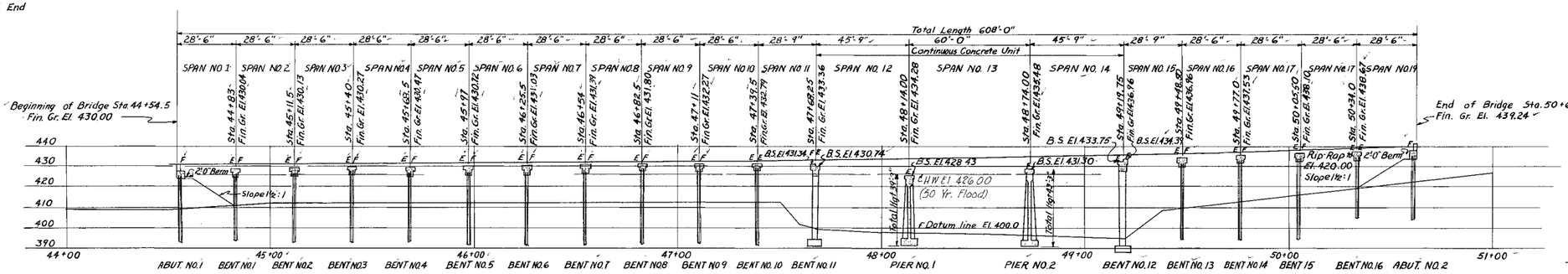
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	TENN.		19		

NOTE:
E=Expansion End
F=Fixed End

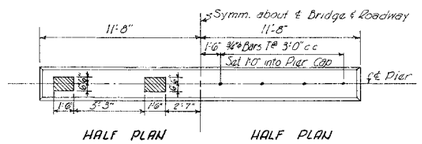


SECTION ALONG ℄ OF BRIDGE & ROADWAY

Scale 1" = 30'-0"

NOTE: Omit roadway drains over end fills.
NOTE: Piles shall be driven to a refusal on rock or a minimum bearing of 21 tons for Abuts Nos 1 & 2 and 28 tons for Bents Nos 1 thru 10 and Nos 13 thru 16.
NOTE: The footing for Bents Nos 11 & 12 shall extend 6" into rock and Piers Nos 1 & 2 shall extend 1'-0" into rock.

NOTE: The fills at the ends of the bridge shall be in place and thoroughly compacted before driving the abutment piles.
NOTE: When Bent and Pier foundations have been uncovered holes 6 ft. deep shall be drilled into the rock at points designated by the engineer.

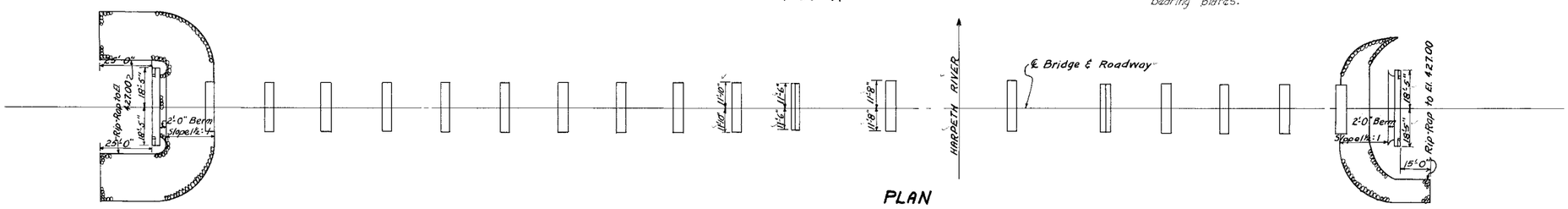


HALF PLAN Pier No 1

HALF PLAN Pier No 2

Note: When pouring bridge seat provisions shall be made for setting anchor bolts for bearing plates.

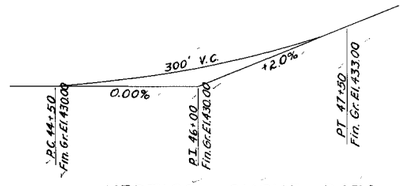
NOTE:
Struts placed between Posts at Bents No. 11 & 12
7-25-61



PLAN

DESIGN DATA

Drainage Area =	7.33 Sq. Mi.
Water Area Provided	10400 Sq. ft.
Mean velocity in constricted Area (Hydraulic Survey)	6.87 f.p.s.



VERTICAL CURVE DATA

GENERAL NOTES

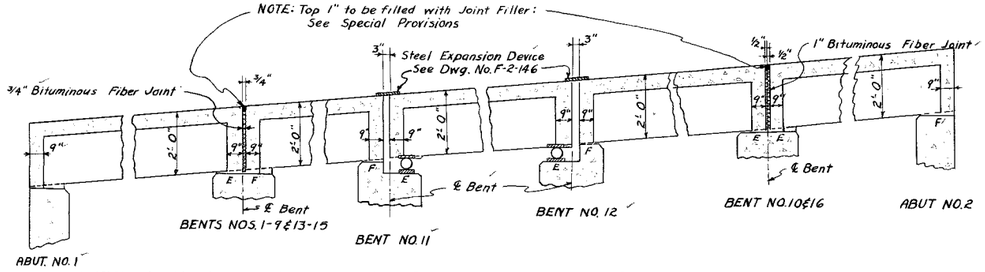
SPECIFICATIONS: Standard Road and Bridge Specifications of the Tennessee Department of Highways.
LOADING: H15-44
CONCRETE: To be Class "A"
REINF. STEEL: See Specifications
FORMS & FINISH: See Specifications
ROCK FOUNDATIONS: See Specifications
RIP-RAP: See Specifications
PILES: To be B.P. 10 @ 42 lb.
JOINT FILLER: See Special Provisions

LIST OF DRAWINGS

Handrail	E-12-104 & F-2-147
Deck Girder 26'-0" Clear Spans	F-10-7
Cont. Conc. Unit 151'-6" Overall Lgth.	F-2-146 & F-2-147
Abutments Nos. 1 & 2	F-10-116
Bents Nos. 1 thru 10 & 13 thru 16	F-10-116
Bents Nos. 11 & 12	K-6-29
Piers Nos 1 & 2 - Type "A" L = 20'-10"	F-10-13

TABLE OF BRIDGE SEAT & PILE CUT-OFF ELEVATIONS

	Abut. No 1	Bent No 1	Bent No 2	Bent No 3	Bent No 4	Bent No 5	Bent No 6	Bent No 7	Bent No 8	Bent No 9	Bent No 10	Bent No 13	Bent No 14	Bent No 15	Bent No 16	Abut. No 2
Bridge Seat Elev.	428.00	428.04	428.13	428.26	428.46	428.71	429.02	429.37	429.78	430.23	430.77	434.94	435.51	436.08	436.67	437.19
Pile Cut-off Elev.	426.50	426.54	426.63	426.76	426.96	427.21	427.52	427.87	428.28	428.75	429.27	433.44	434.01	434.58	435.17	435.69



SKETCH SHOWING BLOCKS POURED MONOLITHIC WITH BEAM STEMS TO OBTAIN LEVEL BEARING

24'-0" ROADWAY

Sta.	44+55	44+83	45+12	45+40	45+69	45+97	46+26	46+54	46+83	47+11	47+40	47+68	48+14	48+74	49+20	49+48	49+77	50+05	50+34	50+62
℄ Survey	G=411.0	412.0	413.0	412.9	412.2	412.2	412.7	413.0	412.9	412.8	414.6	400.2	399.5	396.6	395.6	411.1	410.2	417.2	421.8	426.1
	R=394.0	R=	R=403.0	R=	R=	R=391.2	R=390.7	R=	R=390.9	R=	R=390.6	R=390.2	R=390.5	R=389.6	R=393.7	R=394.1	R=395.2	R=406.2	R=406.8	R=408.1
10'-0"	G=410.7	412.0	413.1	412.6	412.0	412.1	413.0	412.9	412.4	412.4	414.7	400.7	399.1	396.6	395.3	411.1	413.7	417.4	421.4	425.4
	R=	R=393.0	R=	R=392.6	R=	R=	R=391.0	R=	R=	R=390.4	R=390.7	R=390.7	R=391.1	R=389.6	R=393.8	R=394.1	R=394.7	R=407.4	R=406.7	R=407.4
	G=410.7	412.0	413.0	412.2	412.1	412.1	413.0	413.0	412.6	412.2	414.8	400.8	398.8	396.6	395.3	411.1	414.7	417.6	422.4	425.6
	R=393.7	R=	R=393.0	R=	R=392.1	R=392.1	R=	R=391.0	R=390.6	R=	R=390.8	R=390.8	R=391.8	R=389.6	R=393.7	R=398.1	R=405.7	R=408.6	R=408.4	R=407.6

G= Ground Elev.
R= Rock Elev.

SOUNDING SKETCH

ESTIMATED QUANTITIES

Item	Excavation Cu. Yds. Dry	Wet	Rock	Concrete Class "A" Cu. Yds.	Reinf. Steel Lbs.	Cast Steel Lbs.	Struct. Steel Lbs.	Steel Forgings Lbs.	Steel Piles B.P. 10 @ 42 lbs. Lin. Ft.	Rock Drilling Lin. Ft.	Rip-Rap Cu. Yds.
Handrail				37.7	8234						
Deck Girder 16 @ 26'-0" Cl.				442.8	117,594						
Cont. Conc. Unit 1 @ 151'-6"				171.9	53,800	1784	5,125	973			
Abutments Nos. 1 & 2				18.2	2180						
Bents Nos. 1-10 & 13-16				107.8	8124		10,000				
Bents No. 11	4	53	3	23.2	3871						
Bents No. 12		11	3	23.1	3850						
Pier No. 1		81	13	79.0	2722						
Pier No. 2		73	14	90.6	2947						
Total	4	218	33	994.3	203,322	1784	15,125	973	2,156	60	232

REQ'D: 188-3" ϕ Transite Drains or equal, 8" Long.

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

LAYOUT OF BRIDGE
STA. 44+54.5
HARPETH RIVER
CHEATHAM-DICKSON CO.
1961

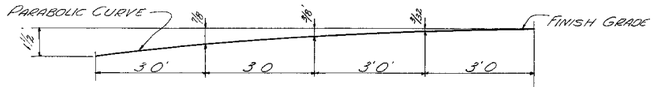
DESIGNED BY
DRAWN BY E.L. Owen DATE 1-20-61
TRACED BY Ray Canter & Mires DATE 1-30-61
CHECKED BY U.G.E. DATE 1-23-61

CORRECT Fred Greene BRIDGE ENGINEER
APPROVED C.H. Long STATE HIGHWAY ENGINEER

K-6-28

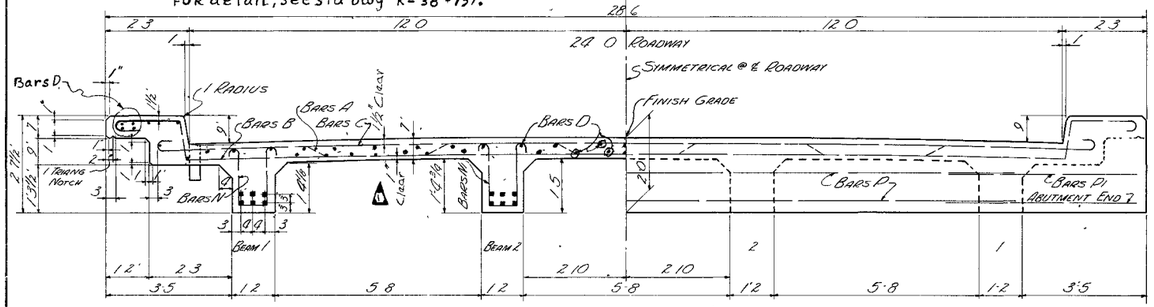
MICROFILMED
REVISED - 8-3-61 - Structural Steel Quantities.

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



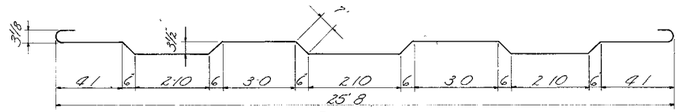
DETAIL OF ROADWAY TEMPLATE

Note: When pouring curbs, provisions shall be made for setting reinforcement for bridge rail. For detail, see Std Dwg K-38-151.

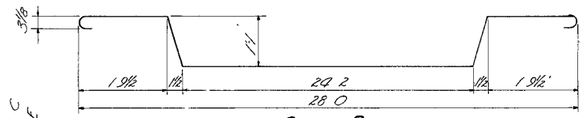


HALF SECTION A·A

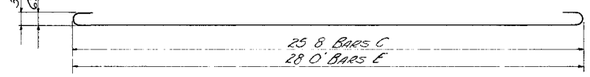
HALF END ELEVATION · ABUTMENT END



BARS A



BARS B

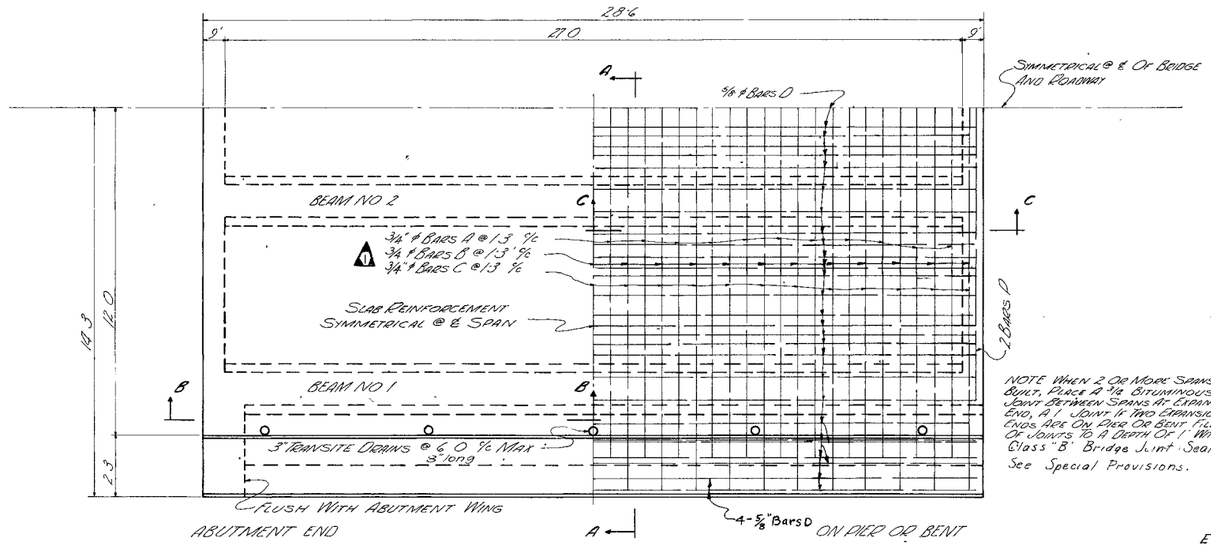


BARS C·E

BILL OF STEEL
INTERMEDIATE SPAN

BAR	SIZE	NO	LENGTH
A	3/4" ϕ	22	27.2'
B	"	23	30.11
C	3/4" ϕ	23	26.8
D	5/8" ϕ	62	28.0
E	1 1/16" °	12	30.0
F	"	4	30.11
F1	"	4	31'.0'
G	1 1/16" °	2	28'.9'
G1	1 1/16" °	2	28'.6
N	5/8" ϕ	50	5.0
N1	5/8" ϕ	50	5.2
P	5/8 ϕ	4	21.2

NOTE FOR EACH ABUTMENT END ADD 4 5/8 ϕ 5.2' BARS P1

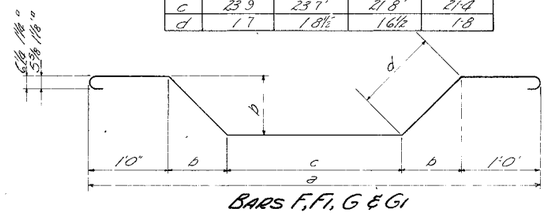


HALF PLAN

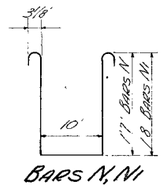
NOTE WHEN 2 OR MORE SPANS ARE BUILT, PLACE A ½ BITUMINOUS FIBER JOINT BETWEEN SPANS AT EXPANSION END, A 1" JOINT AT TWO EXPANSION ENDS ARE ON PIER OR BENT. FILL TOP OF JOINTS TO A DEPTH OF 1" WITH CLASS "B" BRIDGE JOINT SEALER SEE SPECIAL PROVISIONS.

STEEL BENDING TABLE

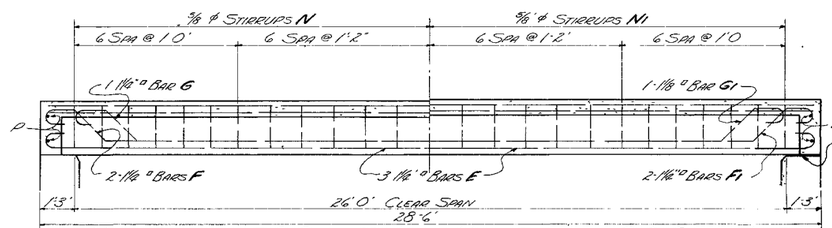
	Bars F	Bars F1	Bars G	Bars G1
a	28.0	28.0	25.10	25.8
b	1.1 1/2	1.2 1/2	11	12
c	23.9	23.7'	21.8'	21.4
d	17	18 1/2	16 1/2	18



BARS F, F1, G & G1

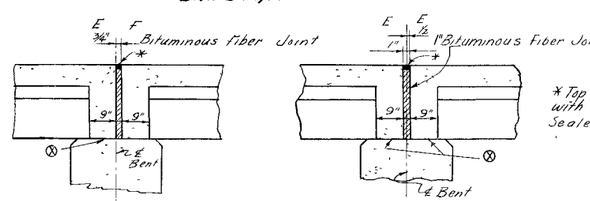


BARS N, N1



HALF SECTION B·B BEAM NO 1 HALF SECTION C·C BEAM NO 2

⊗ 2 Layers (1/16" Each Layer) Johns-Manville Sheet Packing #60 or equal at expansion end, under beams and backwall. For the full width of the expansion portion of the bridge seat. Graphite surfaces to be in contact



SECTION ALONG ℄ OF ROADWAY SHOWING JOINT LOCATION ONE EXPANSION & ONE FIXED END

SECTION ALONG ℄ OF ROADWAY SHOWING JOINT LOCATION TWO EXPANSION ENDS.

* Top of Joint Filled 1" Deep with Class 'B' Bridge Joint Sealer See Special Provisions

ESTIMATED QUANTITIES

	Concrete Class A Cu Yds	Reinforcing Steel Lb
End Span	28.2	9117
Intermediate Span ea	27.6	9095

NOTE: Cost of 3" Transite Drains, Joint Material, & Johns-Manville Service Sheet Packing to be included in the price bid for Class A Concrete

GENERAL NOTES:
SPECIFICATIONS: Standard Road And Bridge Specifications Of The Tennessee Department Of Highways And Public Works
LOADING: H 15-44
CONCRETE: To Be Class A
REINFORCING STEEL: To be intermediate or hard grade
FORMS & FINISH: See Specifications

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

STANDARD CONCRETE BRIDGE

DECK GIRDER TYPE

26'0" CLEAR SPAN 24'0" ROADWAY

1956

CORRECT: Fred Groft, BRIDGE ENGINEER

APPROVED: Herbert S. Bates, STATE HIGHWAY ENGINEER

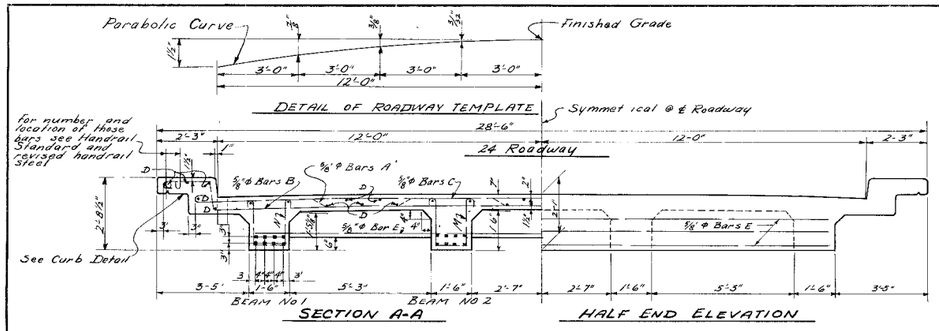
F-10

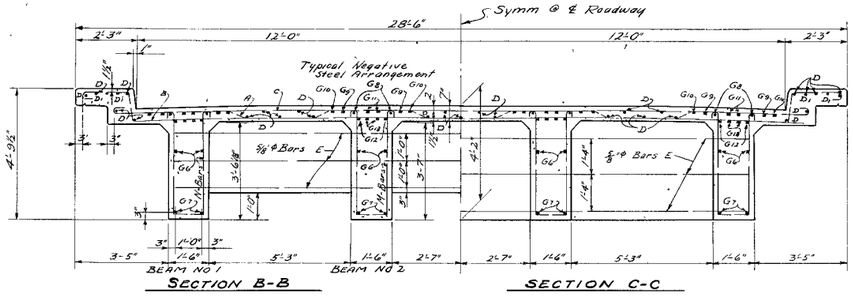
2-COPIES

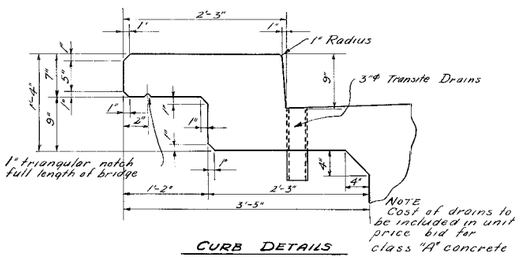
DESIGNED BY W.S. PRESCOTT DATE 8-17-56
DRAWN BY W.S. PRESCOTT DATE 8-17-56
TRACED BY A. BUDGE DATE 8-21-56
CHECKED BY DATE

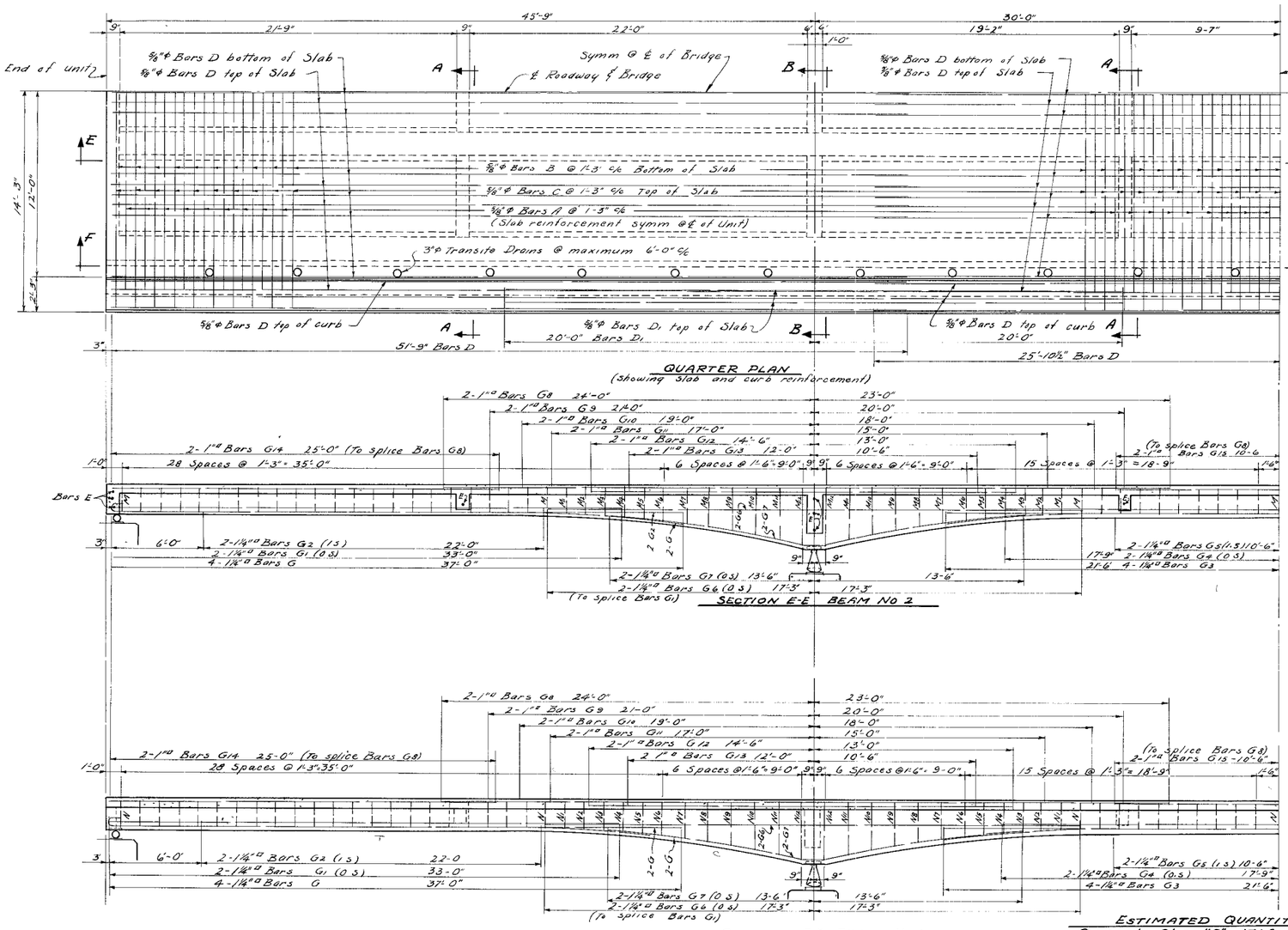
Revised 12-23-57 (Bar Lengths F, F1 Changed)
Revised 5-14-63 - Joint Sealer
Revised 7-10-67 Slab Reinforcement

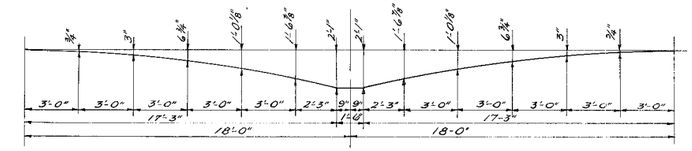
FED ROAD DIST NO	STATE	FED AID PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
8	TENN		19		

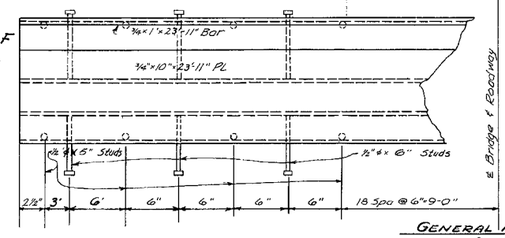




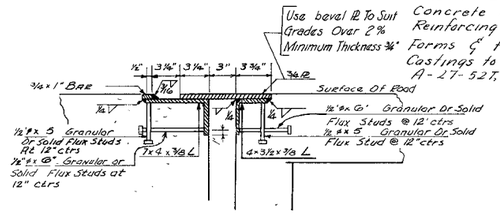


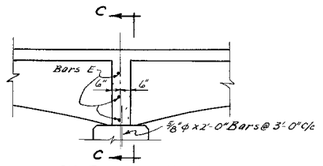






EXPANSION DEVICE
2 Required





GENERAL NOTES

Specifications Standard Road and Bridge Specifications of the Tennessee Department of Highways and Public Works
H15-44 Loading
Concrete To be class "A"
Reinforcing Steel See Specifications
Forms ℄ Finish See Specifications
Castings to conform to A S T M Standard Specifications A-27-52T, Grade 65-35

Do Not Use

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

STANDARD

CONTINUOUS BRIDGE

CONCRETE DECK GIRDER TYPE

TOTAL LENGTH 15'-6" 24' ROADWAY WITH 1'-0" CURBS

1956

CORRECT Fred Green BRIDGE ENGINEER

APPROVED [signature] STATE HIGHWAY ENGINEER

F-2-146

WITH STANDARD DRAWING F-2-147

DESIGNED BY W S Prescott DATE 8-1-56
DRAWN BY W.S Prescott DATE 8-1-56
TRACED BY D Kelley DATE 8-13-56
CHECKED BY DATE

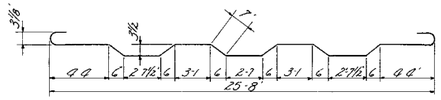
ESTIMATED QUANTITIES

Concrete Class "A"	171.9	cu yds
Reinforcing Steel	53,800	Lb.
* Structural Steel	4,572	Lb.
Cast Steel	1,784	Lb
Steel Forgings	973	Lb

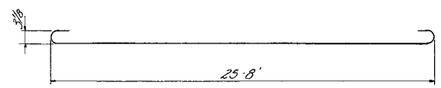
* Includes 2516 #'s For Rdwy Expansion Devices

MICROFILMED
Revised 9 May 1960 Expansion Device & Structural Steel Quantities
Revised 1-19-57 (3002 #'s structural steel added)
Revised 5-15-57 Reinforcing Steel Quantities Added J.T.P.

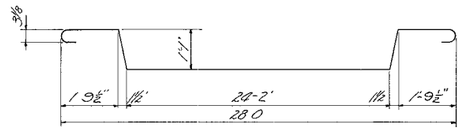
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19		



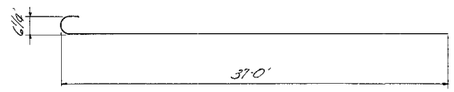
BARS A



BARS C



BARS B

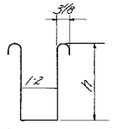


BARS G

BARS G1

TABLE FOR "h"

BAR	h	BAR	h
M	1'9	N	1'8
M1	1'-9⅛	N1	1'-8⅛"
M2	1'9⅛"	N2	1'8⅛
M3	1'10⅛	N3	1'-9⅛
M4	1'11⅛	N4	1'10⅛
M5	2'1"	N5	2'0
M6	2'2⅛	N6	2'1⅛
M7	2'5	N7	2'4"
M8	2'-11½"	N8	2'-6½"
M9	2'10⅛	N9	2'9⅛
M10	3'2"	N10	3'1
M11	3'5⅛	N11	3'-9⅛
M12	3'10"	N12	3'9"



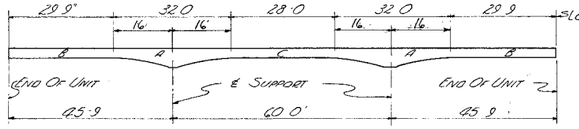
BARS M-M12
BARS N-N12

BILL OF STEEL

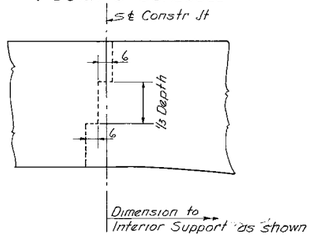
BAR	SIZE	NO	LENGTH	LOCATION
A	⅝" ϕ	120	27'2"	SLAB
B	⅝" ϕ	121	30'11"	SLAB
C	⅝" ϕ	121	24'8"	SLAB
D	⅝" ϕ	75	51'9	SLAB & CURB
D1	⅝" ϕ	4	400'	CURB
E	⅝" ϕ	16	21'2"	END WALLS & DIAPHRAGMS
G	1⅛ "	32	38'0	BEAMS
G1	"	16	33'0	"
G2	"	16	22'0"	"
G3	"	16	43'0	
G4	"	8	35'6	
G5	"	8	21'0	"
G6	"	16	30'6	
G7	1⅛ "	16	27'9	BEAMS
G8	1 "	16	47'0	BEAMS
G9	"	16	41'0	"
G10	"	16	37'0"	
G11	"	16	32'0	"
G12	"	16	27'6"	"
G13	"	16	22'6	"
G14	"	16	25'0	
G15	1" "	8	21'0"	BEAMS
M	⅝" ϕ	132	5'8"	BEAMS
M1		8	5'8	"
M2	"	8	5'10	"
M3	"	8	6'0	"
M4	"	8	6'2	"
M5	"	8	6'4"	"
M6	"	8	6'8	"
M7	"	8	7'0	"
M8	"	8	7'5	"
M9	"	8	8'0	"
M10	"	8	8'6	"
M11	"	8	9'2	"
M12	⅝" ϕ	8	9'10"	BEAMS
N	⅝" ϕ	134	5'6"	BEAMS
N1	"	8	5'6	
N2	"	8	5'8"	
N3	"	8	5'10	
N4	"	8	6'0	"
N5	"	8	6'2	"
N6	"	8	6'6	"
N7	"	8	6'10	"
N8	"	8	7'3"	"
N9	"	8	7'10	"
N10	"	8	8'4	"
N11	"	8	9'0	"
N12	⅝" ϕ	8	9'8"	BEAMS

BILL OF STEEL FOR HANDRAIL

BAR	SIZE	NO	LENGTH	REMARKS
A	⅝" ϕ	184	2'0	
B	½" ϕ	—	—	—
C	½ 9	138	4'-8"	
D	⅜" ϕ	200	2'6"	
E	½" ϕ	96	6'1"	FOR L: 5'10½
E	½" ϕ	64	6'0"	FOR L: 5'9⅞"

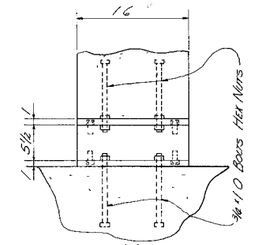


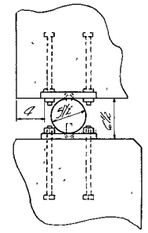
POURING SCHEDULE

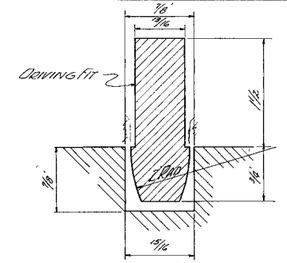


Beam Constr Jt. Detail

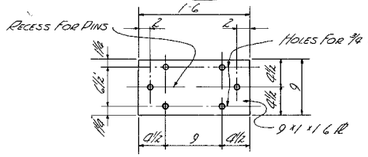
Special Note: Superstructure falsework under Beams shall not be removed in less than twenty-one (21) days after final pour is made





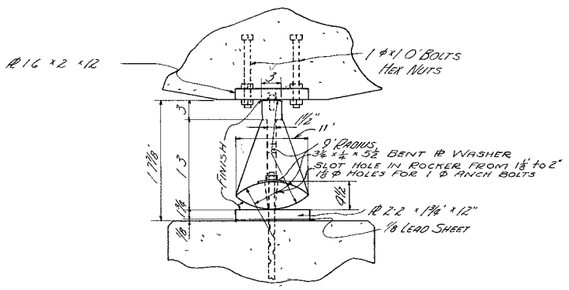


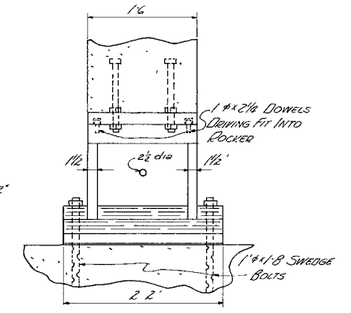
DETAIL OF PIN

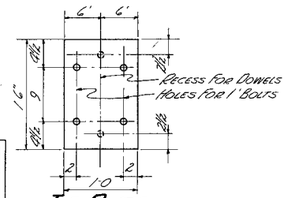


DETAILS OF ROLLER BEARING
8 Required

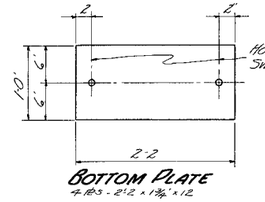
"NOTE: Plates To Be Cast Steel Or Structural Steel Rollers To Be Forged And Annealed.



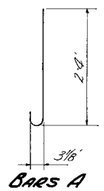




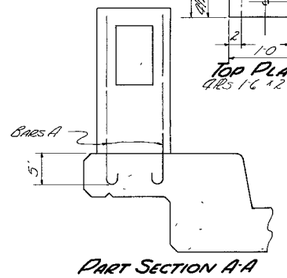
TOP PLATE
4 PLS 1'6 x 2 x ½



BOTTOM PLATE
4 PLS - 2'2 x 1⅜" x 12

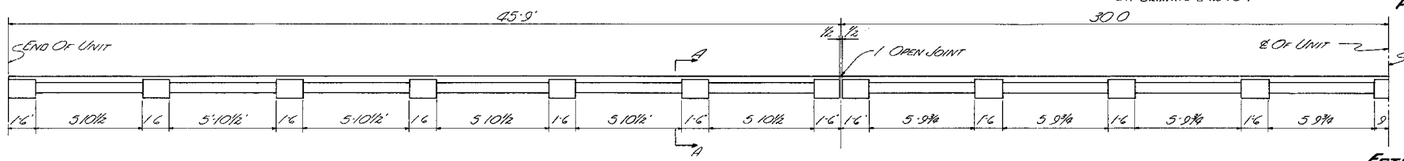


BARS A
NOTE These Bars To Be Used Instead Of Bars A Shown On Drawing E-12-104



PART SECTION A-A

INTERMEDIATE BEARINGS
4 Required
NOTE Plates To Be Cast Steel Or Structural Steel Rollers To Be Cast Steel Annealed



HANDRAIL LAYOUT FOR CONTINUOUS UNIT
NOTE For Details Not Shown On This Sheet See Drawing E-12-104

ESTIMATED HANDRAIL QUANTITIES

Concrete Class A	87	Cu Yds
Reinforcing Steel	1850	Lbs

Do Not Use !

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

STANDARD

CONTINUOUS BRIDGE

CONCRETE DECK GIRDER TYPE

TOTAL LENGTH 151'6" 24' ROADWAY WITH 1'0 CURBS

1956

CORRECT: Fred Gore
BRIDGE ENGINEER

APPROVED: Herbert M. Yates
STATE HIGHWAY ENGINEER

F-2-147

WITH STANDARD DRAWING F-2-141

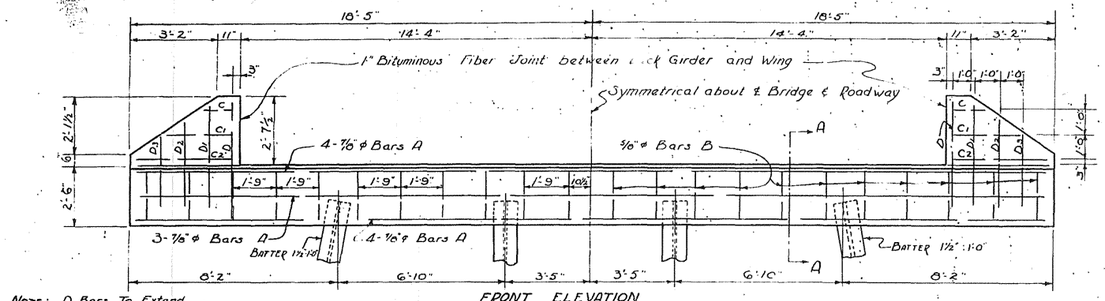
DESIGNED BY W.S. PRESCOTT DATE
DRAWN BY DATE
TRACED BY A. BURKE DATE 8-9-56
CHECKED BY DATE

Issued with Specifications Addendum #16 dated 10-7-56

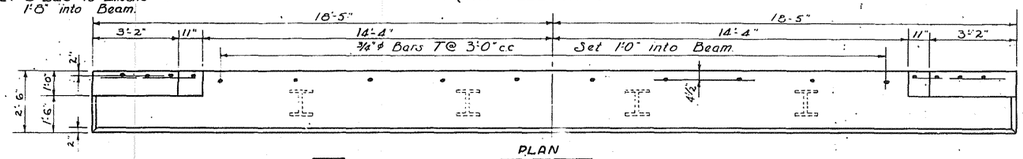
Issued with Specifications dated 6-13-56

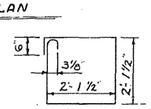
LIBRARY COPY
TENNESSEE DEPARTMENT OF TRANSPORTATION

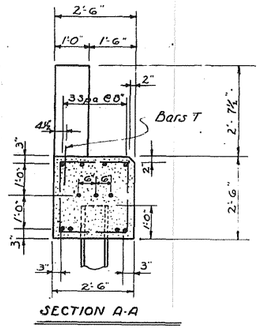
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	TENN.		19		

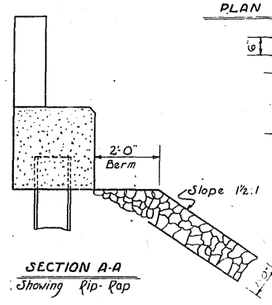


NOTE: D Bars To Extend 1'-0" into Beam.









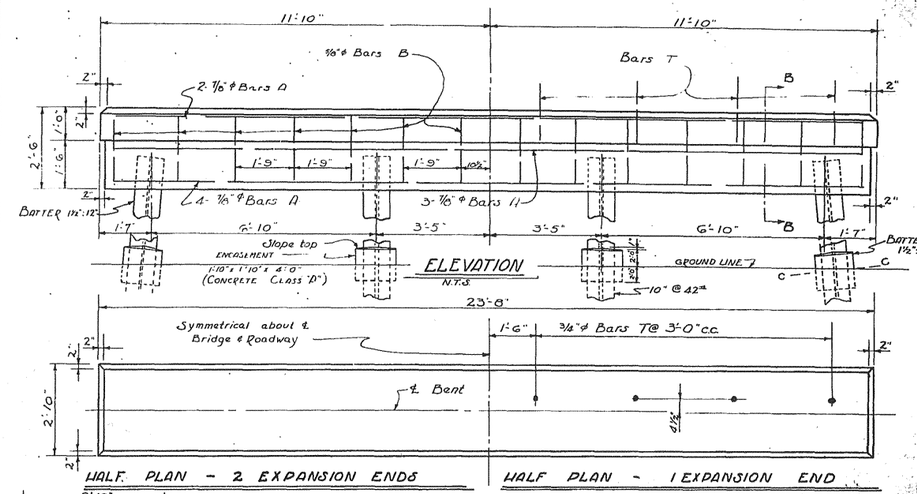
ESTIMATED QUANTITIES

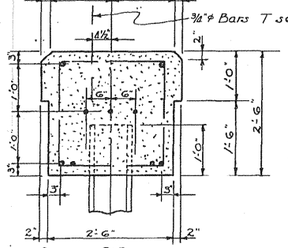
Concrete Class "A"	9.1	Cu. Yds.
Reinforcing Steel	1090	Lbs.

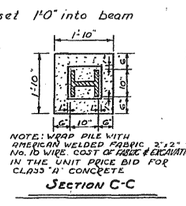
BILL OF STEEL

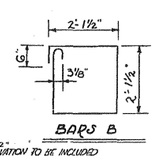
Bar	No.	Size	Length
A	11	7/8"ϕ	36'-4"
B	22	5/8"ϕ	9'-6"
C	2	½"ϕ	1'-0"
C1	2	"	2'-6"
C2	2	½"ϕ	4'-0"
D	2	½"ϕ	4'-0"
D1	2	"	3'-9"
D2	2	"	3'-0"
D3	2	½"ϕ	2'-6"
T	10	3/8"ϕ	2'-0"

PILE BENT ABUTMENT









BILL OF STEEL

Bar	No.	Size	Length
A	9	7/8"ϕ	22'-10"
B	14	5/8"ϕ	9'-6"

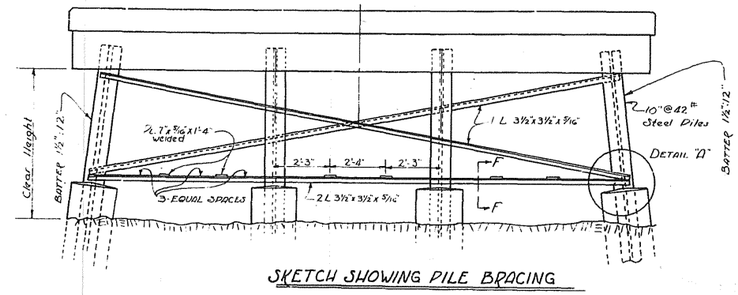
Note: For each Fixed End add B Bars T 3/8"ϕ x 2'0" and 24 Lbs. Steel.

ESTIMATED QUANTITIES

*Class "A" Concrete	7.7	Cu. Yds.
Reinforcing Steel	538	Lbs.

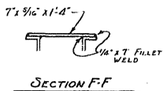
*Includes 70 Cu. Yds. for Pile Encasement.

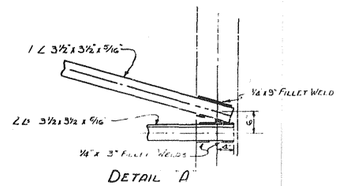
PILE BENT



SKETCH SHOWING PILE BRACING

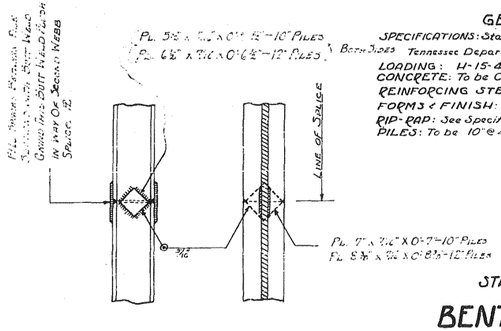
NOTE: BRACING IS REQUIRED IF CLEAR HEIGHT IS GREATER THAN 10'-0" WHEN BRACING IS REQUIRED SEE LAYOUT SHEET OF EACH BRIDGE FOR STRUCTURAL STEEL QUANTITIES





GENERAL NOTES

SPECIFICATIONS: Standard Road & Bridge Specifications of the Tennessee Department of Highways & Public Works.
LOADING: H-15-44.
CONCRETE: To be Class "A"
REINFORCING STEEL: See Specifications.
FORMS & FINISH: See Specifications.
RIP-RAP: See Specifications.
PILES: To be 10"ϕ 42" Steel Piles.



Detail of Pile Splice

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

STANDARD CONCRETE

BENT AND ABUTMENT

PILE BENT TYPE
24'-0" ROADWAY SPAN 26'-0"
SKEW 90°
1957

CORRECT: Fred Green, STATE ENGINEER
APPROVED: Chas. S. McCallen, STATE HIGHWAY COMMISSIONER

F-10

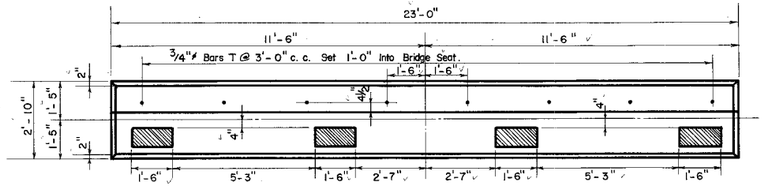
DESIGNED BY ____ DATE ____
DRAWN BY P.B.O. DATE 9-19-57
TRACED BY Mullican DATE 10-1-57
CHECKED BY W.B.E. DATE 21st 1957

Rev. 9-6-58 Class "A" Concrete Pile Encasement
Rev. 5-16-58

MICROFILM ONLY

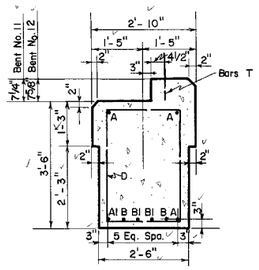
F-10-116

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

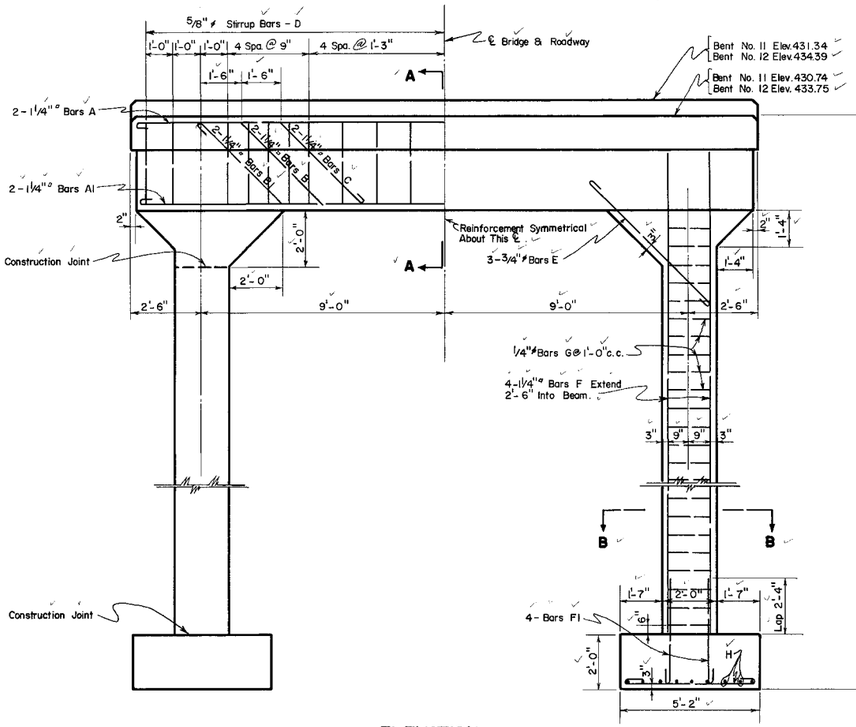


PLAN

NOTE : When Pouring Bridge Seat Provisions Shall Be Made For Setting Anchor Bolts For Bearing Plates.



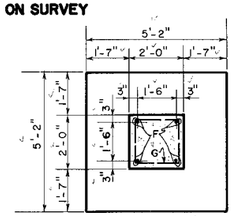
SECTION A-A



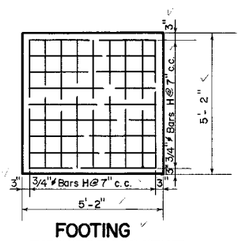
ELEVATION

BENT NO. 11 - LOOKING BACK ON SURVEY
BENT NO. 12 - LOOKING FORWARD ON SURVEY

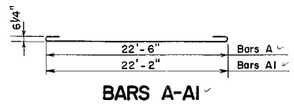
END ELEVATION



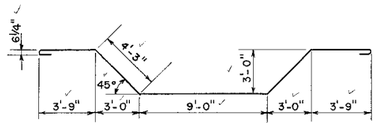
SECTION B-B



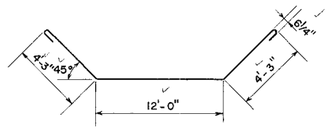
FOOTING REINFORCEMENT



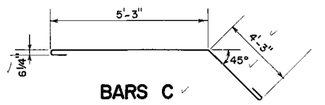
BARS A-A1



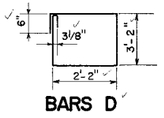
BARS B



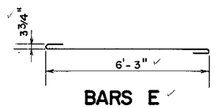
BARS B1



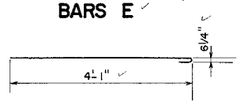
BARS C



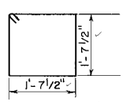
BARS D



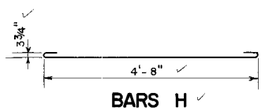
BARS E



BARS F1



BARS G



BARS H

ESTIMATED QUANTITIES

ITEM	Concrete, Class "A" Cu. Yds.	Reinforcing Steel Lbs.
Bent No. 11	23.2	3871
Bent No. 12	23.1	3850

BILL OF STEEL

BENT NO. 11				BENT NO. 12			
Bar	No.	Size	Length	Bar	No.	Size	Length
A	2	1¼"ø	24'-6"	A	2	1¼"ø	24'-6"
A1	2	"	24'-2"	A1	2	"	24'-2"
B	2	"	27'-0"	B	2	"	27'-0"
B1	2	"	22'-6"	B1	2	"	22'-8"
C	4	1¼"ø	11'-6"	C	4	1¼"ø	11'-6"
D	21	5/8"ø	11'-8"	D	21	5/8"ø	11'-8"
E	6	¾"ø	7'-7"	E	6	¾"ø	7'-7"
F	8	1¼"ø	38'-0"	F	8	1¼"ø	37'-6"
F1	8	1¼"ø	5'-1"	F1	8	1¼"ø	5'-1"
G	70	¼"ø	7'-0"	G	70	¼"ø	7'-0"
H	36	¾"ø	6'-0"	H	36	¾"ø	6'-0"
T	8	¾"ø	2'-0"	T	8	¾"ø	2'-0"

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

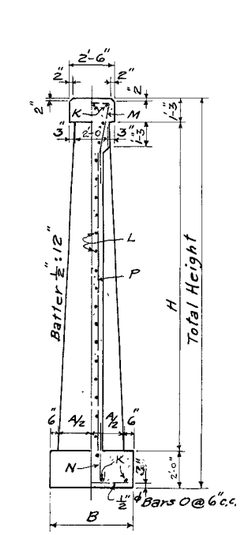
DETAILS OF BENTS NO'S 11 & 12
BRIDGE AT STATION 44+54.5
HARPETH RIVER
CHEATHAM - DICKSON CO.
1961

DESIGNED BY _____ DATE _____
DRAWN BY E. L. OWEN DATE JAN. 24-61
TRACED AND LEROYED BY JOE B. CANTRELL JR. DATE JAN. 26-61
CHECKED BY [illegible] DATE 1-24-61

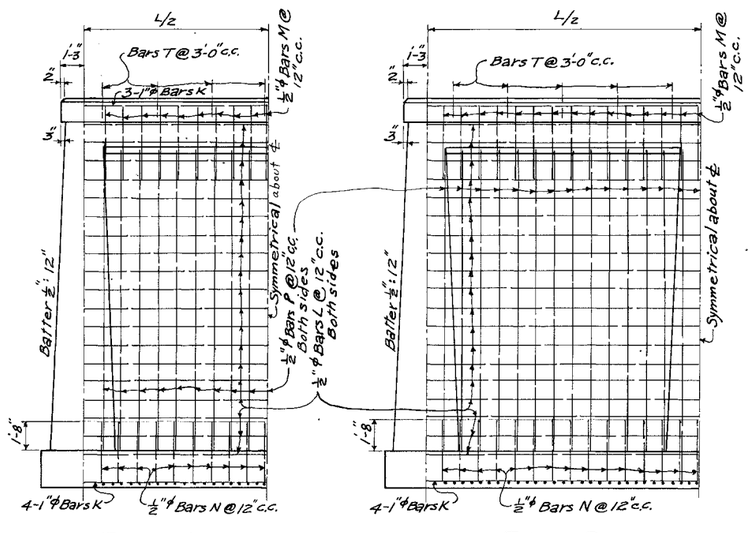
CORRECT Fred Groves
BRIDGE ENGINEER
APPROVED [illegible]
STATE HIGHWAY ENGINEER

K-6-29

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



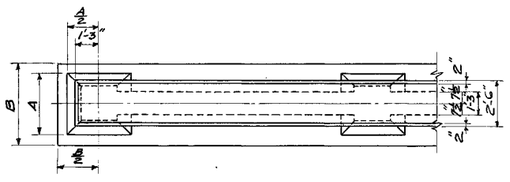
HALF END ELEV. HALF SECTON



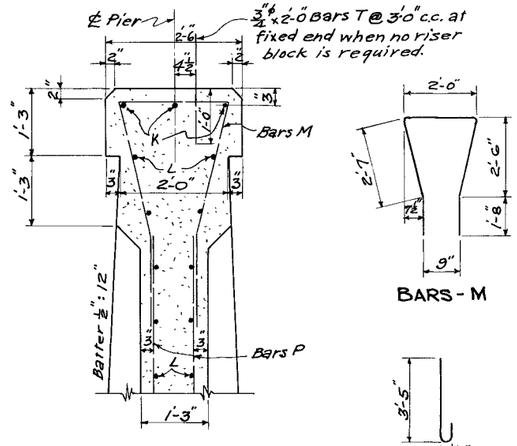
TYPE- A

TYPE B

ELEVATION OF PIERS

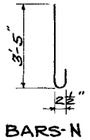


PART PLAN



PART SECT.

BARS - M



BARS - N

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES

Total Height	Dimensions H	A	B	TYPE- A BASED ON L = 20'-0" Steel Reinforcement Bars K=1"ϕ Bars L-M-N-O-P=½"ϕ Bars K-M-N	Bars L No.	Lgth.	Bars O No.	Lgth.	Bars P No.	Lgth	Total Quantities Reinf. Lbs.	Conc. Cu.Yds.	TYPE-B BASED ON L = 30'-0" Steel Reinforcement Bars K=1"ϕ Bars L-M-N-O-P=½"ϕ Bars K-M-N	Bars L No.	Lgth.	Bars O No.	Lgth.	Bars P No.	Lgth.	Total Quantities Reinf. Lbs.	Conc. Cu.Yds.	Quantities Per Ft. Length Same for All Types Reinf. Lbs.	Conc. Cu.Yds.	Total Height
9'-3"	6'	2'-6"	3'-6"		14	20'-0"	37	3'-0"	38	4'-6"	982	16.6		14	30'-0"	57	3'-0"	58	4'-6"	1485	24.0	50.3	0.696	9'-3"
10'-3"	7'	2'-7"	3'-7"		16	20'-0"	37	3'-0"	38	5'-6"	1034	18.2		16	30'-0"	57	3'-0"	58	5'-6"	1564	26.1	53.0	0.748	10'-3"
11'-3"	8'	2'-8"	3'-8"		18	20'-0"	37	3'-3"	38	6'-6"	1092	19.6		18	30'-0"	57	3'-3"	58	6'-6"	1652	28.2	56.0	0.801	11'-3"
12'-3"	9'	2'-9"	3'-9"		20	20'-0"	37	3'-3"	38	7'-6"	1145	21.1		20	30'-0"	57	3'-3"	58	7'-6"	1731	30.4	58.7	0.853	12'-3"
13'-3"	10'	2'-10"	3'-10"		22	20'-0"	37	3'-3"	38	8'-6"	1197	22.6		22	30'-0"	57	3'-3"	58	8'-6"	1810	32.7	61.4	0.906	13'-3"
14'-3"	11'	2'-11"	3'-11"		24	20'-0"	37	3'-6"	38	9'-6"	1255	24.2		24	30'-0"	57	3'-6"	58	9'-6"	1899	34.9	64.4	0.958	14'-3"
15'-3"	12'	3'-0"	4'-0"		26	20'-0"	37	3'-6"	38	10'-6"	1308	25.8		26	30'-0"	57	3'-6"	58	10'-6"	1978	37.3	67.1	1.010	15'-3"
16'-3"	13'	3'-1"	4'-1"		28	20'-0"	37	3'-6"	38	11'-6"	1360	27.5		28	30'-0"	57	3'-6"	58	11'-6"	2057	39.6	69.7	1.063	16'-3"
17'-3"	14'	3'-2"	4'-2"		30	20'-0"	37	3'-9"	38	12'-6"	1418	29.2		30	30'-0"	57	3'-9"	58	12'-6"	2146	42.1	72.8	1.115	17'-3"
18'-3"	15'	3'-3"	4'-3"		32	20'-0"	37	3'-9"	38	13'-6"	1471	30.9		32	30'-0"	57	3'-9"	58	13'-6"	2225	44.6	75.4	1.168	18'-3"
19'-3"	16'	3'-4"	4'-4"		34	20'-0"	37	3'-9"	38	14'-6"	1523	32.7		34	30'-0"	57	3'-9"	58	14'-6"	2304	47.0	78.1	1.220	19'-3"
20'-3"	17'	3'-5"	4'-5"		36	20'-0"	37	4'-0"	38	15'-6"	1581	34.4		36	30'-0"	57	4'-0"	58	15'-6"	2392	49.7	81.1	1.273	20'-3"
21'-3"	18'	3'-6"	4'-6"		38	20'-0"	37	4'-0"	38	16'-6"	1634	36.2		38	30'-0"	57	4'-0"	58	16'-6"	2471	52.3	83.8	1.325	21'-3"
22'-3"	19'	3'-7"	4'-7"		40	20'-0"	37	4'-0"	38	17'-6"	1686	38.1		40	30'-0"	57	4'-0"	58	17'-6"	2551	54.9	86.5	1.378	22'-3"
23'-3"	20'	3'-8"	4'-8"		42	20'-0"	37	4'-3"	38	18'-6"	1744	40.0		42	30'-0"	57	4'-3"	58	18'-6"	2639	57.7	89.5	1.430	23'-3"
24'-3"	21'	3'-9"	4'-9"		44	20'-0"	37	4'-3"	38	19'-6"	1797	42.0		44	30'-0"	57	4'-3"	58	19'-6"	2718	60.6	92.2	1.483	24'-3"
25'-3"	22'	3'-10"	4'-10"		46	20'-0"	37	4'-3"	38	20'-6"	1849	44.0		46	30'-0"	57	4'-3"	58	20'-6"	2797	63.4	94.9	1.535	25'-3"
26'-3"	23'	3'-11"	4'-11"		48	20'-0"	37	4'-6"	38	21'-6"	1907	46.0		48	30'-0"	57	4'-6"	58	21'-6"	2886	66.3	97.9	1.588	26'-3"
27'-3"	24'	4'-0"	5'-0"		50	20'-0"	37	4'-6"	38	22'-6"	1959	48.1		50	30'-0"	57	4'-6"	58	22'-6"	2965	69.3	100.6	1.640	27'-3"
28'-3"	25'	4'-1"	5'-1"		52	20'-0"	37	4'-6"	38	23'-6"	2012	50.2		52	30'-0"	57	4'-6"	58	23'-6"	3044	72.4	103.3	1.693	28'-3"
29'-3"	26'	4'-2"	5'-2"		54	20'-0"	37	4'-9"	38	24'-6"	2070	52.4		54	30'-0"	57	4'-9"	58	24'-6"	3133	75.6	106.3	1.745	29'-3"
30'-3"	27'	4'-3"	5'-3"		56	20'-0"	37	4'-9"	38	25'-6"	2122	54.6		56	30'-0"	57	4'-9"	58	25'-6"	3212	78.7	109.0	1.797	30'-3"
31'-3"	28'	4'-4"	5'-4"		58	20'-0"	37	4'-9"	38	26'-6"	2175	56.9		58	30'-0"	57	4'-9"	58	26'-6"	3291	82.0	111.6	1.850	31'-3"
32'-3"	29'	4'-5"	5'-5"		60	20'-0"	37	5'-0"	38	27'-6"	2233	59.2		60	30'-0"	57	5'-0"	58	27'-6"	3379	85.4	114.7	1.902	32'-3"
33'-3"	30'	4'-6"	5'-6"		62	20'-0"	37	5'-0"	38	28'-6"	2285	61.6		62	30'-0"	57	5'-0"	58	28'-6"	3458	88.8	117.3	1.955	33'-3"
34'-3"	31'	4'-7"	5'-7"		64	20'-0"	37	5'-0"	38	29'-6"	2338	64.0		64	30'-0"	57	5'-0"	58	29'-6"	3537	92.3	120.0	2.007	34'-3"
35'-3"	32'	4'-8"	5'-8"		66	20'-0"	37	5'-3"	38	30'-6"	2396	66.6		66	30'-0"	57	5'-3"	58	30'-6"	3626	96.0	123.0	2.060	35'-3"
36'-3"	33'	4'-9"	5'-9"		68	20'-0"	37	5'-3"	38	31'-6"	2448	69.0		68	30'-0"	57	5'-3"	58	31'-6"	3705	99.7	125.7	2.112	36'-3"
37'-3"	34'	4'-10"	5'-10"		70	20'-0"	37	5'-3"	38	32'-6"	2501	71.6		70	30'-0"	57	5'-3"	58	32'-6"	3784	103.4	128.4	2.165	37'-3"
38'-3"	35'	4'-11"	5'-11"		72	20'-0"	37	5'-6"	38	33'-6"	2559	74.3		72	30'-0"	57	5'-6"	58	33'-6"	3873	107.3	131.4	2.217	38'-3"
39'-3"	36'	5'-0"	6'-0"		74	20'-0"	37	5'-6"	38	34'-6"	2611	77.1		74	30'-0"	57	5'-6"	58	34'-6"	3952	111.2	134.1	2.270	39'-3"
40'-3"	37'	5'-1"	6'-1"		76	20'-0"	37	5'-6"	38	35'-6"	2664	79.8		76	30'-0"	57	5'-6"	58	35'-6"	4031	115.2	136.8	2.322	40'-3"
41'-3"	38'	5'-2"	6'-2"		78	20'-0"	37	5'-9"	38	36'-6"	2722	82.7		78	30'-0"	57	5'-9"	58	36'-6"	4119	119.3	139.8	2.375	41'-3"
42'-3"	39'	5'-3"	6'-3"		80	20'-0"	37	5'-9"	38	37'-6"	2774	85.5		80	30'-0"	57	5'-9"	58	37'-6"	4199	123.4	142.5	2.427	42'-3"
43'-3"	40'	5'-4"	6'-4"		82	20'-0"	37	5'-9"	38	38'-6"	2827	88.5		82	30'-0"	57	5'-9"	58	38'-6"	4278	127.8	145.1	2.480	43'-3"
44'-3"	41'	5'-5"	6'-5"		84	20'-0"	37	6'-0"	38	39'-6"	2885	91.5		84	30'-0"	57	6'-0"	58	39'-6"	4366	132.1	148.2	2.532	44'-3"
45'-3"	42'	5'-6"	6'-6"		86	20'-0"	37	6'-0"	38	40'-6"	2937	94.6		86	30'-0"	57	6'-0"	58	40'-6"	4445	136.6	150.9	2.585	45'-3"

7-Bars K 1"ϕ x 20'-0"
19-Bars M ½"ϕ x 10'-6"
38-Bars N ½"ϕ x 3'-10"

7-Bars K 1"ϕ x 30'-0"
29-Bars M ½"ϕ x 10'-6"
58-Bars N ½"ϕ x 3'-10"

For Number of Bars T see Special Table.

TABLE OF BARS T FOR ONE FIXED END

Length L	No.
20'-0" TO 22'-0"	7
22'-0" " 24'-0"	8
24'-0" " 27'-0"	9
27'-0" " 30'-0"	10
30'-0" " 33'-0"	11
33'-0" " 36'-0"	12

GENERAL NOTES:

Specifications: Standard Road and Bridge Specifications of the Tennessee Department of Highways and Public Works.
Concrete shall be Class "A".
Reinforcing Steel: See Specifications.
Forms & Finish: See Specifications.
Rock Foundation: See Specifications.

STATE OF TENNESSEE
DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS
NASHVILLE

STANDARD CONCRETE PIERS

DUMBELL TYPE
HEIGHTS 9'-3" TO 45'-3"
1956

DESIGNED BY _____ DATE _____
DRAWN BY U.G. Emge DATE 8-7-56
TRACED BY JWM DATE 8-10-56
CHECKED BY _____ DATE _____

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

F-10-13