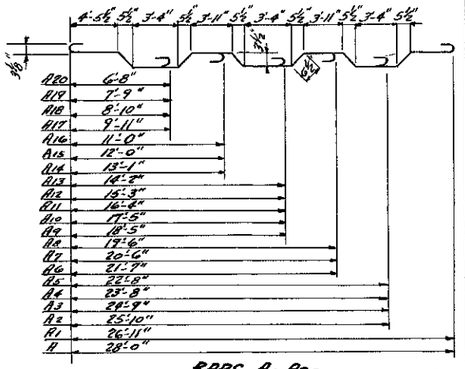


SECTION B-B (Typical All Beams)

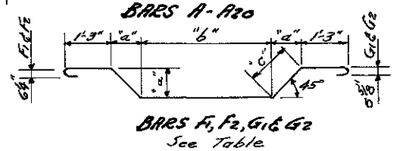
Use 2 layers of Johns-Manville Sheet Packing No. 60 (Or approved equal) (⅛" thick each layer) under Beams and Backwall. For full width of Expansion portion of Expansion Bridge Seats for Spans No. 1, 2, 3, 4 & 5. Graphite surfaces in contact.



HALF END ELEVATION
Expansion End



BARS A-A20



BARS F1, F2, G1 & G2
See Table

ADDITIONAL STEEL

Spans No. 2 & 4 (each)

Bar	No.	Size	Length
E1	12	5/8" ϕ	27'-6"
E2	4	"	27'-9"
E3	6	"	28'-0"
E4	11	5/8" ϕ	28'-3"

Span No. 5

E1	12	5/8" ϕ	27'-6"
E2	4	"	27'-9"
E3	6	"	28'-0"
E4	9	"	28'-3"
E5	2	3/8" ϕ	31'-6"
P	4	3/8" ϕ	T-G"

CONTINUED BILL OF STEEL

Constant Each Span

Bar	No.	Size	Length
D	60	5/8" ϕ	6'-5"
F1	4	1½" ϕ	31'-0"
F2	4	1½" ϕ	31'-5"
G1	4	1½" ϕ	28'-0"
G2	4	1½" ϕ	28'-5"
H1	8	1¼" ϕ	29'-8"
H2	8	1¼" ϕ	30'-2"
N	108	3/8" ϕ	6'-2"
P	5	3/8" ϕ	36'-0"

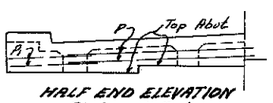
ADDITIONAL STEEL

Span No. 1

Bar	No.	Size	Length
E	2	5/8" ϕ	31'-0"
E1	10	"	27'-6"
E2	4	"	27'-9"
E3	6	"	28'-0"
E4	11	5/8" ϕ	28'-3"
P1	4	5/8" ϕ	T-6"

ESTIMATED QUANTITIES

ITEM	Concrete, Class "A" Cu. Yds.	Reinforcing Steel lbs.
Span 1	37.9	7785
Span 2	36.8	9747
Span 4	36.8	9747
Span 5	37.9	9785



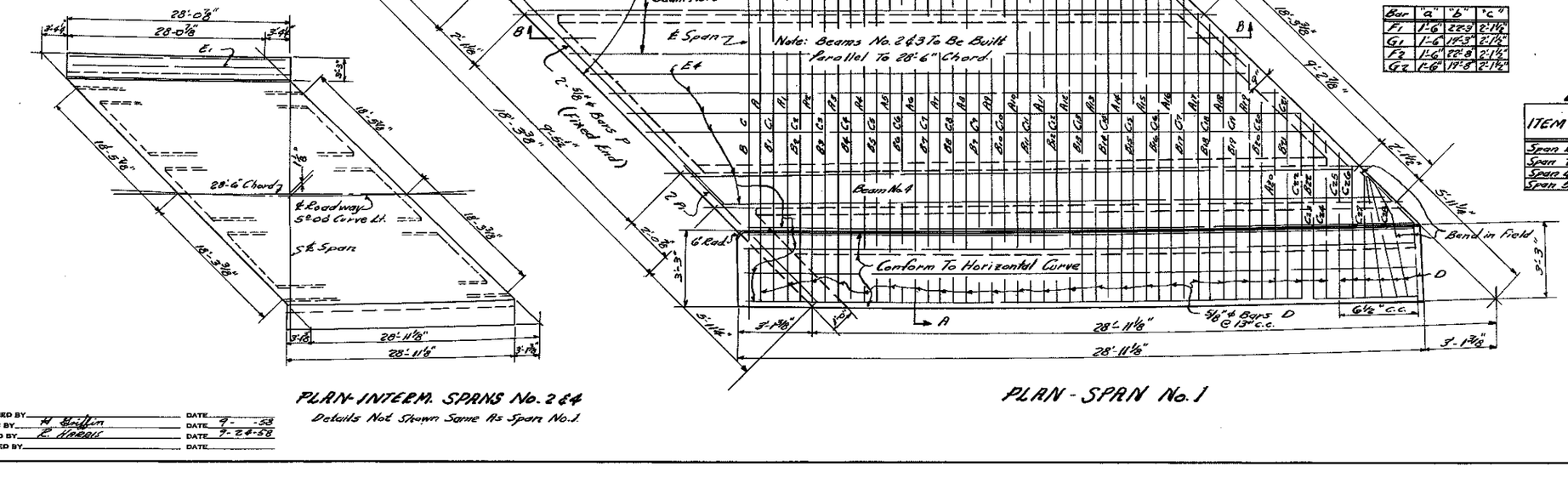
HALF END ELEVATION
Abutment End

PLAN-INTERM. SPANS No. 2 & 4
Details Not Shown Same As Span No. 1

PLAN - SPAN No. 5
Details Not Shown Same As Span No. 1

BENDING TABLE

Bar	"a"	"b"	"c"
F1	1'-6"	22'-3"	2'-1½"
G1	1'-6"	19'-3"	2'-1½"
F2	1'-6"	22'-8"	2'-1½"
G2	1'-6"	19'-8"	2'-1½"



PLAN - SPAN No. 1

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

SPANS No. 1, 2, 4 & 5

FOR BRIDGE OVER
LITTLE EMORY RIVER
STA. 91+32.0
ROANE CO.
1958

CORRECT: Fred Greer, BRIDGE ENGINEER
APPROVED: [signature], STATE HIGHWAY ENGINEER

DESIGNED BY: H. Griffin — DATE: 9- -58
DRAWN BY: H. Griffin — DATE: 9- -58
TRACED BY: E. Harris — DATE: 9-26-58
CHECKED BY: — DATE:

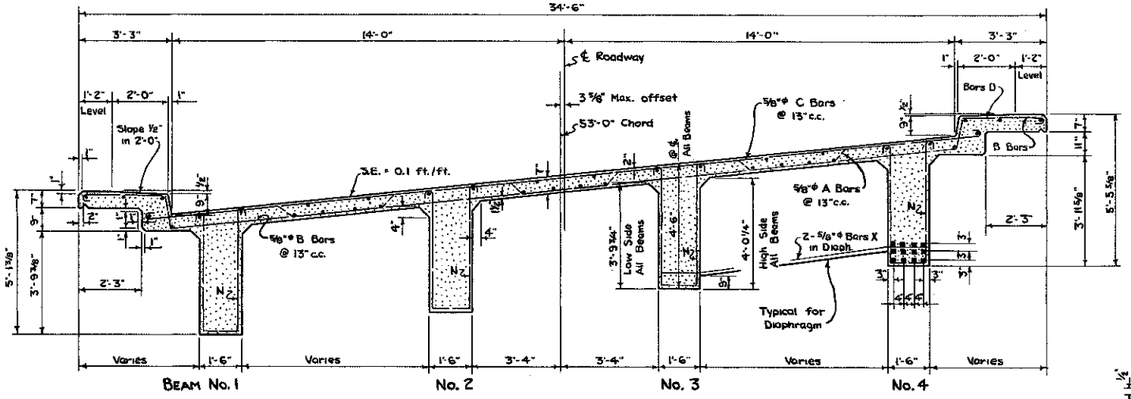
Tr. Checked 10-21-58

6-9-148

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TO NO.
8	TENN.		19	27	

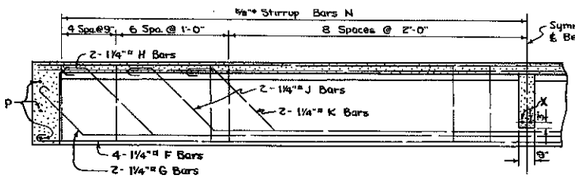
BILL OF STEEL F-031-1(6)

Bar	No.	Size	Length	Bar	No.	Size	Length	Bar	No.	Size	Length
A	22	5/8"ø	31'-0"	B19	1	5/8"ø	17'-1"	C23	1	5/8"ø	6'-0"
A1	1	"	30'-3"	B16	1	"	16'-6"	C24	1	"	5'-10"
A2	1	"	29'-2"	B17	1	"	15'-5"	C25	1	"	5'-7"
A3	1	"	28'-2"	B18	1	"	14'-4"	C26	1	"	4'-11"
A4	1	"	27'-1"	B19	1	"	13'-3"	C27	1	"	4'-8"
A5	1	"	26'-0"	B20	1	"	12'-2"	C28	1	"	4'-5"
A6	1	"	24'-11"	B21	1	"	11'-1"	C29	1	"	4'-2"
A7	1	"	23'-10"	B22	1	"	9'-11"	C30	1	"	2'-8"
A8	1	"	22'-9"	B23	1	"	9'-6"	C31	1	"	2'-5"
A9	1	"	21'-8"	B24	1	"	9'-0"	C32	1	"	2'-2"
A10	1	"	20'-7"	B25	1	"	8'-5"	C33	1	"	2'-5"
A11	1	"	19'-7"	B26	1	"	32'-0"	C34	1	"	2'-4"
A12	1	"	18'-5"	B27	1	"	30'-10"	C35	1	"	2'-2"
A13	1	"	17'-5"	B28	1	"	29'-9"	C36	1	"	2'-2"
A14	1	"	16'-4"	B29	1	"	28'-8"	C37	1	"	2'-0"
A15	1	"	15'-2"	B30	1	"	27'-7"	C38	1	"	1'-9"
A16	1	"	14'-2"	B31	1	"	26'-5"	C39	1	"	1'-8"
A17	1	"	13'-1"	B32	1	"	25'-4"	C40	1	"	1'-7"
A18	1	"	12'-0"	B33	1	"	24'-3"	C41	1	"	1'-6"
A19	1	"	10'-11"	B34	1	"	23'-2"	C42	1	"	1'-5"
A20	1	"	9'-9"	B35	1	"	22'-0"	C43	1	"	1'-4"
A21	1	"	8'-7"	B36	1	"	20'-10"	C44	1	"	1'-3"
A22	1	"	7'-6"	B37	1	"	19'-8"	C45	1	"	1'-2"
A23	1	"	29'-10"	B38	1	"	18'-6"	C46	1	"	1'-0"
A24	1	"	28'-9"	B39	1	"	17'-5"	C47	1	"	9"
A25	1	"	27'-7"	B40	1	"	16'-4"	C48	1	"	6"
A26	1	"	26'-5"	B41	1	"	15'-3"	C49	1	"	7"
A27	1	"	25'-4"	B42	1	"	14'-2"	C50	1	"	6"
A28	1	"	24'-2"	B43	1	"	13'-0"	C51	1	"	6"
A29	1	"	23'-0"	B44	1	"	11'-11"	C52	1	"	5'-10"
A30	1	"	21'-11"	B45	1	"	10'-10"	C53	1	"	5'-7"
A31	1	"	20'-9"	B46	1	"	9'-8"	C54	1	"	4'-11"
A32	1	"	19'-8"	B47	1	"	9'-3"	C55	1	"	4'-8"
A33	1	"	18'-5"	B48	1	"	8'-3"	C56	1	"	3'-10"
A34	1	"	17'-4"	B49	1	5/8"ø	8'-3"	C57	1	5/8"ø	3'-10"
A35	1	"	16'-3"								
A36	1	"	15'-0"	C	23	5/8"ø	30'-6"	D	35	5/8"ø	6'-0"
A37	1	"	13'-11"	C1	1	"	29'-3"	E	10	5/8"ø	5'-10"
A38	1	"	12'-9"	C2	1	"	28'-1"	E1	5	"	5'-2"
A39	1	"	11'-8"	C3	1	"	27'-0"	E2	3	"	5'-2"
A40	1	"	10'-6"	C4	1	"	26'-0"	E3	5	"	5'-2"
A41	1	"	9'-5"	C5	1	"	25'-0"	E4	8	"	5'-2"
A42	1	"	8'-4"	C6	1	"	23'-11"	E5	5	5/8"ø	5'-3"
A43	1	5/8"ø	7'-3"	C7	1	"	22'-10"				
B	23	5/8"ø	36'-11"	C8	1	"	21'-10"	F1	4	1 1/4"ø	52'-1"
B1	1	"	32'-5"	C9	1	"	20'-9"	F2	4	1 1/4"ø	52'-1"
B2	1	"	31'-4"	C10	1	"	19'-8"	F3	4	1 1/4"ø	52'-10"
B3	1	"	30'-3"	C11	1	"	18'-8"	F4	4	1 1/4"ø	53'-1"
B4	1	"	29'-3"	C12	1	"	17'-8"	G1	2	1 1/4"ø	46'-11"
B5	1	"	28'-2"	C13	1	"	16'-7"	G2	2	"	47'-1"
B6	1	"	27'-2"	C14	1	"	15'-6"	G3	2	"	47'-10"
B7	1	"	26'-1"	C15	1	"	14'-5"	G4	2	1 1/4"ø	48'-1"
B8	1	"	25'-1"	C16	1	"	13'-4"	H1	4	1 1/4"ø	54'-0"
B9	1	"	24'-0"	C17	1	"	12'-3"	H2	4	1 1/4"ø	53'-10"
B10	1	"	22'-11"	C18	1	"	11'-2"	J1	4	1 1/4"ø	46'-10"
B11	1	"	21'-10"	C19	1	"	10'-1"	J2	4	1 1/4"ø	47'-0"
B12	1	"	20'-9"	C20	1	"	9'-0"	K1	4	1 1/4"ø	35'-0"
B13	1	"	19'-9"	C21	1	7/8"ø	7'-11"	K2	4	1 1/4"ø	33'-10"
B14	1	5/8"ø	18'-8"	C22	1	5/8"ø	6'-11"				
								N	148	5/8"ø	10'-0"
								P	7	5/8"ø	36'-0"
								X	6	5/8"ø	9'-0"



SECTION A-A

NOTE: Main Reinforcement same all Beams, except length.



SECTION B-B

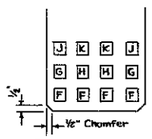
NOTE:

IN BEAM NO. 1
F Bars = Bars F1
G Bars = Bars G1
H Bars = Bars H1
J Bars = Bars J1
K Bars = Bars K1

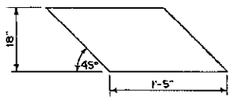
IN BEAM NO. 2
F and G Bars = Bars F2 & G2 Respectively.
H, J, and K Bars = Bars H1, J1, & K1 Respectively.

IN BEAM NO. 3
F and G Bars = Bars F3 & G3 Respectively.
H, J, and K Bars = Bars H2, J2, & K2 Respectively.

IN BEAM NO. 4
F and G Bars = Bars F4 & G4 Respectively.
H, J, and K Bars = Bars H2, J2, & K2 Respectively.



SKETCH SHOWING BAR LOCATION



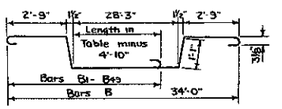
NOTE: 4- Neoprene Bearing Pads 1" thick required- shaped as above for expansion end.

BENDING TABLE

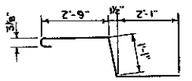
Bar	"A"	"B"	"C"	"D"
H1	3'-8"	39'-8"	5'-2"	49'-0"
H2	3'-8"	38'-8"	5'-2"	48'-0"
J1	3'-5"	32'-10"	4'-10"	41'-8"
J2	3'-5"	31'-10"	4'-10"	40'-8"
K1	3'-5"	26'-0"	4'-10"	34'-10"
K2	3'-5"	25'-0"	4'-10"	33'-10"

BARS H1 & H2, J1 & J2, K1 & K2

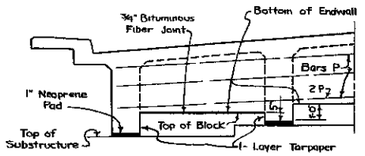
(See Bending Table)



BARS B- B49

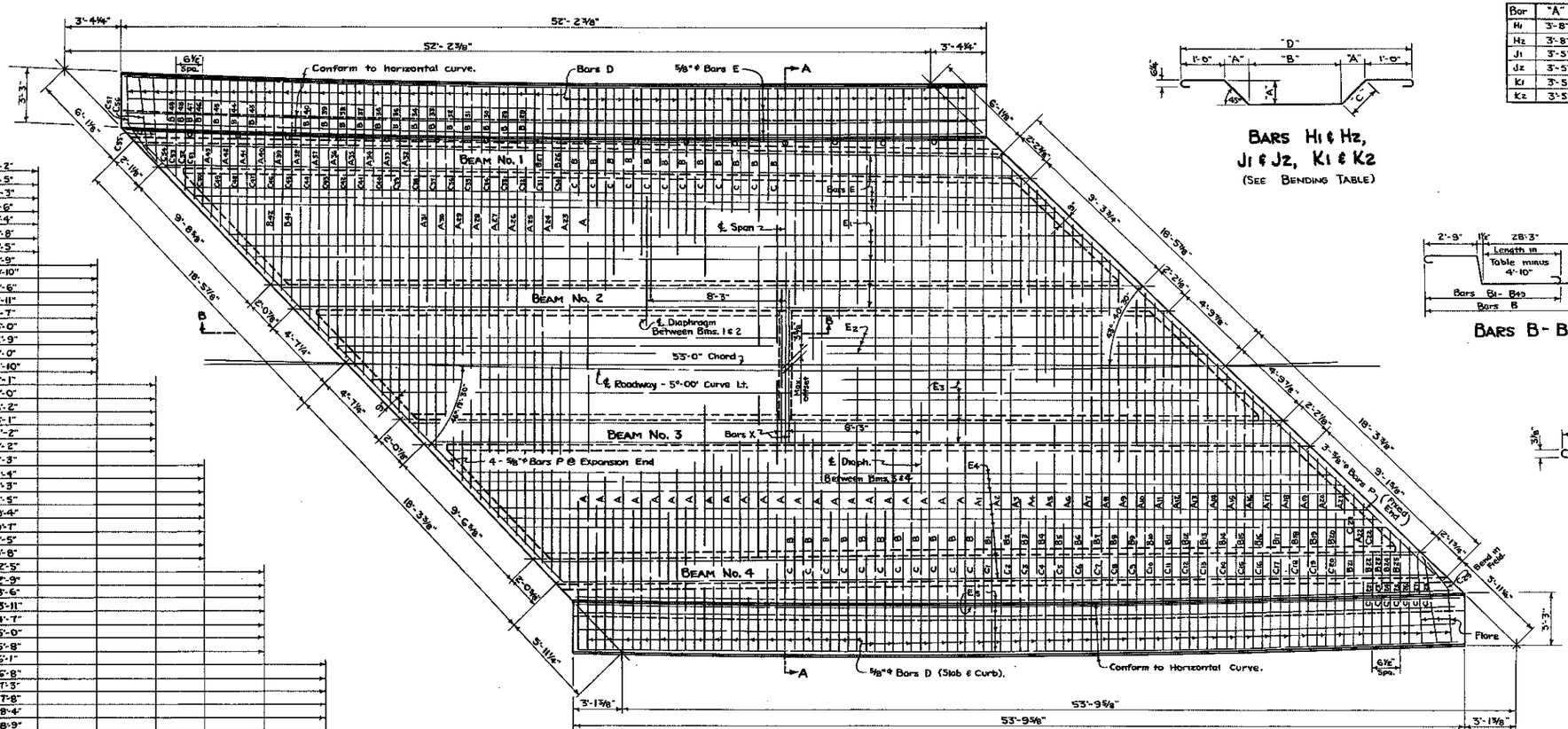


BARS D

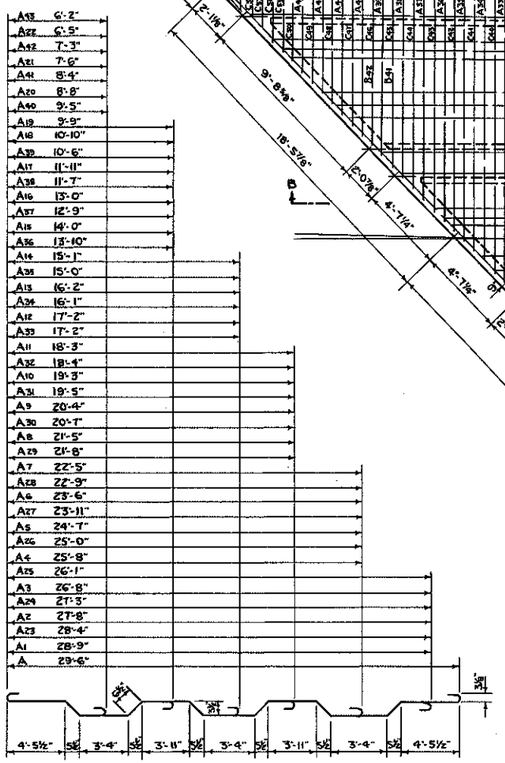


HALF END ELEVATION

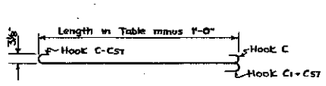
EXPANSION END



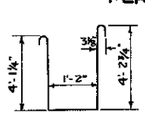
PLAN - SPAN NO. 3



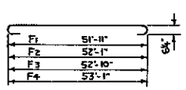
BARS A-A43



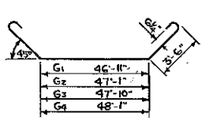
BARS C-C57



BARS N



BARS F1- F4



BARS G1- G4

ESTIMATED QUANTITIES

Concrete Class "A"	96.0 Cu. Yds.
Reinforcing Steel	22475 Lbs.

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

SPAN NO. 3

FOR BRIDGE OVER LITTLE EMORY RIVER
STA. 91+32.0
ROANE - MORGAN COS.
1959

DESIGNED BY _____ DATE _____
DRAWN BY H. Griffin DATE 11-20-58
TRACED BY R. Sykes DATE 12-3-58
CHECKED BY _____ DATE _____

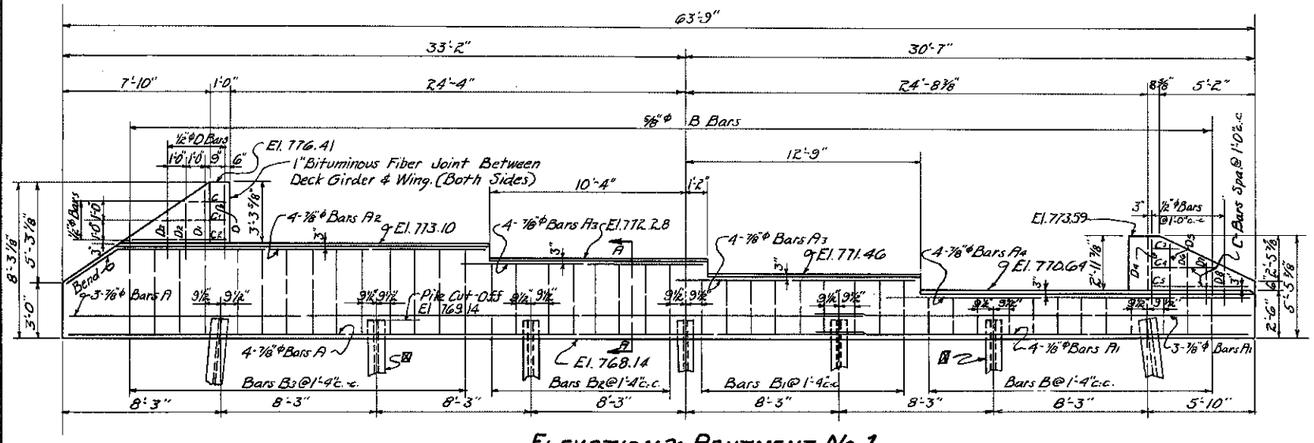
CORRECT Fred Greve BRIDGE ENGINEER
APPROVED Herbert S. Weaver STATE HIGHWAY ENGINEER

G-9-

Tracing V 12-4-58 H.M. Sisco

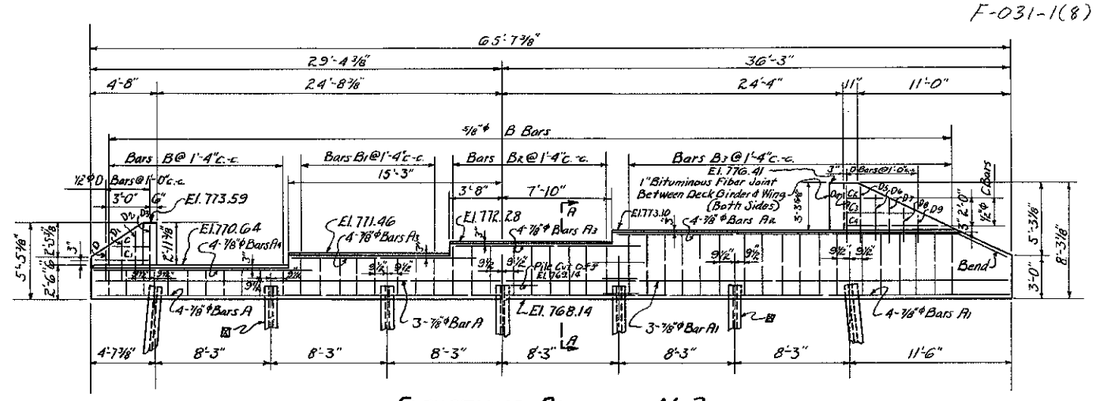
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19	28	35

F-031-1(8)

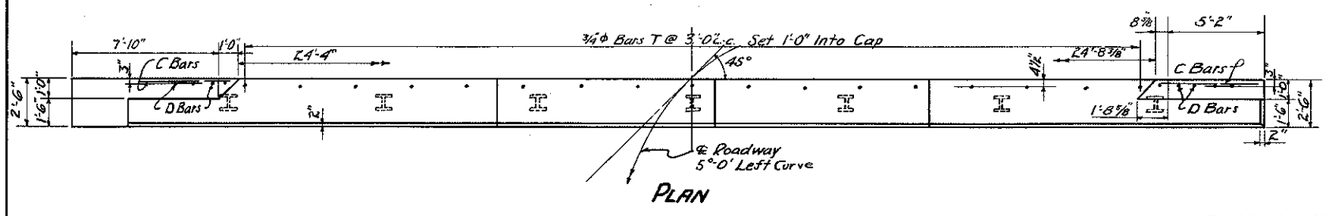


ELEVATION ~ ABUTMENT NO. 1
Looking Back On Survey

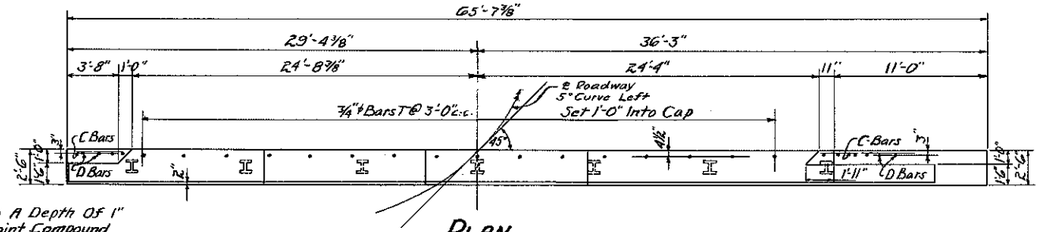
NOTE: D Bars To Extend 10" Into Beam



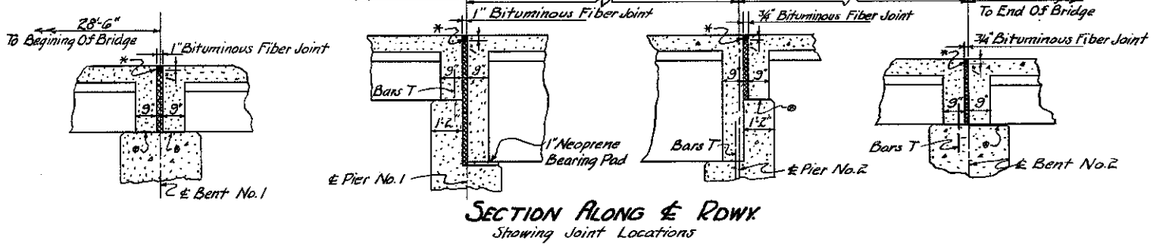
ELEVATION ~ ABUTMENT NO. 2
Looking Forward On Survey



PLAN

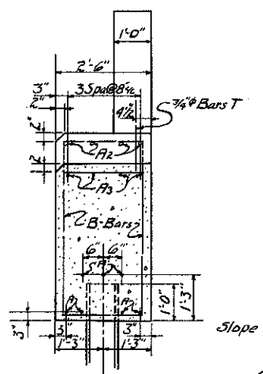


PLAN

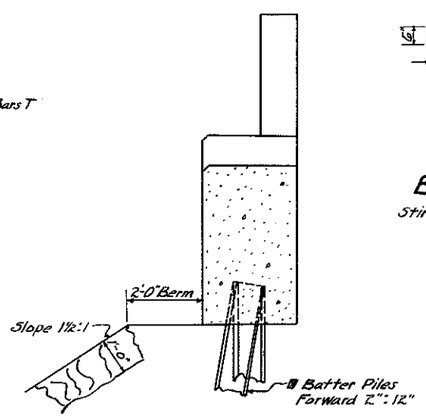


SECTION ALONG ℄ ROWY.
Showing Joint Locations

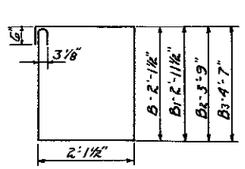
* Top Of Joint Filled To A Depth Of 1" With Rubber Asphalt Joint Compound Federal Specifications SS-S-164.
@ 2 Layers (1/16" Each Layer) Johns-Manville Sheet Packing No. 60 Or Approved Equal, For Full Width Of Expansion Portion Of Bridge Seat, Graphite Surfaces In Contact.



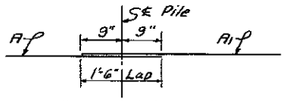
SECTION A-A



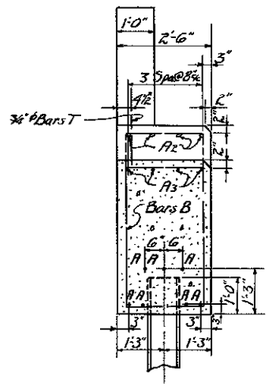
SECTION A-A
Showing Rip-Rap And Pile Batter



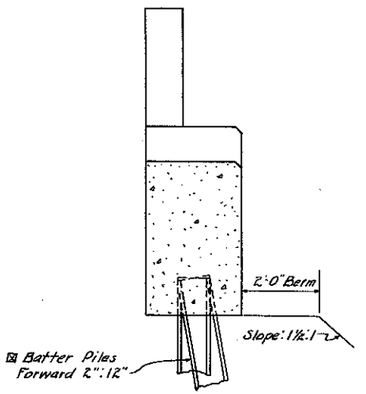
BARS B-B3
Stirrups Same For Abut. 1 & 2.



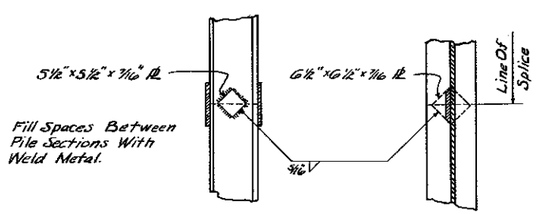
BARS A & A1 SPLICE



SECTION A-A



SECTION A-A
Showing Pile Batter



DETAIL OF PILE SPLICE

BILL OF STEEL
For Abutments No. 1 & 2

Abutment No. 1				Abutment No. 2			
Bar	No.	Size	Length	Bar	No.	Size	Length
A	7	⅞ ϕ	41'-11"	A	7	⅞ ϕ	38'-2"
A1	7	"	22'-10"	A1	7	"	28'-6"
A2	4	"	23'-0"	A2	4	"	28'-3"
A3	8	"	13'-0"	A3	8	"	13'-0"
A4	4	⅞ ϕ	19'-6"	A4	4	⅞ ϕ	15'-7"
B	12	⅝" ϕ	9'-6"	B	10	⅝" ϕ	9'-6"
B1	9	"	11'-2"	B1	8	"	11'-2"
B2	8	"	12'-9"	B2	9	"	12'-9"
B3	14	⅝ ϕ	14'-5"	B3	18	⅝" ϕ	14'-5"
C	1	½" ϕ	1'-7"	C	1	½" ϕ	2'-5"
C1	1	"	3'-1"	C1	1	"	3'-11"
C2	1	"	4'-8"	C2	1	"	2'-3"
C3	1	"	1'-6"	C3	1	"	4'-7"
C4	1	"	3'-5"	C4	1	½" ϕ	6'-6"
C5	1	½" ϕ	5'-5"	D	1	½" ϕ	2'-3"
D	1	½" ϕ	4'-0"	D1	1	"	3'-0"
D1	1	"	3'-8"	D2	1	"	3'-5"
D2	1	"	3'-0"	D3	1	"	3'-9"
D3	1	"	2'-3"	D4	1	"	4'-0"
D4	1	"	3'-7"	D5	1	"	3'-11"
D5	1	"	3'-3"	D6	1	"	3'-3"
D6	1	"	2'-9"	D7	1	"	3'-0"
D7	1	"	2'-3"	D8	1	"	2'-6"
D8	1	½" ϕ	1'-10"	D9	1	½" ϕ	2'-0"
T	16	⅜" ϕ	2'-0"	T	16	⅜" ϕ	2'-0"

ESTIMATED QUANTITIES

	Concrete Class "A" Cu. Yds.	Reinforcing Steel Lbs.
Abutment No. 1	23.1	2105
Abutment No. 2	24.8	2185

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

ABUTMENTS NO. 1 & 2
FOR BRIDGE
OVER LITTLE EMORY RIVER
STA. 91 + 32.0
ROANE-MORGAN CO'S.
1959

DESIGNED BY _____ DATE _____
DRAWN BY E.G. Bingham DATE 11-24-58
TRACED BY Carl Wright DATE 12-9-58
CHECKED BY _____ DATE _____

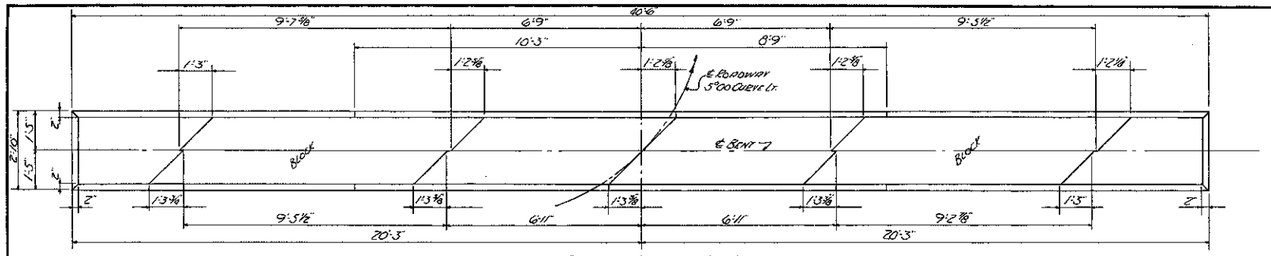
Tr. check 12-9-58

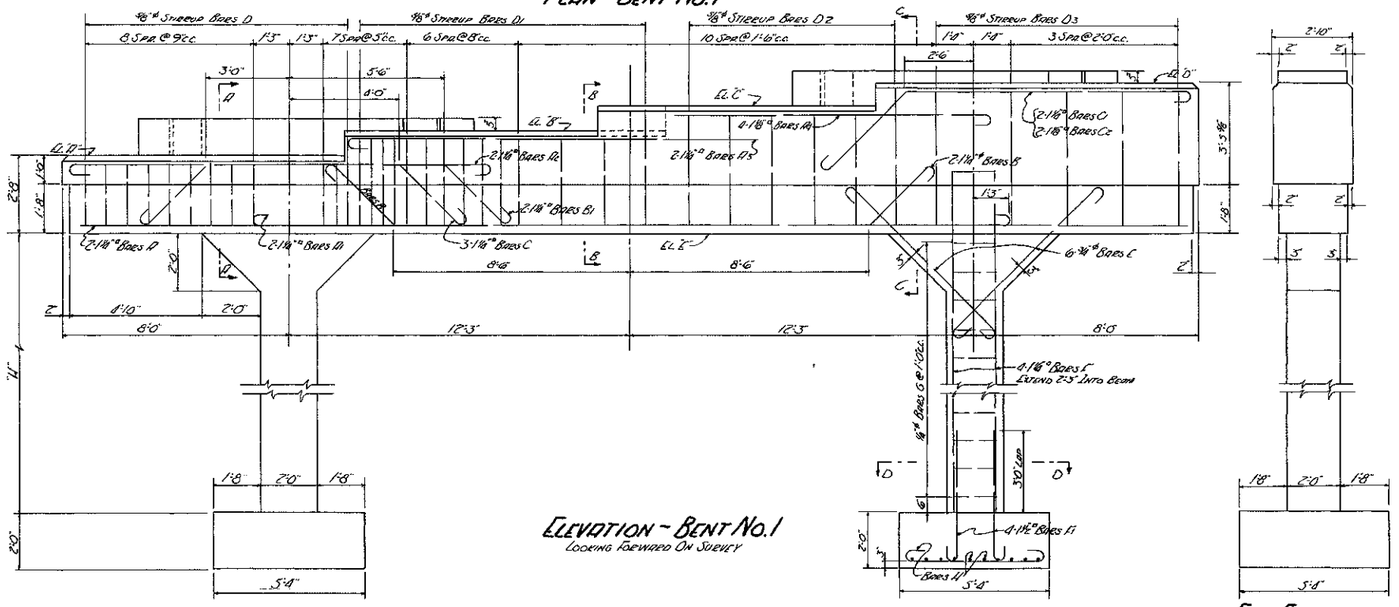
CORRECT Fred Greve, BRIDGE ENGINEER
APPROVED [signature], STATE HIGHWAY ENGINEER

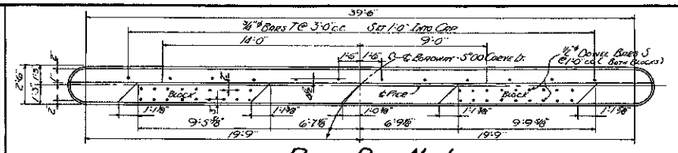
6-9-15

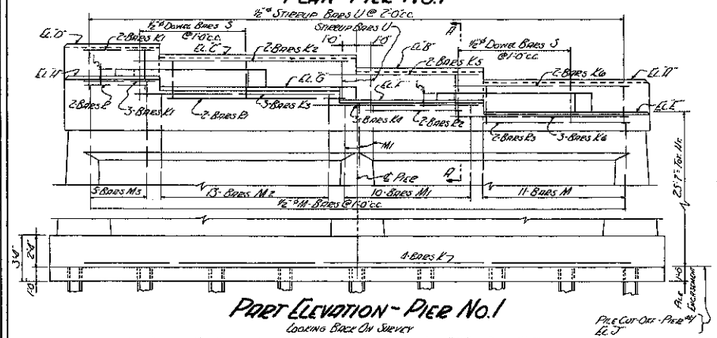
F-031-1(6)

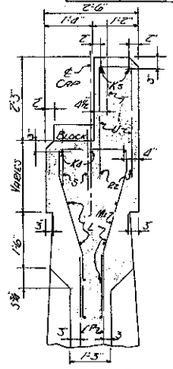
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19	29	29











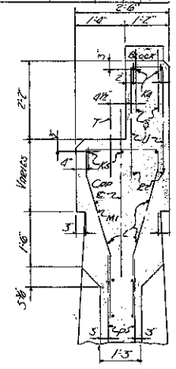
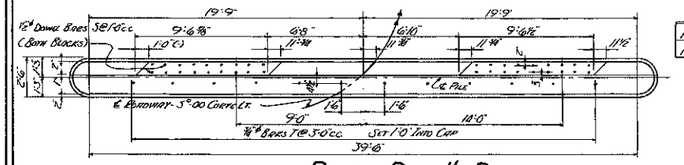
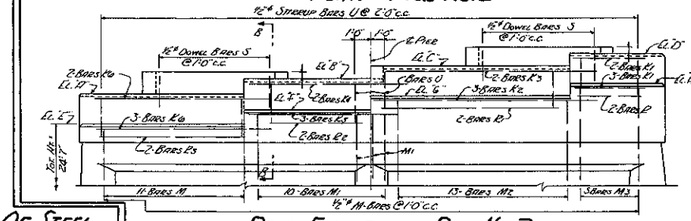


TABLE OF ELEVATION

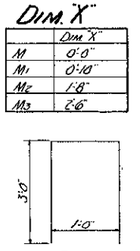
	℄ A	℄ B	℄ C	℄ D	℄ E	℄ F	℄ G	℄ H	℄ J
PIER No.1	770.68	771.46	772.78	773.10	768.39	769.21	770.03	770.85	761.59
PIER No.2	770.64	771.46	772.78	773.10	768.47	769.29	770.11	770.93	—

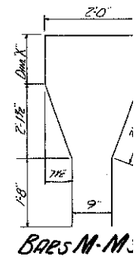




DIM. "X"

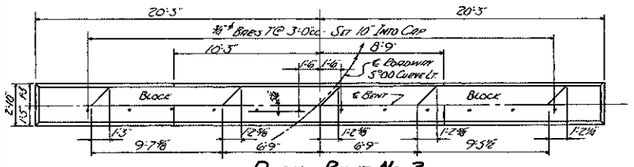
	Dim. "X"
M	0'-0"
M1	0'-10"
M2	1'-8"
M3	2'-6"

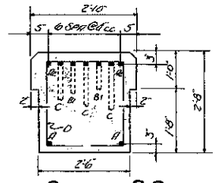


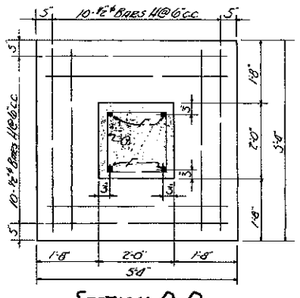


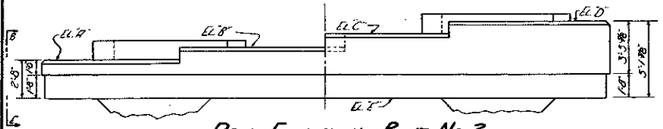
BILL OF STEEL

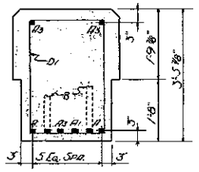
		PIER No.1		PIER No.2	
BAR	SIZE	No.	LENGTH	No.	LENGTH
E	1"	4	39'6"	4	39'6"
E1	-	5	5'-6"	5	5'-6"
E2	-	2	15'-8"	3	15'-8"
E3	-	3	14'-8"	2	11'-8"
M	-	3	11'-8"	2	11'-8"
K	-	2	10'-8"	3	10'-8"
K6	1"	5	12'-8"	5	12'-8"
C	1⅛"	48	39'-6"	46	39'-6"
M	1⅛"	11		11	9'-5"
M1	-	10		10	11'-5"
M2	-	13		13	13'-5"
M3	⅝"	5	-	5	10'-5"
N	⅝"	76	4'-3"	76	4'-3"
O	⅞"	74	4'-3"	74	4'-3"
P	⅞"	76	21'-0"	76	25'-0"
R	⅝"	2	4'-6"	2	4'-6"
R1	-	2	17'-6"	2	12'-6"
R2	-	2	6'-6"	2	6'-6"
R3	⅝"	2	10'-6"	2	10'-6"
S	½"	36	1'-8"	36	1'-8"
T	⅜"	12	2'-0"	12	2'-0"
U	½"	20	7'-0"	20	7'-0"

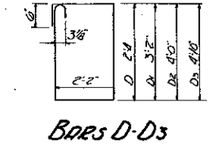


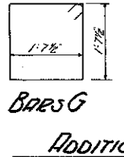


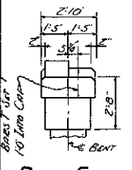


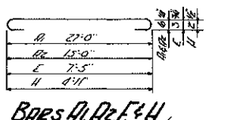


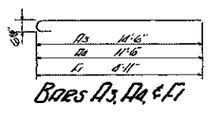


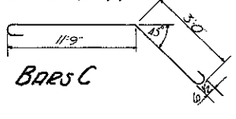


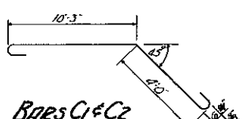


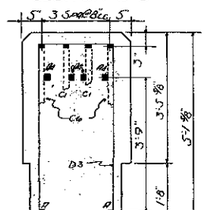


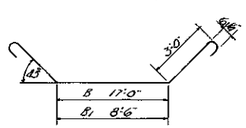












*CONSTANT BILL OF STEEL

BAR	No.	SIZE	LENGTH
A	2	1⅛"	39'8"
A1	2	"	29'0"
A2	2	"	17'0"
A3	2	1⅛"	15'5"
A4	4	1⅛"	12'5"
B	2	1⅛"	25'0"
B1	2	1⅛"	16'6"
C	3	1⅛"	16'9"
C1	2	1⅛"	16'3"
C2	2	1⅛"	16'1"
D	12	⅞"	10'0"
D1	18	"	11'8"
D2	6	"	13'4"
D3	5	⅞"	15'0"
E	12	⅜"	8'9"
F1	8	1⅛"	5'9"
H	80	½"	5'9"

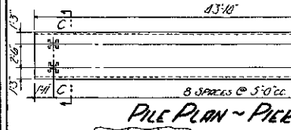
*FOR ONE BENT.

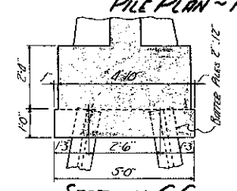
ADDITIONAL BILL OF STEEL

		BENT No.1		BENT No.2	
BAR	SIZE	No.	LENGTH	No.	LENGTH
F	1⅛"	8	26'9"	8	17'3"
G	⅝"	48	7'0"	30	7'0"
T	⅜"	—	—	12	2'0"

ESTIMATED QUANTITIES

	CONCRETE CLASS 'D' CU YDS.	REINFORCING STEEL LBS.
PIER No.1	93.7	3998
PIER No.2	82.3	12 Ob.





ESTIMATED QUANTITIES

	CONCRETE CLASS 'D' CU YDS.	REINFORCING STEEL LBS.
BENT No.1	29.2	4506
BENT No.2	25.6	4117

TABLE FOR "H" ℄ ELEVATIONS

	"H"	℄ A	℄ B	℄ C	℄ D	℄ E
BENT No.1	24'6"	770.68	771.46	772.28	773.10	767.97
BENT No.2	15'0"	770.64	771.46	772.28	773.10	767.97

PIERS NO.1 & 2

BENTS NO.1 & 2

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

BENTS NO.1 & 2
PIERS NO.1 & 2
OVER LITTLE EMORY RIVER
STA. 91+32.0
ROANE - MORGAN COUNTIES
1959

CORRECT Fred Grove
BRIDGE ENGINEER
APPROVED Charles M. Bates
STATE HIGHWAY ENGINEER

G-9-151

DESIGNED BY _____ DATE _____
DRAWN BY R. BURGESS DATE 12-1-58
TRACED BY H.E. SUDDUTH DATE 12-9-58
CHECKED BY _____ DATE _____

TRA C&S 12/30/58 Bingham