

INDEX OF SHEETS

1	TITLE SHEET	
2	QUANTITY SHEETS	
3-14	GUARD RAIL ITEM SUMMARY SHEETS	
15	NOTES AND SEEDING FORMULA	
16	BRIDGE RAILING, GALVANIZED BOX BEAM TO APPROACH RAIL DETAILS	
17	BURIED GUARD RAIL END INTO BACK SLOPE DETAIL	
18	TWO RAIL ALUMINUM TO STEEL BEAM GUARD RAIL DETAILS	
19	NEW "M.E.L.T." REPLACING "TEXAS TWIST" DETAIL	
20-26	CONSTRUCTION APPROACH SIGNING AT INTERCHANGES	
27	CONSTRUCTION APPROACH SIGNING DETAILS	
28	BRIDGE RAIL CONNECTION DETAIL SHEET	

C-1	TREATED TIMBER CURB	06-01-94
E-101	CONSTRUCTION SIGN DETAILS	08-08-95
E-102	CONSTRUCTION SIGN DETAILS	08-08-95
E-102A	CONSTRUCTION SIGN DETAILS	08-08-95
E-103	MAINLINE TRAFFIC CONTROL DIVIDED HIGHWAY ONE LANE CLOSED	08-08-95
E-105	TRAFFIC CONTROL FOR CONSTRUCTION VEHICLE U-TURNS ON DIVIDED HIGHWAY	08-08-95
E-106	TRAFFIC CONTROL MISCELLANEOUS DETAILS	08-08-95
E-107A	BREAKAWAY BARRICADE DETAILS	08-08-95
E-110	MAJOR MAINTENANCE OPERATION LANE CLOSURE	08-08-95
E-121	STANDARD SIGN PLACEMENT CONVENTIONAL ROAD	08-08-95
E-142	REGULATORY SIGN DETAILS	09-20-95
E-198	DELINEATORS AND MILEPOSTS	08-18-95
G-1	STEEL BEAM GUARDRAIL (50MPH & OVER) HEAVY DUTY STEEL BEAM GUARDRAIL ANCHOR FOR STEEL BEAM RAIL	06-01-94
G-17A	MODIFIED ECCENTRIC LOADER TERMINAL (MELT)	01-18-96
G-17B	MODIFIED ECCENTRIC LOADER TERMINAL (MELT)	06-30-95
SB-R4A-82	BRIDGE RAILING GALVANIZED BOX BEAM	09-19-89
SB-R6-82	BRIDGE RAILING HEAVY DUTY STEEL BEAM	01-06-95

STATE OF VERMONT
AGENCY OF TRANSPORTATION



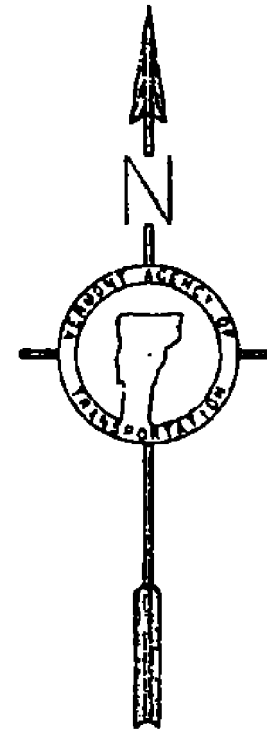
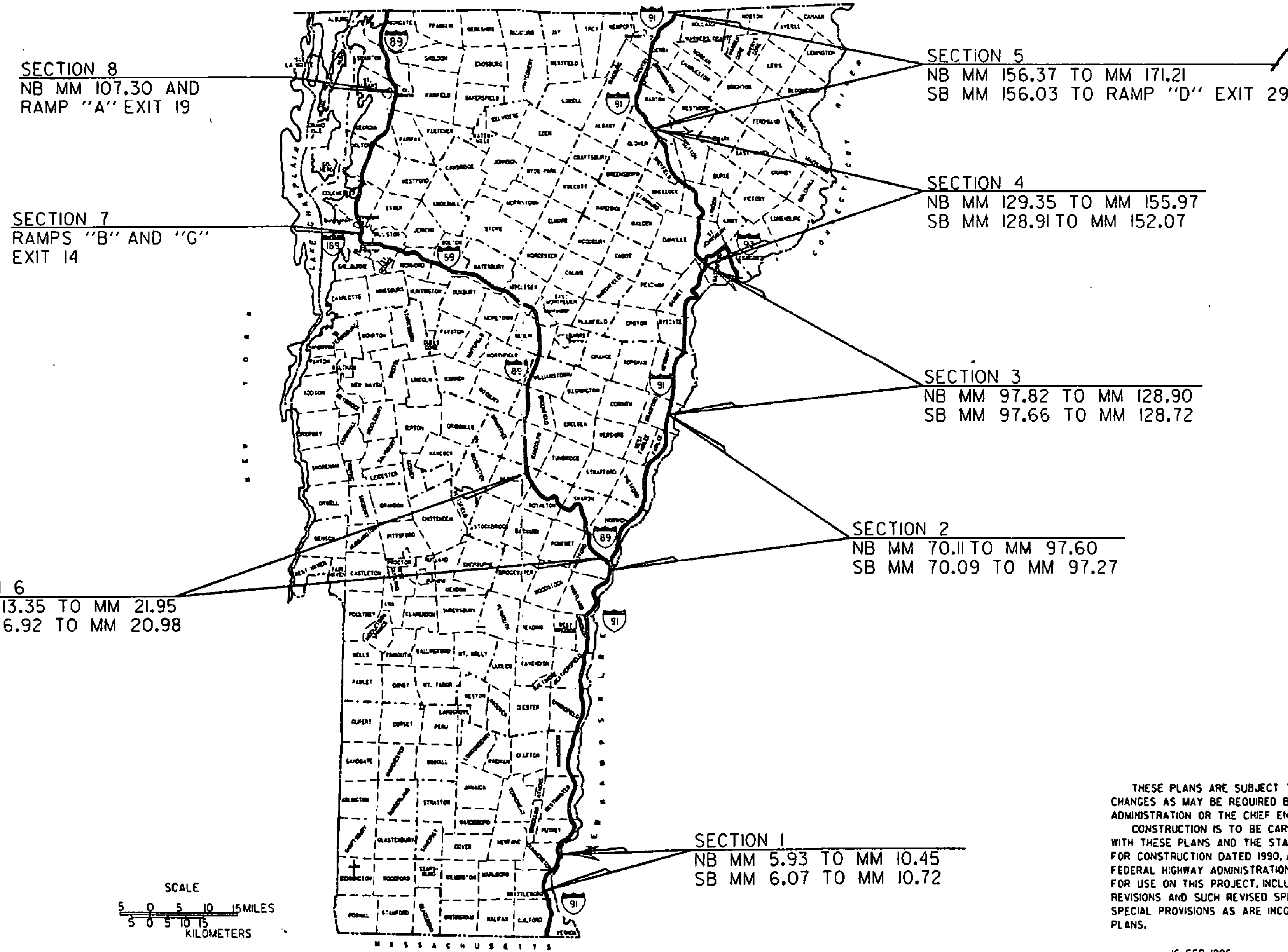
PROPOSED IMPROVEMENT
STATEWIDE GUARDRAIL APPROACH ENDS
INTERSTATE ROUTES 89 AND 91

CONTRACT PLANS
THESE PLANS DO NOT REFLECT
CHANGES MADE ON THE PROJECT.

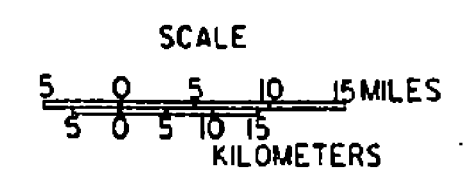
PROJECT DESCRIPTION

WORK TO BE PERFORMED UNDER THIS PROJECT INVOLVES
UPGRADING ALL NON-CONFORMING GUARDRAIL APPROACH
TERMINAL END SECTIONS.

Date DEC 04 1996
MORRILL CONSTRUCTION, INC.
By James W. Morrill
James W. Morrill, President
Glenn Hershbach
Secretary of Transportation Signature



TRAFFIC DATA
DESIGN SPEED 65 MPH



THESE PLANS ARE SUBJECT TO SUCH ENGINEERING
CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY
ADMINISTRATION OR THE CHIEF ENGINEER.
CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE
WITH THESE PLANS AND THE STANDARD SPECIFICATIONS
FOR CONSTRUCTION DATED 1990, AS APPROVED BY THE
FEDERAL HIGHWAY ADMINISTRATION ON MARCH 15, 1990
FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT
REVISIONS AND SUCH REVISED SPECIFICATIONS AND
SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE
PLANS.

APPROVED <u>[Signature]</u> DATE <u>9/16/96</u> DIRECTOR OF ENGINEER
DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
APPROVED <u>[Signature]</u> DATE <u>9/16/96</u> DIVISION ADMINISTRATOR
PROJECT NO. STATEWIDE GUARDRAIL IMG GDR(1)
SHEET 1 OF 28 SHEETS

EARTHWORK AND DRAINAGE SUMMARY SHEET - STATEWIDE GUARD RAIL IMG GDRL(1)

MILE MARKER	MILE MARKER	POSITION	AGGREGATE SHOULDER MATERIAL (TONS) 402.12	REMOVAL & DISPOSAL OF GUARDRAIL 621.80	STEEL BEAM GUARDRAIL W/STL POST 621.20	M.E.L.T. (EACH) 621.52	DELIMITORS (EACH)	UNDER DRAIN	APPROACH SECTION TYPE 1 621.70	ANCHOR 621.60	REMARKS
I-91 NORTHBOUND		SECTION 2									
70.11	70.15	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
70.11	70.15	RT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
70.21	70.33	RT	35	665.5	587.5						EXISTING HEAVY DUTY THREE CABLE WITH BASKETS SEE SHEET 18 FOR CONSTRUCTION TREATMENT
70.75	70.80	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
71.93	71.96	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
72.94	73.00	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
74.65	74.78	RT	35	651.5	575.0	1	1				EXISTING THREE CABLE AND TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
78.78	74.82	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
75.80	75.84	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
75.81	75.85	RT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
79.86		RT	35	37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
80.15	80.18	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
82.66		RT	55	37.5	375.0	1	1				EXISTING TEXAS TWIST EXTEND SOUTH SEE SHEET 19 FOR CONSTRUCTION TREATMENT
84.19		LT	35	37.5	12.5	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
RAMP D EXIT 14		RT	35	37.5	12.5	1	1	40			EXIT 14 EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
85.43		LT	35	37.5	12.5	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
85.43		RT	35	37.5	12.5	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
87.96		RT	35	37.5	12.5	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
88.44		LT	35	37.5	12.5	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
88.44		RT	35	37.5	12.5	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
89.16		RT	35	37.5	12.5	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
89.21	89.26	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
90.60		RT	35	37.5	12.5	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
91.50	91.53	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
91.50	91.54	RT	35	291.5	212.5	1	1				EXISTING THREE CABLE INTO ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
92.37		RT	35	37.5	37.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
93.56		RT	35	37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
93.56		LT	35	37.5	162.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
95.94		RT	35	37.5	12.5	1	1	20			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
97.15		RT	35	37.5	12.5	1	1	20			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
97.58	97.60	LT	35	112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
I-91 SOUTHBOUND		SECTION 2									
97.27		LT	35	37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
96.51		RT	35	37.5	25.0	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
SHEET TOTAL			1175	3633.5	3050.0	32	32	320	0	0	

DRAWN BY SQUAD A/JFC DATE FEB '96
 SQUAD LEADER NYQUIST
 DESIGN FILE NO. 2500A/95A376/D4376.DGN
 PARM FILE D43765021 DATE PLOTTED 16-SEP-1996
 PROJ. NAME STATEWIDE GUARD RAIL
 PROJ. NO. IMG GDRL(1)
 SHEET 4 OF 28 SHEETS

Sheet Number: 4

EARTHWORK AND DRAINAGE SUMMARY SHEET - STATEWIDE GUARD RAIL IMG GDRL(1)

MILE MARKER	MILE MARKER	POSITION	AGGREGATE SHOULDER MATERIAL (TONS) 402.12					REMOVAL & DISPOSAL OF GUARDRAIL 621.80	STEEL BEAM GUARDRAIL W/STL POST 621.20	M.E.L.T. (EACH) 621.52	DELINEATORS (EACH)	UNDER DRAIN	APPROACH SECTION TYPE I 621.70	ANCHOR 621.60	REMARKS
I - 91 SOUTHBOUND SECTION 2 CONTINUED															
96.15		LT	35					37.5	62.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
95.27		LT	35					37.5	62.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
94.81		RT	30					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
94.80		LT	30					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
94.40		LT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
94.03		LT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
94.03		RT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
93.18		LT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
93.13		RT	35					37.5	375.0						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
93.02		LT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
91.60	91.56	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
91.60	91.56	LT	35					270	237.5						EXISTING TWO RAIL ALUMINUM AND THREE CABLE SEE SHEET 18 FOR CONSTRUCTION TREATMENT
90.90		LT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
90.60		LT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
90.23		LT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
89.36	89.32	LT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
89.36	89.32	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
88.47		LT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
88.47		RT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
85.78		LT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
85.78		RT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
85.46		LT	35					37.5	112.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
85.46		RT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
84.27		RT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
80.38		LT	35					37.5	12.5			40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
80.29	80.25	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
78.37		LT	35					75.0	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
78.26	78.20	LT	35					37.5	175.0						TEXAS TWIST MAKE ONE CONTINUOUS RUN OF GUARD RAIL FROM 78.20 THRU 78.37
78.23		RT	35					37.5	12.5						EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
75.91	75.87	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
74.90	74.88	LT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
74.90	74.88	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
73.05	73.03	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
71.93	73.90	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
71.09	71.05	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
70.13	70.09	RT	35					112.5	75.0						EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
SHEET TOTAL			1250					2445.0	2087.5	35	35	360	0	0	

DRAWN BY	SQUAD A/JFC	DATE	FEB '96
SQUAD LEADER	MYQUST		
DESIGN FILE NO.	/500A/25A376/DA376.DGN		
PARM FILE	DA376S03J	DATE PLOTTED	15-SEP-1996
PROJ. NAME	STATEWIDE GUARD RAIL		
PROJ. NO.	IMG GDRL(1)		
SHEET	5	OF	28 SHEETS

Sheet Number: 5

EARTHWORK AND DRAINAGE SUMMARY SHEET - STATEWIDE GUARD RAIL IMG GDRL(1)

MILE MARKER	MILE MARKER	POSITION	AGGREGATE SHOULDER MATERIAL (TONS) 402.12				REMOVAL & DISPOSAL OF GUARDRAIL 621.80	STEEL BEAM GUARDRAIL W/STL POST 621.20	M.E.L.T. (EACH) 621.52	DELINEATORS (EACH)	UNDER DRAIN	APPROACH SECTION TYPE I 621.70	ANCHOR 621.60	REMARKS
I-91 NORTHBOUND		SECTION 3												
97.82	97.86	LT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
97.82	97.86	RT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
98.38	98.40	LT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
98.38	98.40	RT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
99.07		RT	35				37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
101.07		RT	35				37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
103.27		RT	35				37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
103.39		LT	35				37.5	537.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
105.73		RT	35				37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
105.77		LT	35				37.5	12.5	1	1	40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
110.52	110.59	RT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
110.54	110.59	LT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
112.34		RT	35				37.5	75.0	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
112.74		LT	35				37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
112.91		RT	35				37.5	12.5	1	1	20			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
112.92		LT	35				37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
113.05	113.09	LT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
113.05	113.09	RT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
120.41	120.44	RT	35				112.5	75.0	1	1	20			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
120.41	120.44	LT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
120.99	121.04	RT	30											EXISTING TWO RAIL ALUMINUM ADD AGGREGATE SHOULDER (MOD.)
121.00	121.05	LT	35				112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
123.15	123.18	LT	30											EXISTING BOX BEAM GUARDRAIL BURY END BY ADDING MATERIAL
123.15	123.18	RT	30											EXISTING BOX BEAM GUARDRAIL BURY END BY ADDING MATERIAL
126.75		RT	30				75.0		1	1				*EXISTING STEEL BEAM GUARDRAIL W/FLARE-REMOVE, SEE SHEET 17 FOR CONSTRUCTION TREATMENT*
126.75		LT	30				75.0		1	1				*EXISTING STEEL BEAM GUARDRAIL W/FLARE-REMOVE, SEE SHEET 17 FOR CONSTRUCTION TREATMENT*
128.22	128.25	LT	35				275.0	162.5	1	1		1		EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
128.52	128.57	LT	35				275.0	162.5	1	1		1		EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
RAMP C	EXIT 19		30											EXIT 19 EXISTING BURIED BOX BEAM ADD MATERIAL AS NEEDED
RAMP B	EXIT 20		35				155.0	37.5	1	1		1		EXIT 20 EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
128.85	128.90	LT	35				275.0	150.0	1	1		1		EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
I-91 SOUTHBOUND		SECTION 3												
128.72	128.66	RT	35				275.0	187.5	1	1		1		EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
128.70	128.66	LT	35				200.0	125.0	1	1		1		EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
128.37	128.32	RT	35				275.0	187.5	1	1		1		EXISTING BOX BEAM GUARDRAIL SEE SHEET 16 FOR CONSTRUCTION TREATMENT
SHEET TOTAL			1160				3492.5	2550.0	30	30	80	7	0	

DRAWN BY SQUAD A/JFG DATE FEB '96
 SQUAD LEADER NYOUST
 DESIGN FILE NO. 2500A/25A376/D316.DGN
 PARM FILE D316S04J DATE PLOTTED 15-SEP-1996
 PROJ. NAME STATEWIDE GUARD RAIL
 PROJ. NO. IMG GDRL(1)
 SHEET 6 OF 28 SHEETS

Sheet Number: 6

EARTHWORK AND DRAINAGE SUMMARY SHEET - STATEWIDE GUARD RAIL IMG GDRL(1)

MILE MARKER	MILE MARKER	POSITION	AGGREGATE SHOULDER MATERIAL (TONS) 402.2					REMOVAL & DISPOSAL OF GUARDRAIL 621.80	STEEL BEAM GUARDRAIL W/STL POST 621.20	M.E.L.T. (EACH) 621.52	DELINEATORS (EACH)	UNDER DRAIN	APPROACH SECTION TYPE I 621.70	ANCHOR 621.60	REMARKS
		I-91 NORTHBOUND SECTION 4													
129.35		RT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
129.73	129.77	LT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
129.73	129.77	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
129.91		RT	35					37.5	12.5	1	1	40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
RAMP B	EXIT 21	RT	35					37.5	12.5	1	1				SLEEPERS RIVER EXIT, 21 EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
130.62	130.67	LT						243.0	150.0	1	1				REMOVE N.B. RAIL ONLY; INSTALL NEW RAIL ADJACENT TO SHOULDER OF ROAD
133.95	134.00	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
133.95	133.99	LT	35					112.5	75.0	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
136.50	136.55	LT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
136.50	136.54	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
137.08	137.14	LT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
137.10	137.15	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
138.50		RT	35					37.5	50.0	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
138.72	138.76	LT	35					112.5	75.0	1	1	40			EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
139.86	139.90	LT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
141.15		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
141.50	141.54	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
143.70		RT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
143.91		RT	35					37.5	137.5	1	1	40			EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
144.83		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
145.65	145.72	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
145.65	145.71	LT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
146.66		RT	35					37.5	62.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
151.75		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
152.05		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
154.86		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
155.93	155.97	LT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
155.93	155.97	RT	35					112.5	75.0	1	1				EXISTING TWO RAIL ALUMINUM SEE SHEET 18 FOR CONSTRUCTION TREATMENT
		I-91 SOUTHBOUND SECTION 4													
152.07		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
152.06		RT	35					37.5	87.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
151.60		RT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
151.59		LT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
148.59		RT	35					37.5	212.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
145.80		RT	35					37.5	12.5	1	1				EXISTING TEXAS TWIST SEE SHEET 19 FOR CONSTRUCTION TREATMENT
SHEET TOTAL			1155					2605.5	1987.5	34	34	160	0	0	

DRAWN BY SQUAD A/JFC DATE FEB '96
 SQUAD LEADER NYOUST
 DESIGN FILE NO. /S00A/95A376/DA376.DGN
 PARM FILE DA376S06J DATE PLOTTED 16-SEP-1996
 PROJ. NAME STATEWIDE GUARD RAIL
 PROJ. NO. IMG GDRL(1)
 SHEET 8 OF 28 SHEETS

Sheet Number: 8

EARTHWORK AND DRAINAGE SUMMARY SHEET - STATEWIDE GUARD RAIL IMG GDRL(1)

			AGGREGATE SHOULDER MATERIAL (TONS) 402.12				REMOVAL & DISPOSAL OF GUARDRAIL 621.80	STEEL BEAM GUARDRAIL W/STL POST 621.20	M.E.L.T. (EACH) 621.52	DELINEATORS (EACH)	UNDER DRAIN	APPROACH SECTION TYPE 1 621.70	ANCHOR 621.60	
SECTION 1	TOTAL		315				937.5	612.5	9	9	0	0	0	
SECTION 2	TOTAL		2425				6078.5	5137.5	67	67	680	0	0	
SECTION 3	TOTAL		2115				5830.0	4250.0	54	54	140	7	2	
SECTION 4	TOTAL		2030				4785.5	3350.0	59	59	520	2	0	
SECTION 5	TOTAL		1960				3825.0	2437.5	56	56	300	0	0	
SECTION 6	TOTAL		870				1912.5	1125.0	25	25	240	0	0	
SECTION 7	TOTAL		0	0			225.0	112.5	4	4	0	0	0	
PROJECT	TOTAL		9715				23594.0	17025.0	274	274	1880	9	2	

DRAWN BY SQUAD A/JFG DATE FEB '96
 SQUAD LEADER NYOUST
 DESIGN FILE NO. /500A/95A376/DA376.DGN
 PARM FILE DA376SUJ DATE PLOTTED 16-SEP-1996
 PROJ. NAME STATEWIDE GUARD RAIL
 PROJ. NO. IMG GDRL(1)
 SHEET 14 OF 28 SHEETS

: Sheet Number: 14

1. THE MAJORITY OF THE SITES WILL REQUIRE MINIMAL AMOUNT OF MATERIAL FOR CONSTRUCTION OF THE 'MELT' BUBBLE WHEN CONSTRUCTED IN VERY CLOSE PROXIMITY TO EXISTING TERMINAL LOCATION. THIS MINOR AMOUNT OF MATERIAL WILL NOT BE ABLE TO BE "SCABBED" ON TO THE EXISTING FILL(S). THE MATERIAL SHOULD BE BENCHED TO PREVENT EROSION.
2. AREAS TO BE GRADED , SEEDED, AND MULCHED WILL BE DETERMINED BY THE RESIDENT ENGINEER.
3. WHERE STEEL BEAM IS CONNECTED TO THE BOX BEAM GUARD RAIL, THE CONNECTION WILL BE INSTALLED ACCORDING TO THE DESIGN DETAIL ON SHEET 16, AND WILL BE SUBSIDIARY TO GUARD RAIL APPROACH SECTION, TYPE I.
4. THE NEED FOR CURB BOARD WILL BE DETERMINED BY THE ENGINEER. GRANULAR MATERIAL BEHIND CURB BOARD TO BE AGGREGATE SHOULDERS.
5. ALL STEEL BEAM GUARD RAIL WILL HAVE STEEL POSTS, UNLESS OTHERWISE INDICATED ON THE PLANS.
6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND RESET MILEMARKER POSTS AND DELINEATOR POSTS WHEN THE WORK MAY CAUSE DAMAGE TO THEM.
7. THE ITEM OF AGGREGATE SHOULDERS SHALL BE USED IN ALL "MELT" FLARE CONSTRUCTION AREAS.

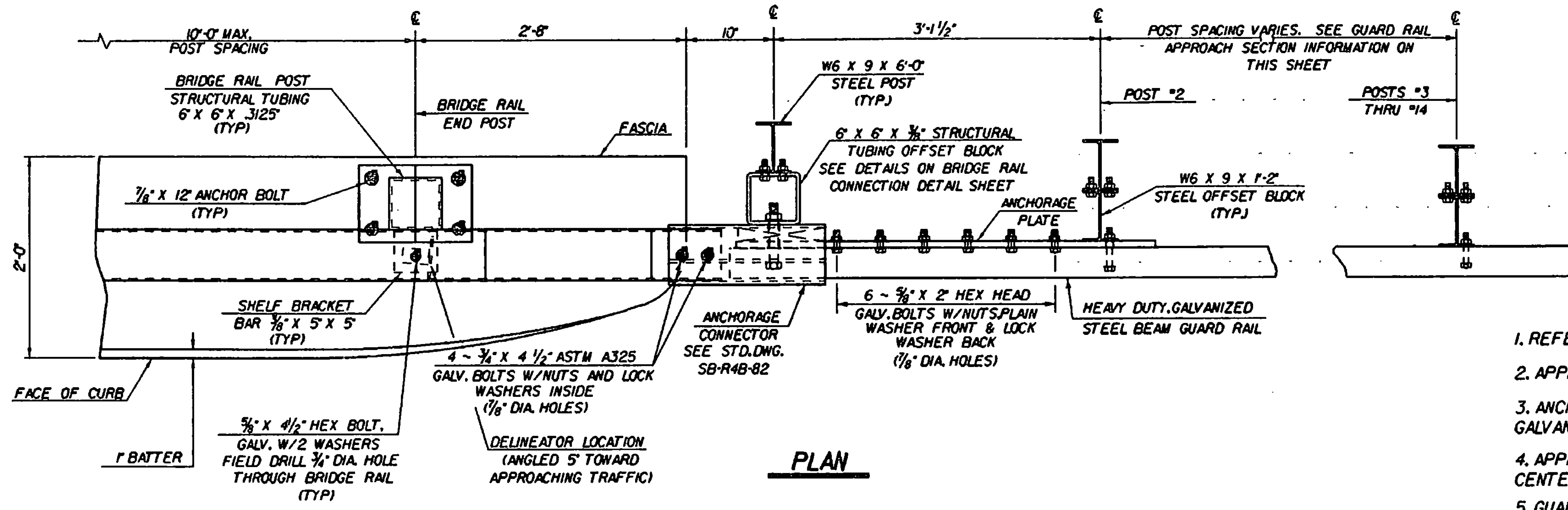
SEEDING FORMULA
RURAL AREAS

<u>% WT.</u>	<u>LBS./A.</u>	<u>NAME</u>	<u>PUR %</u>	<u>GERM %</u>
37.5	22.5	CREeping RED FESCUE	98	85
37.5	22.5	TALL FESCUE	95	90
5.0	3.0	RED TOP	95	90
15.0	9.0	BIRDSFOOT TREFOIL	98	85
5.0	3.0	ANNUAL RYEGRASS	95	85
<u>100.0</u>	<u>60.0</u>			

THE SEED MIXTURE SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS WEED SEED.
 SEED- TO BE APPLIED PER SEEDING FORMULA DIRECTED BY THE ENGINEER.
 FERTILIZER- FORMULA 10-20-10 TO BE USED WITH SEED, APPLIED AT THE RATE OF 500 LBS./ACRE.
 AGRICULTURAL LIMESTONE- TO BE APPLIED AT THE RATE OF 2 TONS/ACRE OR AS DIRECTED BY THE ENGINEER.
 HAY MULCH- TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.
 TOPSOIL- TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

NOTES AND SEEDING FORMULA

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL(1)
DESIGN FILE NAME: sqda/95a376/da376.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376gr5.l	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jf gruchacz
SQUAD LEADER: bt nyquist	SHEET: 15 OF 28



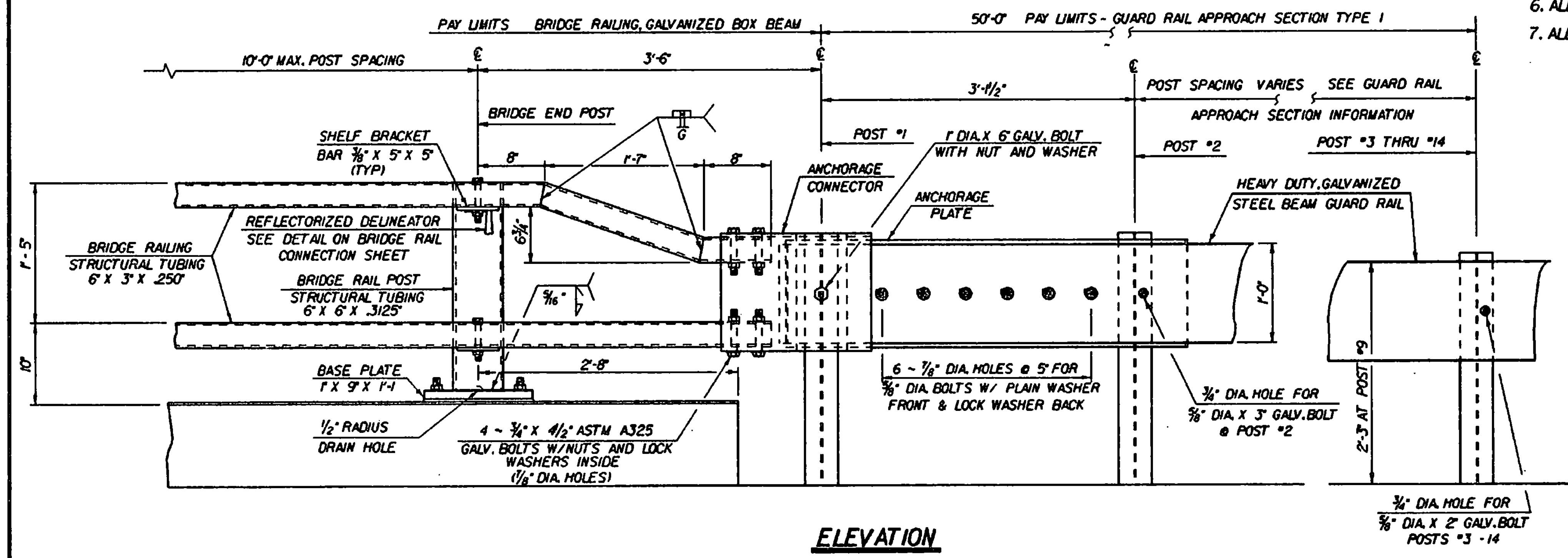
NOTES

1. REFER TO STANDARD G-1 FOR DETAILS OF APPROACH GUARD RAIL.
2. APPROACH RAIL SPLICES SHALL LAP IN DIRECTION OF TRAFFIC FLOW.
3. ANCHORAGE CONNECTOR AND ANCHORAGE PLATE SHALL BE ASTM A 36 STEEL GALVANIZED TO ASTM A 123 AFTER FABRICATION.
4. APPROACH RAILING SHALL BE HEAVY DUTY STEEL BEAM FOR 50'-0" FROM CENTER-LINE OF POST 1.
5. GUARD RAIL APPROACH SECTION TYPE-1 SHALL INCLUDE STEEL TUBE POST, W6X9 STEEL ANCHORAGE PLATE, ANCHORAGE CONNECTOR, RAIL, POSTS, BLOCKS AND ATTACHMENT HARDWARE.
6. ALLOWABLE DIMENSIONABLE TOLERANCE FOR BENT SECTIONS IS +/- 1/16 OF AN INCH.
7. ALL BRIDGE RAILING REFERENCED IS EXISTING IN PLACE.

GUARD RAIL APPROACH SECTION TYPE 1

POST NO.	SPACING
1	3'-4 1/2"
2	3'-1 1/2"
3	3'-4 1/2"
4	3'-4 1/2"
5	3'-4 1/2"
6	3'-4 1/2"
7	3'-4 1/2"
8	3'-4 1/2"
9	4'-2"
10	4'-2"
11	4'-2"
12	4'-2"
13	6'-3"
14	6'-3"

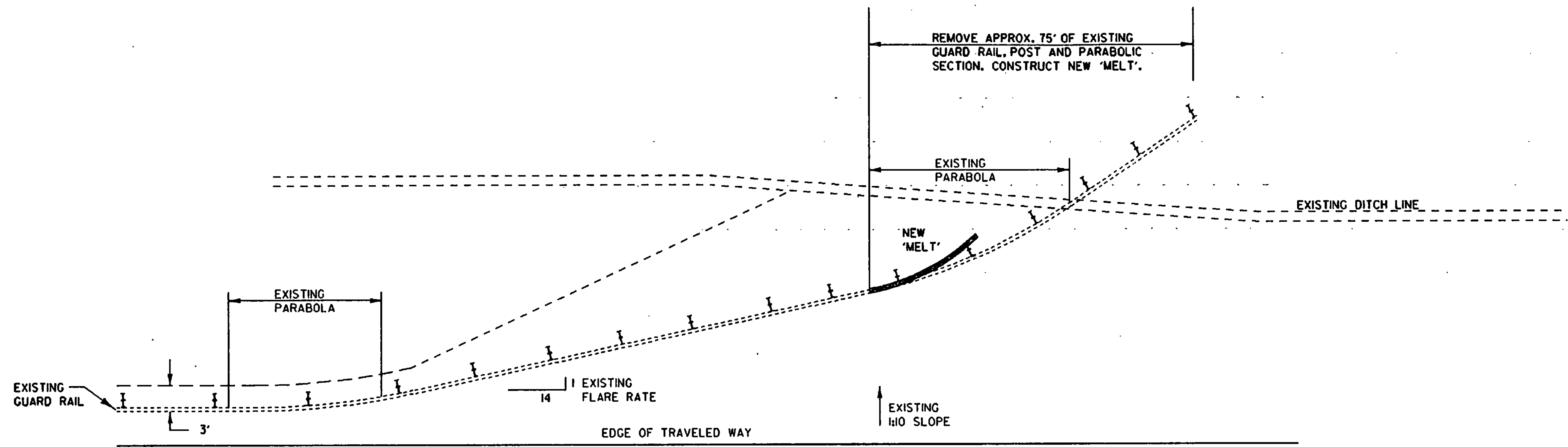
50'-0" PAY LENGTH GUARD RAIL APPROACH SECTION TYPE 1



DETAILS—BRIDGE RAILING, GALVANIZED BOX BEAM (PEDESTAL MOUNTED), WITH APPROACH RAIL UTILIZING STEEL POSTS.

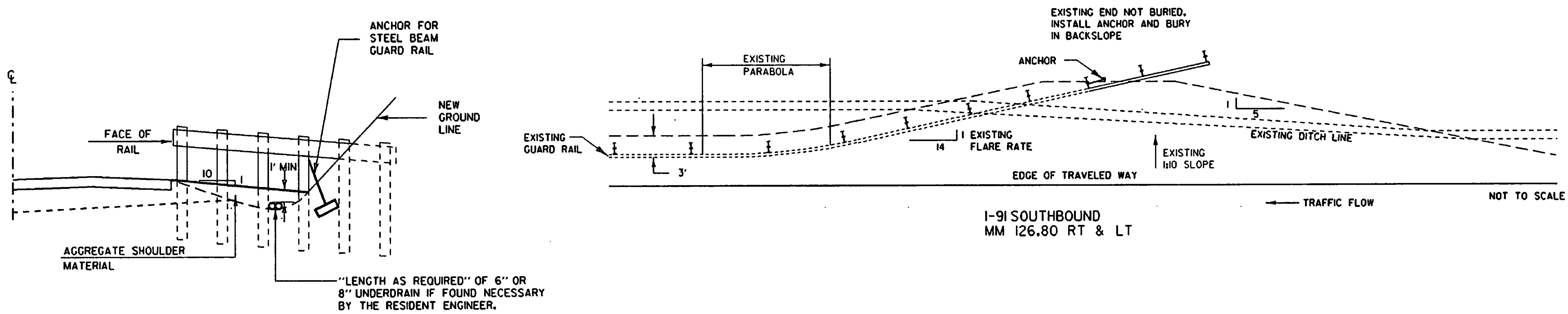
NOT TO SCALE

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL(I)
DESIGN FILE NAME: sqda/95a376/da376.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376gr4.l	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: struct/rev. jfg
SQUAD LEADER: bt nyquist	SHEET: 16 OF 28



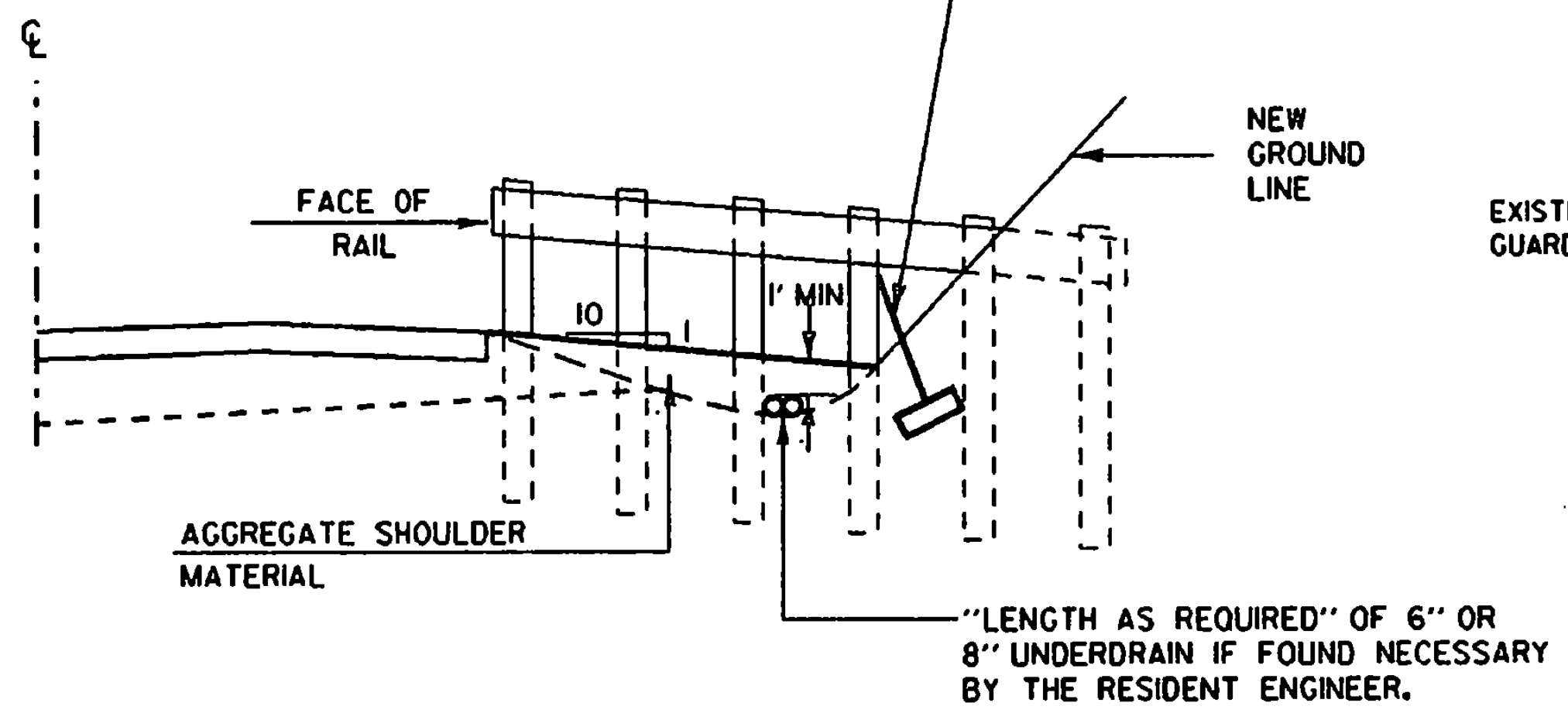
I-91 NORTHBOUND
MM 126.75 RT & LT

NOT TO SCALE



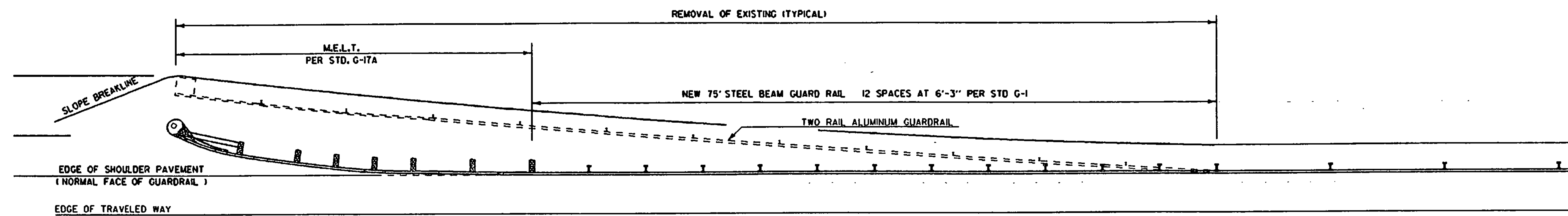
I-91 SOUTHBOUND
MM 126.80 RT & LT

NOT TO SCALE

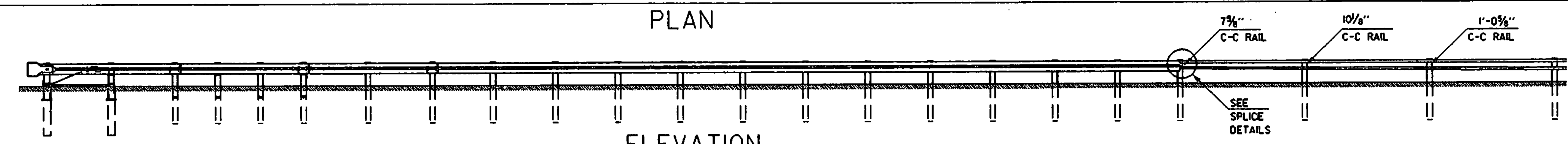


**BURIED GUARD RAIL
END DETAIL**
NOT TO SCALE

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL(1)
DESIGN FILE NAME: sqdb/95a376/d0376.dgn	PLOT DATE: 17-SEP-1996
IPARM FILE NAME: da376gr3.l	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: sqdb/rev. jfg
SQUAD LEADER: bt nyqulet	SHEET: 17 OF 28

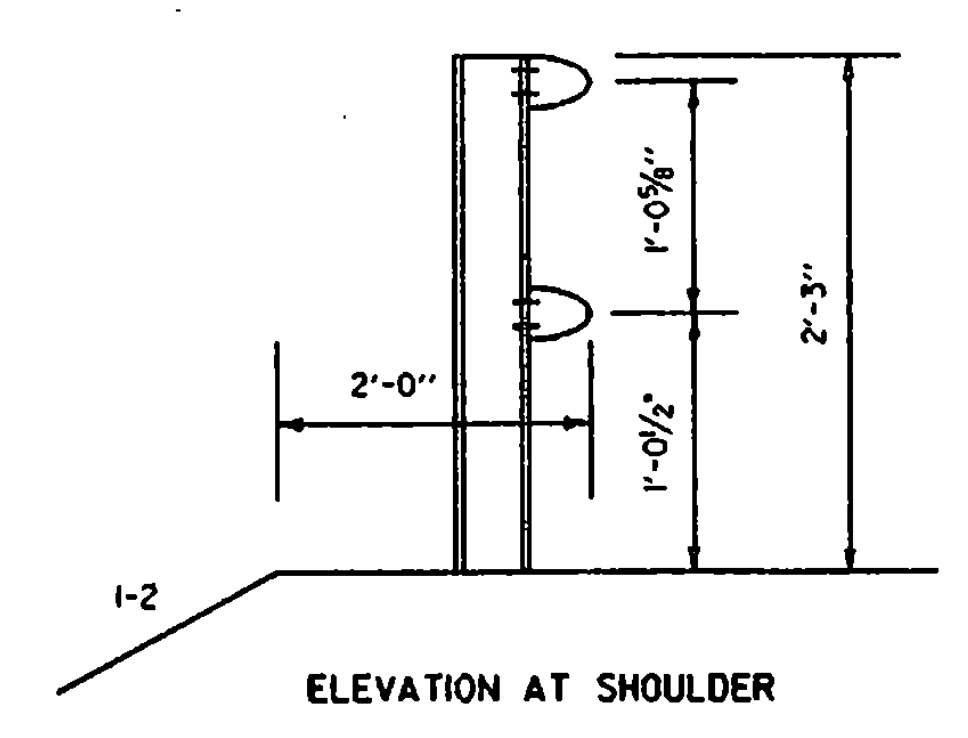
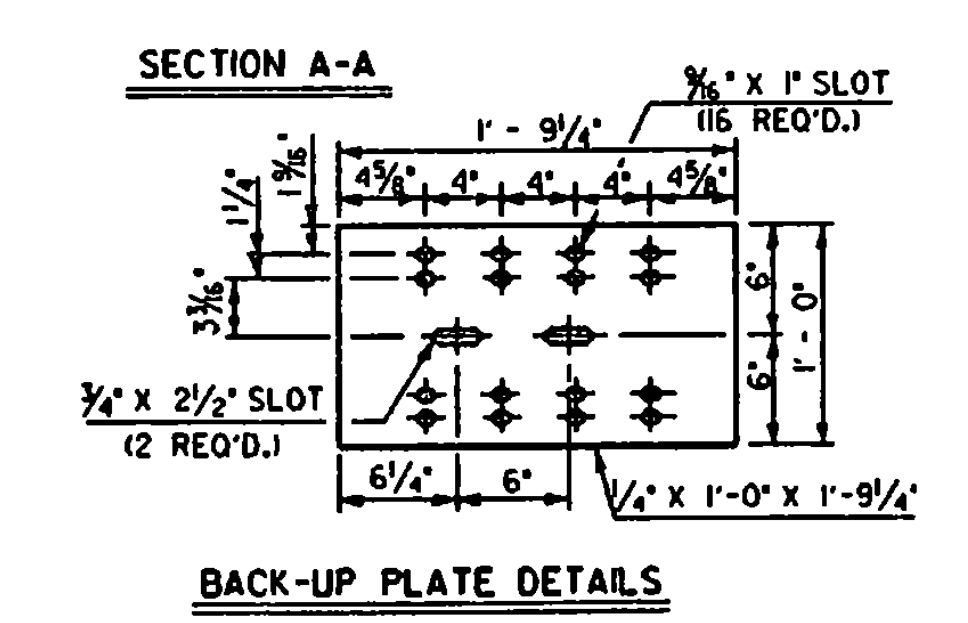
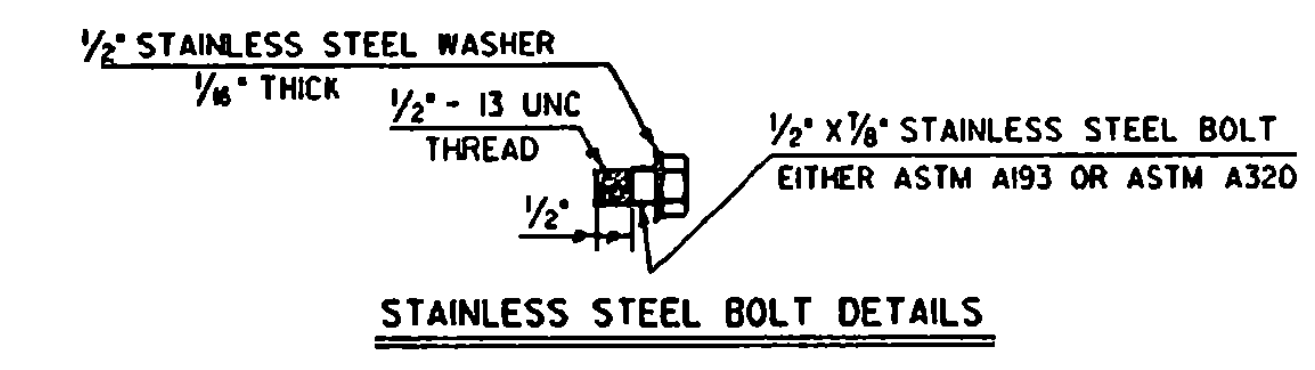
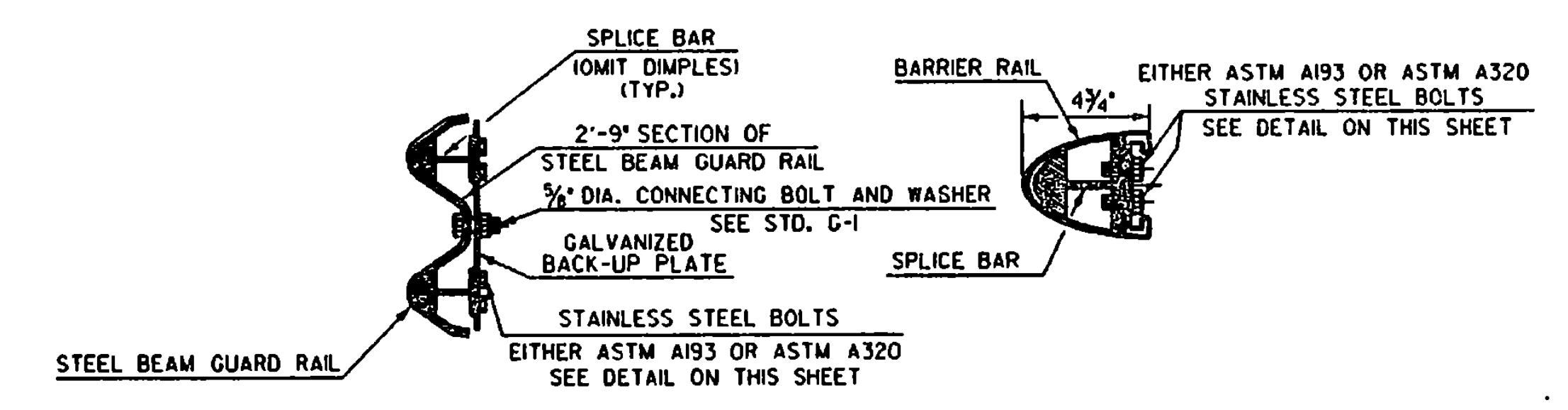
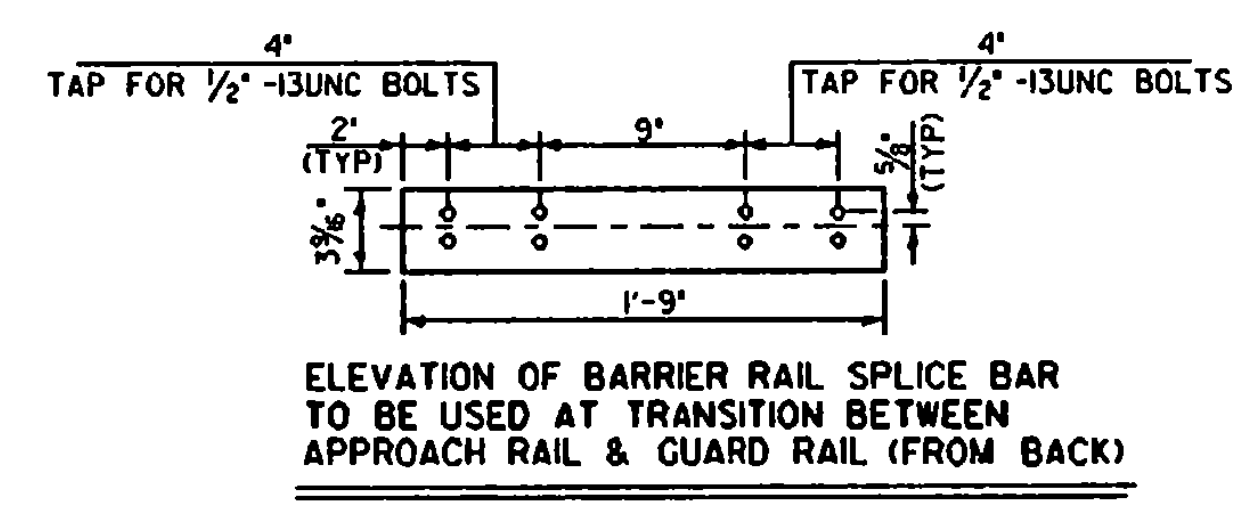


PLAN



ELEVATION

SPLICE DETAILS



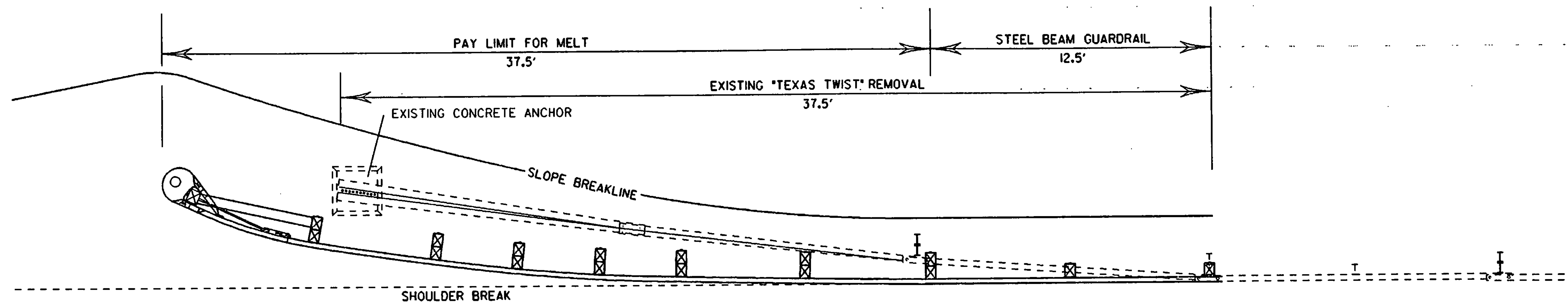
NOTES

1. THE EXACT LENGTH OF REMOVAL WILL BE DETERMINED BY THE ENGINEER. THE INTENT OF THE REMOVAL IS TO BE AT A POINT WHERE NEW STEEL BEAM INSTALLED WILL BE PARALLEL TO THE EXISTING EDGE OF SHOULDER. FOR MOST CASES IT WILL BE 12.5 FEET.
2. THE NEED FOR CURB BOARD WILL BE DETERMINED BY THE ENGINEER.
3. THE COST OF ALL MATERIALS AND LABOR FOR THE SPLICE BETWEEN THE ALUMINUM AND STEEL BEAM GUARD RAIL SHALL BE SUBSIDIARY TO ITEM 621.20, STEEL BEAM GUARDRAIL.
4. CENTER-TO-CENTER ADJUSTMENT OF THE ALUMINUM BOTTOM RAIL FOR SPLICING PURPOSES WILL ALSO BE SUBSIDIARY TO ITEM 621.20 STEEL BEAM GUARDRAIL.
5. THE ITEM OF AGGREGATE SHOULDERS SHALL BE USED IN ALL "MELT" FLARE CONSTRUCTION AREAS.

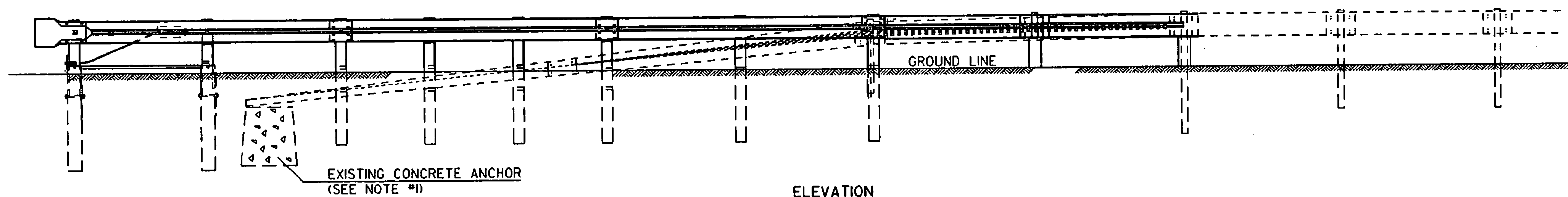
TWO RAIL ALUMINUM TO STEEL BEAM GUARD RAIL DETAILS

NOT TO SCALE

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: <i>design/sqda/95a376/da376.dgn</i>	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: <i>da376gr1.f</i>	SURVEY DATE: <i>n/a</i>
SURVEYED BY: <i>n/a</i>	DRAWN BY: <i>jt gruchacz</i>
SQUAD LEADER: <i>bt nyquist</i>	SHEET: 18 OF 28



PLAN



ELEVATION

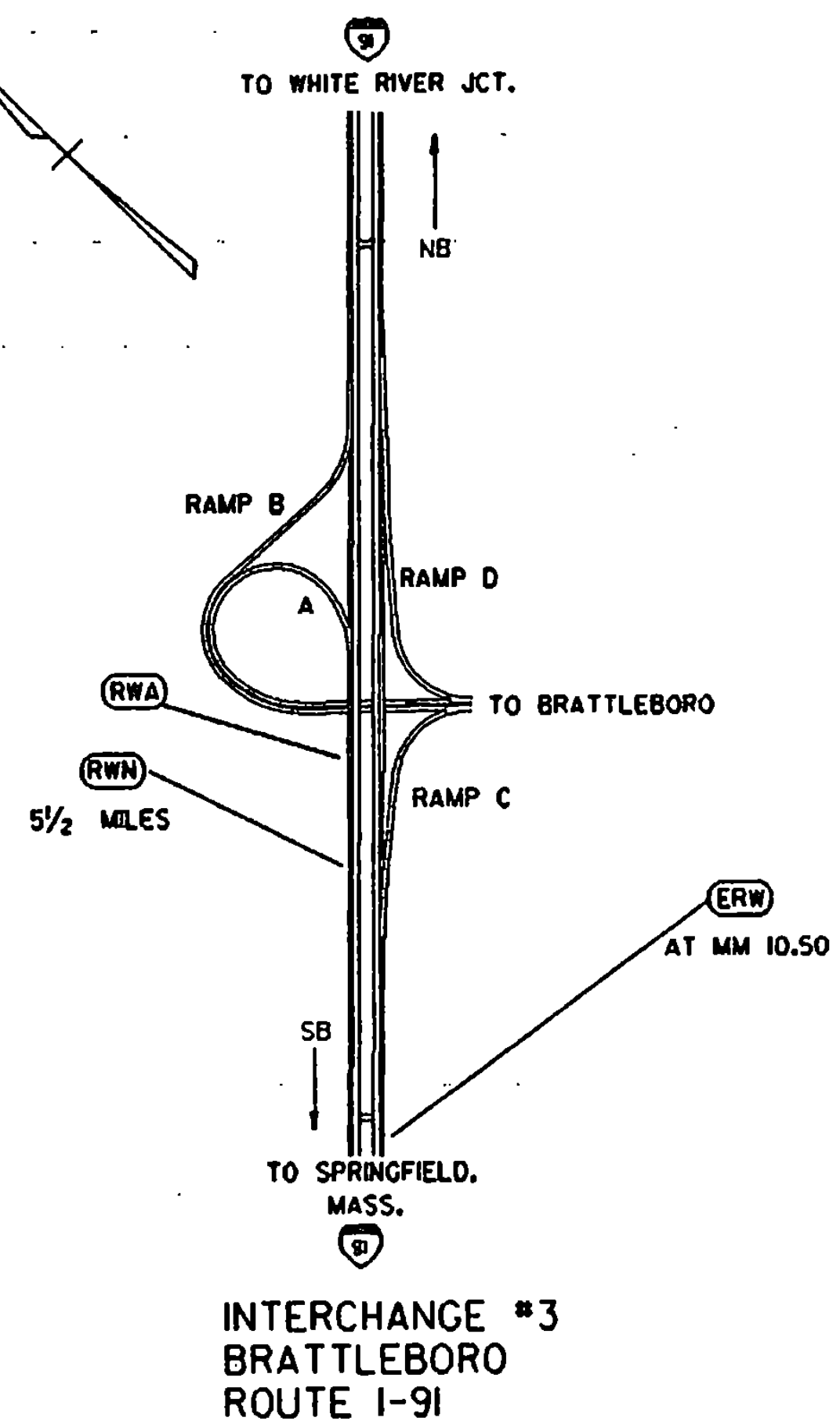
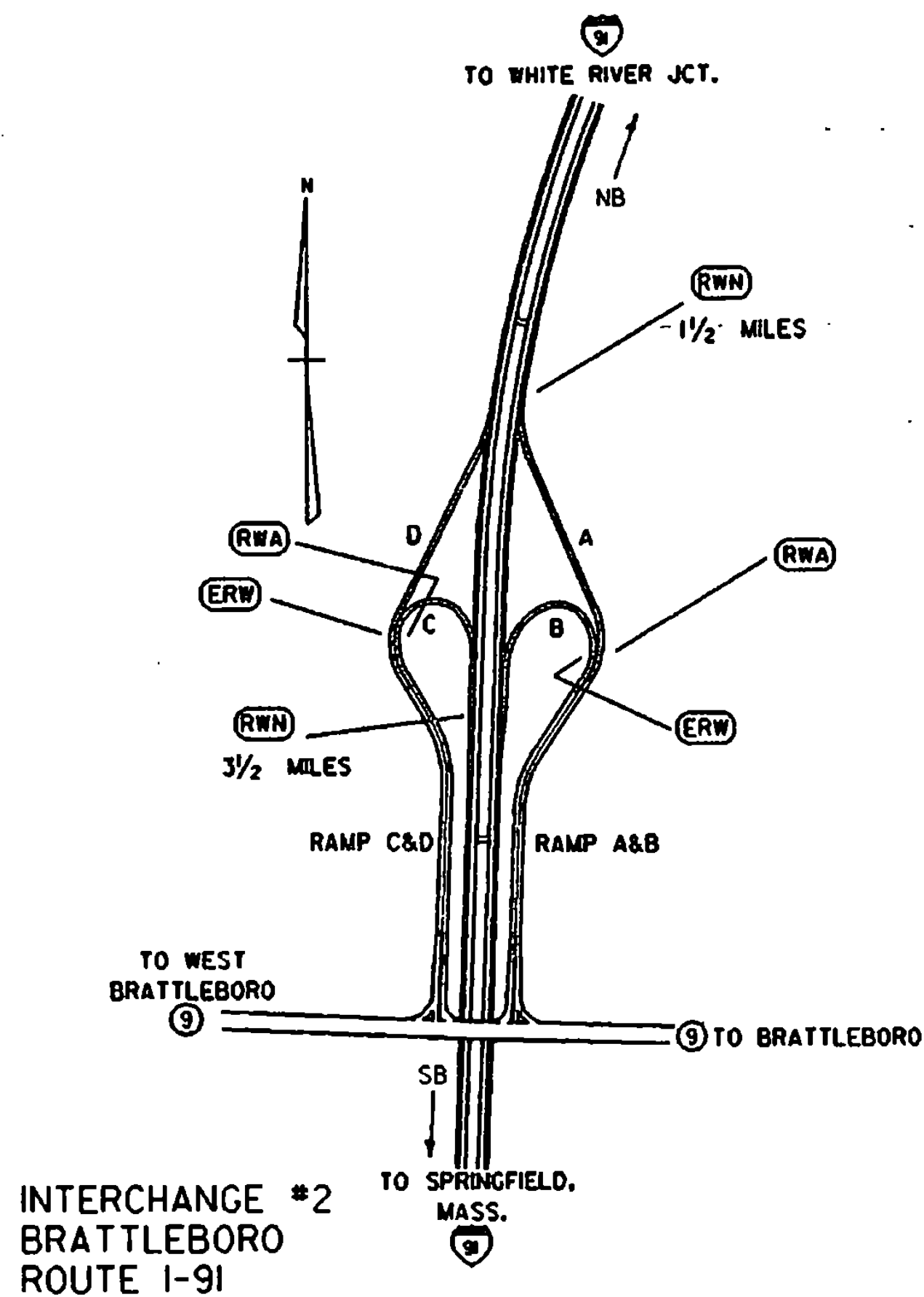
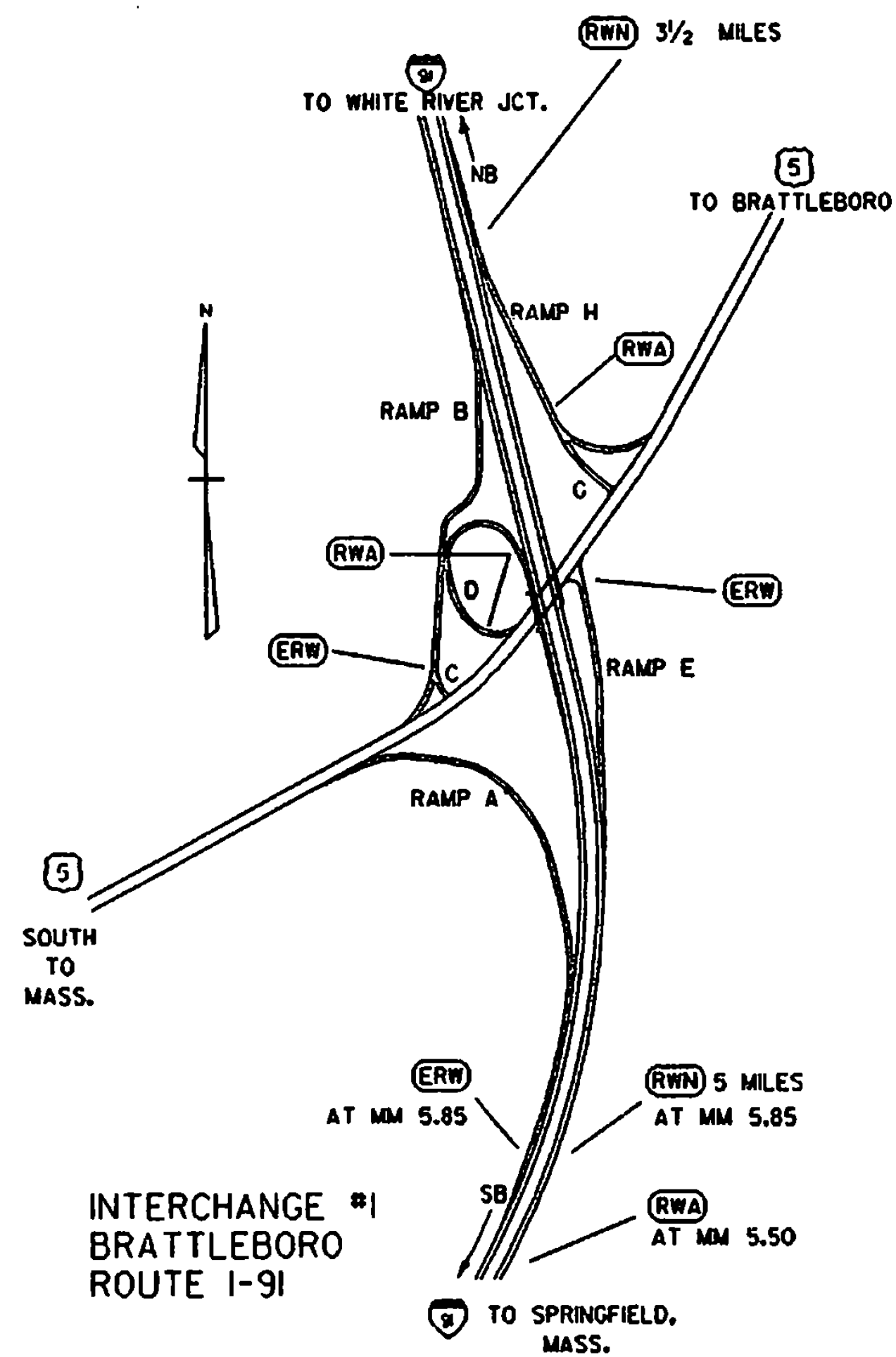
NOTES

1. EXISTING ANCHOR TO REMAIN IN PLACE. THE ANCHOR MAY BE REMOVED WHEN THE RESIDENT ENGINEER DEEMS IT NECESSARY. REMOVAL TO BE PAID UNDER THE ITEM OF TRENCH EXCAVATION OF ROCK.
2. 12.5' OF GUARDRAIL IS ADDED TO THE RUN TO AVOID CONFLICT WITH THE EXISTING ANCHOR.
3. THE RESIDENT ENGINEER MAY CALL FOR EXTENDING THE GUARDRAIL RUN FARTHER THAN 12.5' TO FIND A FEASIBLE SITE TO CONSTRUCT THE 'MELT' BUBBLE.
4. THE ITEM OF AGGREGATE SHOULDERS SHALL BE USED IN ALL "MELT" FLARE CONSTRUCTION AREAS.

NEW 'MELT' REPLACING 'TEXAS TWIST' DETAIL

NOT TO SCALE

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL(I)
DESIGN FILE NAME: sqda/95a376/da376.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376gr2.1	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jf gruchacz
SQUAD LEADER: bt nyquist	SHEET: 19 OF 28



GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

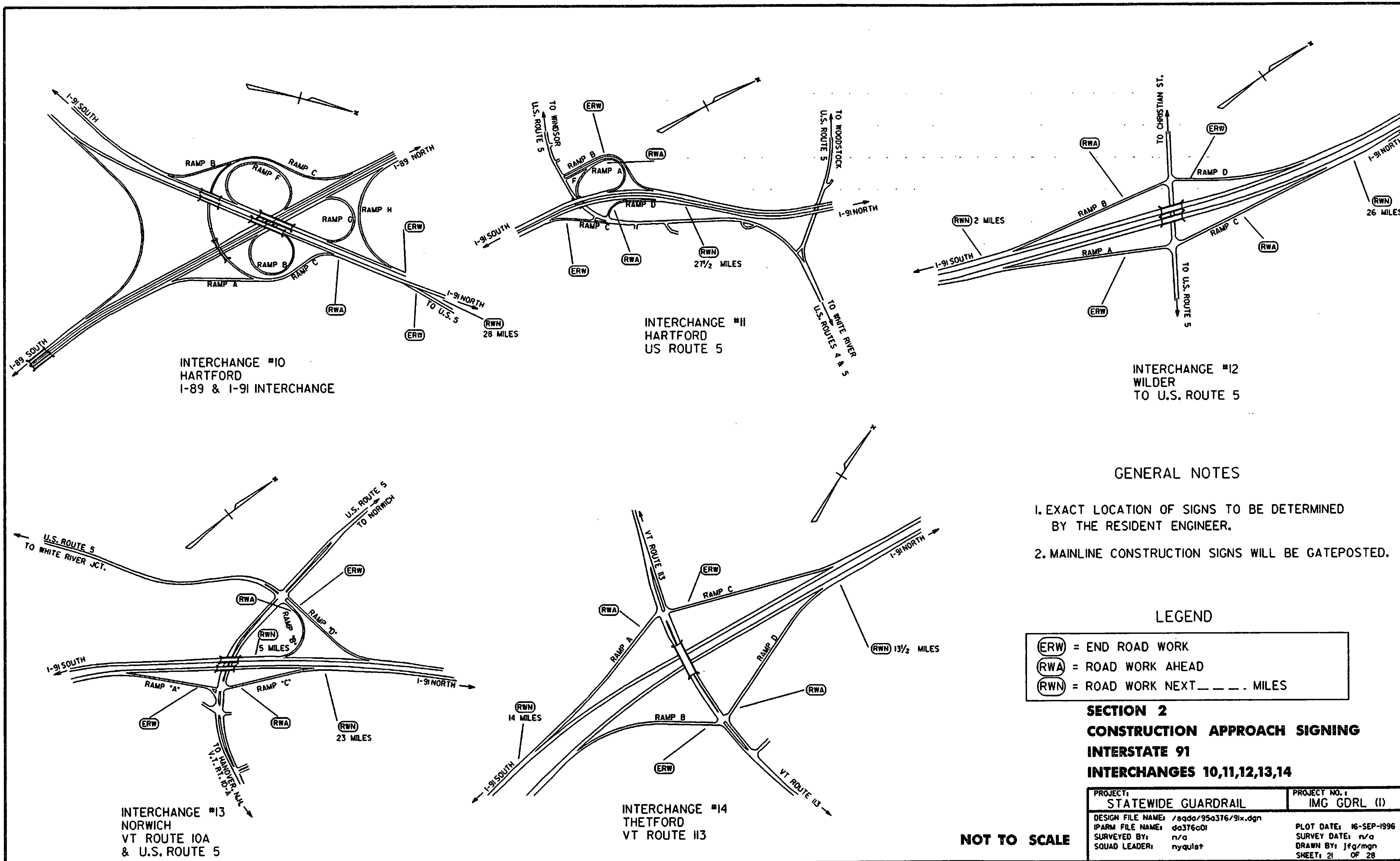
SECTION 1
 CONSTRUCTION APPROACH SIGNING
 INTERSTATE 91
 INTERCHANGES 1, 2, 3

NOT TO SCALE

LEGEND

(ERW)	= END ROAD WORK
(RWA)	= ROAD WORK AHEAD
(RWN)	= ROAD WORK NEXT _____ MILES

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO. 1 IMG GDRL (I)
DESIGN FILE NAME: /bqda/95a376/91x.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376c08	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 20 OF 28



GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

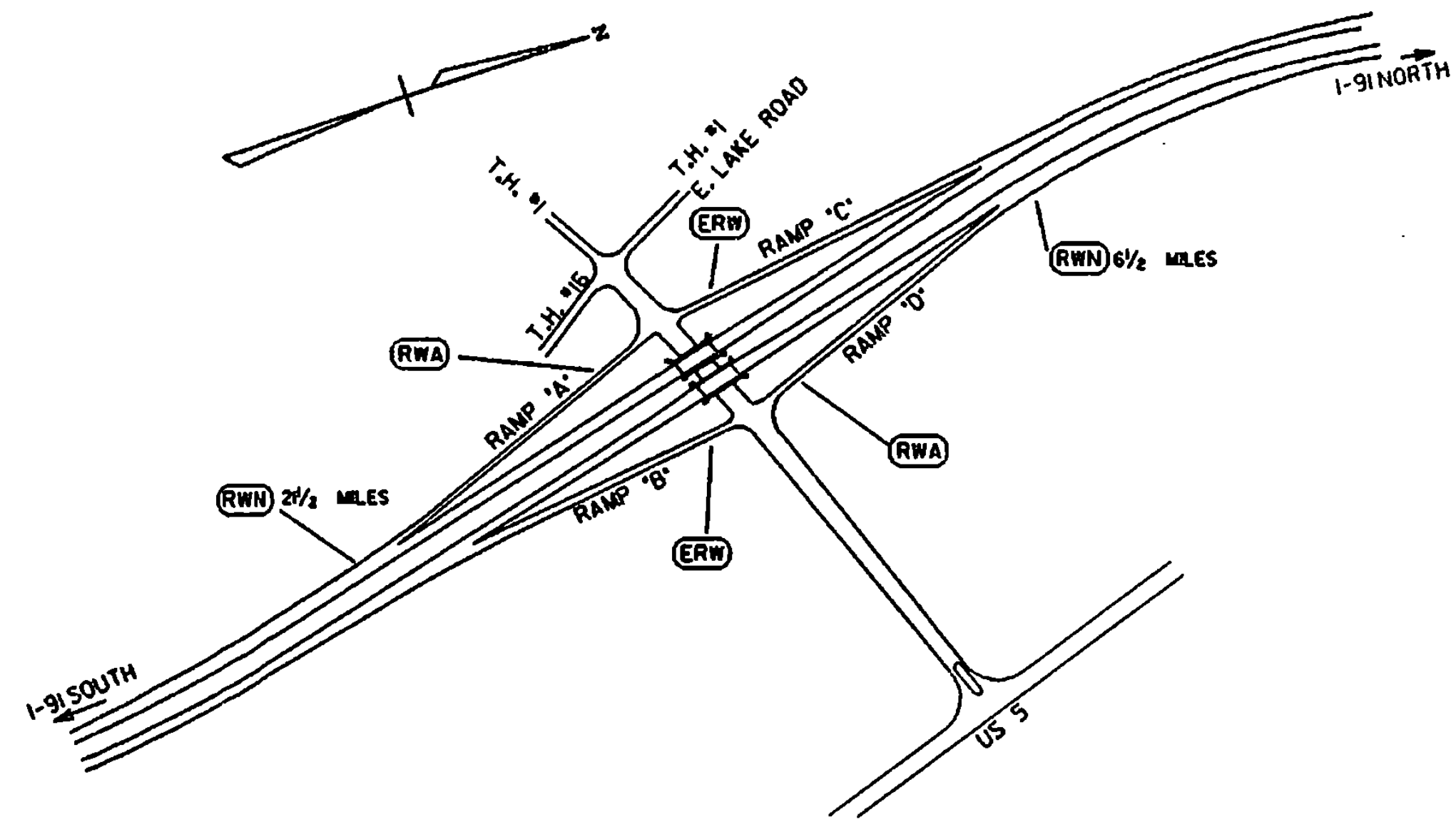
LEGEND

(ERW) = END ROAD WORK
 (RWA) = ROAD WORK AHEAD
 (RWN) = ROAD WORK NEXT _____ MILES

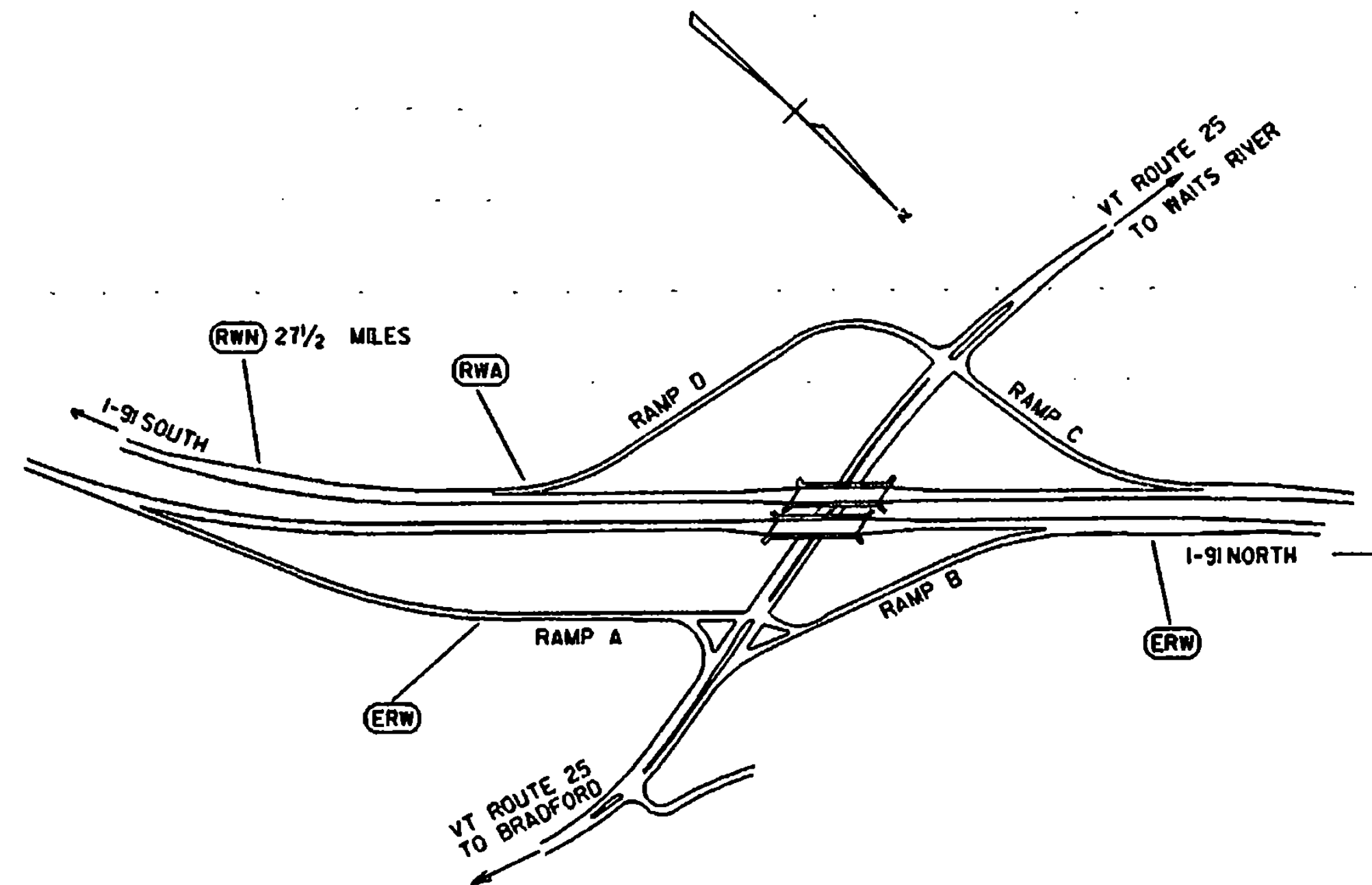
**SECTION 2
 CONSTRUCTION APPROACH SIGNING
 INTERSTATE 91
 INTERCHANGES 10,11,12,13,14**

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/95a376/91x.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376c01	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 21 OF 28

NOT TO SCALE



INTERCHANGE #15
FAIRLEE



INTERCHANGE #16
BRADFORD
VT ROUTE 25

GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

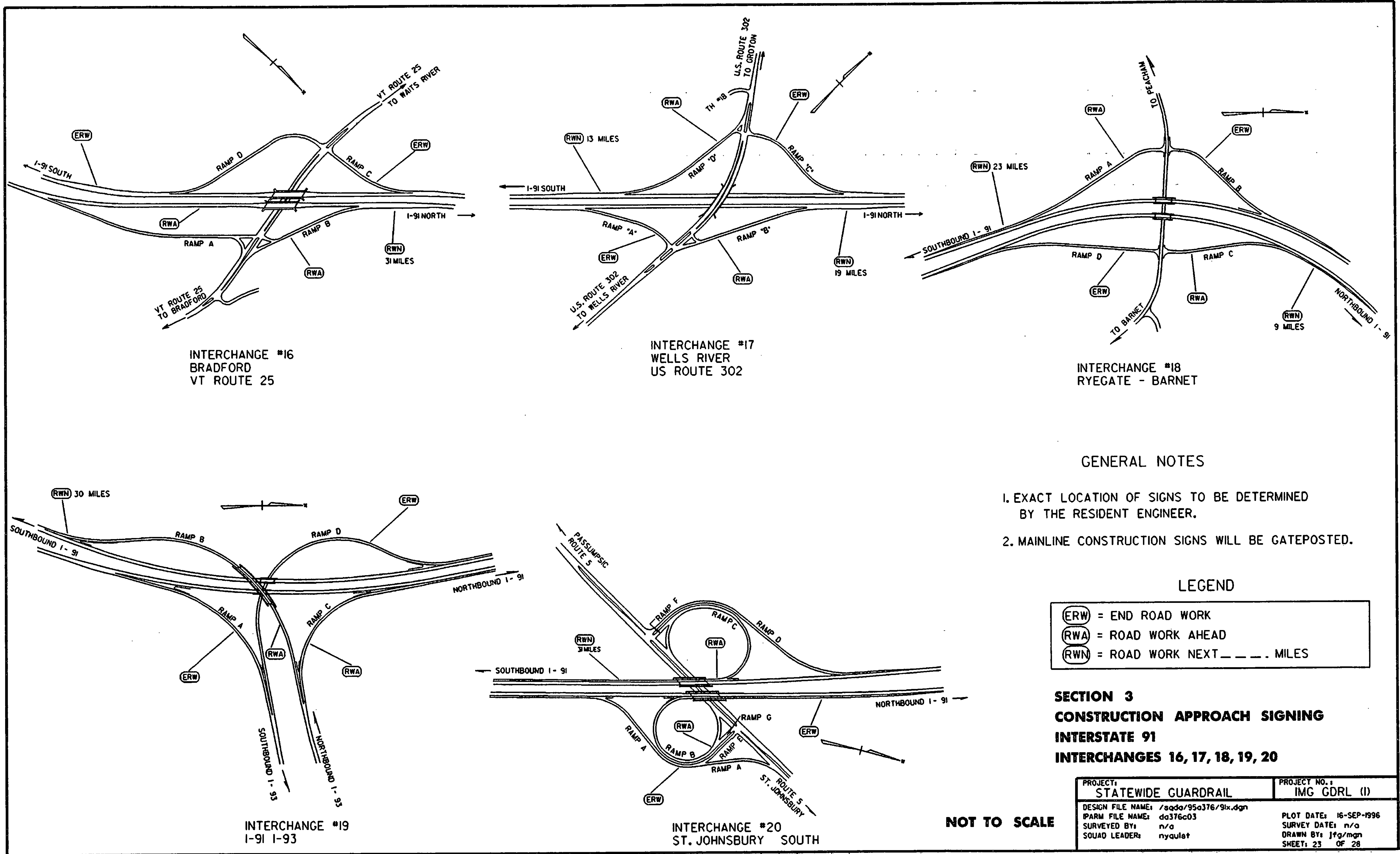
LEGEND

(ERW)	= END ROAD WORK
(RWA)	= ROAD WORK AHEAD
(RWN)	= ROAD WORK NEXT _____ MILES

SECTION 2
CONSTRUCTION APPROACH SIGNING
INTERSTATE 91
INTERCHANGES 15, 16

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/95a376/91x.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: do376c02	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 22 OF 28

NOT TO SCALE



INTERCHANGE #16
BRADFORD
VT ROUTE 25

INTERCHANGE #17
WELLS RIVER
US ROUTE 302

INTERCHANGE #18
RYEGATE - BARNET

INTERCHANGE #19
I-91 I-93

INTERCHANGE #20
ST. JOHNSBURY SOUTH

GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

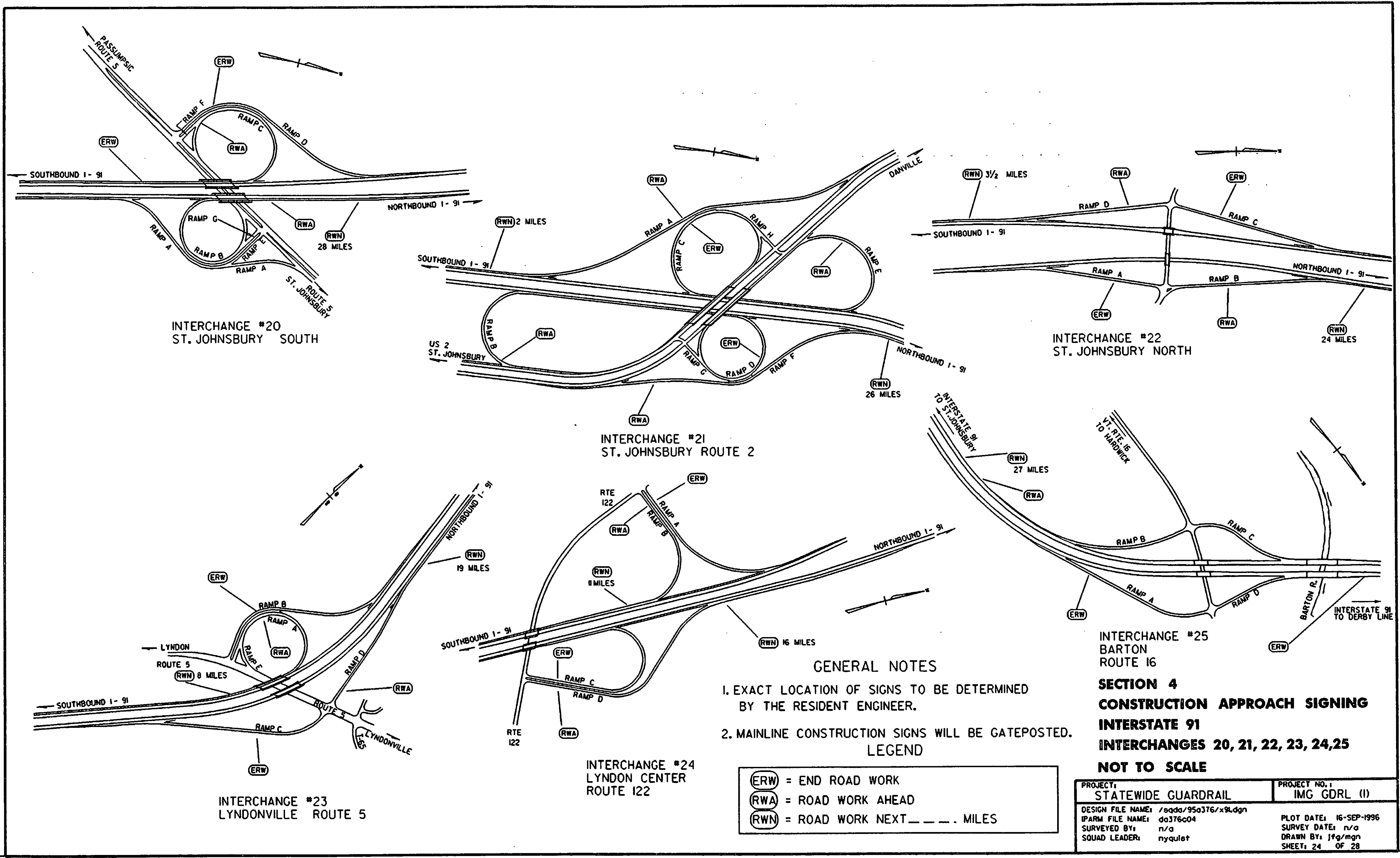
LEGEND

(ERW)	= END ROAD WORK
(RWA)	= ROAD WORK AHEAD
(RWN)	= ROAD WORK NEXT _____ MILES

SECTION 3
CONSTRUCTION APPROACH SIGNING
INTERSTATE 91
INTERCHANGES 16, 17, 18, 19, 20

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/95a376/9ix.dgn	PLOT DATE: 16-SEP-1996
PARM FILE NAME: da376c03	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 23 OF 28

NOT TO SCALE



GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

LEGEND

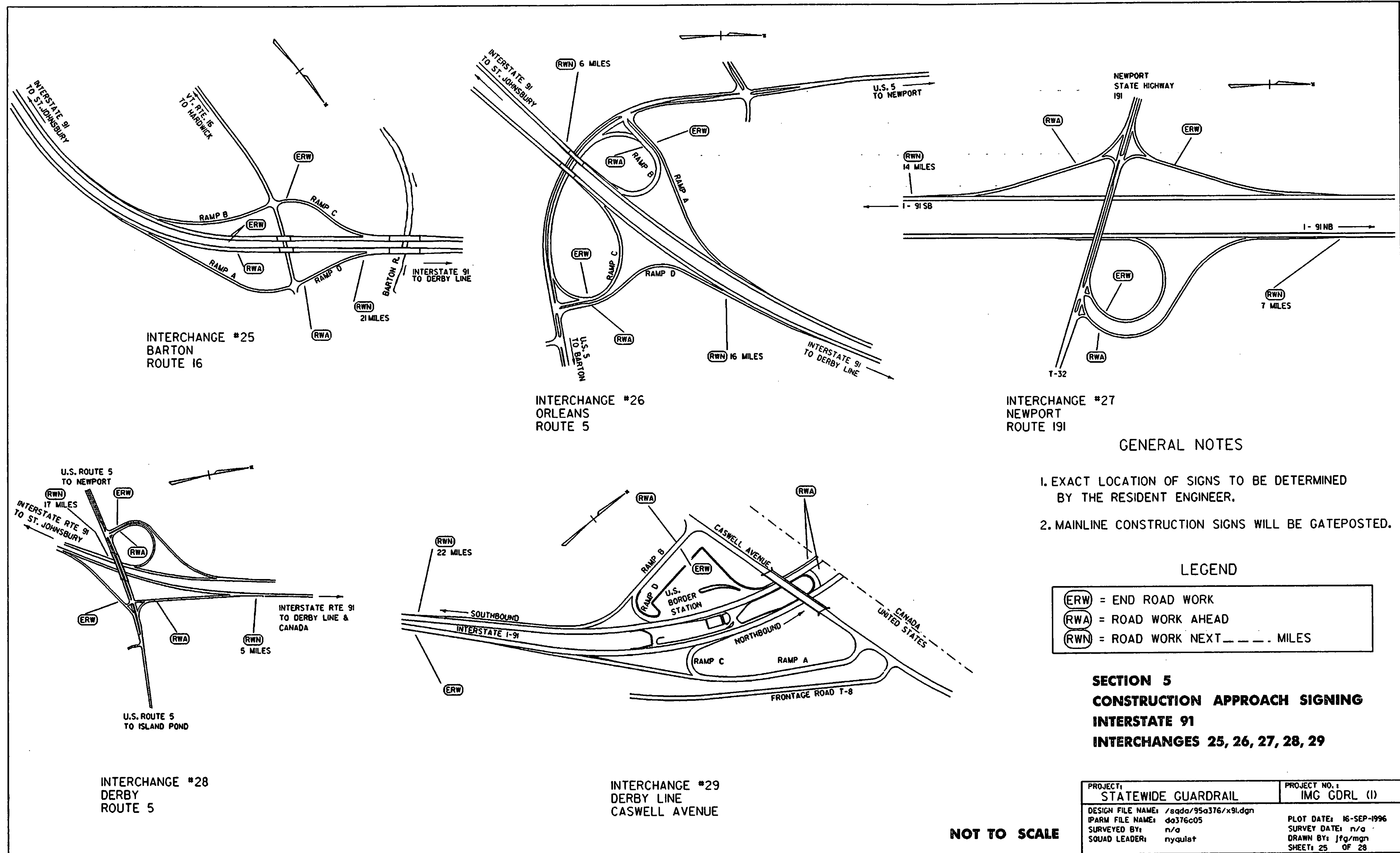
(ERW)	= END ROAD WORK
(RWA)	= ROAD WORK AHEAD
(RWN)	= ROAD WORK NEXT _____ MILES

INTERCHANGE #25
BARTON
ROUTE 16

SECTION 4
CONSTRUCTION APPROACH SIGNING
INTERSTATE 91
INTERCHANGES 20, 21, 22, 23, 24, 25
NOT TO SCALE

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/950376/x9L.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376c04	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 24 OF 28

: Sheet Number: 24



INTERCHANGE #25
BARTON
ROUTE 16

INTERCHANGE #26
ORLEANS
ROUTE 5

INTERCHANGE #27
NEWPORT
ROUTE 191

INTERCHANGE #28
DERBY
ROUTE 5

INTERCHANGE #29
DERBY LINE
CASWELL AVENUE

GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

LEGEND

(ERW)	= END ROAD WORK
(RWA)	= ROAD WORK AHEAD
(RWN)	= ROAD WORK NEXT _____ MILES

**SECTION 5
CONSTRUCTION APPROACH SIGNING
INTERSTATE 91
INTERCHANGES 25, 26, 27, 28, 29**

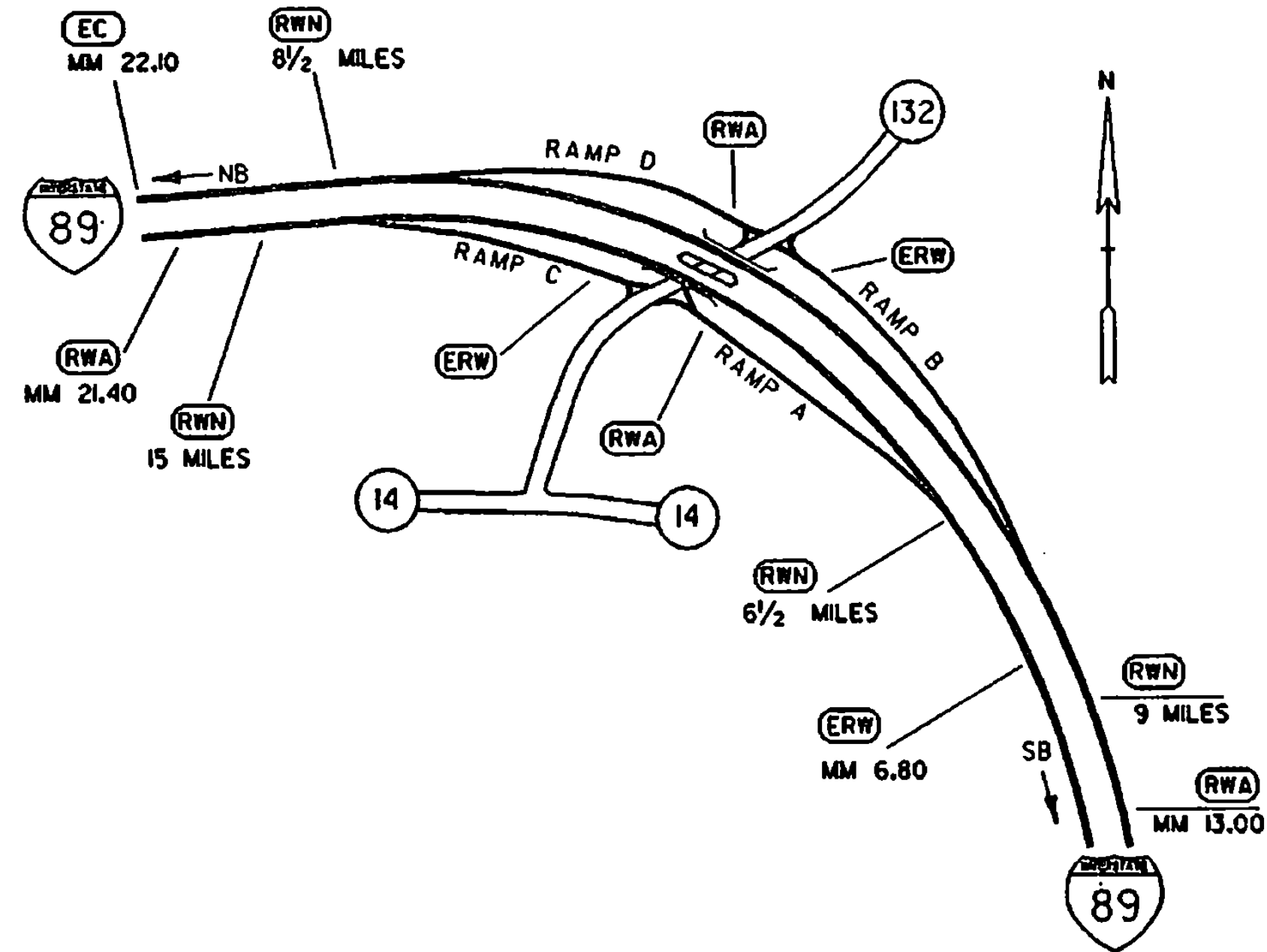
NOT TO SCALE

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/95a376/x91.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: dq376c05	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 25 OF 28

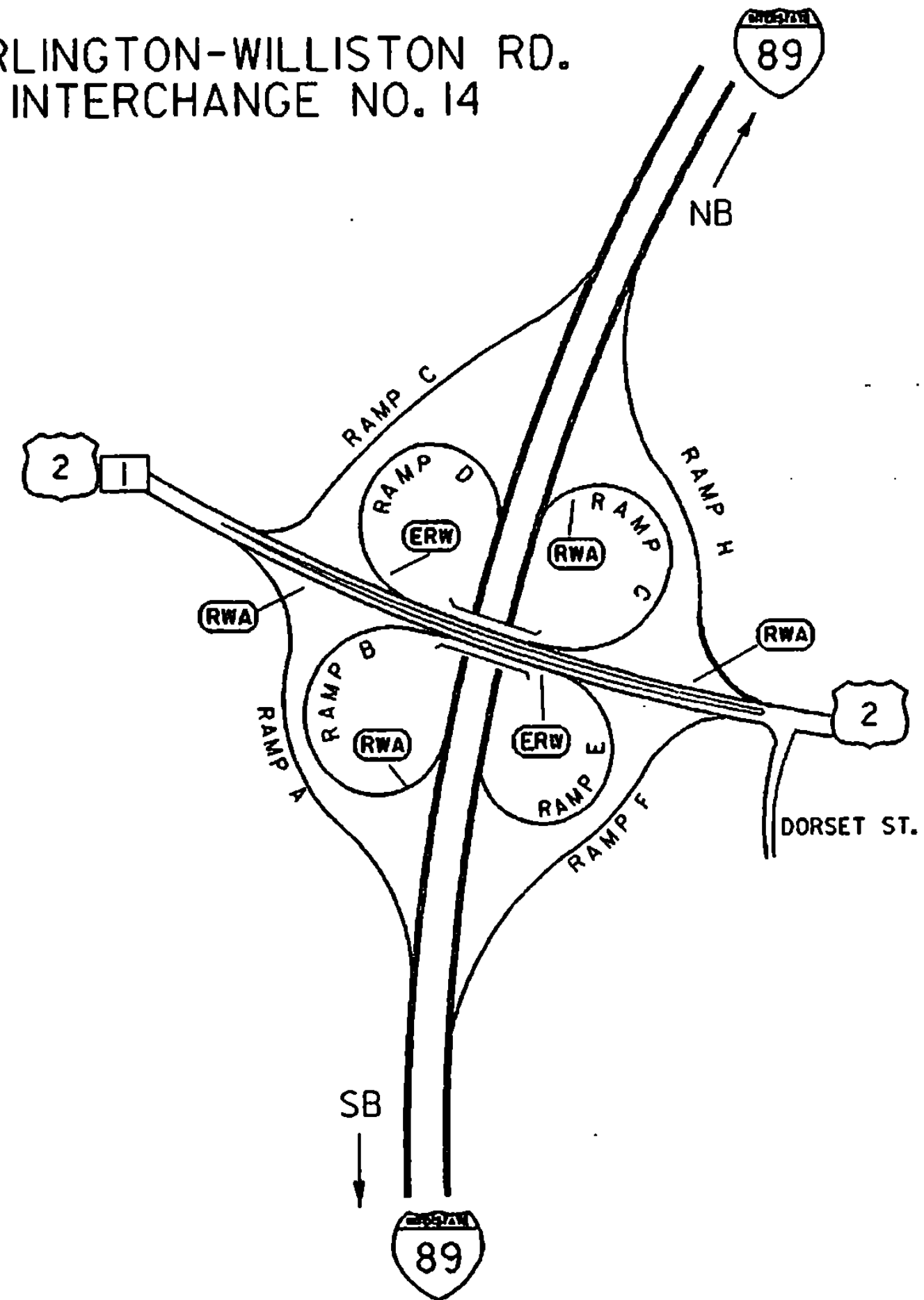
Sheet Number: 25

SHARON INTERCHANGE

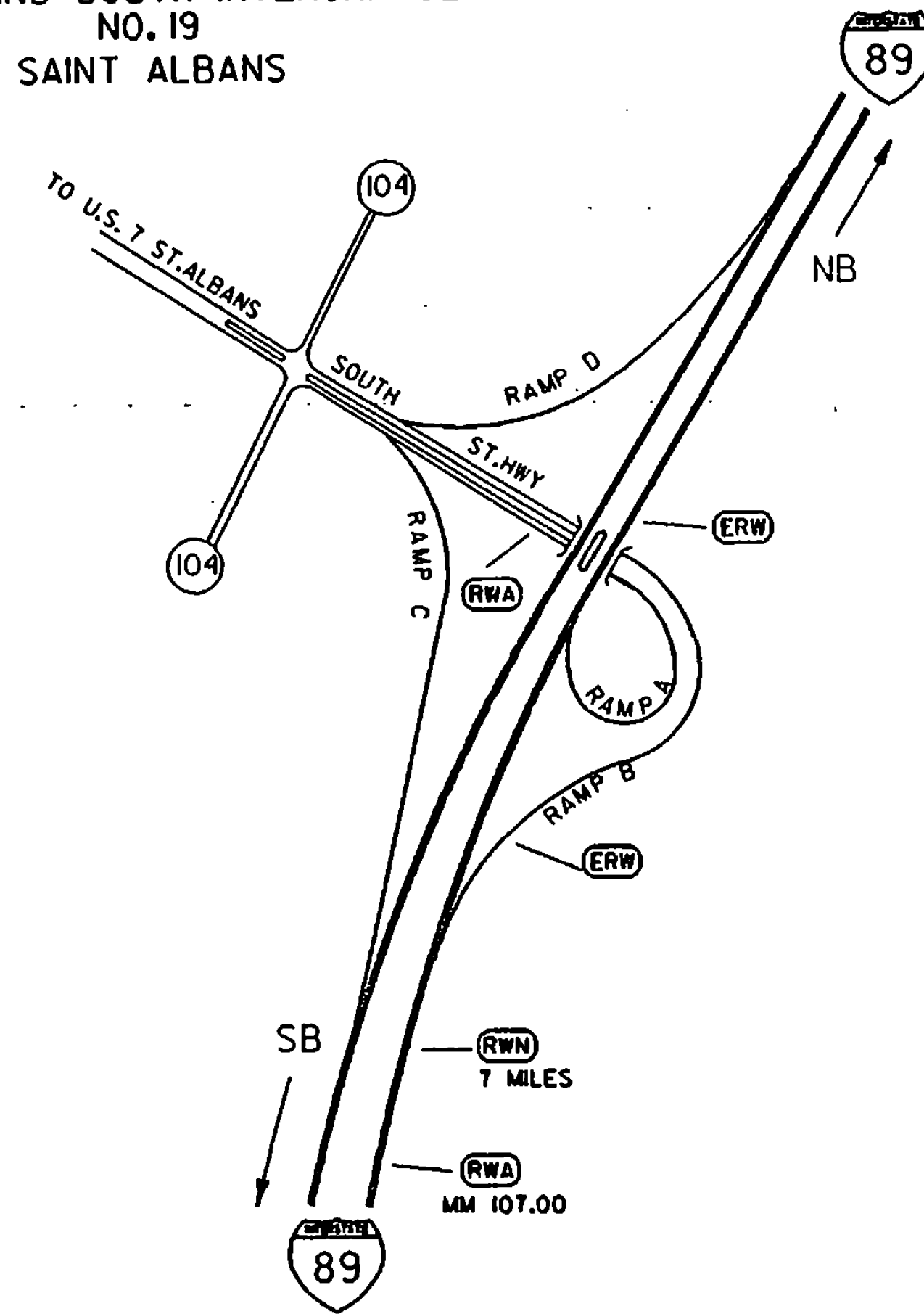
NO. 2



BURLINGTON-WILLISTON RD. INTERCHANGE NO. 14



ST ALBANS SOUTH INTERCHANGE NO. 19 SAINT ALBANS



GENERAL NOTES

1. EXACT LOCATION OF SIGNS TO BE DETERMINED BY THE RESIDENT ENGINEER.
2. MAINLINE CONSTRUCTION SIGNS WILL BE GATEPOSTED.

LEGEND

(ERW)	= END ROAD WORK
(RWA)	= ROAD WORK AHEAD
(RWN)	= ROAD WORK NEXT _____ MILES

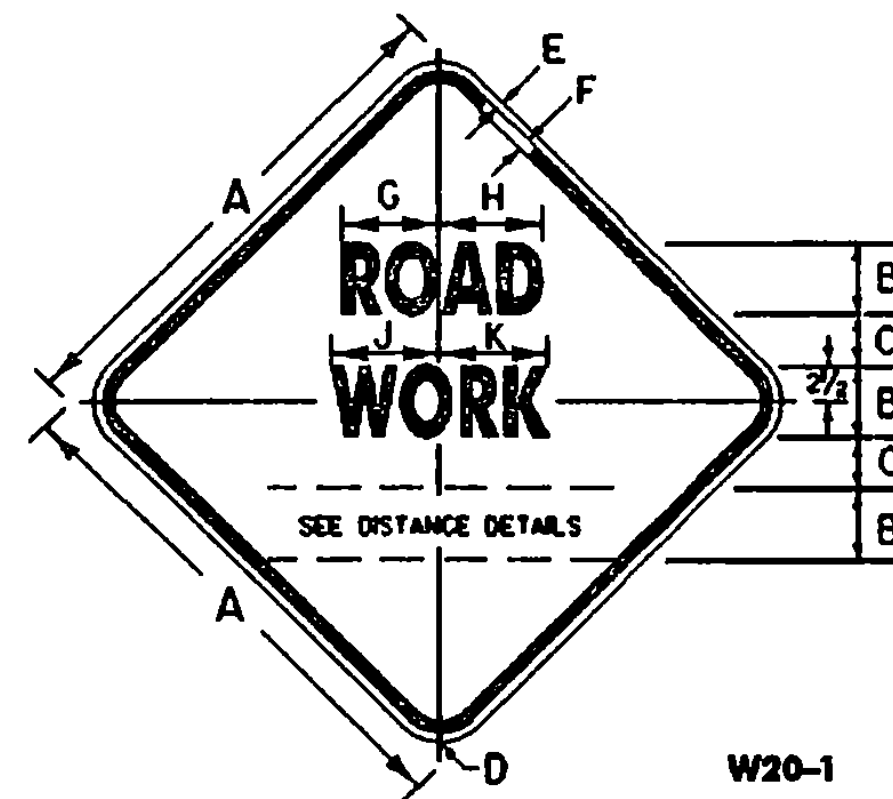
**SECTIONS 6,7, AND 8
CONSTRUCTION APPROACH SIGNING
INTERSTATE 89
INTERCHANGES 2, 14, 19**

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/95o376/89x.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: do376c07	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: jfg/mgn
SQUAD LEADER: nyquist	SHEET: 26 OF 28

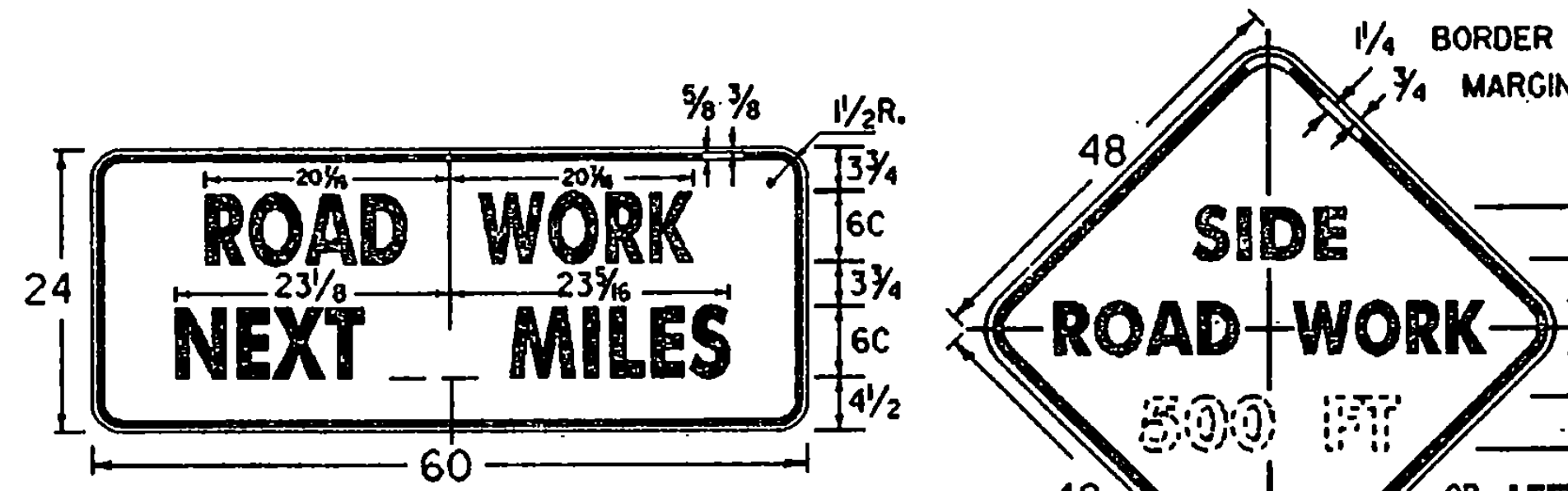
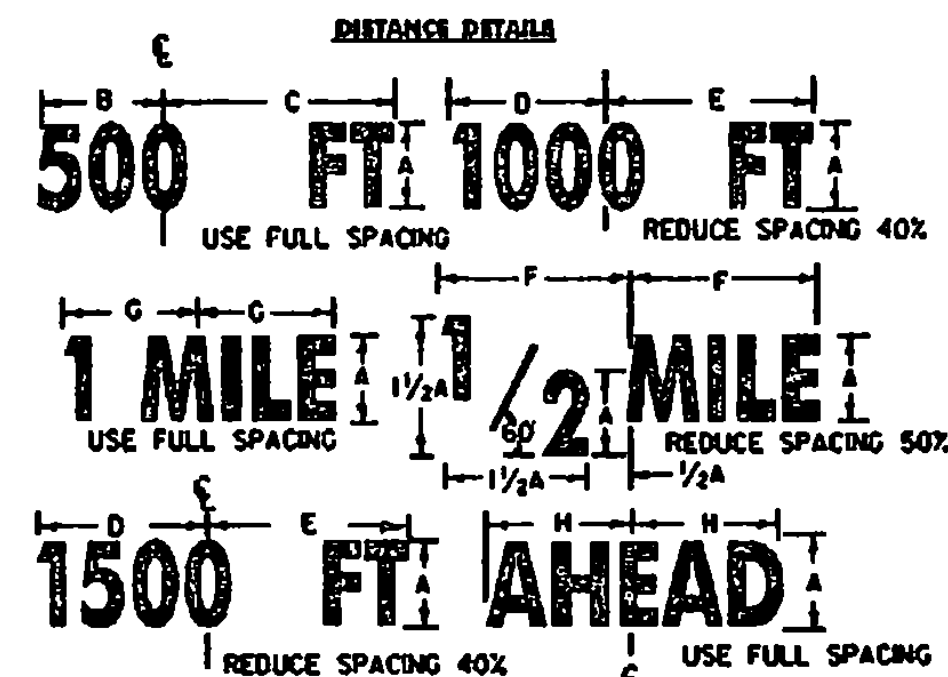
NOT TO SCALE

Sheet Number: 26

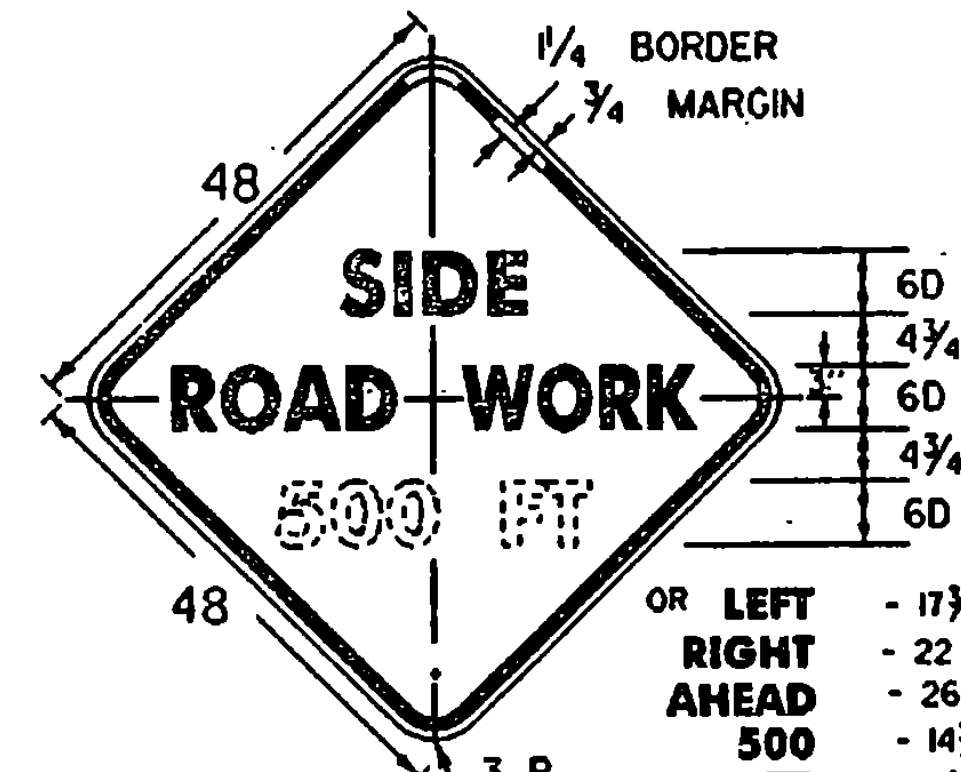
CONSTRUCTION APPROACH SIGNS



W20-1



G20-1

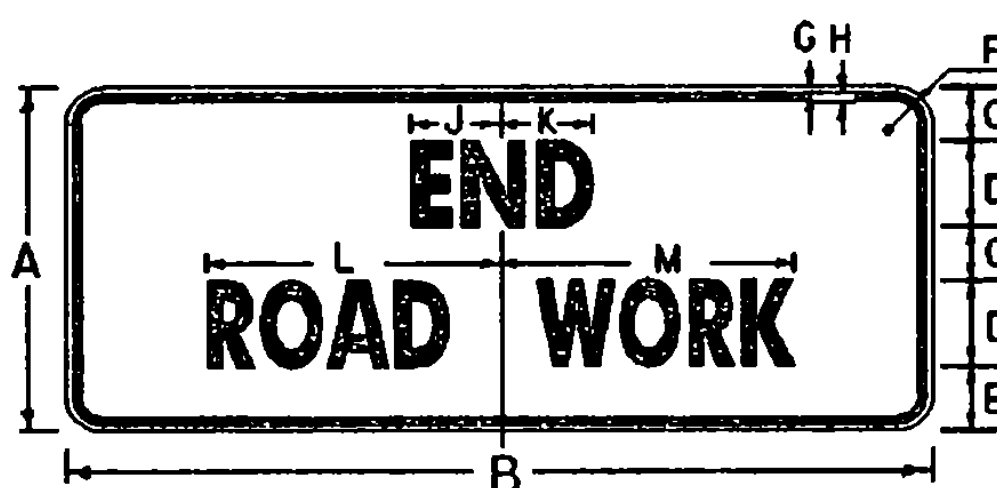


W20-1

THIS SIGN TO BE USED WHEN PROJECT LENGTH EXCEEDS 2 MILES OR AS REQUESTED BY THE RESIDENT ENGINEER, SHOW MILEAGE TO NEAREST 1/4 MILE USING FRACTIONS, NOT DECIMALS. HAND LETTERING OF MILEAGE WILL NOT BE ALLOWED. (ALL DIMENSIONS SHOWN IN INCHES)

DIMENSIONS (INCHES)										
STD.	A	B	C	D	E	F	G	H	J	K
	48	7C	4 1/4	3" R.	3/4	1 1/4	9/2	9 3/4	10 1/2	10 3/4
URBAN	36	5C	3 3/4	2 1/4 R.	3/8	1/4	6 3/4	11 1/4	7 1/2	7 3/4

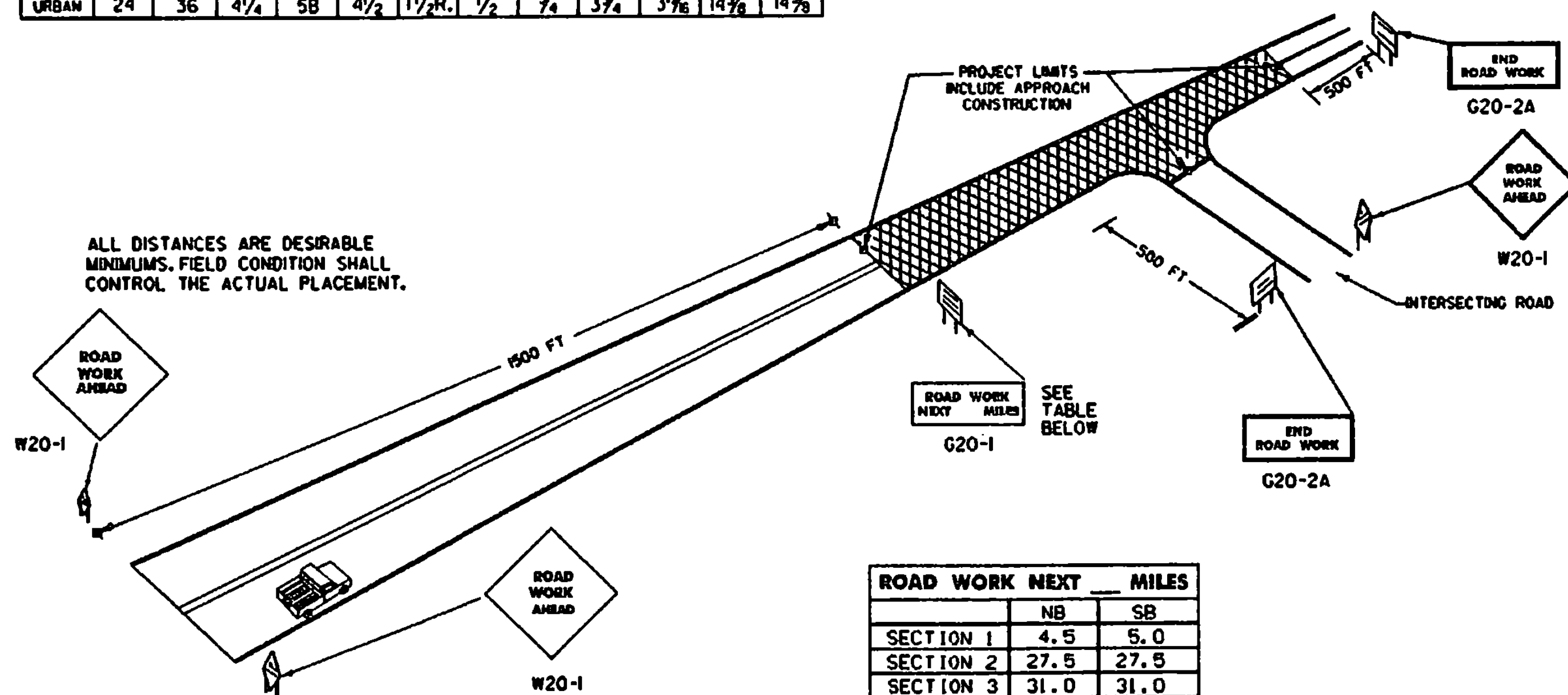
DIMENSIONS (INCHES)							
A	B	C	D	E	F	G	H
9D	10 3/4	10 3/4	9 3/4	11 1/4	11 1/4	9 1/2	10 3/4
6C	10 3/4	10 1/2	11 1/4	12	12 1/2	9 3/4	10 1/2
7C	12	12 3/4	13 3/4	14	14 3/4	10 3/4	12 1/4
8D	16 1/4	17 1/4	17	18	18	14 3/4	17 3/4



G20-2A

DIMENSIONS (INCHES)												
STD.	A	B	C	D	E	F	G	H	J	K	L	M
	24	60	3 3/4	6C	4 1/2	11 1/2 R.	3/8	3/8	6 1/4	6 3/4	20 1/4	20 3/4
URBAN	24	36	4 1/4	5B	4 1/2	11 1/2 R.	1/2	1/4	3 3/4	3 3/4	14 3/4	14 3/4

(ALL DIMENSIONS SHOWN IN INCHES UNLESS OTHERWISE NOTED)



ALL DISTANCES ARE DESIRABLE MINIMUMS. FIELD CONDITION SHALL CONTROL THE ACTUAL PLACEMENT.

SECTION	ROAD WORK NEXT MILES	
	NB	SB
SECTION 1	4.5	5.0
SECTION 2	27.5	27.5
SECTION 3	31.0	31.0
SECTION 4	27.0	23.5
SECTION 5	15.0	15.0
SECTION 6	9.0	14.0

TYPICAL APPROACH SIGNING (SIGNS NOT SHOWN FOR OPPOSITE DIRECTION)

NOTES CONT.

GENERAL

THE COST OF FURNISHING, INSTALLING, MAINTAINING AND REMOVING ALL CONSTRUCTION APPROACH SIGNS WILL BE CONSIDERED SUBSIDIARY WORK PERTAINING TO THE PROJECT AS A WHOLE AND SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR VARIOUS ITEMS INVOLVED IN THE CONTRACT, DURING ALL PHASES OF CONSTRUCTION THE REQUIREMENTS SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE MET WHEN THE PROJECT IS CLOSED DOWN FOR TEMPORARY PERIODS THE SIGNS SHALL BE COVERED IN A WORKMANLIKE MANNER.

SIGN COVERS

SIGN COVERS SHALL CONSIST OF A PANEL PAINTED FLAT BLACK, THE SAME SIZE AS THE SIGN IT COVERS. THE PANEL SHALL BE OF WOOD, PLYWOOD, HARDBOARD OR ANY MATERIAL SATISFACTORY TO THE ENGINEER. NO MATERIAL WILL BE APPROVED THAT WILL DETERIORATE BY EXPOSURE TO THE WEATHER DURING THE PROJECT. MOUNTING OF THE PANEL SHALL BE DONE IN SUCH A WAY AS NOT TO DAMAGE THE SIGN FACE MATERIAL.

CONTRACTORS SHALL COORDINATE THEIR SIGNING ACTIVITIES WITH OTHER CONTRACTORS WITHIN THE PROJECT LIMITS, AS DIRECTED BY THE REGIONAL CONSTRUCTION ENGINEER.

SIGN POSTS

WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARD RAIL OR OTHER APPROVED TRAFFIC BARRIERS, THE POSTS ON WHICH THE SIGNS ARE MOUNTED SHALL BE YIELDING METAL POSTS AS DESIGNATED IN THE E SERIES OF STANDARD DRAWINGS OR YIELDING WOODEN POSTS IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:

WOODEN POSTS ARE ACCEPTABLE FOR USE WITH CONSTRUCTION SIGNS. THESE POSTS SHALL HAVE A UNIFORM CROSS-SECTION AND SHALL BE MADE FROM GRADE 2, AIR-DRIED SOUTHERN YELLOW PINE OR ANOTHER EQUIVALENT SOFTWOOD. AN ACCEPTABLE EQUIVALENT SOFTWOOD SHALL HAVE AN EXTREME FIBER BENDING "F_b" DESIGN VALUE NOT TO EXCEED 1400 psi AND HORIZONTAL SHEAR "F_v" DESIGN VALUE NOT TO EXCEED 90 psi SPECIFICATIONS "DESIGN VALUES FOR WOOD CONSTRUCTION" AND RELATED SUPPLEMENT, DATED 1986.

AS ESTABLISHED BY THE NATIONAL FOREST PRODUCTS ASSOCIATION IN THEIR NATIONAL DESIGN THE FOLLOWING ARE CONSIDERED TO BE ACCEPTABLE WOODEN POSTS:

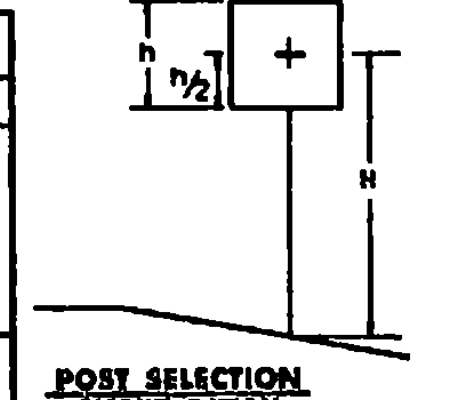
- 4" x 4" (ACTUAL DIMENSIONS ARE 3.5" x 3.5")
 - ACCEPTABLE FOR SINGLE OR DUAL POSTS INSTALLATION WITH NO MODIFICATIONS.
 - ACCEPTABLE FOR THREE POSTS (OR MORE) INSTALLATION ONLY WHEN THERE ARE NO MORE THAN TWO POSTS IN A 7 FOOT PATH.
- 4" x 6" (ACTUAL DIMENSIONS ARE 3.5" x 5.5")
 - ACCEPTABLE FOR SINGLE POST INSTALLATIONS ONLY WHEN MODIFIED BY DRILLING TWO 1/2" DIAMETER HOLES, ONE AT 4" AND THE OTHER 18" ABOVE THE GROUND LINE AND PERPENDICULAR TO THE ROADWAY CENTERLINE.
 - ACCEPTABLE FOR MULTIPLE POSTS (TWO OR MORE) INSTALLATIONS ONLY WHEN MODIFIED AS ABOVE AND THE MINIMUM SPACING BETWEEN POSTS IS 7 FEET.
- 6" x 6" (ACTUAL DIMENSIONS ARE 5.5" x 5.5")
 - ACCEPTABLE FOR SINGLE POST INSTALLATIONS ONLY WHEN MODIFIED BY DRILLING TWO 2" DIAMETER HOLES, ONE AT 4" AND THE OTHER AT 18" ABOVE THE GROUND LINE AND PERPENDICULAR TO ROADWAY CENTERLINE.
 - ACCEPTABLE FOR MULTIPLE POST INSTALLATION ONLY WHEN MODIFIED AS ABOVE AND THE MINIMUM SPACING BETWEEN POSTS IS 7 FEET.
- 6" x 8" (ACTUAL DIMENSIONS ARE 5.5" x 7.5")
 - ACCEPTABLE FOR SINGLE POST INSTALLATIONS ONLY WHEN MODIFIED BY DRILLING TWO 3" DIAMETER HOLES, ONE AT 4" AND THE OTHER AT 18" ABOVE THE GROUND LINE AND PERPENDICULAR TO THE ROADWAY CENTERLINE.
 - ACCEPTABLE FOR MULTIPLE POST INSTALLATIONS ONLY WHEN MODIFIED AS ABOVE AND THE MINIMUM SPACING BETWEEN POSTS IS 7 FEET.

ADDITIONAL DESIGN CRITERIA

THE LONGER DIMENSION OF THE POST(S), SUCH AS THE 6" DIMENSION OF THE 4" x 6" POST, SHALL BE PLACED PARALLEL TO THE ROADWAY CENTERLINE. ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS OCCUR:

- THE SIGN WIDTH (HORIZONTAL DIMENSIONS FOR DIAMOND SHAPED SIGNS) EXCEEDS 3 1/2 FEET.
- THE EXPOSED SIGN AREA OF ANY SINGLE SIGN OR ASSEMBLY EXCEEDS 12 1/2 SQ. FEET.
- THE S_v OF A SINGLE POST IS EXCEEDED. (SEE THE POST SELECTION CHART BELOW).

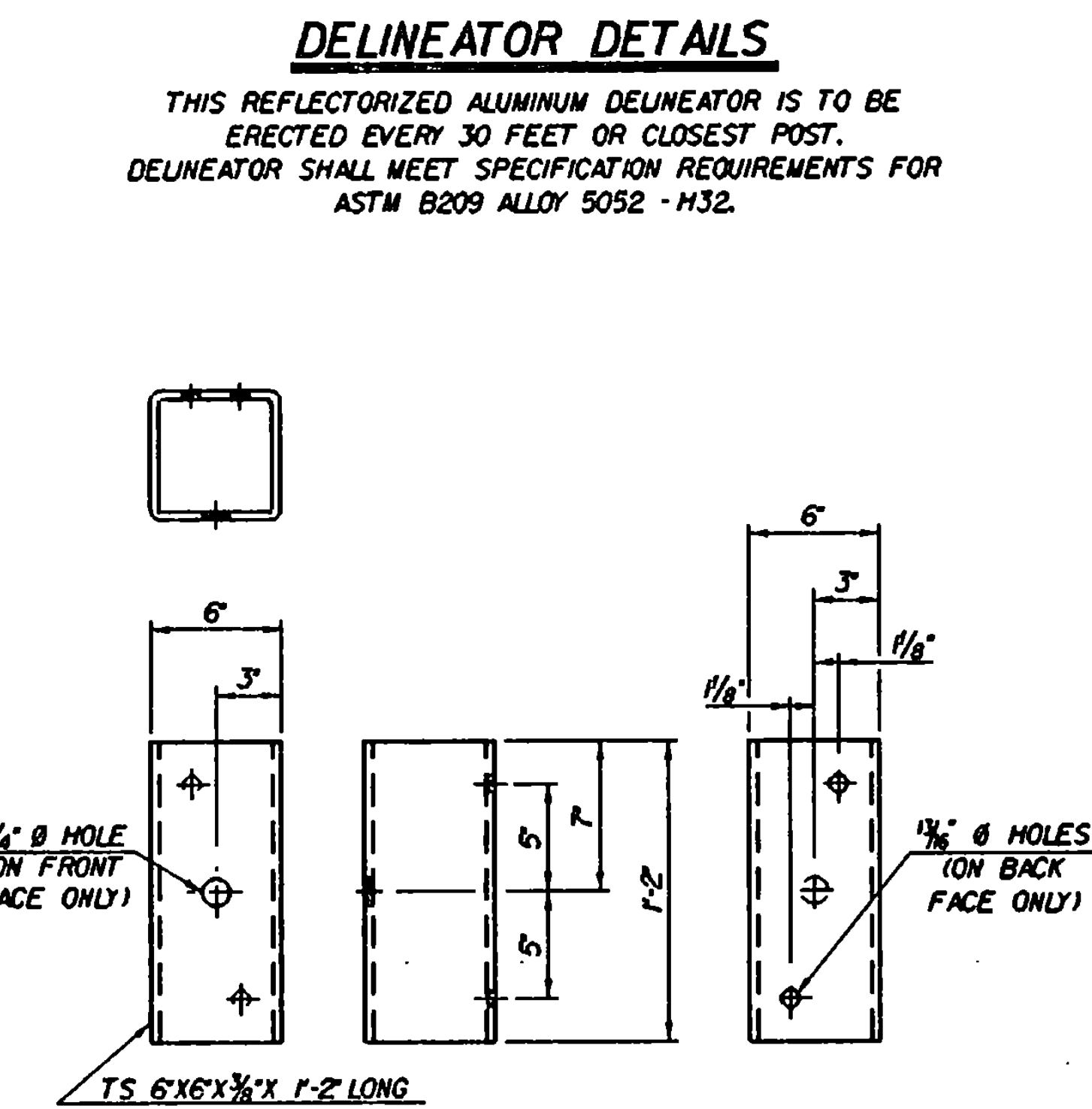
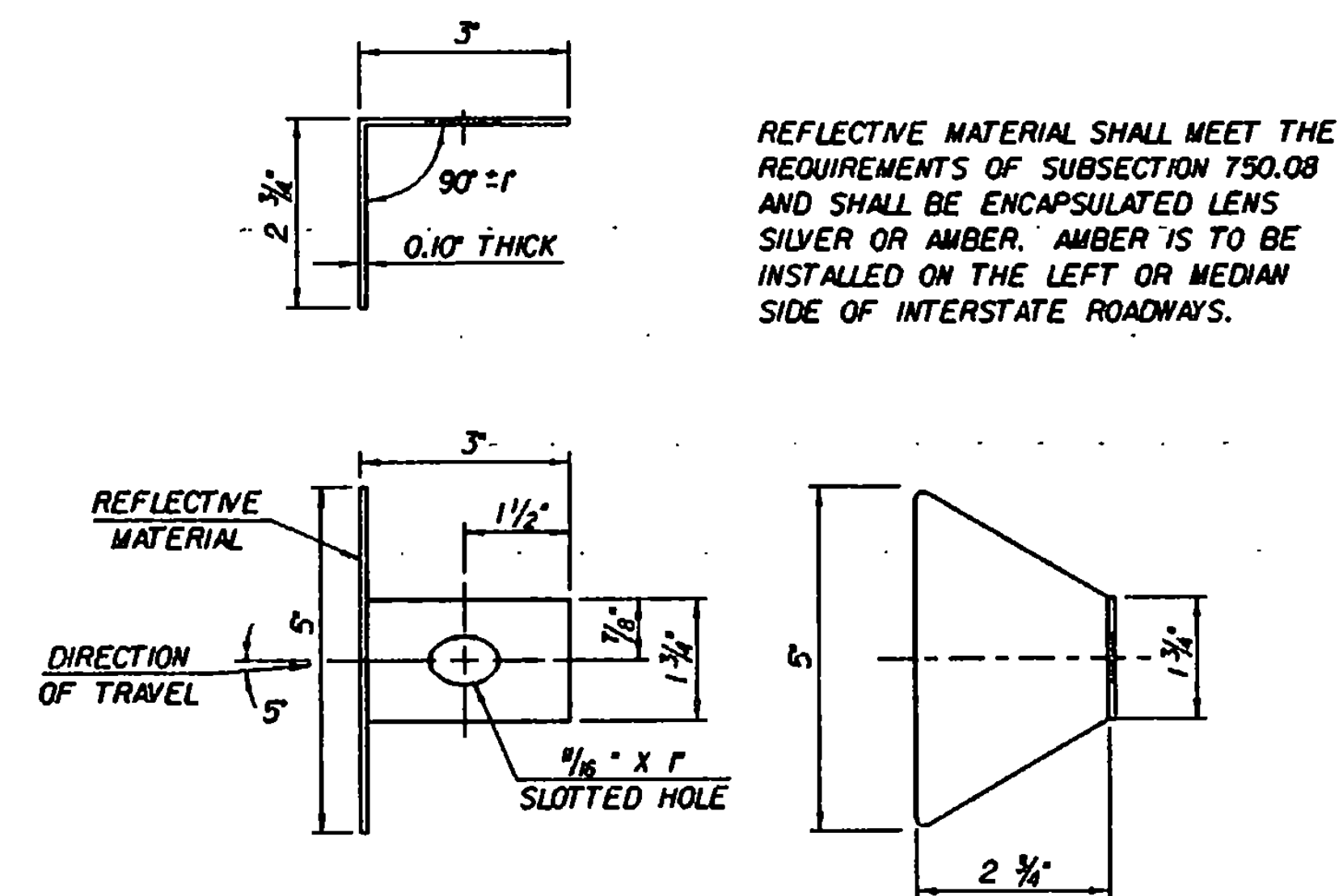
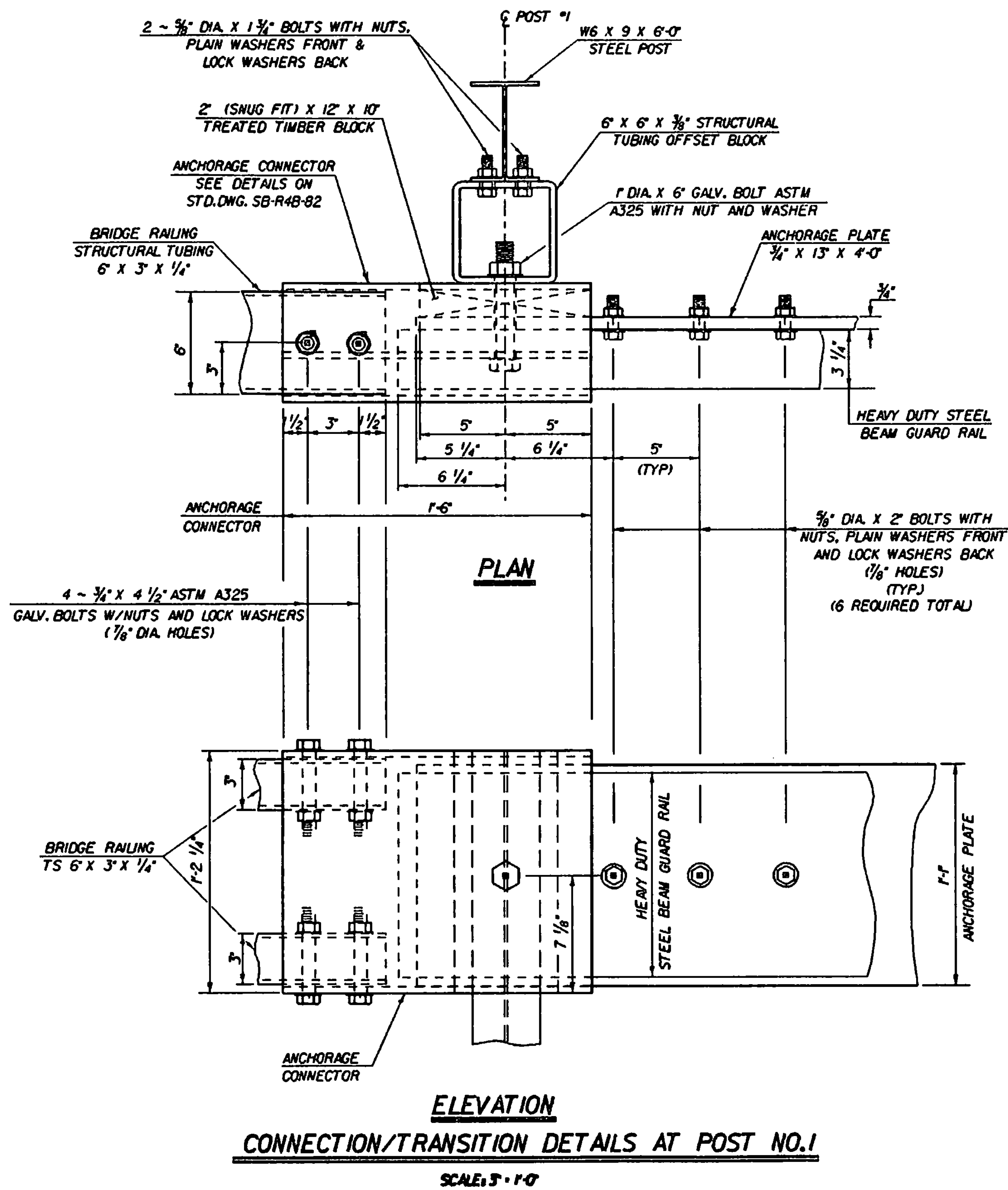
WOOD POST SELECTION CHART		
SIGN AREA (FT ²) X HEIGHT (FT) < S _v (SELECTION VALUE)	S _v	DESIGN CRITERIA
4" x 4"	64	WIND SPEED = 60 MPH (10-YEAR MEAN OCCURRENCE INTERVAL)
4" x 6"	147	WIND PRESSURE = 13 psf
6" x 6"	266	ALLOWABLE BENDING STRESS
6" x 8"	369	



CONSTRUCTION APPROACH SIGNS DETAILS

PROJECT: STATEWIDE GUARDRAIL	PROJECT NO.: IMG GDRL (I)
DESIGN FILE NAME: /sqda/95a376/da375.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da375cab.t	SURVEY DATE: N/A
SURVEYED BY: N/A	DRAWN BY: MGN
SQUAD LEADER: NYQUIST	SHEET: 27 OF 28

N.T.S.



BOX BEAM BRIDGE RAIL NOTES

- BRIDGE RAILING AND GUARD RAIL APPROACH SECTIONS ARE DESIGNED IN ACCORDANCE WITH THE LATEST AASHTO SPECIFICATIONS.
- ALL PLATES, BARS, AND ANGLES SHALL BE ASTM A36 STEEL. UNLESS OTHERWISE SPECIFIED, ALL BOLTS SHALL BE ASTM A307. STRUCTURAL STEEL TUBING SHALL BE ASTM A500 COLD-FORMED GRADE 'B' AS MODIFIED IN SECTION 732.034(c).
- ALL BOX BEAM BRIDGE RAILING, AND COMPONENTS SHALL CONFORM TO SECTION 525 OF THE STANDARD SPECIFICATIONS. ALL OTHER SLEEVES, ANCHOR BOLTS, AND ATTACHMENT HARDWARE SHALL BE A325 STEEL AND GALVANIZED TO ASTM A153 AFTER FABRICATION.
- THE FABRICATOR SHALL SUBMIT SHOP DRAWINGS, INCLUDING WELDING PROCEDURES TO THE STRUCTURES DIVISION, FOR APPROVAL IN ACCORDANCE WITH THE PROVISIONS OF SECTION 506.04 - SHOP DRAWINGS. ALL WELDING SHALL CONFORM WITH SECTION 506.10.
- THE RAIL SYSTEM SHALL BE CONTINUOUS WITH EACH TUBE SECTION ATTACHED TO A MINIMUM OF TWO POSTS. JOINTS SHALL BE SPLICED AS SHOWN, WITH CONNECTIONS LOCATED ONE DIRECTLY ABOVE THE OTHER.
- A BRIDGE RAILING JOINT SPLICE SHALL BE PROVIDED AT EACH SUPERSTRUCTURE EXPANSION JOINT. THE RAIL JOINT OPENING SHALL BE 1 INCH UNLESS OTHERWISE NOTED.
- THE BOX BEAM RAIL SHALL BE SHOP BENT TO MATCH RADIUS LESS THAN 950 FEET.
- DELINEATORS SHALL BE MOUNTED AS SHOWN ON SB-R4A-82. PAYMENT FOR DELINEATORS SHALL BE SUBSIDIARY TO OTHER ITEMS.
- SEE STD. SB-R6-82 FOR POST ANCHORAGE DETAILS WHEN USING FASCIA MOUNTED BRIDGE RAIL POSTS.
- PROCEDURE QUALIFICATION FOR ALL WELDS SHALL BE PERFORMED AND APPROVED PRIOR TO FABRICATION. WELDER QUALIFICATION WILL BE REQUIRED FOR EACH PROCEDURE. PROCEDURE AND WELDER QUALIFICATION ACCEPTANCE SHALL BE APPROVED BY RADIOGRAPHIC TESTING.

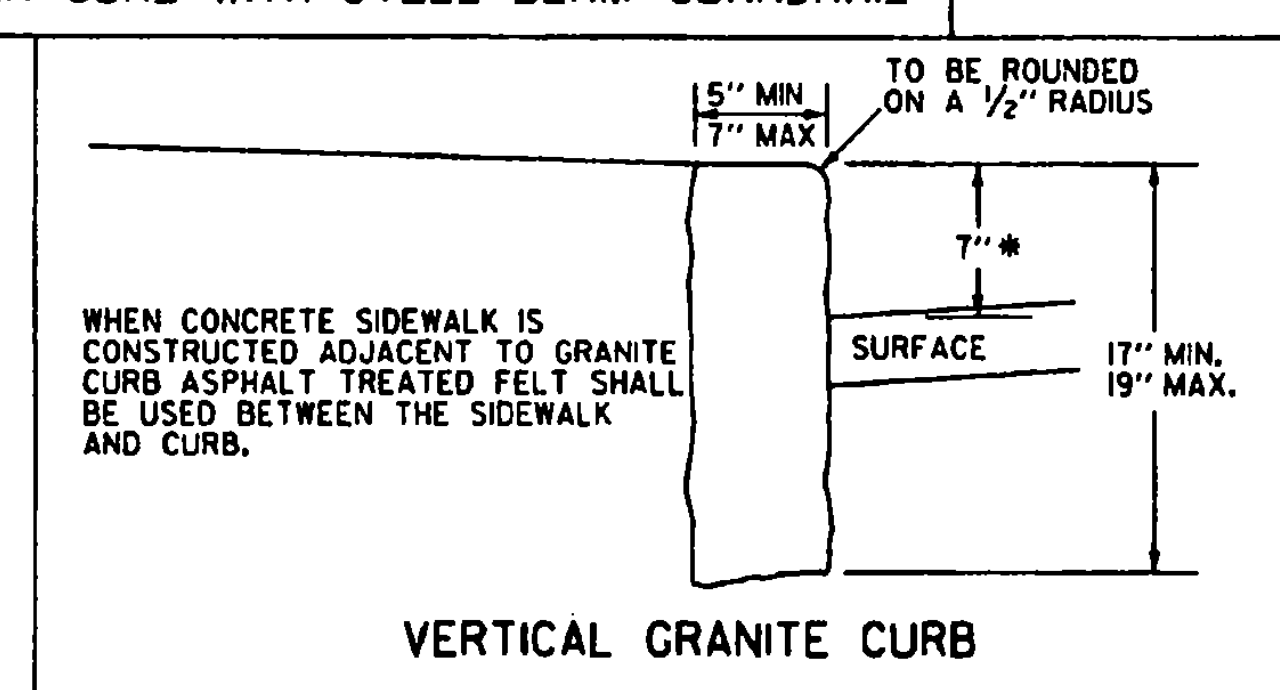
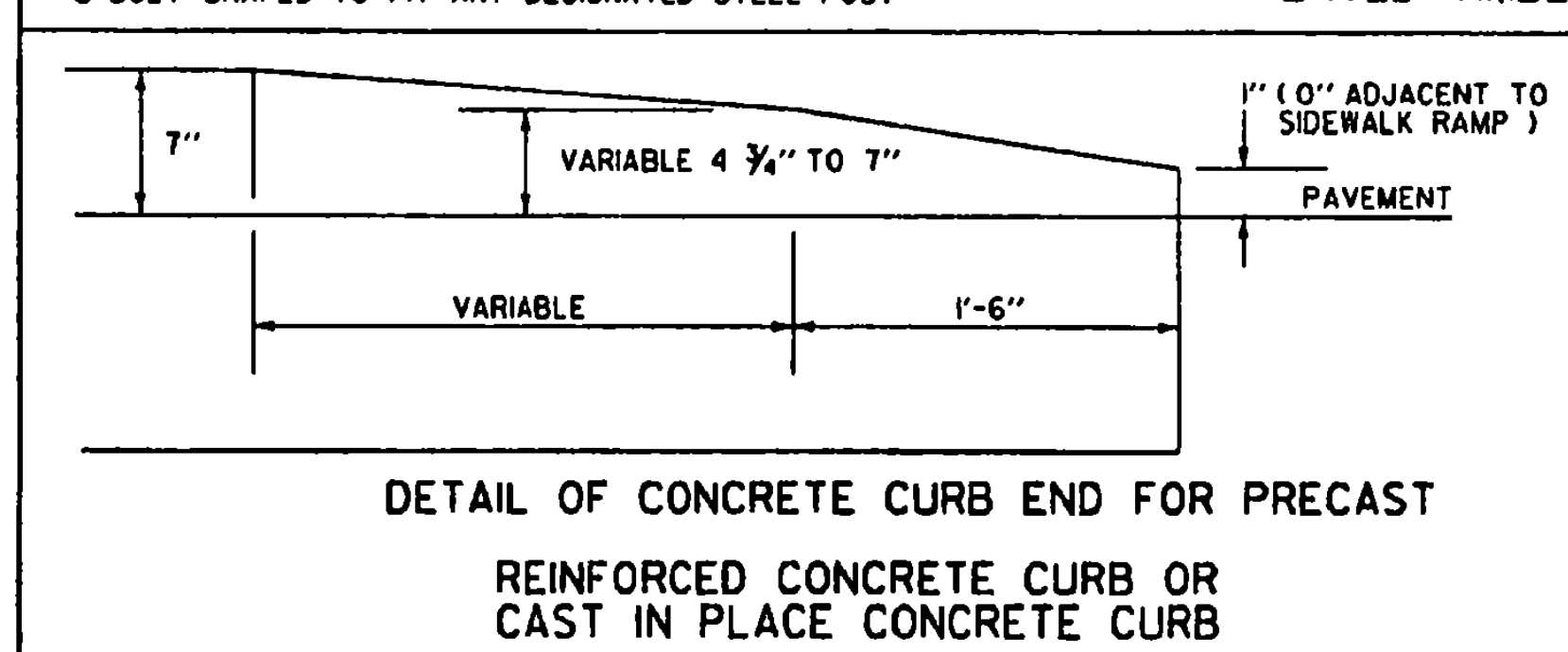
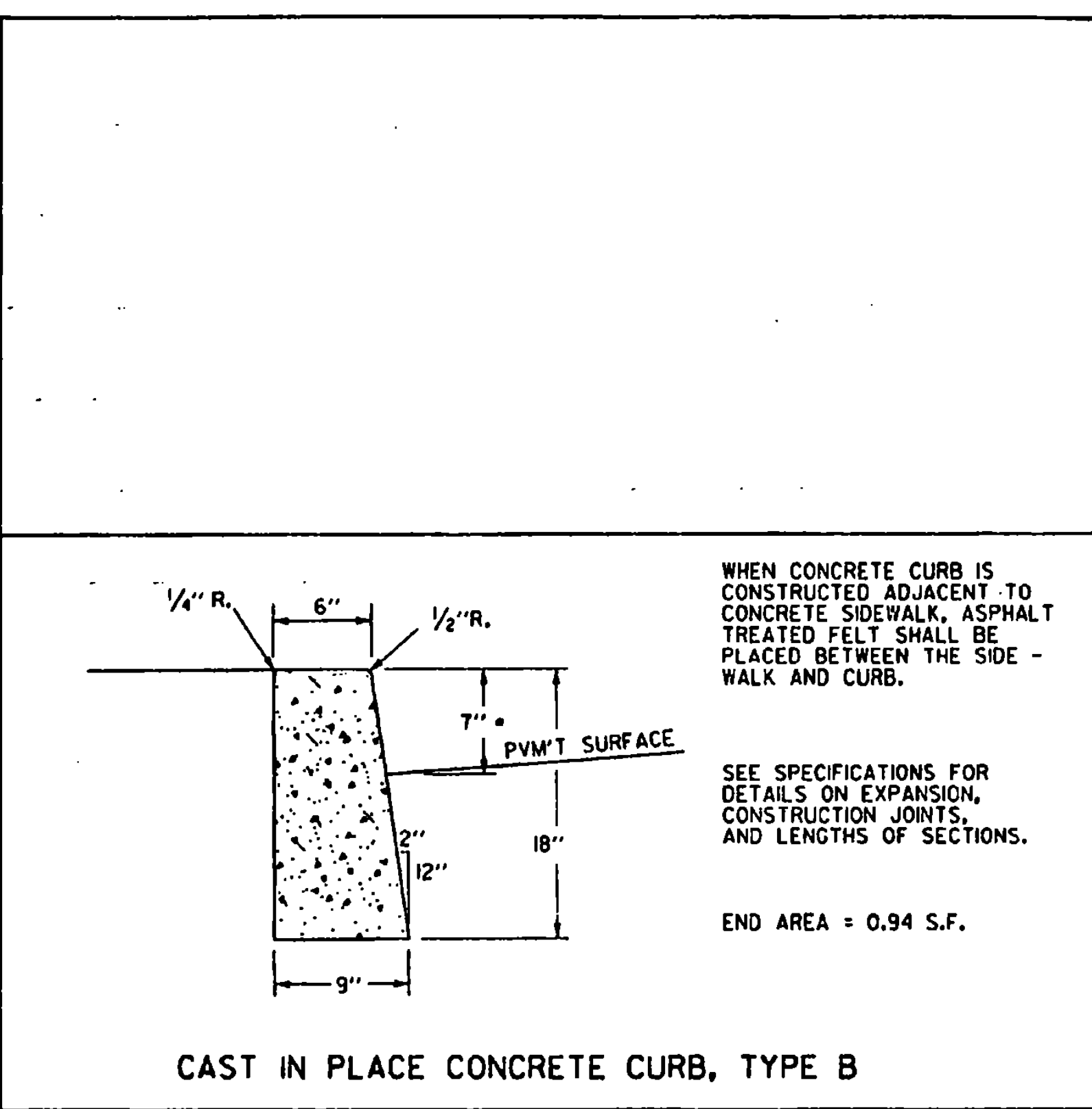
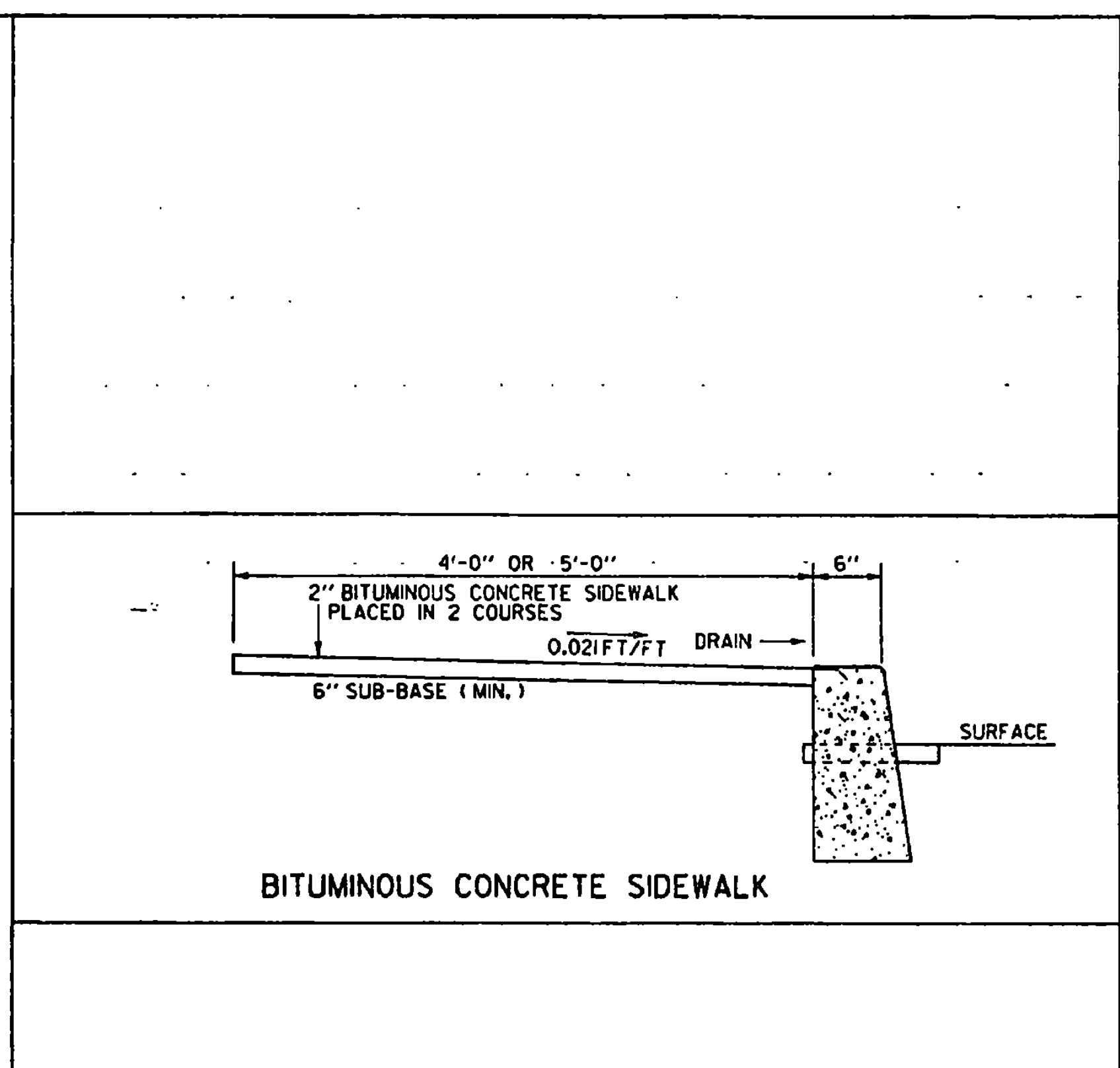
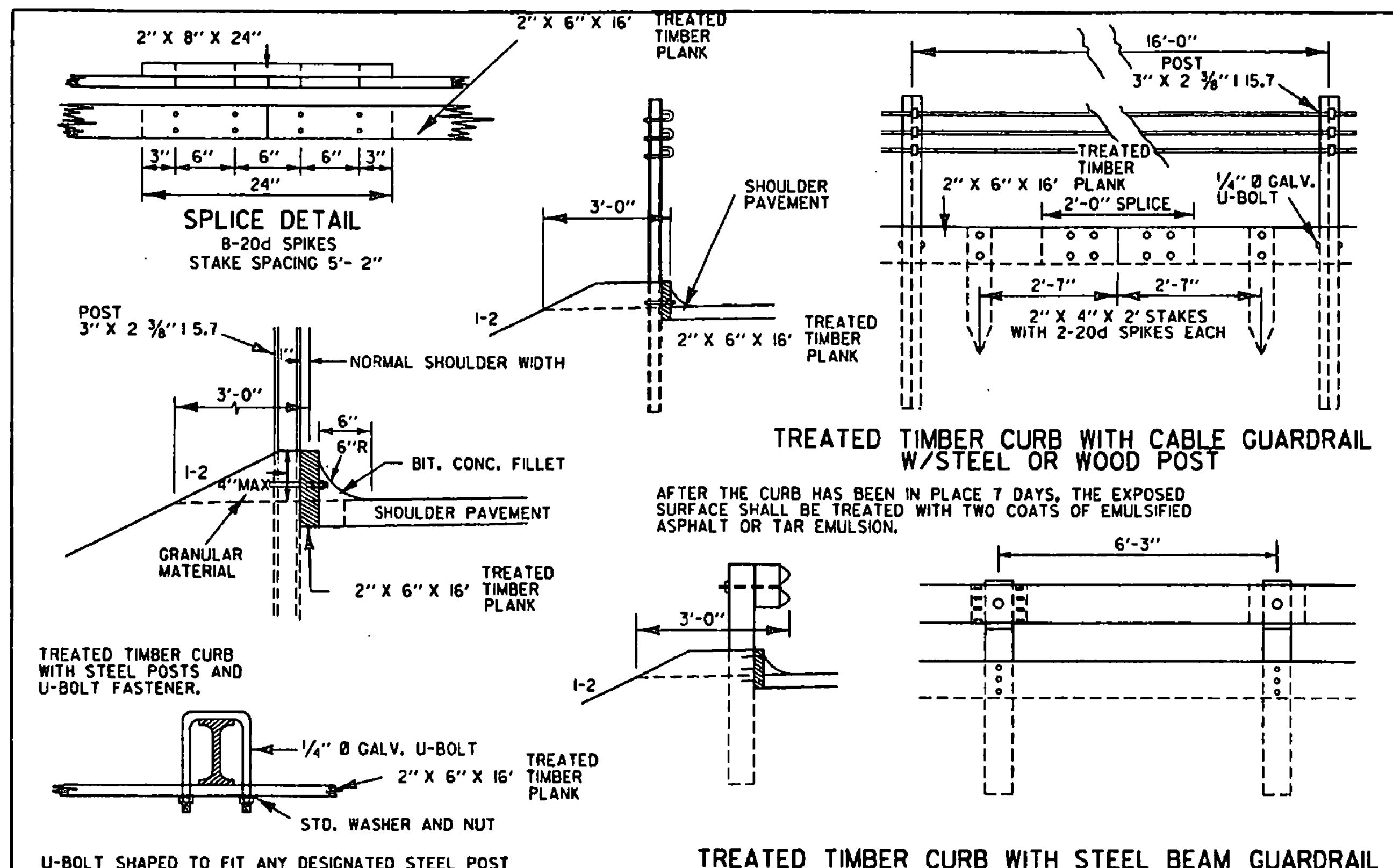
APPROACH RAIL NOTES

- REFER TO STANDARD G-1 OR G-1d FOR ADDITIONAL APPROACH RAIL DETAILS.
- ALL POSTS FOR HEAVY DUTY STEEL BEAM GUARD RAIL SHALL BE STEEL, IN ACCORDANCE WITH SECTION 728 'GUARD RAIL, GUIDE POST AND BARRIERS' UNLESS OTHERWISE SPECIFIED IN THE CONTRACT.
- APPROACH RAIL SPLICES SHALL LAP IN DIRECTION OF TRAFFIC FLOW.
- ANCHORAGE CONNECTOR AND ANCHORAGE PLATE SHALL BE ASTM A36 STEEL GALVANIZED TO ASTM A123 AFTER FABRICATION.
- APPROACH RAILING SHALL BE HEAVY DUTY STEEL BEAM FOR EITHER TYPE OF GUARD RAIL APPROACH SECTION.
- ALLOWABLE DIMENSIONAL TOLERANCE FOR BENT SECTIONS IS +/- 1/8 OF AN INCH.
- THE UNIT PRICES BID FOR EITHER TYPE OF GUARD RAIL APPROACH SECTION, SHALL INCLUDE ANCHORAGE CONNECTOR, ANCHORAGE PLATE, HEAVY DUTY STEEL BEAM GUARD RAIL, POSTS, OFFSET BLOCKS, BLOCKING, BOLTS, AND ALL NECESSARY HARDWARE.

BRIDGE RAIL CONNECTION DETAIL SHEET

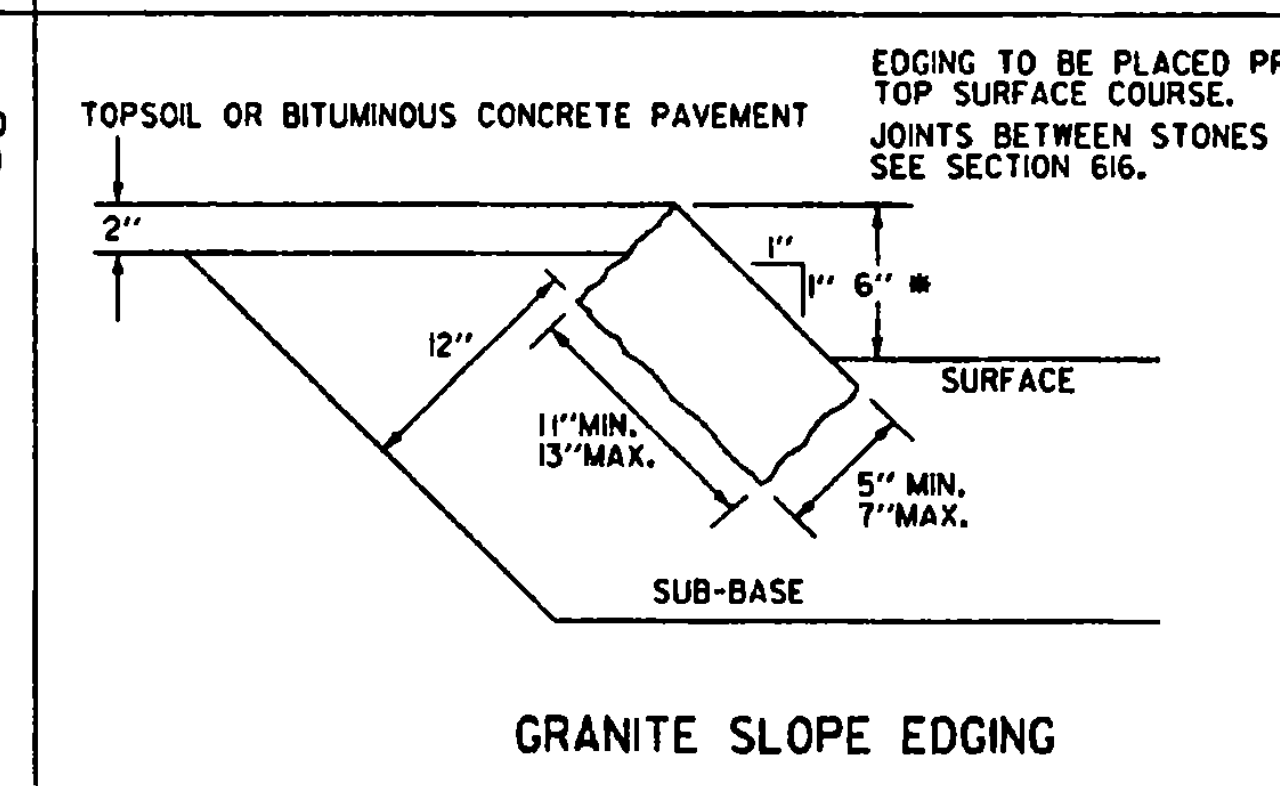
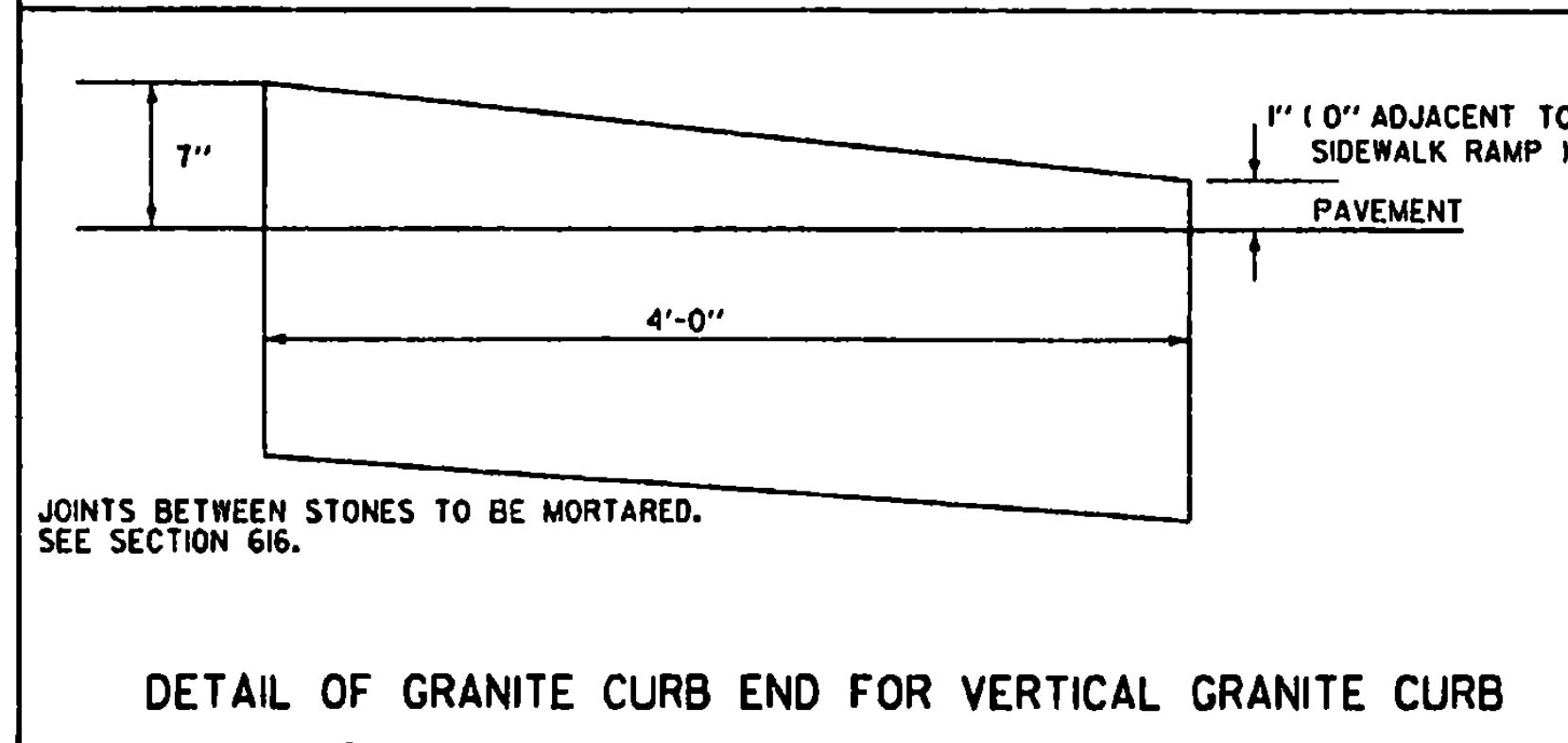
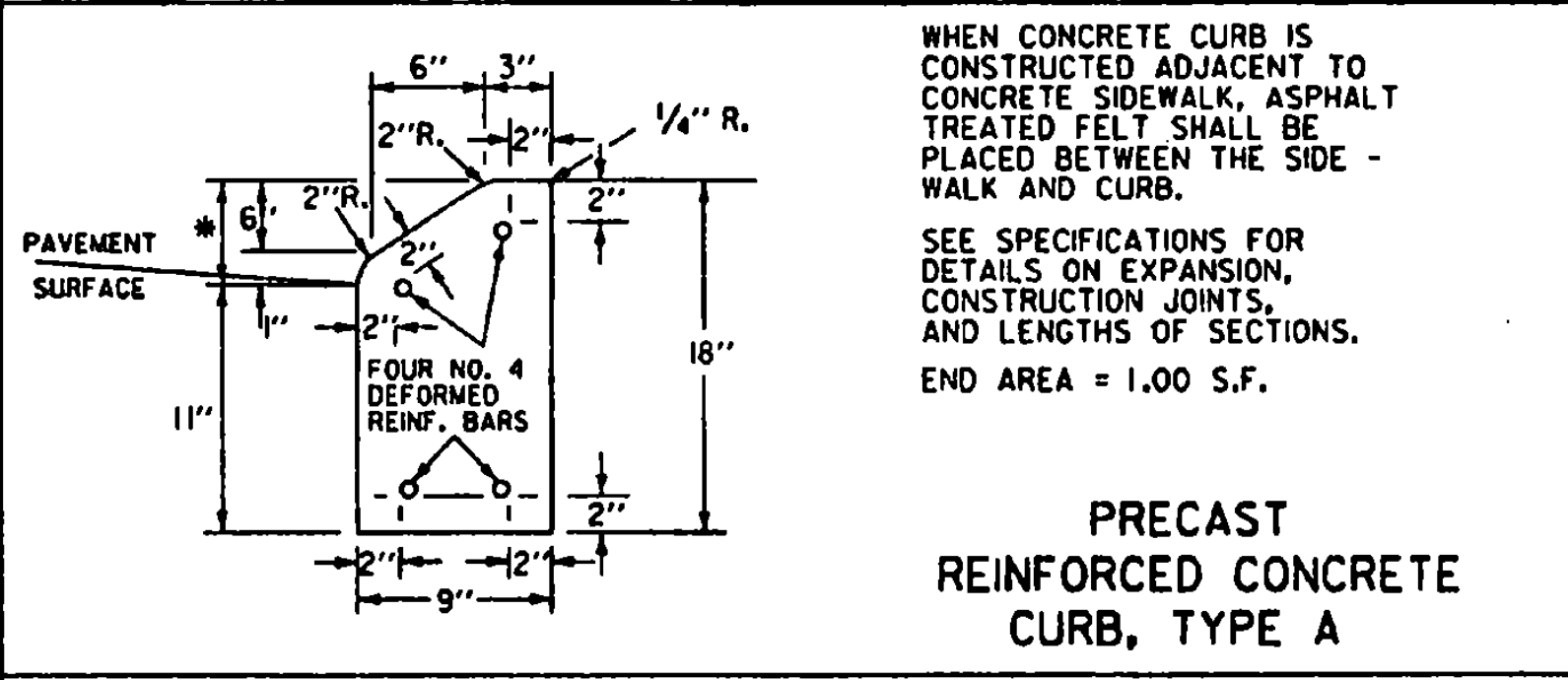
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DESIGN FILE NAME: sqda/95a376/da376.dgn	PLOT DATE: 16-SEP-1996
IPARM FILE NAME: da376qr6.l	SURVEY DATE: n/a
SURVEYED BY: n/a	DRAWN BY: structures
SQUAD LEADER: bt nyquist	SHEET: 28 OF 28

Sheet Number: 28



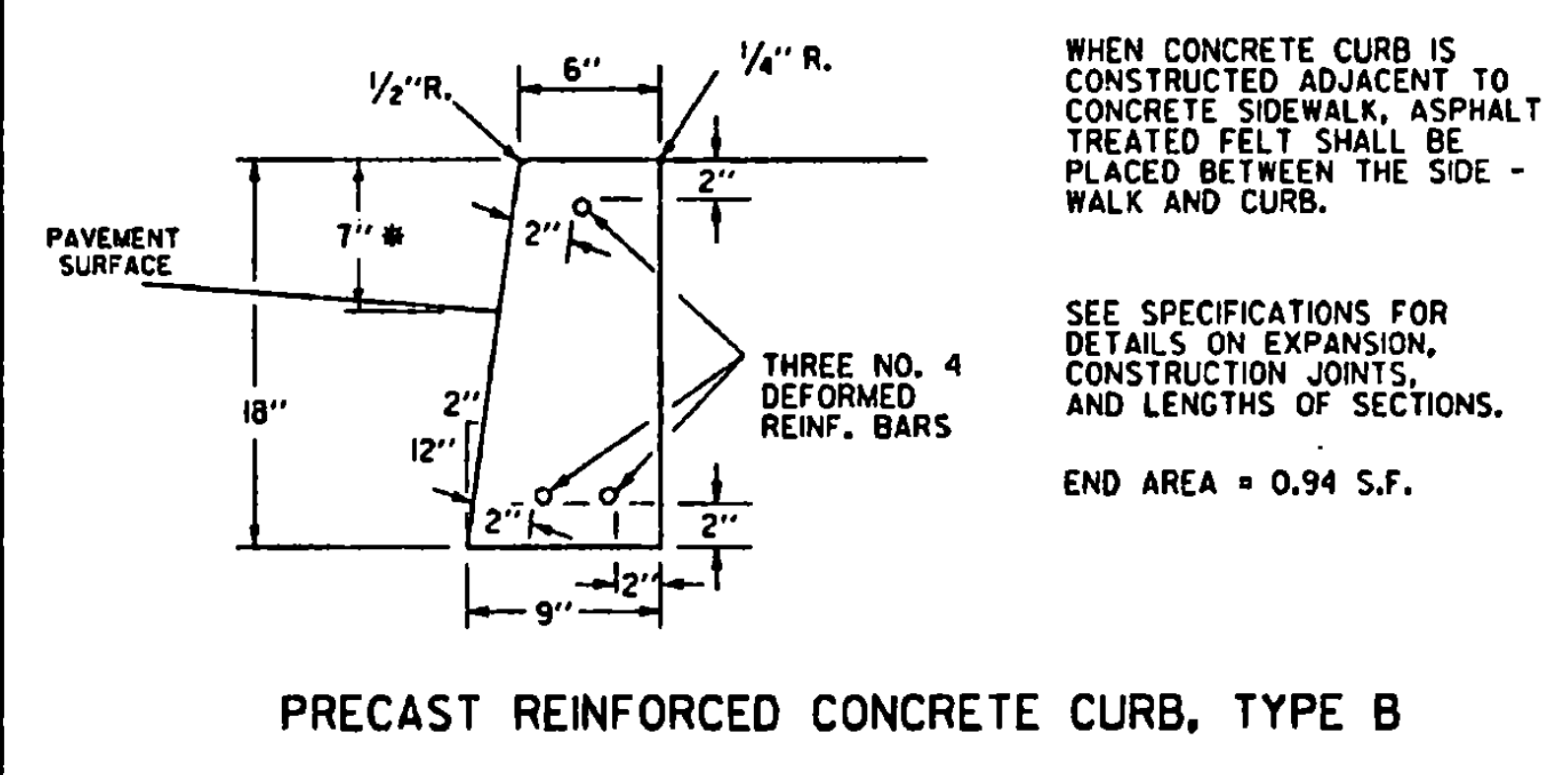
NOTE

* HEIGHT NOT TO EXCEED 4" WHEN CURBING IS INSTALLED ADJACENT TO GUARDRAIL (STANDARD SHAPE TO BE BURIED TO THIS DEPTH)



NOTE

* HEIGHT NOT TO EXCEED 4" WHEN CURBING IS INSTALLED ADJACENT TO GUARDRAIL (STANDARD SHAPE TO BE BURIED TO THIS DEPTH)



REVISIONS AND CORRECTIONS

DEC. 8, 1971 - ORIGINAL APPROVAL DATE

NOV 16, 1992 - CHANGED 6" CURB TO 4"

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

Stephen D. McCallum, PE
DIRECTOR OF ENGINEERING

John D. Manning, PE
DESIGN ENGINEER

GRANITE SLOPE EDGING

VERTICAL GRANITE CURB

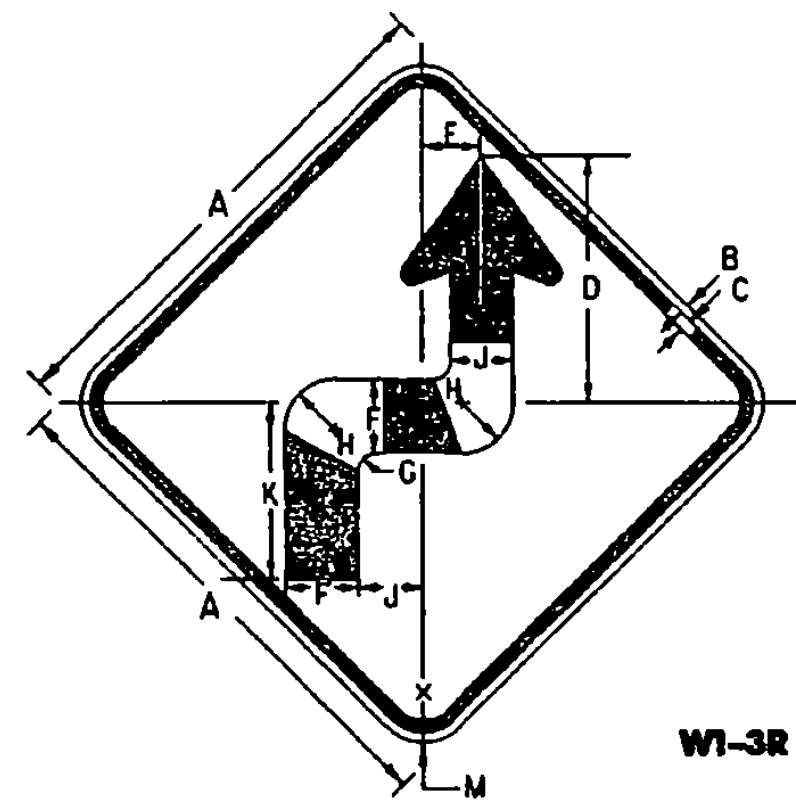
PRECAST REINFORCED CONCRETE CURB

CAST IN PLACE CONCRETE CURB

TREATED TIMBER CURB

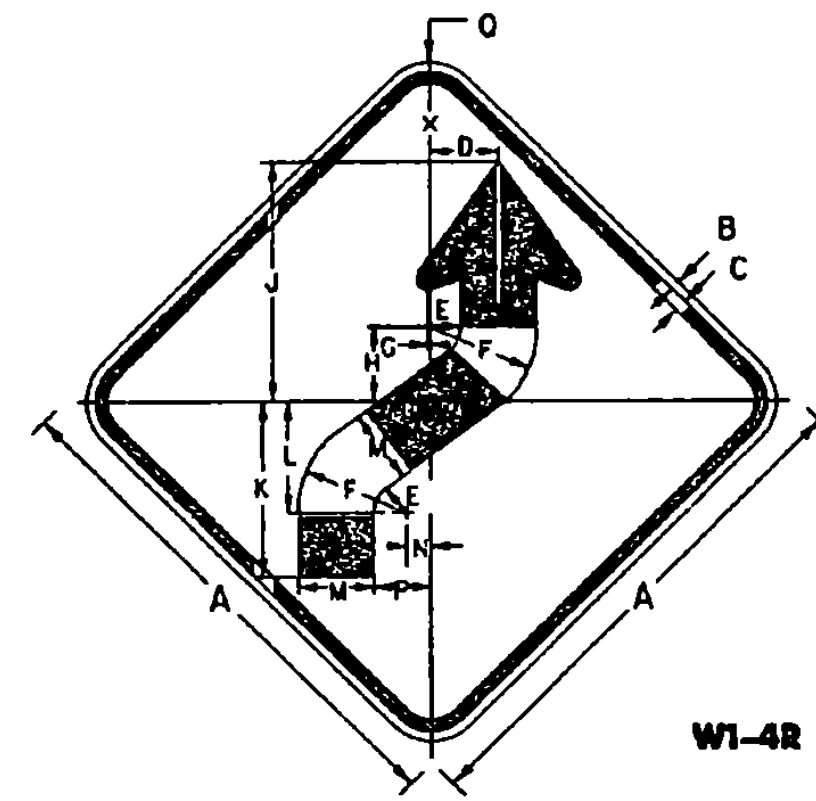
STANDARD

C-1



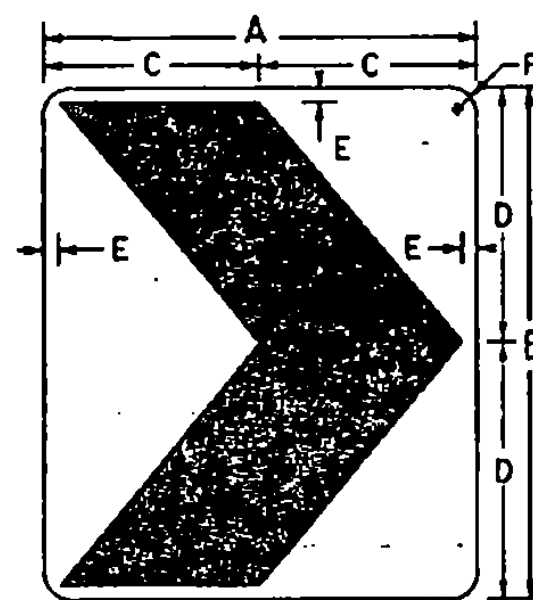
W1-3R

SIGN	DIMENSIONS (INCHES)											
	A	B	C	D	E	F	G	H	J	K	L	M
STD. & MIN.	36	5/8	7/8	17 1/4	4 1/2	5 1/4	1 1/4	3 3/8	4 1/2	12 3/8	1 7/8	2 1/4
SPECIAL	48	3/4	1 1/4	23 3/4	5 3/8	7	1 3/8	4 7/8	6	16 3/8	2 3/8	3



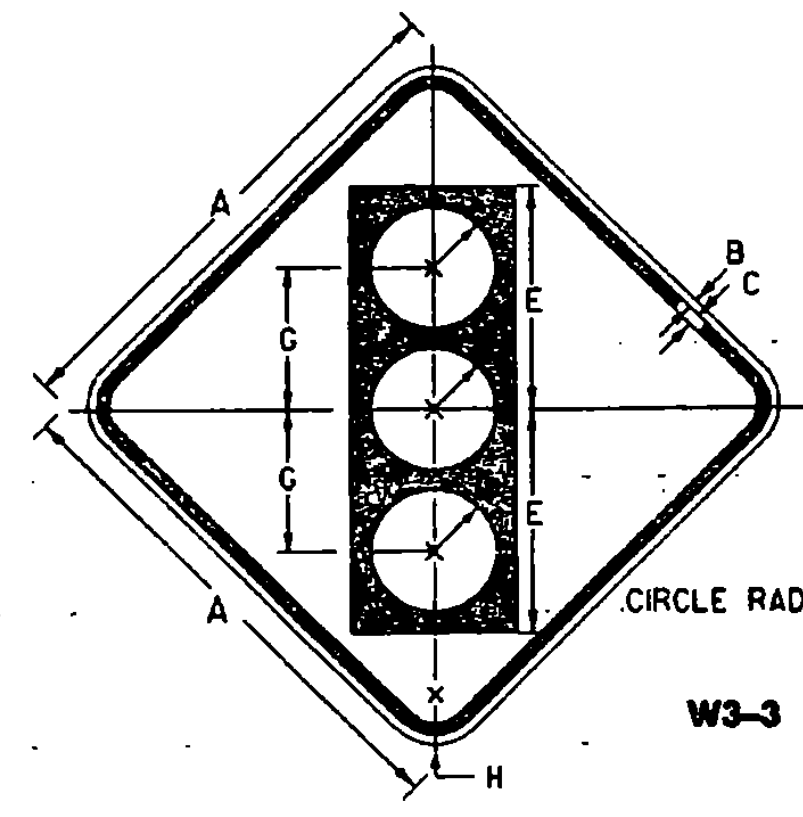
W1-4R

SIGN	DIMENSIONS (INCHES)														
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
STD. & MIN.	36	5/8	7/8	4 3/8	2 1/4	7 1/2	3/2	5 1/4	16 3/4	12 3/8	7 7/8	5 1/4	1 1/8	3 3/8	2 1/4
SPECIAL	48	3/4	1 1/4	6 3/8	3	10	3/2	7	22 1/2	16 1/2	10 1/2	7	2 1/4	5 1/4	3



W1-5

SIGN	DIMENSIONS (INCHES)					
	A	B	C	D	E	F
STD.	18	24	9	12	3/4	1 1/2
SPECIAL	24	30	12	15	3/4	1 1/2
EXPWY.	30	36	15	18	1	1 1/2
FRWY.	36	48	18	24	1 1/8	2 1/4

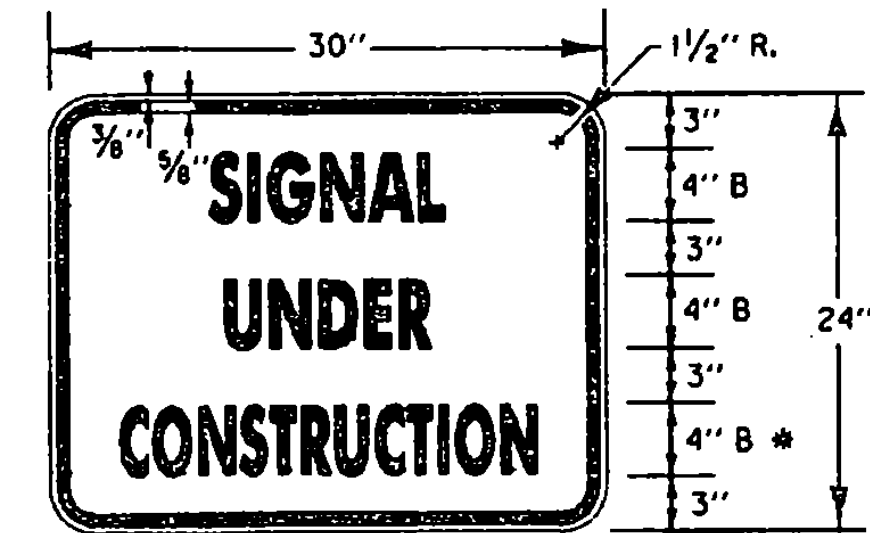


W3-3

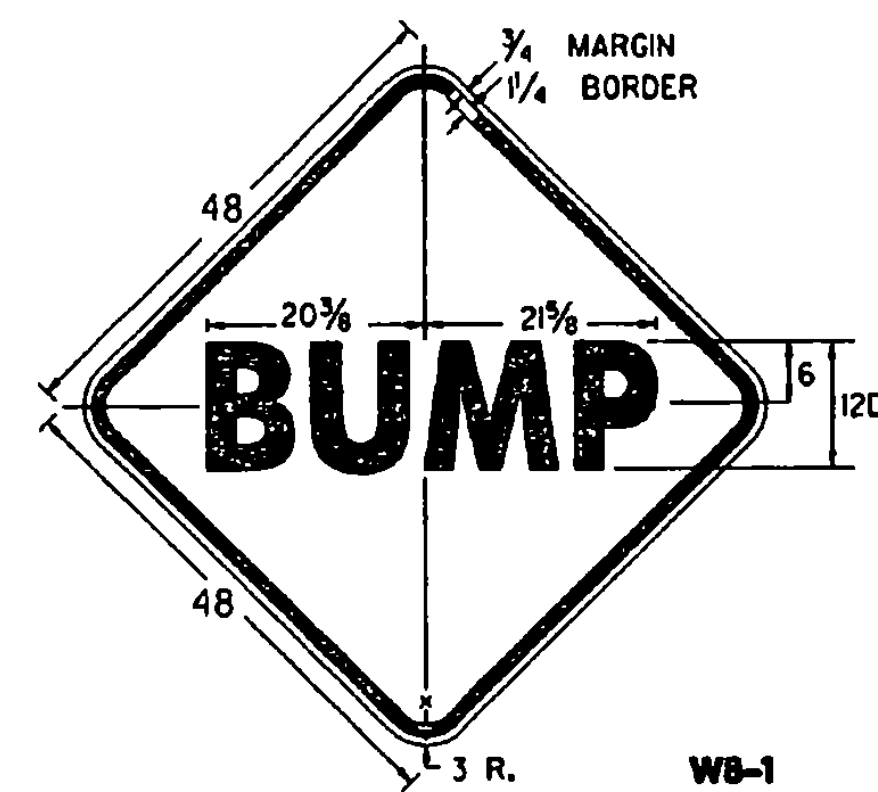
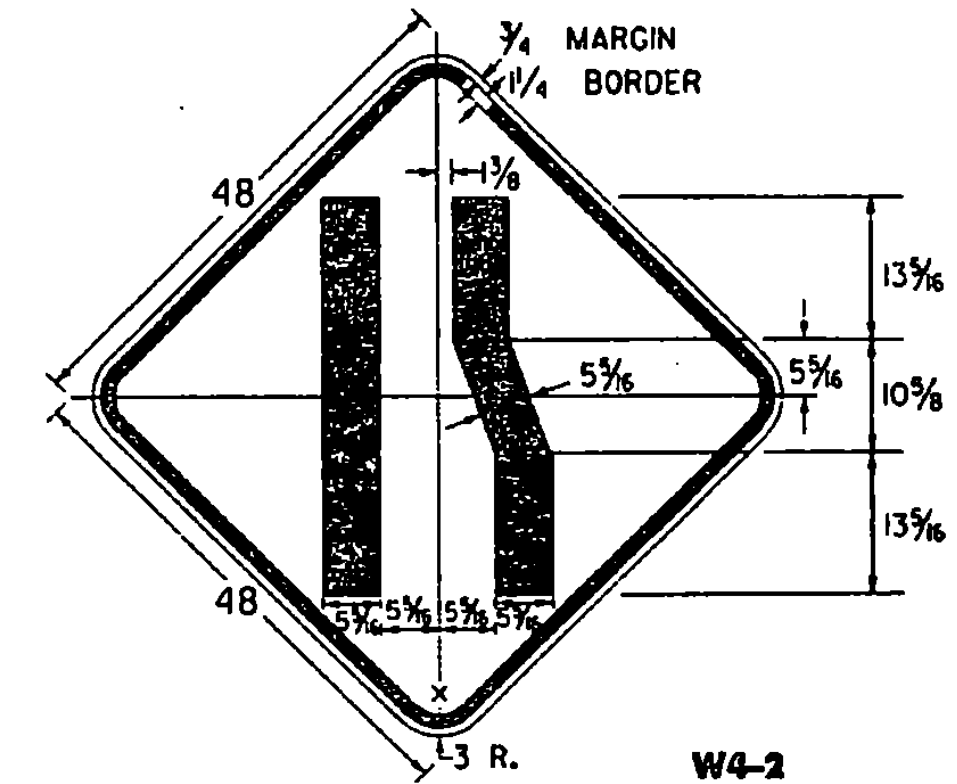
SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
STD. & MIN.	36	5/8	7/8	5 3/4	15 3/4	4 1/4	10	2 1/4
SPECIAL	48	3/4	1 1/4	7 1/2	20	5	12 1/2	3

COLORS

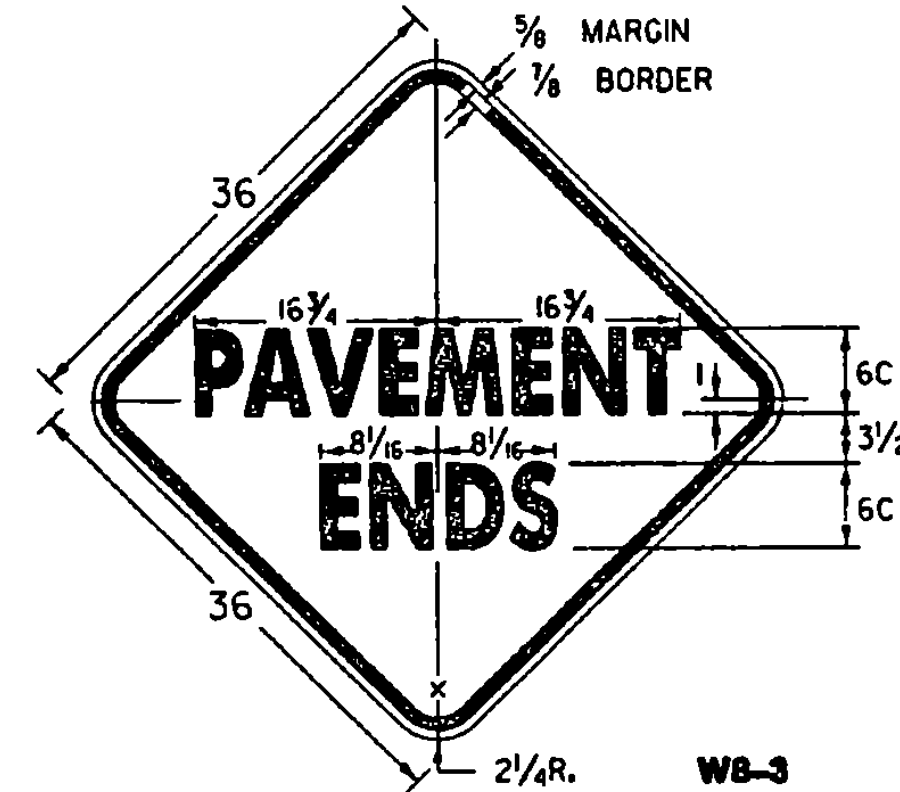
SYMBOL & LEGEND - BLACK (NON-REFL)
BACKGROUND - ORANGE (REFL)
TOP CIRCLE - RED (REFL)
MIDDLE CIRCLE - YELLOW (REFL)
BOTTOM CIRCLE - GREEN (REFL)



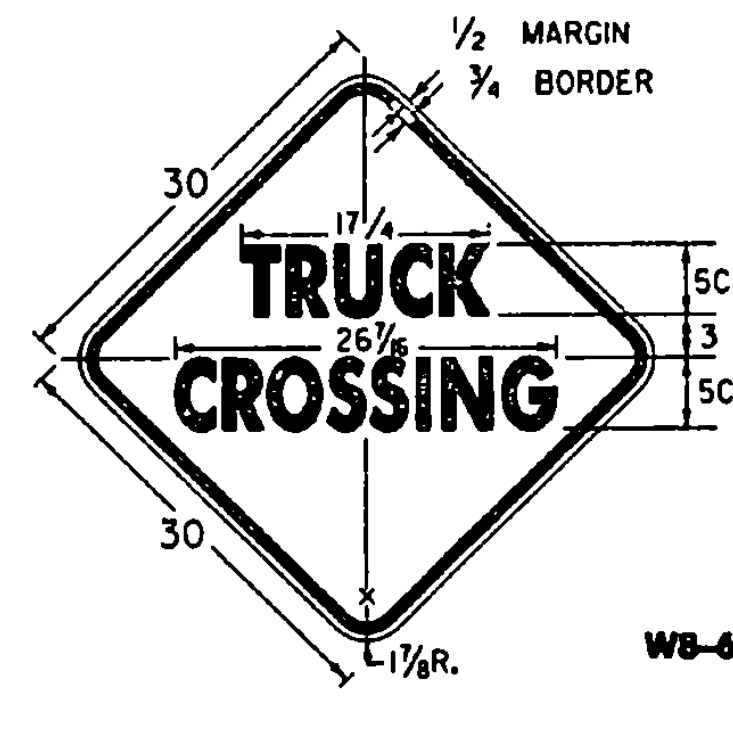
* REDUCE SPACING 50%



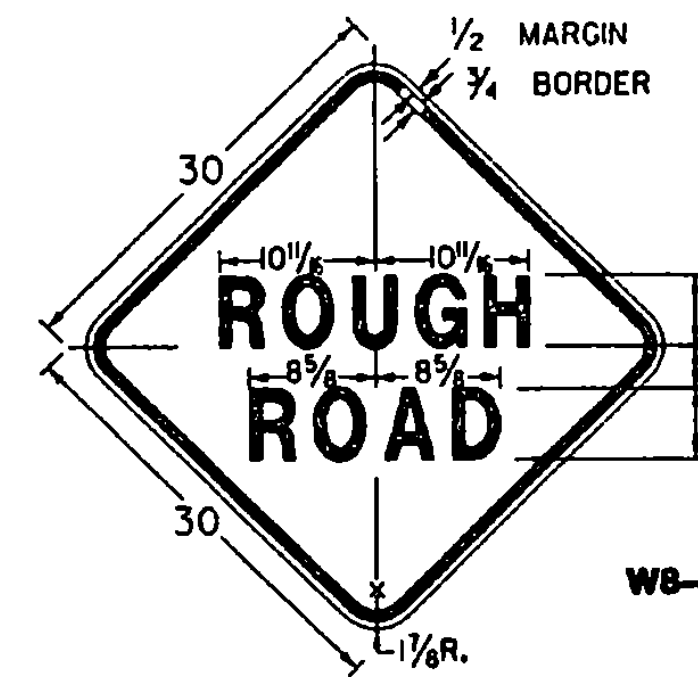
WB-1



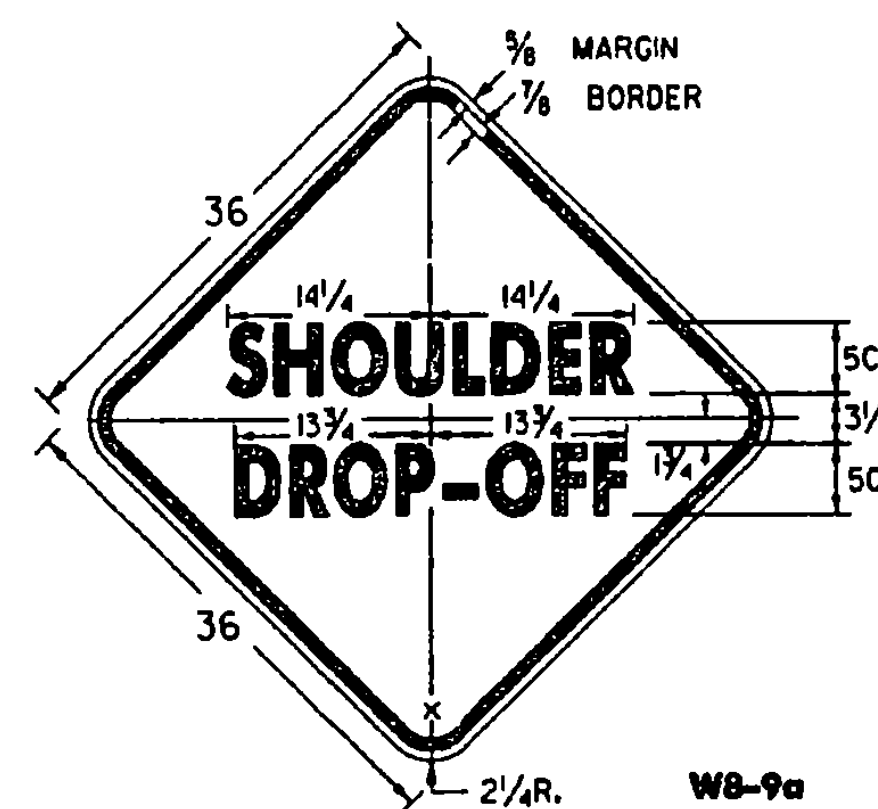
WB-3



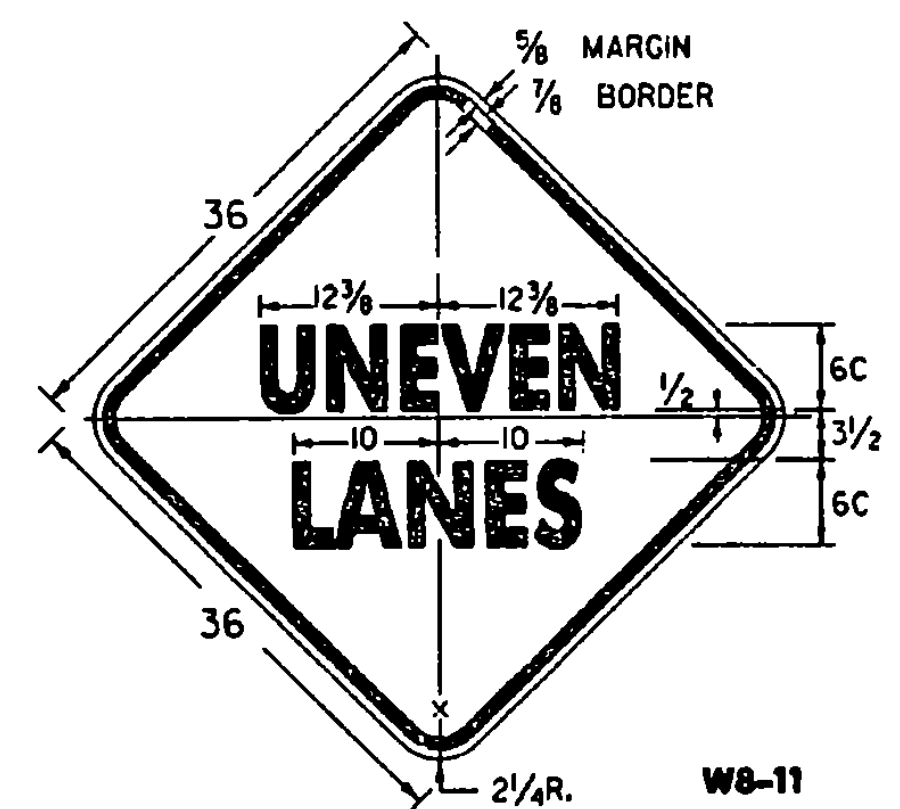
WB-4



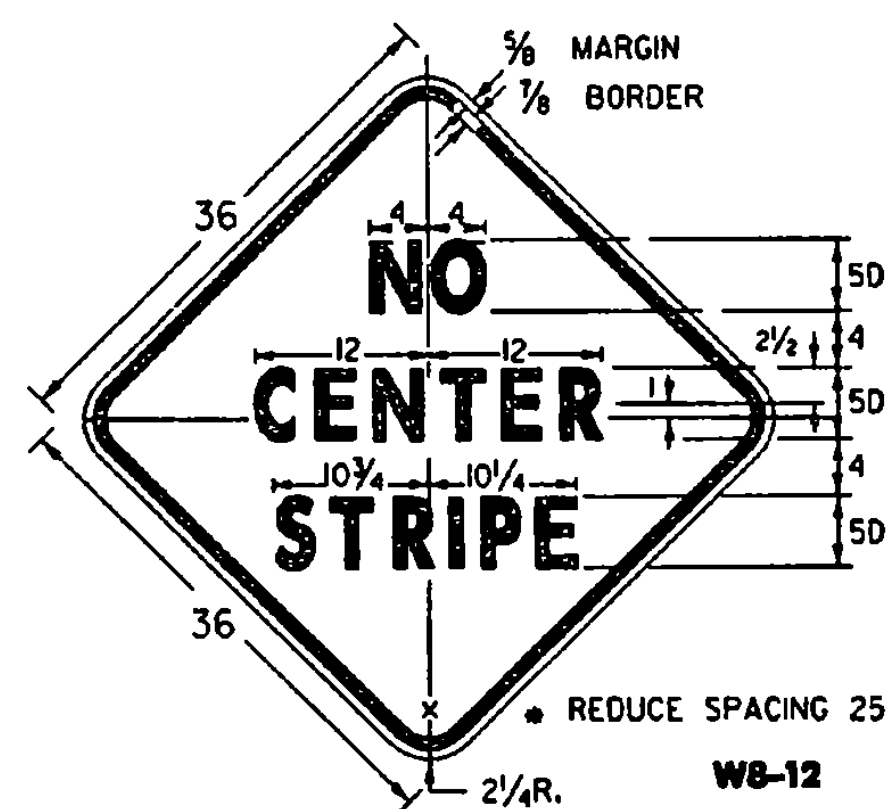
WB-5



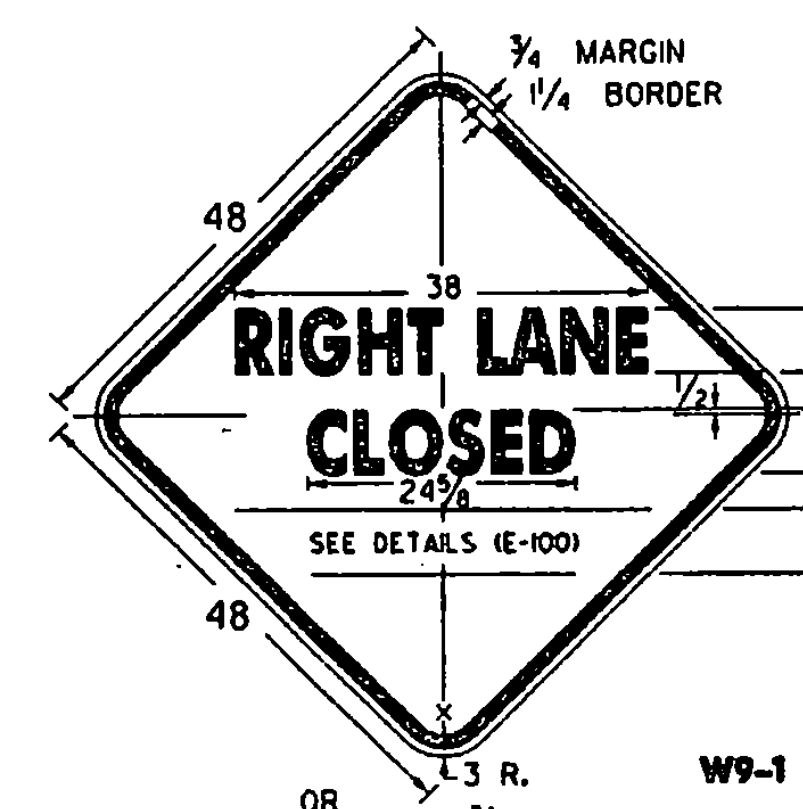
WB-9a



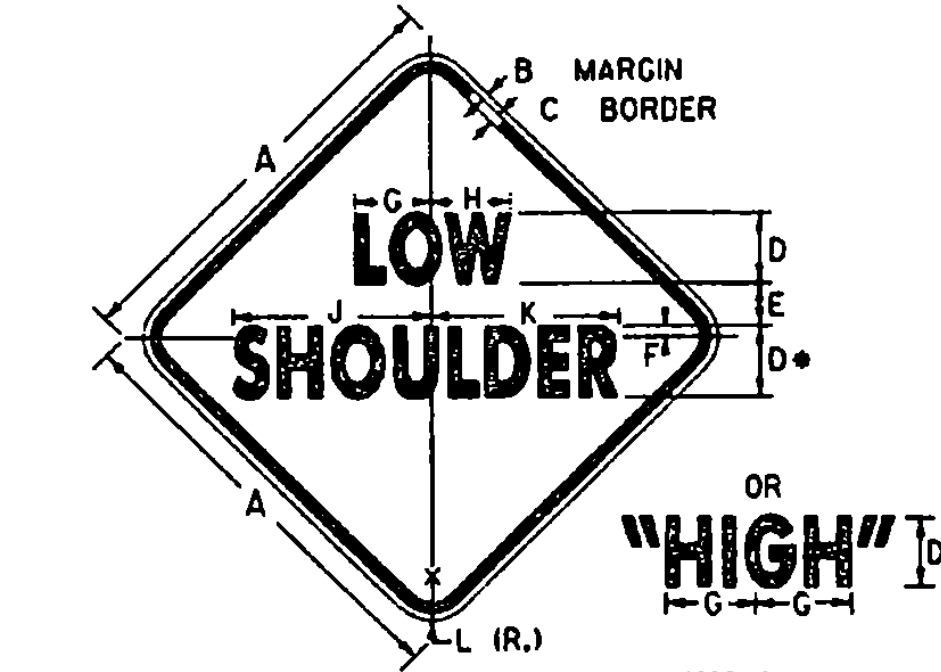
WB-11



WB-12



WB-9



OR "HIGH" L

SIGN	DIMENSIONS (INCHES)											
	A	B	C	D	E	F	G	H	J	K	L	
STD.	30	1/2	3/4	5C	3	3 3/8	5 3/8	13 3/8	13 3/8	1 1/4	3	
FRWY.	48	3/4	1 1/4	8C	5	1 1/2	8 1/4	9	2 1/4	20 1/4	3	

NOTES

SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS
COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS ON A REFLECTORIZED TYPE II B OR TYPE III ORANGE BACKGROUND, UNLESS OTHERWISE NOTED.

SIGNS USED ONLY FOR DAYTIME MAINTENANCE OPERATIONS DO NOT NEED TO BE REFLECTORIZED, HOWEVER, THESE SIGNS SHALL BE LABELED "DAYTIME USE ONLY" ON THE BACK OF THE SIGN PANEL WITH 3" SERIES C LETTERS.

(ALL DIMENSIONS SHOWN IN INCHES)

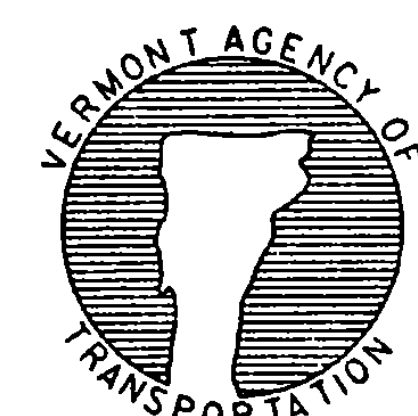
LEFT LANE

OTHER STDS. E-100 REQUIRED:

REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
OCT. 21, 1992 - ADDED ADDITIONAL SIGN DIMENSIONS, REVISED CHEVRON BACKGROUND TO ORANGE, & REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED AND DELETED VARIOUS SIGN DETAILS

APPROVED
Samuel D. McArthur
DIRECTOR OF ENGINEERING
Dwight A. Ross
TRAFFIC AND SAFETY ENGINEER

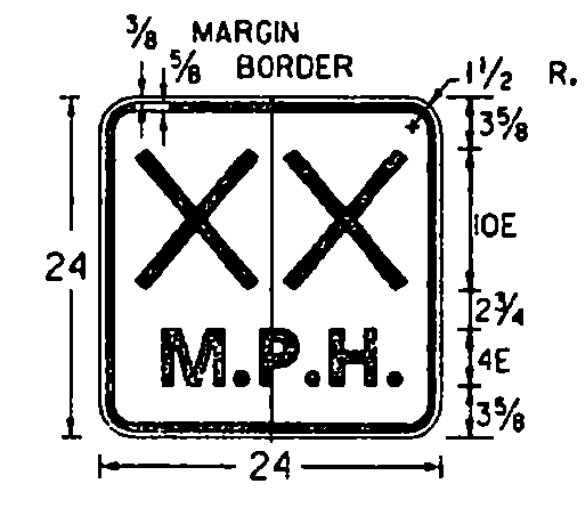
CONSTRUCTION SIGN DETAILS



STANDARD E-101

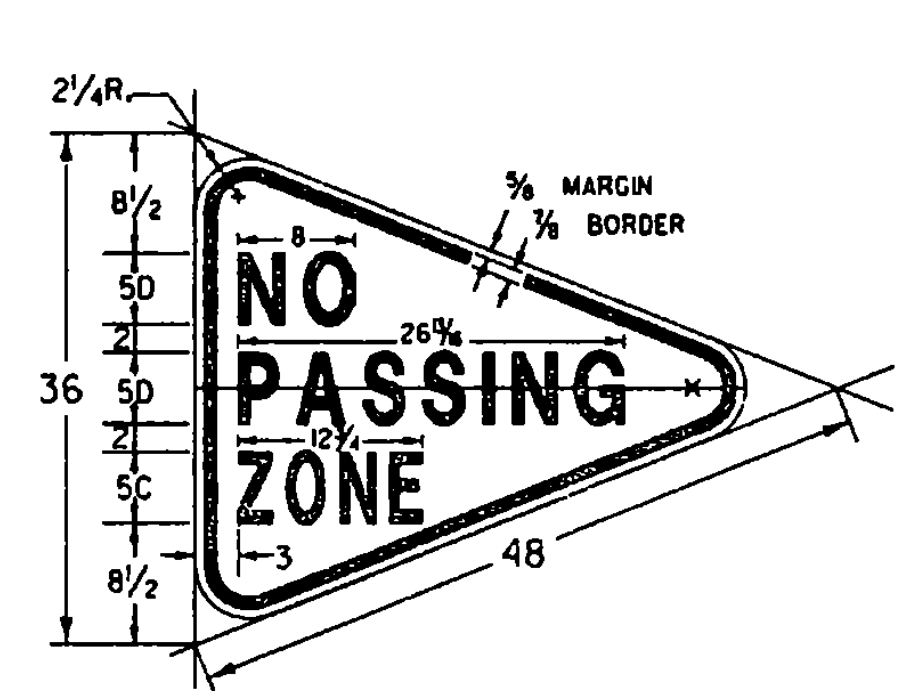
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

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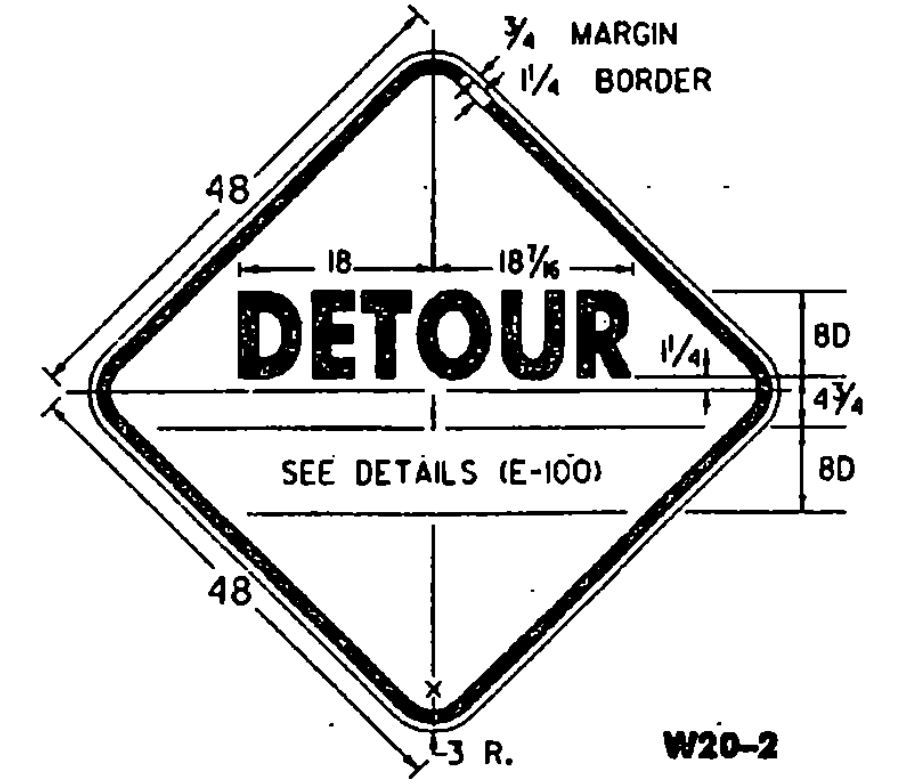


"XX" DENOTES ADVISORY SPEED AS SHOWN ON THE PLANS

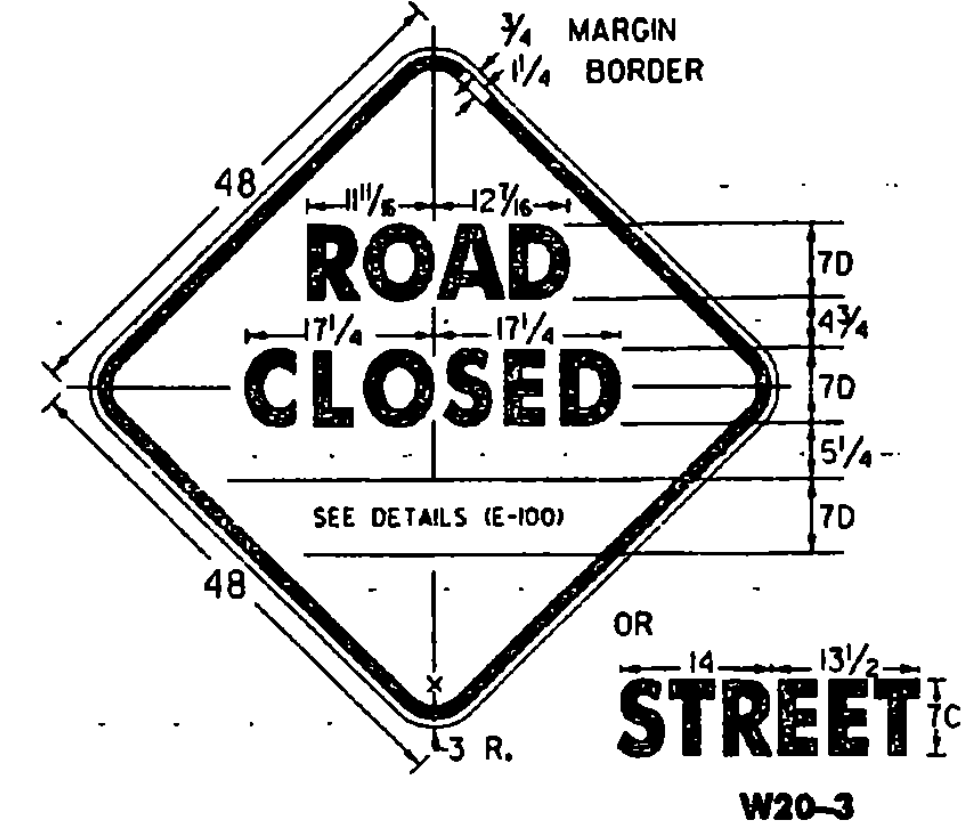
W13-1



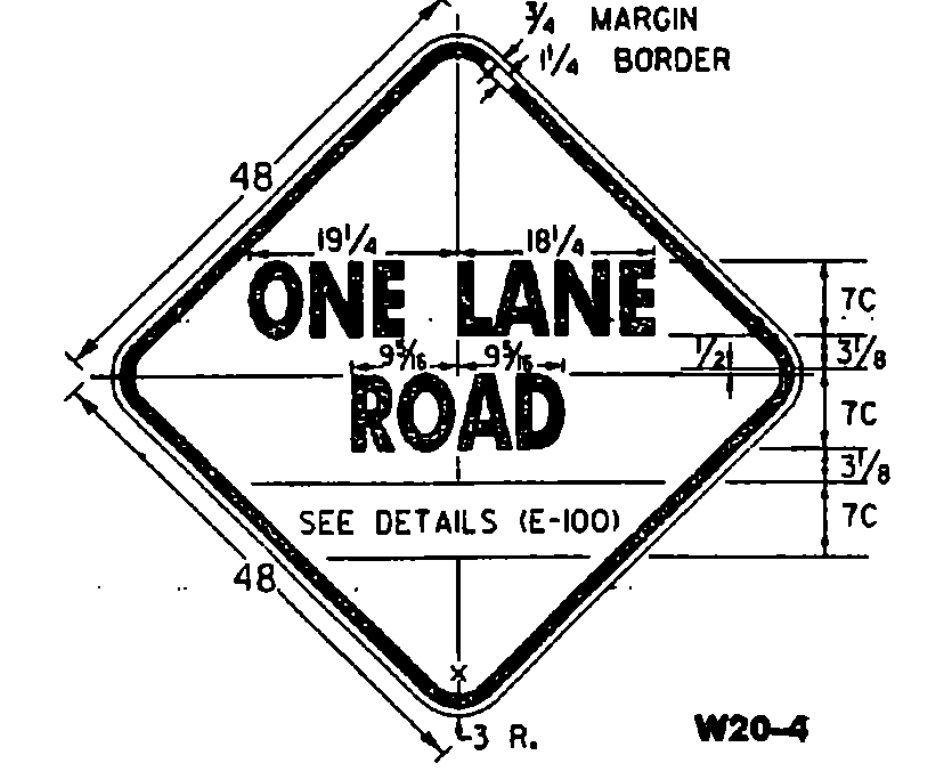
W14-3



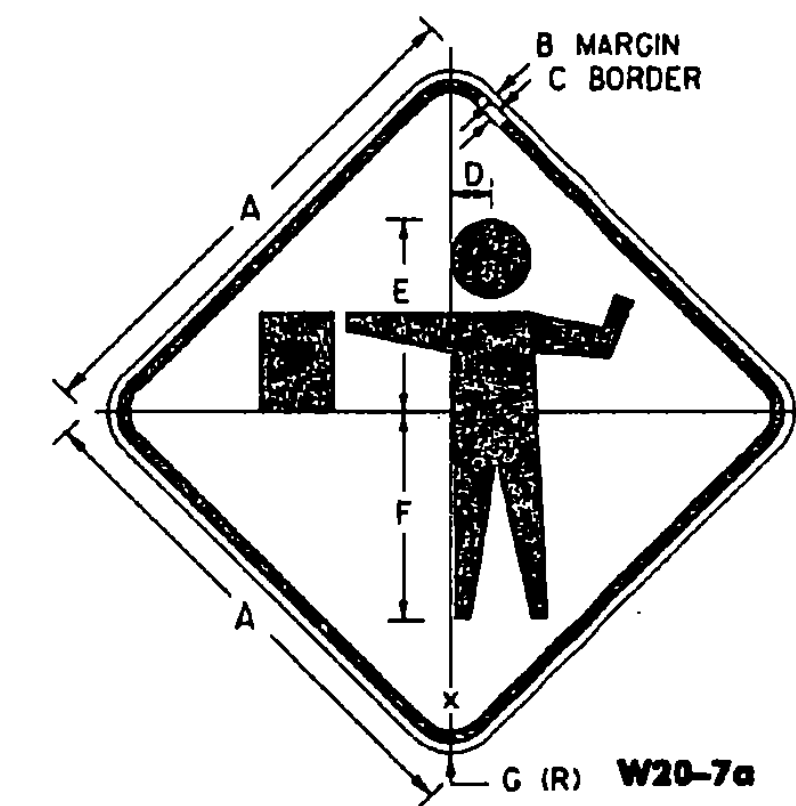
W20-2



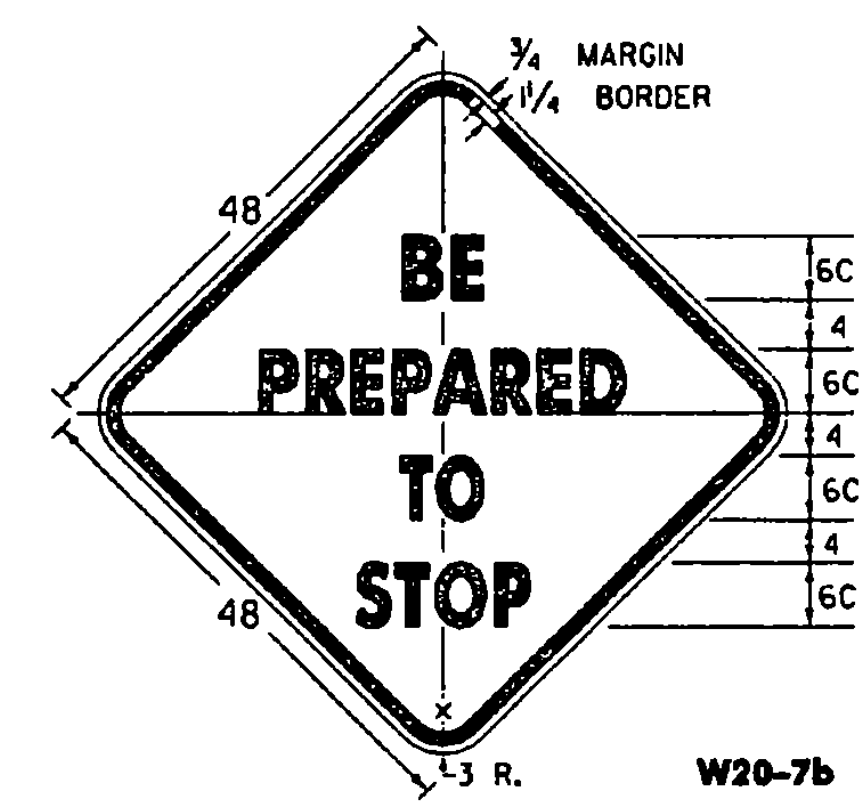
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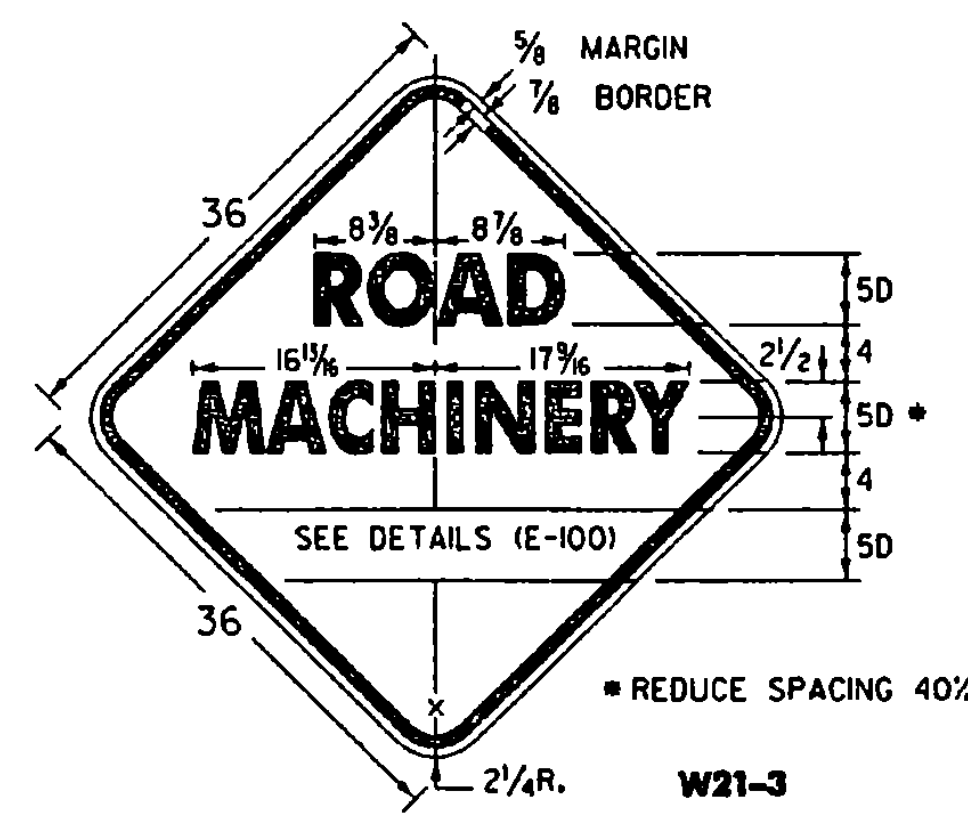
W20-4



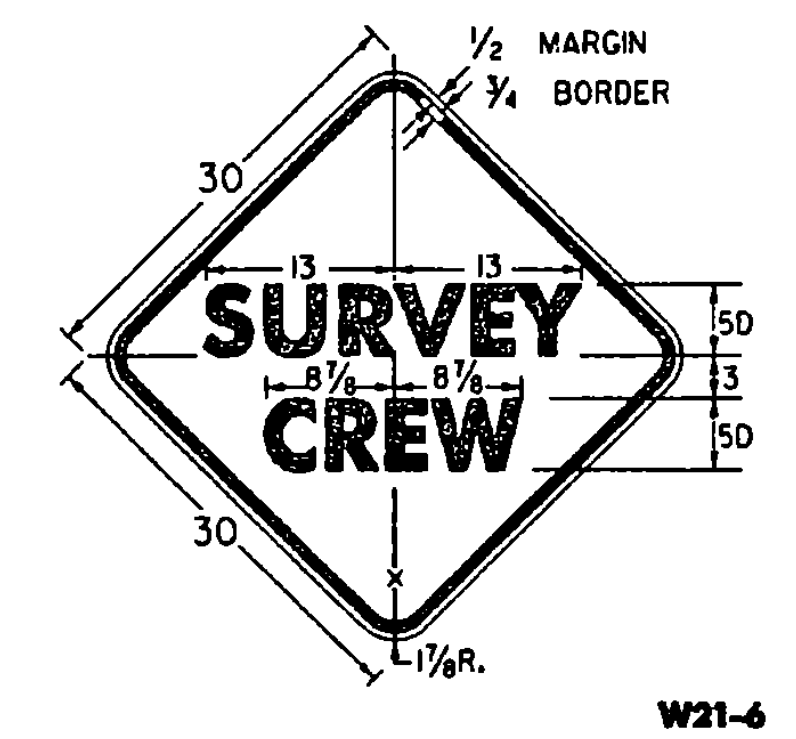
W20-7a



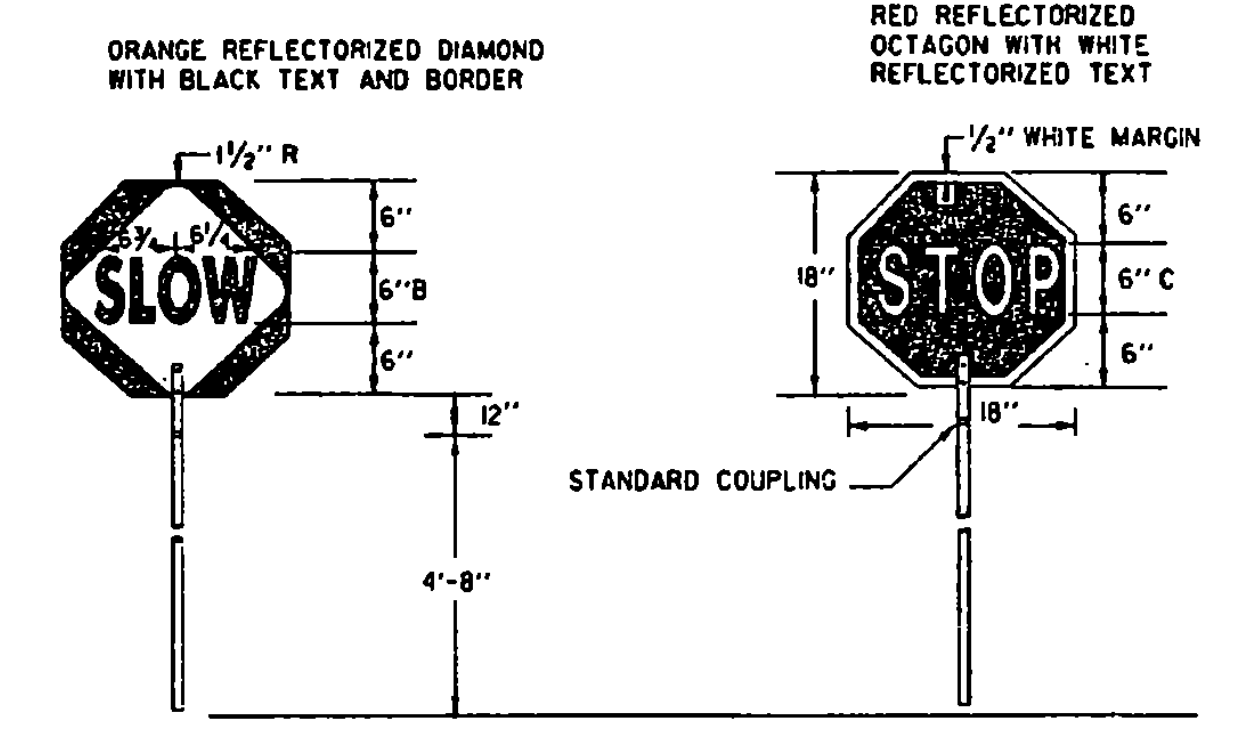
W20-7b



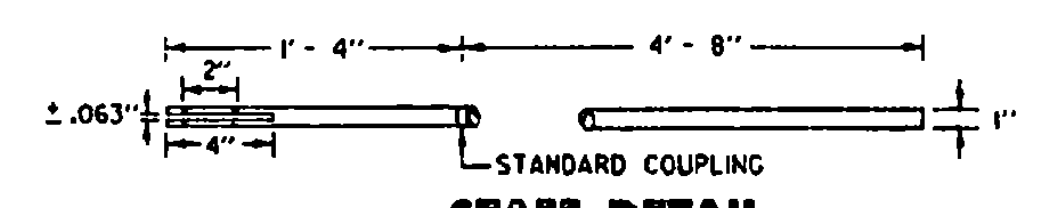
W21-3



W21-6



SIGN DETAIL



STAFF DETAIL

MATERIALS
THE SIGN MATERIALS SHALL BE 0.063" ALUMINUM WITH COLORS AS INDICATED ON DETAILS.
THE STAFF SHALL BE 3/4" TO 1" DIAMETER RIGID ALUMINUM CONDUIT/TUBING WITH A WALL THICKNESS OF 0.125", OR 1" TO 1 1/2" DIAMETER RIGID PVC CONDUIT/TUBING WITH 0.125" WALL THICKNESS

MOUNTING
THE STAFF SHALL BE MOUNTED WITH EITHER TWO 1/4" DIAMETER ALUMINUM BOLTS OR TWO 1/4" DIAMETER ALUMINUM RIVETS.

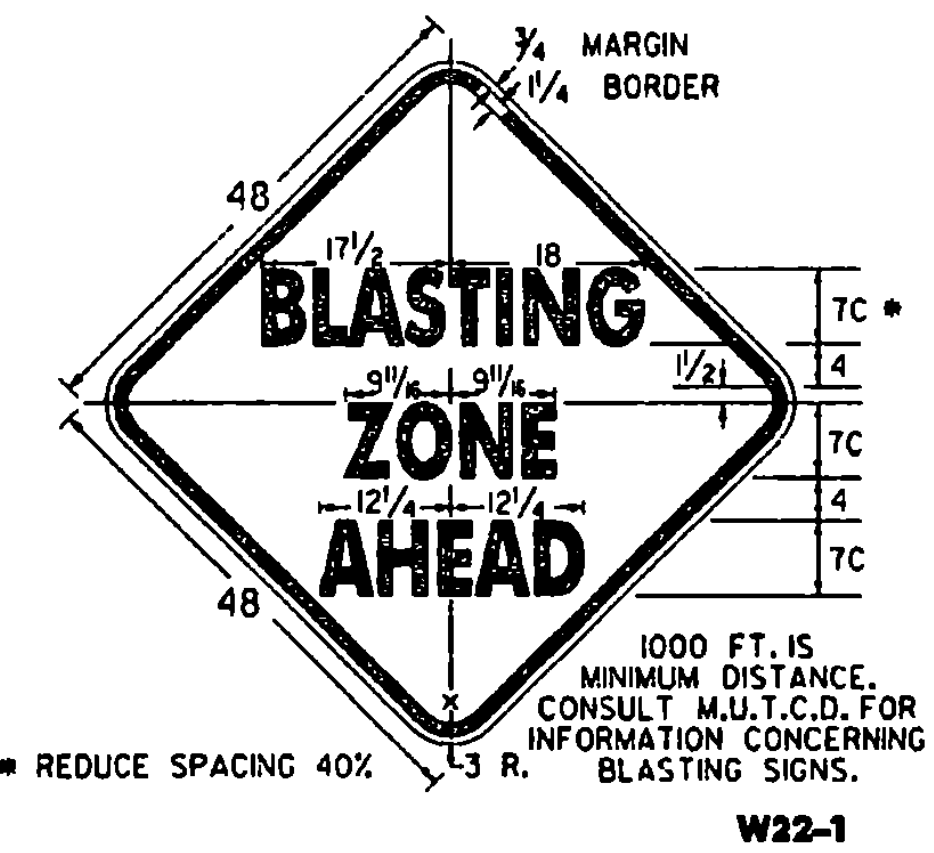
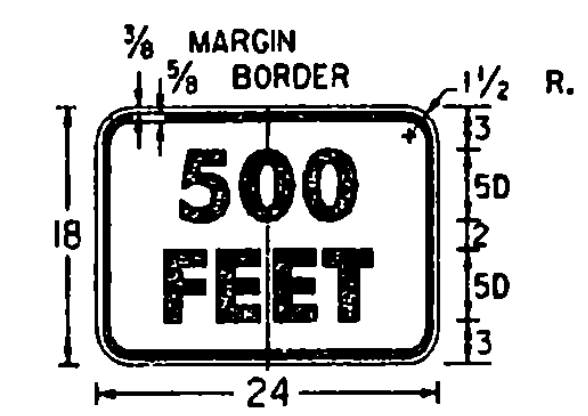
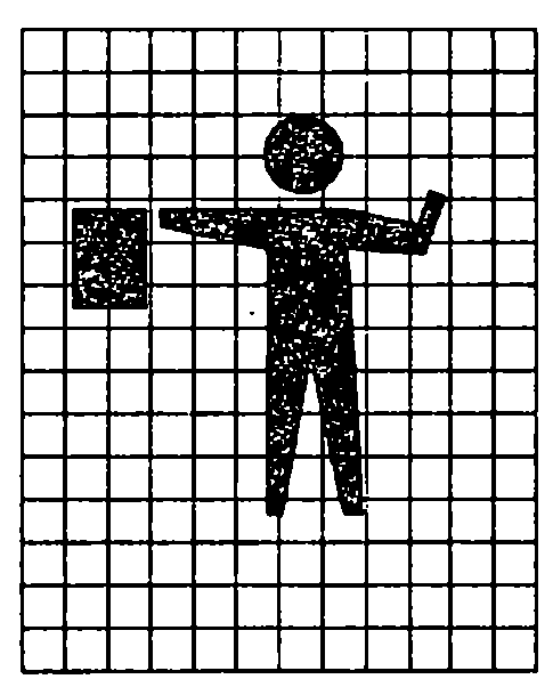
SIGN PADDLE FOR FLAGPERSON

NOTES

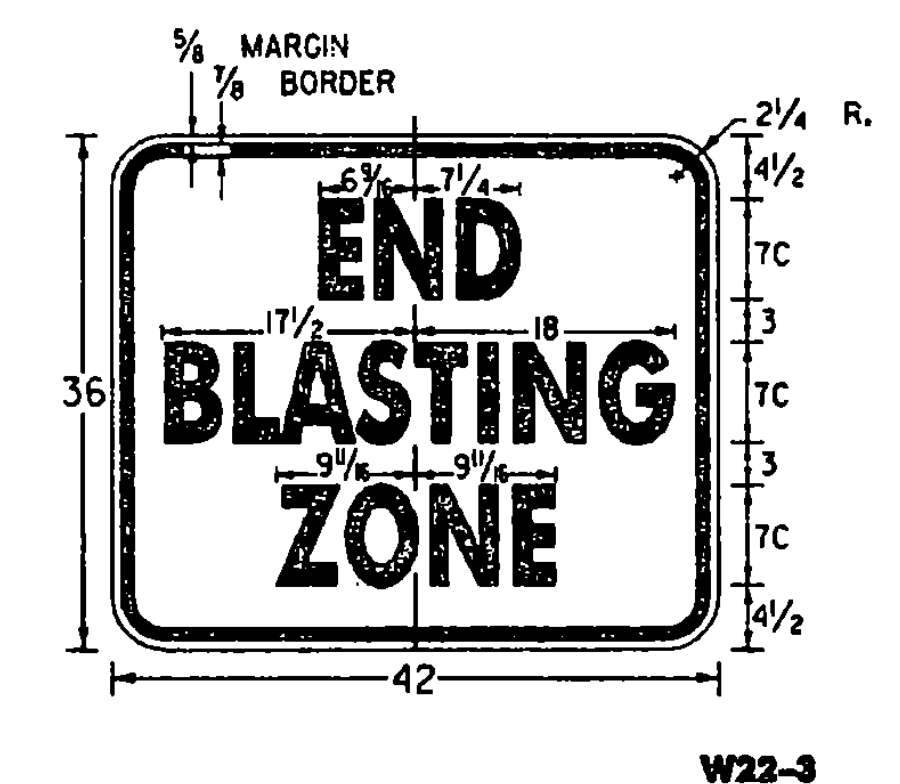
SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS
COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS SHALL BE ON A REFLECTORIZED ORANGE BACKGROUND OF TYPE II B OR TYPE III REFLECTIVE SHEETING, UNLESS OTHERWISE NOTED. THE EXCEPTION IS THE PADDLE SIGN.

SIGN DETAILS INDICATE THE APPROPRIATE COLOR.

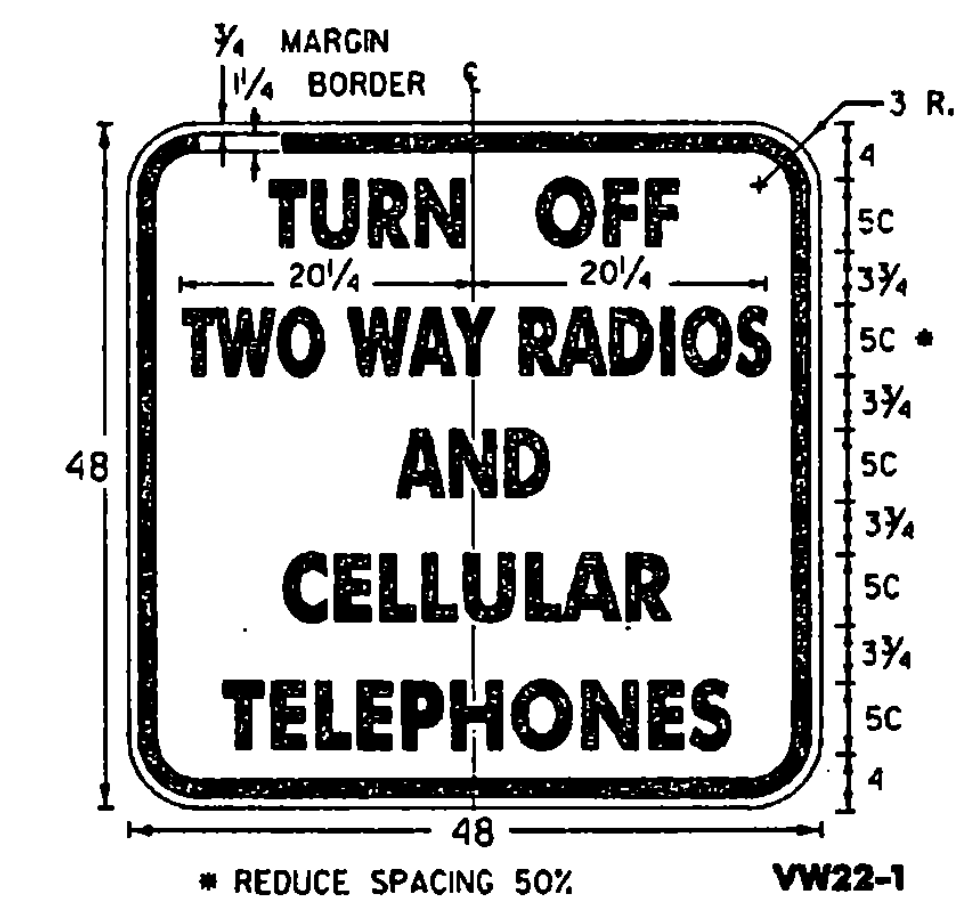
SIGNS USED ONLY FOR DAYTIME MAINTENANCE OPERATIONS DO NOT NEED TO BE REFLECTORIZED, HOWEVER, THESE SIGNS SHALL BE LABELED "DAYTIME USE ONLY" ON THE BACK OF THE SIGN PANEL WITH 3" SERIES C LETTERS.



W22-1



W22-3



W22-1

SIGN	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	G
STD.	36	3/8	1/4	2 3/4	13 1/2	14 3/8	2 1/4
FWY.	48	3/4	1 1/4	3 3/4	18	19 1/2	3

(ALL DIMENSIONS SHOWN IN INCHES)

OTHER STDS. E-100 REQUIRED:

REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
JAN. 23, 1989 - DELETE MOTORCYCLE SYMBOL SIGN AND SPEED SIGN, ADDED TWO SIGNS
OCT. 21, 1992 - ADDED A SIGN, REVISED A SIGN DIMENSION & TYPE ERROR & REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED FLAGGER GRID

APPROVED
Stephen D. MacArthur
DIRECTOR OF ENGINEERING
David A. Ross
TRAFFIC AND SAFETY ENGINEER

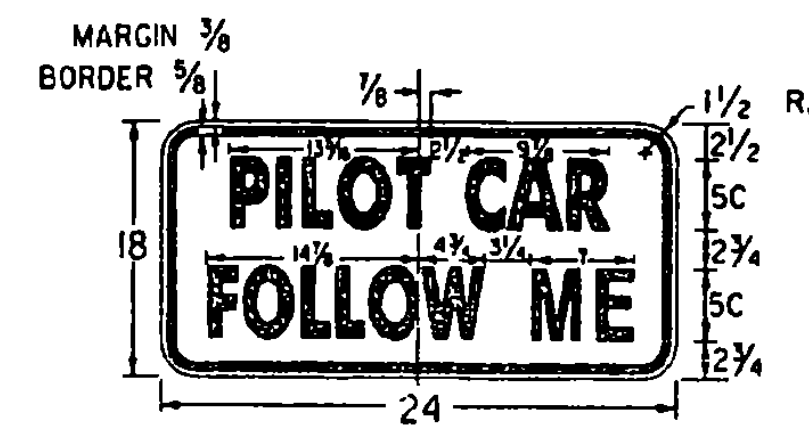
CONSTRUCTION SIGN DETAILS



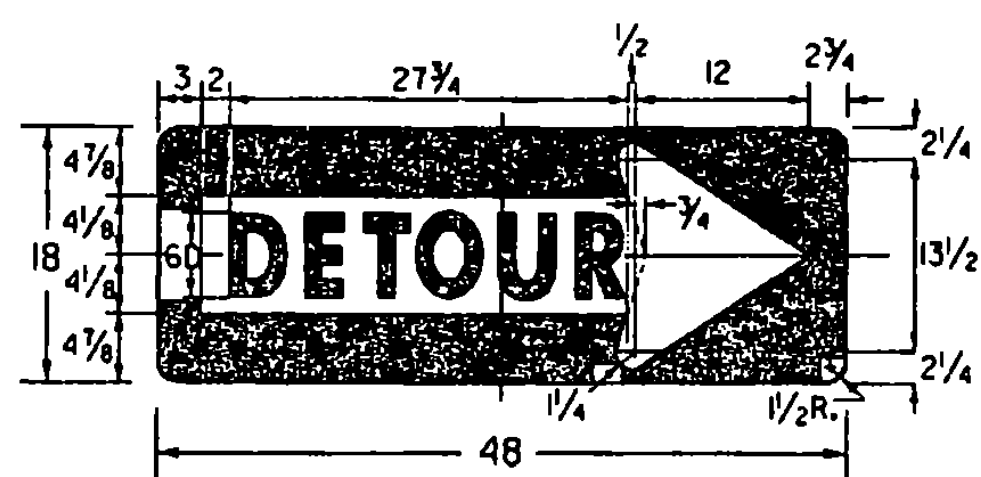
STANDARD E-102

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

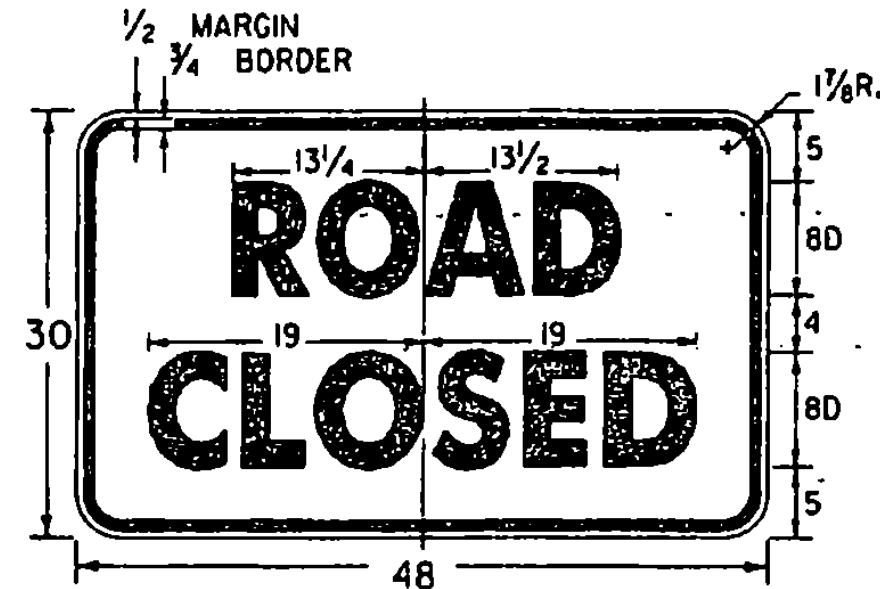
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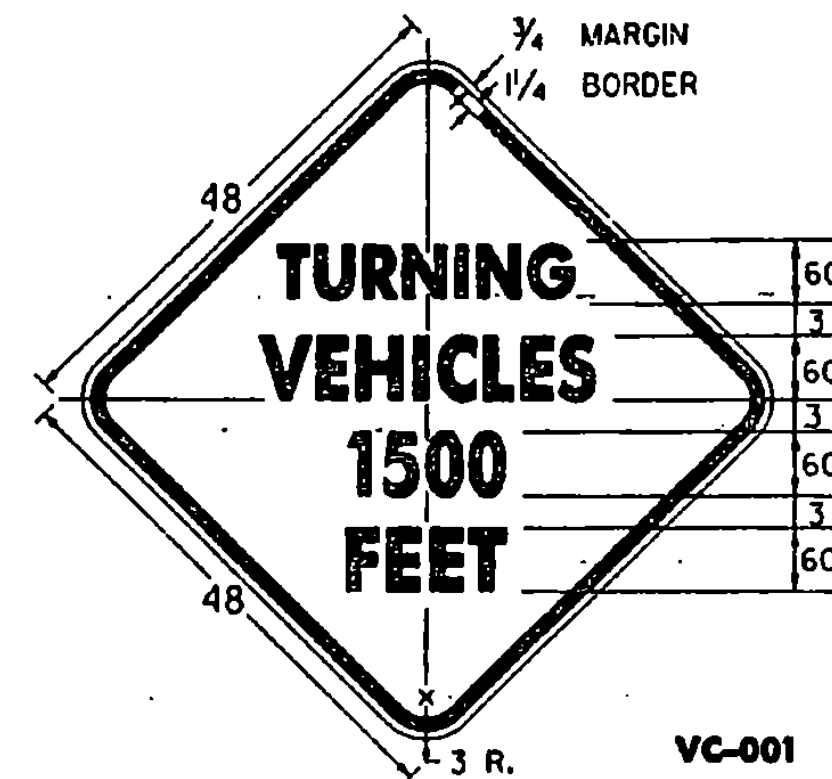
G20-4



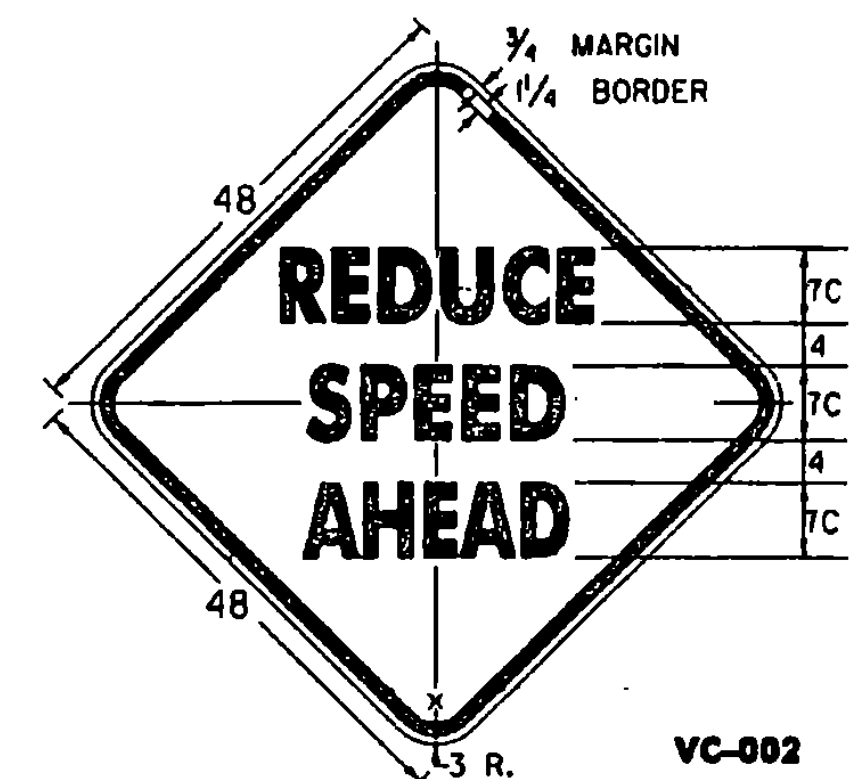
M4-10(R)



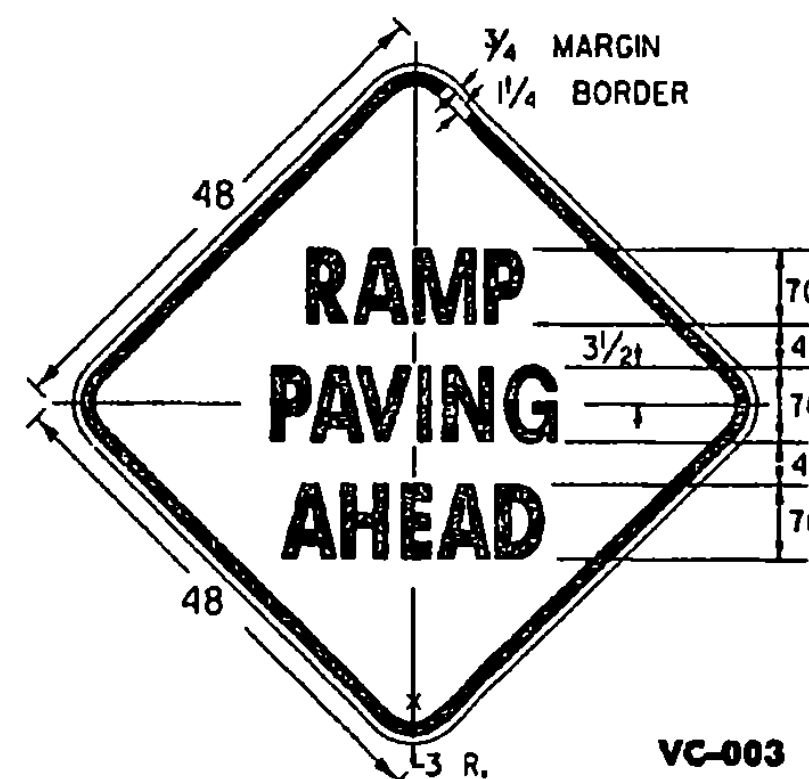
R11-2
COLORS:
BLACK TEXT AND BORDER
WHITE REFLECTORIZED BACKGROUND



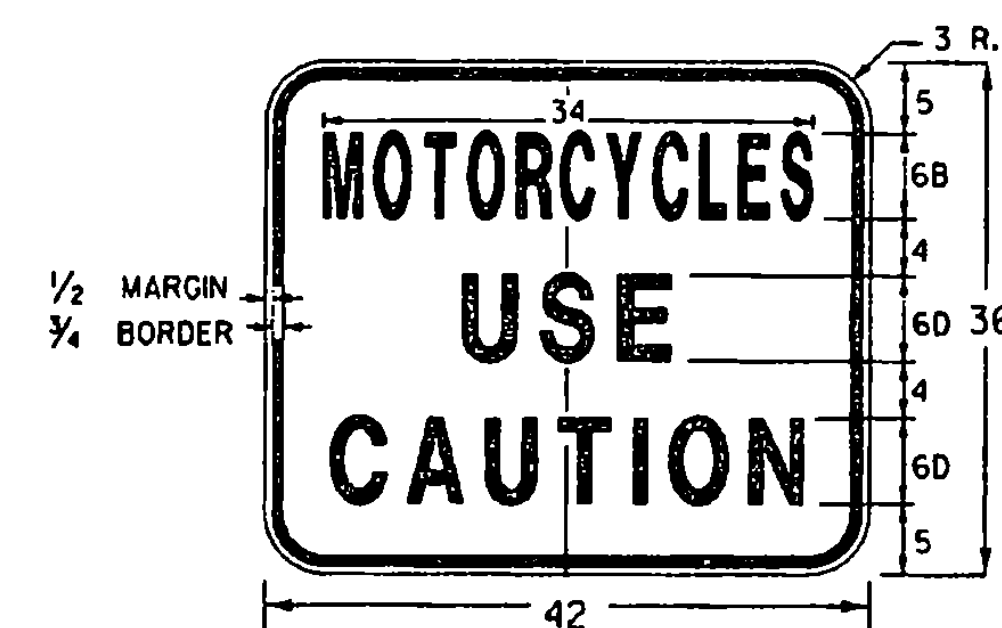
VC-001



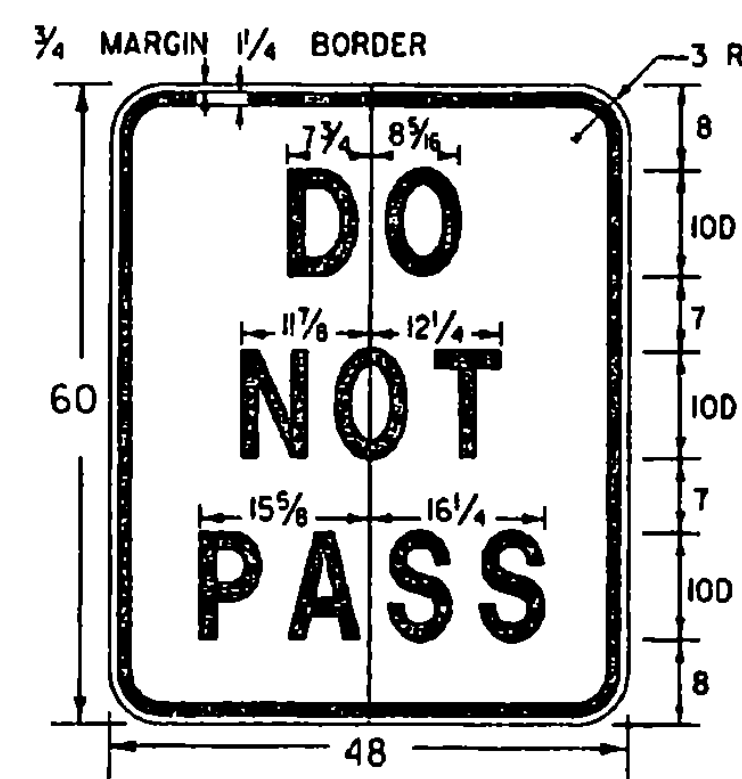
VC-002



VC-003

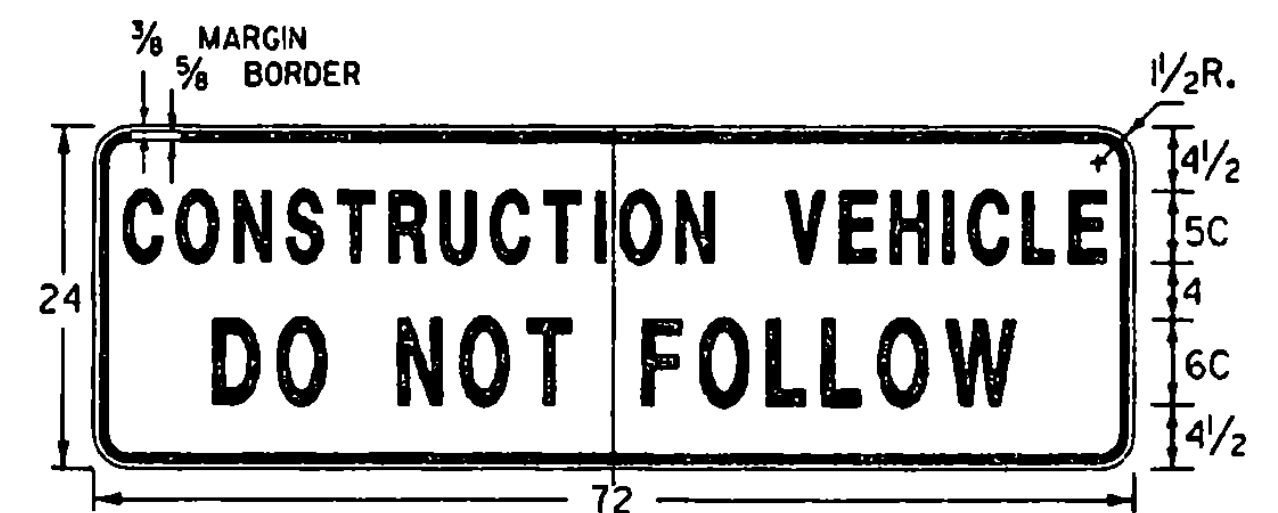


VC-004



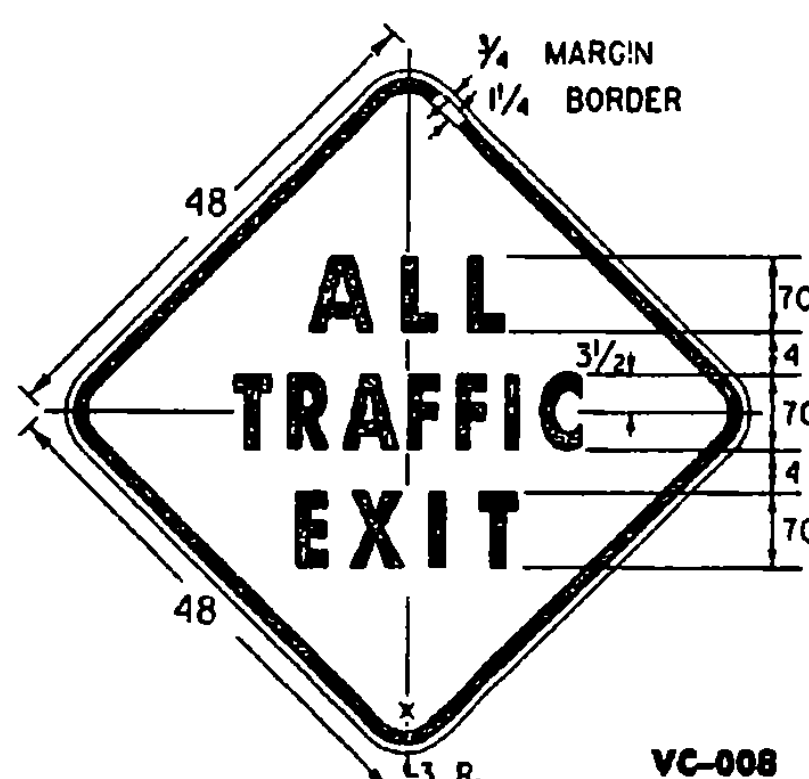
VC-005

• REDUCE SPACING BY 40%

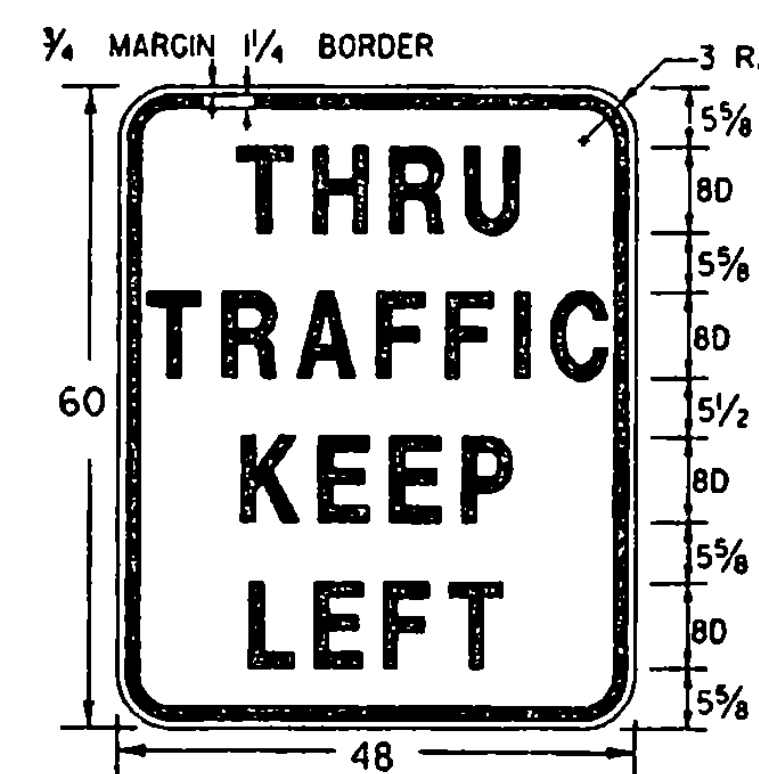


VC-007

IT IS SUGGESTED THAT THIS SIGN BE DESIGNED TO FOLD, (DOWN OR ACROSS), OR BE COVERED, OR BE REMOVED WHEN NOT IN USE. THE SIGN SHOULD ALSO BE MOUNTED AS TO NOT INTERFERE WITH THE VISIBILITY OF DIRECTIONAL OR TAIL LIGHTS AS REQUIRED BY LAW.

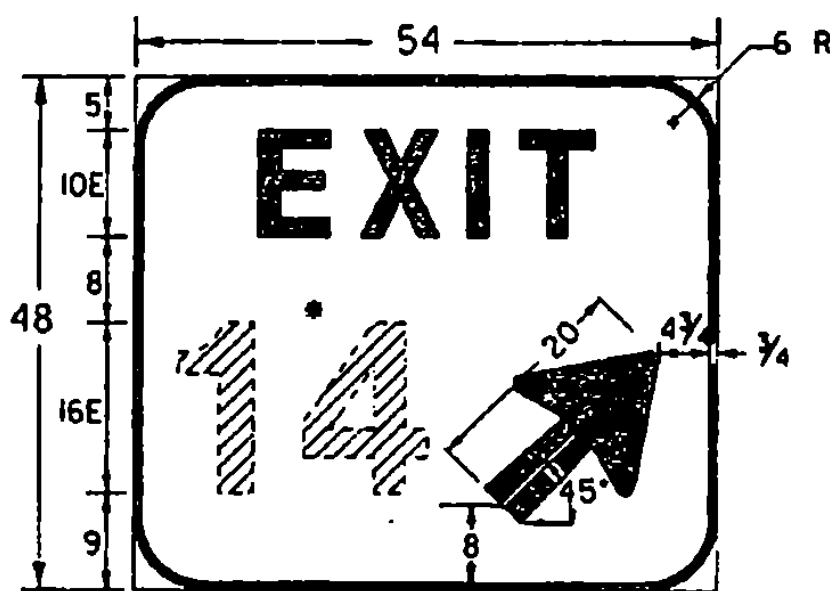


VC-008



VR-118

COLORS: BLACK BORDER & TEXT
WHITE (REFL.) BACKGROUND



E5-1a

• EXIT NUMBER AS PER PLANS OPTICALLY SPACED

COLORS:
BACKGROUND - GREEN (REFL.)
BORDER, ARROW AND LEGEND - WHITE (REFL.)

(ALL DIMENSIONS SHOWN IN INCHES)

NOTES

SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS

COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS SHALL BE ON A REFLECTORIZED ORANGE BACKGROUND OF TYPE II B OR TYPE III REFLECTIVE SHEETING, UNLESS OTHERWISE NOTED.

SIGN DETAILS INDICATE THE APPROPRIATE COLOR.

SIGNS USED ONLY FOR DAYTIME MAINTENANCE OPERATIONS DO NOT NEED TO BE REFLECTORIZED, HOWEVER, THESE SIGNS SHALL BE LABELED "DAYTIME USE ONLY" ON THE BACK OF THE SIGN PANEL WITH "3" SERIES C LETTERS.

OTHER STDS. E-100 REQUIRED:

REVISIONS AND CORRECTIONS
AUG 08, 1995 - DATE OF ORIGINAL ISSUE

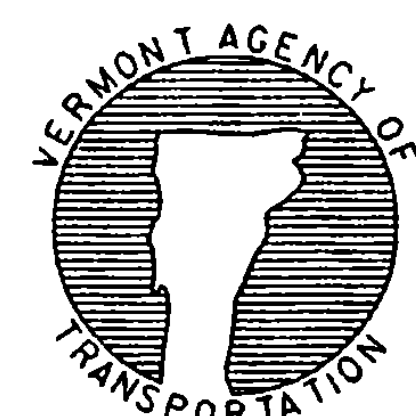
APPROVED

Stephen D. McArthur
DIRECTOR OF ENGINEERING

David A. Ross
TRAFFIC AND SAFETY ENGINEER

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

CONSTRUCTION SIGN DETAILS



STANDARD E-102A

TRAVEL LANE REQUIREMENTS

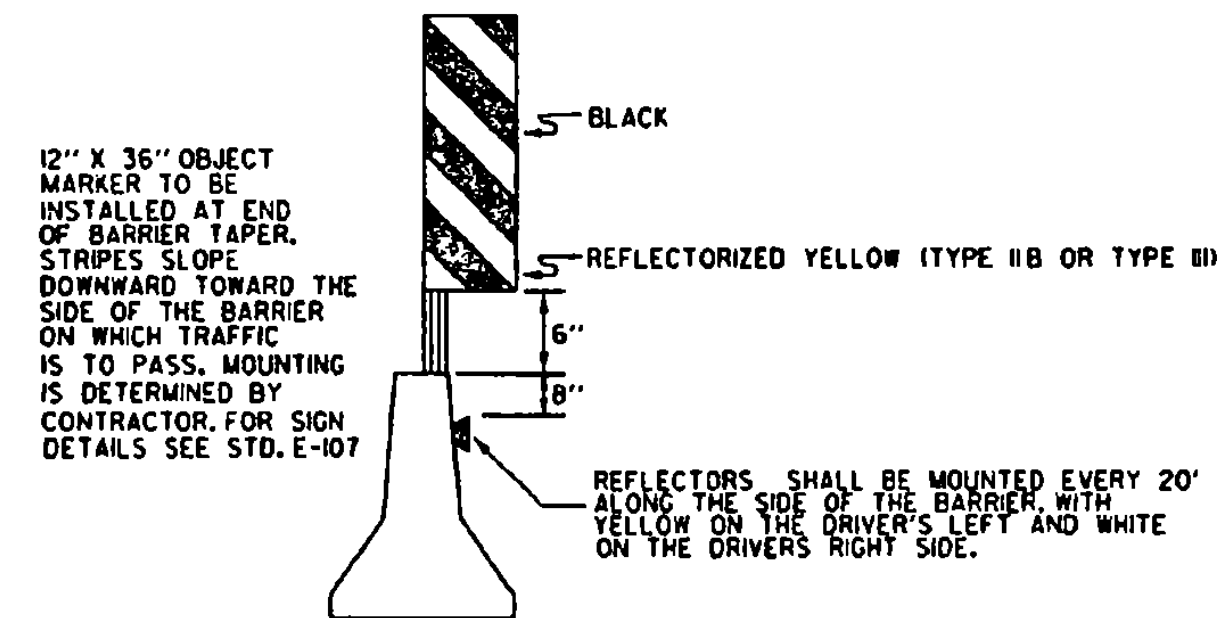
BARRIER SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE CENTERLINE TO ALLOW THE TRAFFIC TO USE THE NORMAL LANE WIDTH.

EDGE LINES SHALL BE REMOVED AND NEW TEMPORARY TAPE EDGE LINES APPLIED. THE DRIVER'S LEFT EDGE LINE SHALL BE A MINIMUM OF ONE FOOT, (TWO FEET IS DESIRABLE) FROM BARRIER. TRAVEL LANE SHALL BE 12 FEET WIDE.

THE TEMPORARY TAPE PAVEMENT MARKINGS SHALL BE OF A TYPE WHICH CAN BE COMPLETELY REMOVED AFTER THE PROJECT IS COMPLETED WITHOUT SCARRING OR MARKING THE PAVEMENT SURFACE. PAYMENT FOR THE TAPE MARKINGS SHALL BE UNDER THE APPROPRIATE ITEM NUMBERS.

PAVEMENT MARKING REMOVALS SHALL BE PAID UNDER THE APPROPRIATE ITEM NUMBER. TEMPORARY TAPE REMOVAL IS NOT PAID UNDER THE REMOVAL ITEM. IT IS SUBSIDIARY TO THE TAPE ITEM.

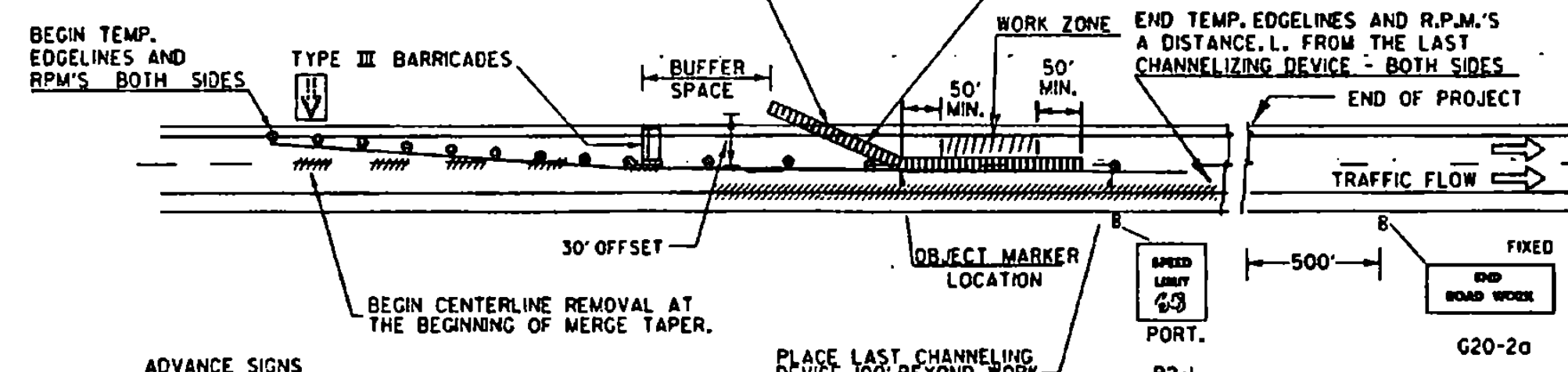
THE RAISED PAVEMENT MARKERS (RPM'S) SHALL BE OF A TYPE WHICH CAN BE EASILY REMOVED AND THEY SHALL BE PLACED TO THE OUTSIDE OF THE TEMPORARY TAPE PAVEMENT MARKINGS. THE RPM'S SHALL BE SPACED AT 20 FT. THE RPM'S ARE TO BE PAID UNDER THE ITEM TEMPORARY RAISED PAVEMENT MARKINGS. IF RPM'S ARE INCLUDED AS AN INTEGRAL PART OF THE TEMPORARY TAPE PAVEMENT MARKINGS, THEN THE COST OF THE RAISED MARKERS SHALL BE CONSIDERED A PART OF THE TEMPORARY PAVEMENT MARKING ITEM AND SEPARATE RPM'S SHALL NOT BE REQUIRED.



CONCRETE MEDIAN BARRIERS: PROVIDE A MINIMUM TAPER RATE AS SHOWN IN THE TABLE BELOW, WITH A MINIMUM OF 50 FT. OF TANGENT SECTION ON EACH END OF THE WORK ZONE. THE END OF THE BARRIER FACING APPROACHING TRAFFIC SHALL MEET THE FOLLOWING REQUIREMENT: WHEN NO GUARDRAIL IS PRESENT, USE 30' OFFSET FROM EDGE OF TRAVELLED WAY. IF GUARDRAIL IS PRESENT, THEN CONCRETE BARRIER CAN BE TAPERED TO A DISTANCE BEYOND THE DEFLECTION DISTANCE OF THE GUARDRAIL. IF A 30' OFFSET IS NOT ATTAINABLE OR TO A DISTANCE BEYOND THE DEFLECTION DISTANCE OF THE GUARDRAIL, THEN A CRASH ATTENUATOR DESIGNED FOR THE REGULAR SPEED LIMIT OF THE ROADWAY SHALL BE PROVIDED.

IF THE BARRIER IS PLACED SUCH THAT THE TEMPORARY TAPE CAN BE PLACED OVER THE EXISTING DASHED LINE, THEN THE EDGE LINES DO NOT NEED TO BE TAPERED BEFORE THE BARRIER AND THE DASHED MARKINGS DO NOT NEED TO BE REMOVED IN THE TANGENT SECTION.

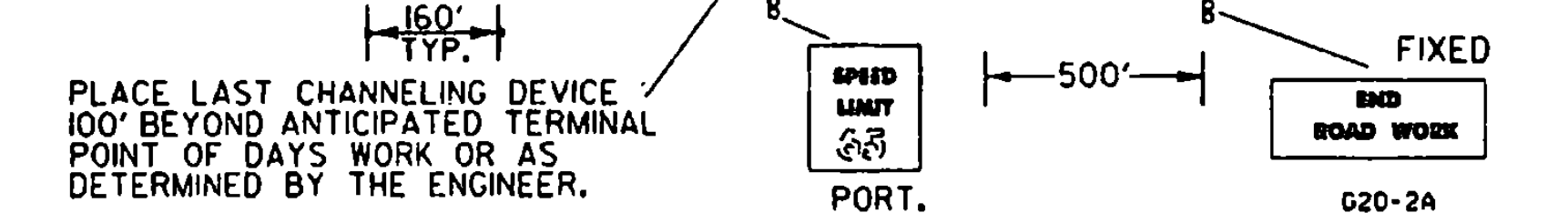
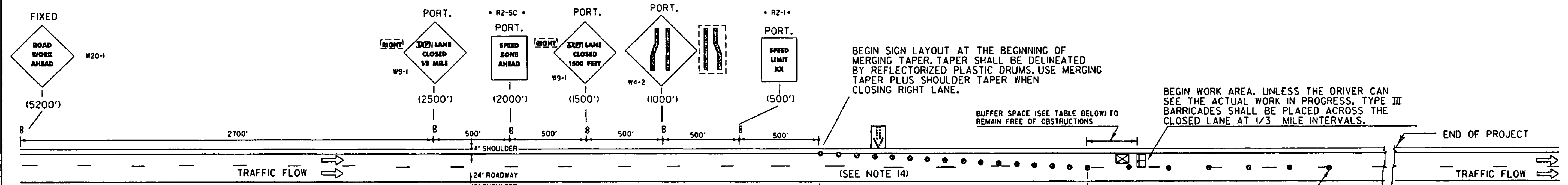
IF THE BARRIER IS PLACED SUCH THAT COVERING THE DASHED LINES WITH THE TEMPORARY TAPE EDGE LINE IS NOT POSSIBLE THEN THE EDGE LINES SHALL BE TAPERED A LENGTH, L, BOTH IN ADVANCE AND BEYOND THE BARRIER PLACED ON TANGENT.



ONE LANE CLOSED WITH POSITIVE BARRIER PROTECTION

NOTES

- WHEN CONSTRUCTION EQUIPMENT IS WORKING AT OR NEAR THE EXIT OR ENTRANCE RAMP, FLAGPERSONS OR UNIFORMED TRAFFIC CONTROL OFFICERS (UTO'S) SHOULD BE USED TO ASSIST IN CONTROLLING TRAFFIC. SEE STD. E-106 FOR TRAFFIC CONTROL DETAILS.
- ALL SIGNS SHALL BE PLACED BEFORE ANY WORK BEGINS OR EQUIPMENT IS PUT ON THE ROADWAY. SIGNS SHALL BE COVERED OR REMOVED WHEN NOT APPLICABLE. SEE STANDARD SHEET E-100 FOR REQUIREMENTS.
- CONTRACTOR SHALL HAVE CHANNELIZING DEVICES AND SIGNS FOR LEFT SIDE CLOSURE AND RIGHT SIDE CLOSURE ON PROJECT BEFORE STARTING PROJECT.
- EXISTING SPEED LIMIT SIGNS SHALL BE COVERED WHEN REDUCED SPEED SIGNS ARE POSTED.
- CHANNELIZING DEVICES OTHER THAN REFLECTORIZED PLASTIC DRUMS WILL BE ALLOWED ALONG TANGENT SECTIONS AS LONG AS THEY CONFORM TO THE M.U.T.C.D. AND ARE APPROVED BY THE RESIDENT ENGINEER. THE TYPE OF DEVICE SHALL BE CONSISTENT THROUGHOUT THE TANGENT SECTION.
- THE "SPEED LIMIT XX" AND OTHER RELATED SIGNS SHALL BE REMOVED OR COVERED WHEN WORK IS NOT IN PROGRESS AND ROADWAY IS NOT RESTRICTED.
- "REDUCED SPEED AHEAD" SIGNS MAY BE USED IN LIEU OF "SPEED ZONE AHEAD".
- FOR RELATIVELY SHORT TERM PROJECTS WITH NO OFFICIAL SPEED ZONE ENACTMENT, THE SPEED LIMIT AND REDUCED SPEED LIMIT SIGNS CAN BE SUBSTITUTED WITH ADVISORY SPEED PLATES MOUNTED AS SUPPLEMENTAL SIGNS ON OTHER WARNING SIGNS.
- ALL FIXED SIGNS SHALL BE MOUNTED ON YIELDING STEEL, ALUMINUM OR WOOD SUPPORTS AS SHOWN ON APPROPRIATE STANDARD SHEETS.
- PORTABLE SIGNS SHALL BE KEPT LEVEL WHEN PLACED ON THE EDGE OF ROADWAY AND ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. PAYMENT SUBSIDIARY TO OTHER ITEMS. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACES SHALL BE PLACED ABOVE THE TOP OF THE GUARDRAIL.
- WARNING LIGHTS SHALL NOT BE USED ON CHANNELIZING DEVICES.
- THE NUMBER OF CHANNELIZING DEVICES, TYPE III BARRICADES AND OTHER TRAFFIC CONTROL DEVICES SHOWN ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE ACTUAL NUMBER REQUIRED ARE TO BE DETERMINED BASED ON INDIVIDUAL DETOUR CONDITIONS (TAPERS, SPEED LIMITS, LENGTH OF DETOUR CURVE, ETC.).
- FOR ANY LONG TERM CLOSURE (GREATER THAN 3 DAYS) EXISTING CENTERLINE SHALL BE REMOVED AND TEMPORARY EDGE LINES PLACED AS SHOWN WITH POSITIVE BARRIER.



LEGEND

- (500) - DENOTES DISTANCE FROM BEGIN MERGE TAPER
 - - FLASHING ARROW PANEL
 - - REFLECTORIZED PLASTIC DRUM
 - //// - PAVEMENT MARKING REMOVAL
 - ▬ - CONCRETE MEDIAN BARRIER
 - - TYPE III BARRICADE
 - ⊠ - TRUCK/TRAILER MOUNTED ATTENUATOR (OPTIONAL)
- IF CONSTRUCTION ACTIVITIES REDUCE LANE WIDTHS TO THE POINT WHERE 40 MPH CANNOT BE MAINTAINED, ADDITIONAL ADVISORY SPEED PLATE SIGNS SHALL BE INSTALLED UNDER THE LANE REDUCTION TRANSITION SIGN. FLAGPERSONS AND U.T.O.'S SHALL NOT BE ALLOWED TO INTERFERE WITH TRAFFIC BY STEPPING INTO THE LANE TO REDUCE THE DRIVER'S SPEED.

POSTED SPEED OR 85TH PERCENTILE M.P.H.	MERCING TAPER 12' LANE	SHOULDER TAPER W=10'	BARRIER TAPER RATE	BUFFER SPACE (MINIMUMS)
40	320'	90'	9 TO 1	160'
45	540'	150'	-	270'
50	600'	170'	11 TO 1	300'
55	660'	190'	-	330'
60	720'	200'	13 TO 1	360'
65	780'	220'	-	390'

TAPER FORMULA:
 $L = S \times W$ FOR SPEEDS OF 45 OR MORE.
 $L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 OR LESS.
 WHERE:
 L = MINIMUM LENGTH OF TAPER.
 S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK OR 85 PERCENTILE SPEED.
 W = WIDTH OF OFFSET.

REVISIONS AND CORRECTIONS

OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
 JAN. 23, 1989 - FHWA COMMENTS - CHANGE TO 65 M.P.H. TAPER RATES
 OCT. 21, 1992 - ADDED TAPER RATE TABLE & REVISED TITLE BLOCK
 AUG. 08, 1995 - DELETED AN INVALID NOTE

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

APPROVED

Scott D. McAllen
 DIRECTOR OF ENGINEERING

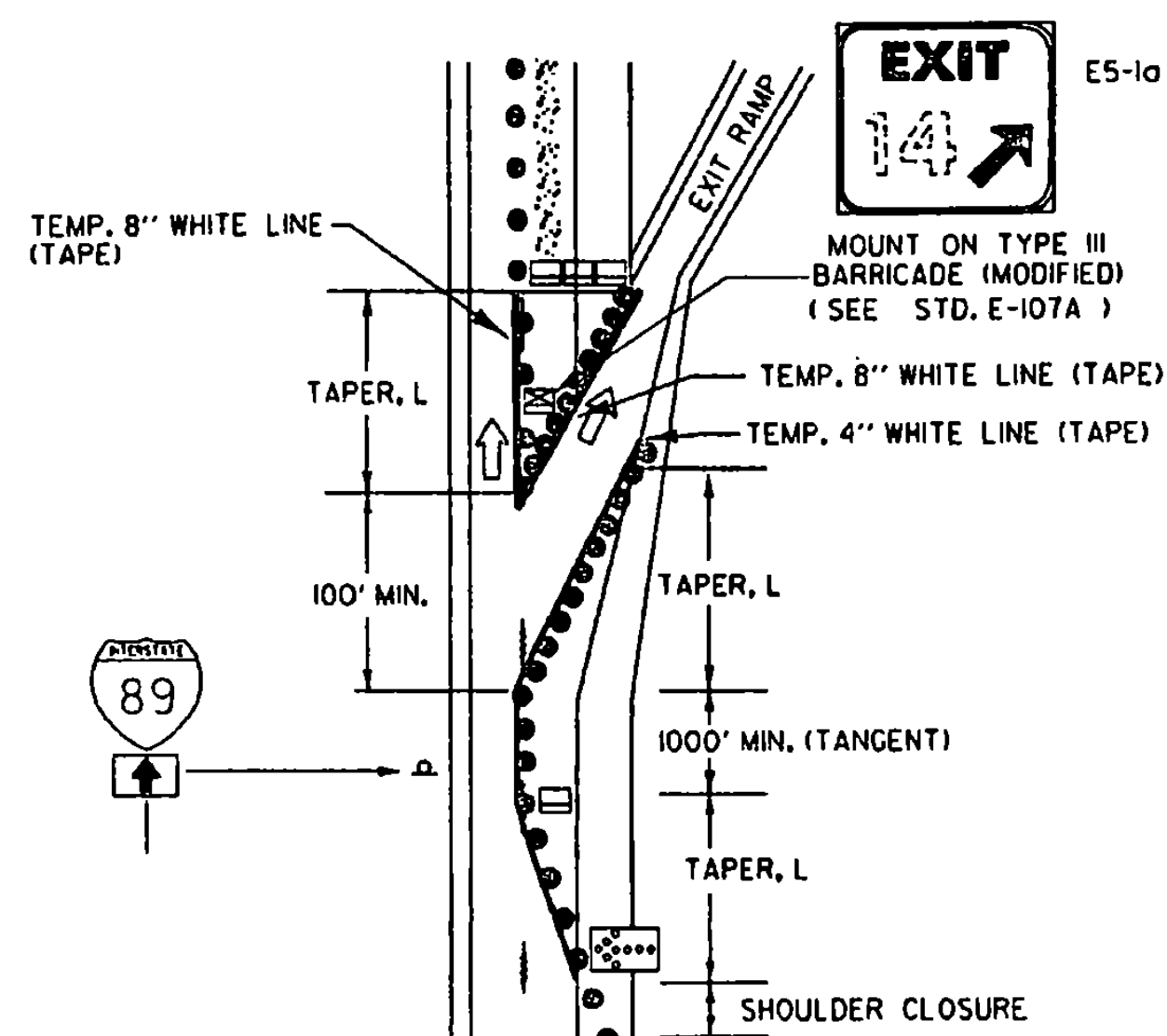
David A. Reed
 TRAFFIC AND SAFETY ENGINEER

MAINLINE TRAFFIC CONTROL DIVIDED HIGHWAY ONE LANE CLOSED

OTHER STDS. REQUIRED: E-100 E-101 E-102 E-102A E-107A

VERMONT AGENCY OF TRANSPORTATION

STANDARD E-103



NOT TO SCALE

MAINLINE LANE CLOSURE AT AN EXIT RAMP

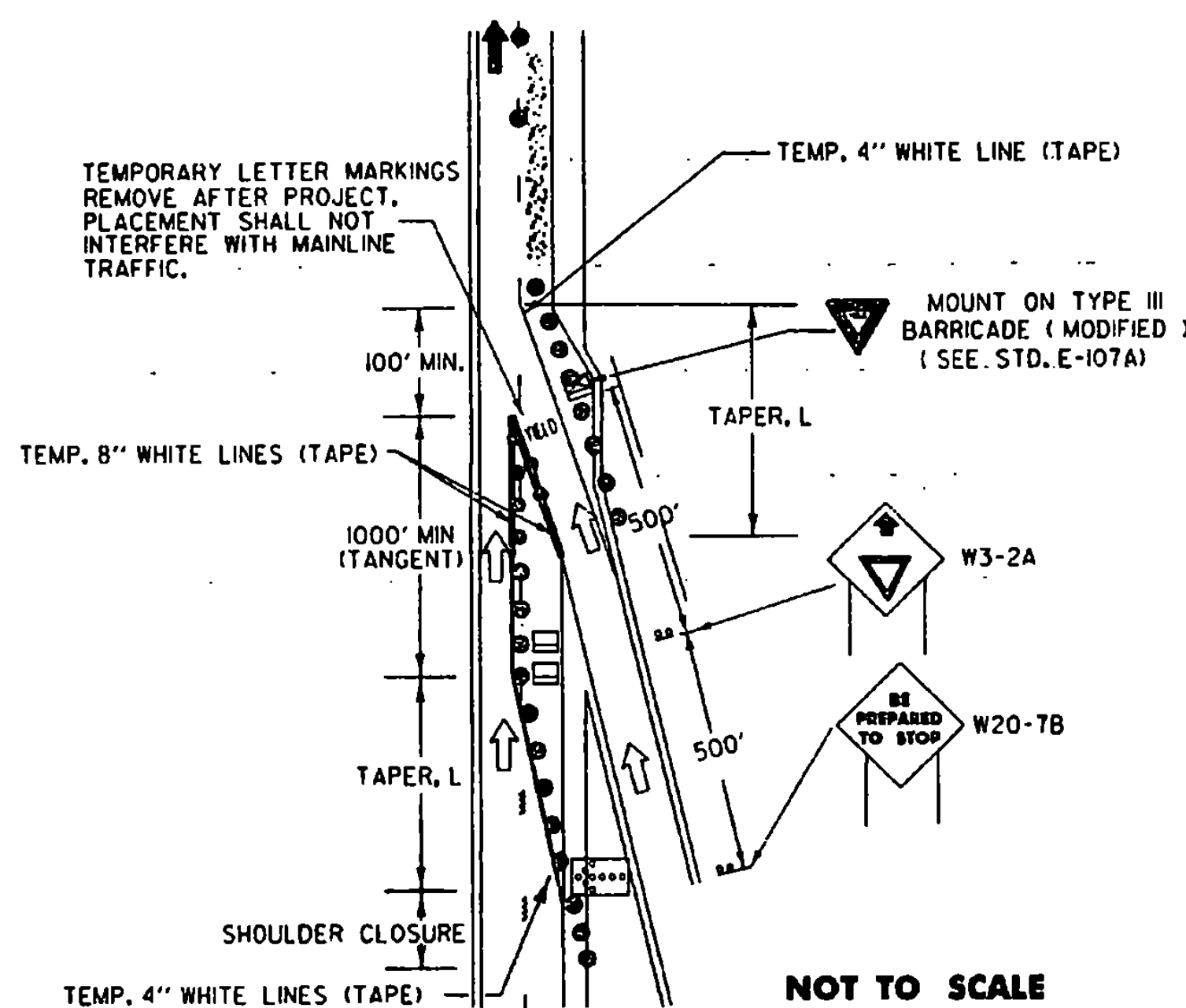
THIS DETAIL SHALL BE USED WHEN THE WORK ZONE BEGINS AT THE CORE OR THE MAINLINE LANE CLOSURE DRUM PLACEMENT INTERFERES WITH THE EXIT RAMP.

NOTES:

- 1) ALL SIGNS SHALL BE MOUNTED ON FIXED POSTS (YIELDING TYPE) UNLESS OTHERWISE NOTED.
- 2) CHANNELIZING DEVICES SHALL BE PLACED AS FOLLOWS:
TAPERS - DEVICES SHALL BE SPACED A MAXIMUM OF "S" (THE SPEED LIMIT IN FEET) APART.
TANGENT - DEVICES SHALL BE SPACED 2 X "S" (THE SPEED LIMIT IN FEET) APART.
- 3) ALL DISTANCES ARE DESIRABLE MINIMUMS FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
- 4) TAPER RATES ARE BASED ON THE POSTED MAINLINE AND EXIT SPEEDS.
- 5) TEMPORARY PAVEMENT MARKINGS ARE REQUIRED WHEN THE LAYOUT IS TO BE IN EFFECT FOR THREE DAYS OR MORE.
- 6) LANE CLOSURES AND TAPER LENGTHS, L, AS DETAILED ON STANDARD E-103.
- 7) EXIT SIGN SHALL BE MOUNTED A MINIMUM OF 3' ABOVE THE GROUND AND HIGH ENOUGH TO BE SEEN ABOVE CHANNELIZING DEVICES.

LEGEND

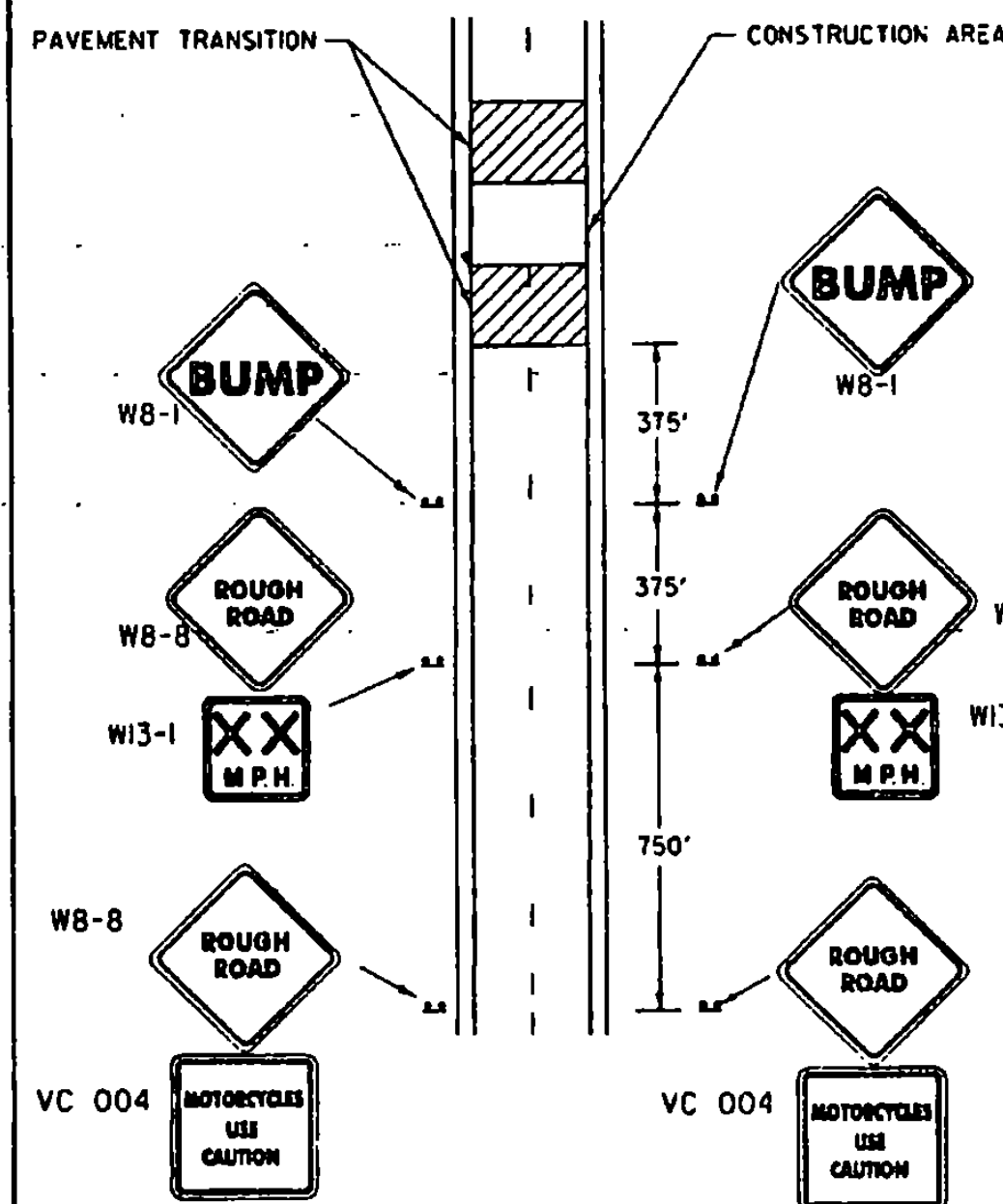
- REFL. 28" CONES
- REFL. PLASTIC DRUMS
- PAVEMENT MARKING REMOVAL
- ↑ INDICATES TRAFFIC FLOW
- ⋯ WORK AREA
- ⊠ FLASHING ARROW PANEL
- TYPE III BARRICADES
- ⊞ TYPE III BARRICADES (MOD.)



NOT TO SCALE

MAINLINE LANE CLOSURE AT AN ENTRANCE RAMP

THIS DETAIL SHALL BE USED WHEN THE WORK ZONE BEGINS AT THE END OF THE ACCELERATION LANE OR THE MAINLINE LANE CLOSURE DRUM PLACEMENT INTERFERES WITH THE ON-RAMP TRAFFIC.
IF THE LENGTH OF THE ACCELERATION LANE IS NOT ADEQUATE, THE YIELD SIGN SHALL BE REPLACED WITH A STOP SIGN. IF A STOP SIGN IS USED, IT SHOULD BE ACCOMPANIED BY A STOP BAR.

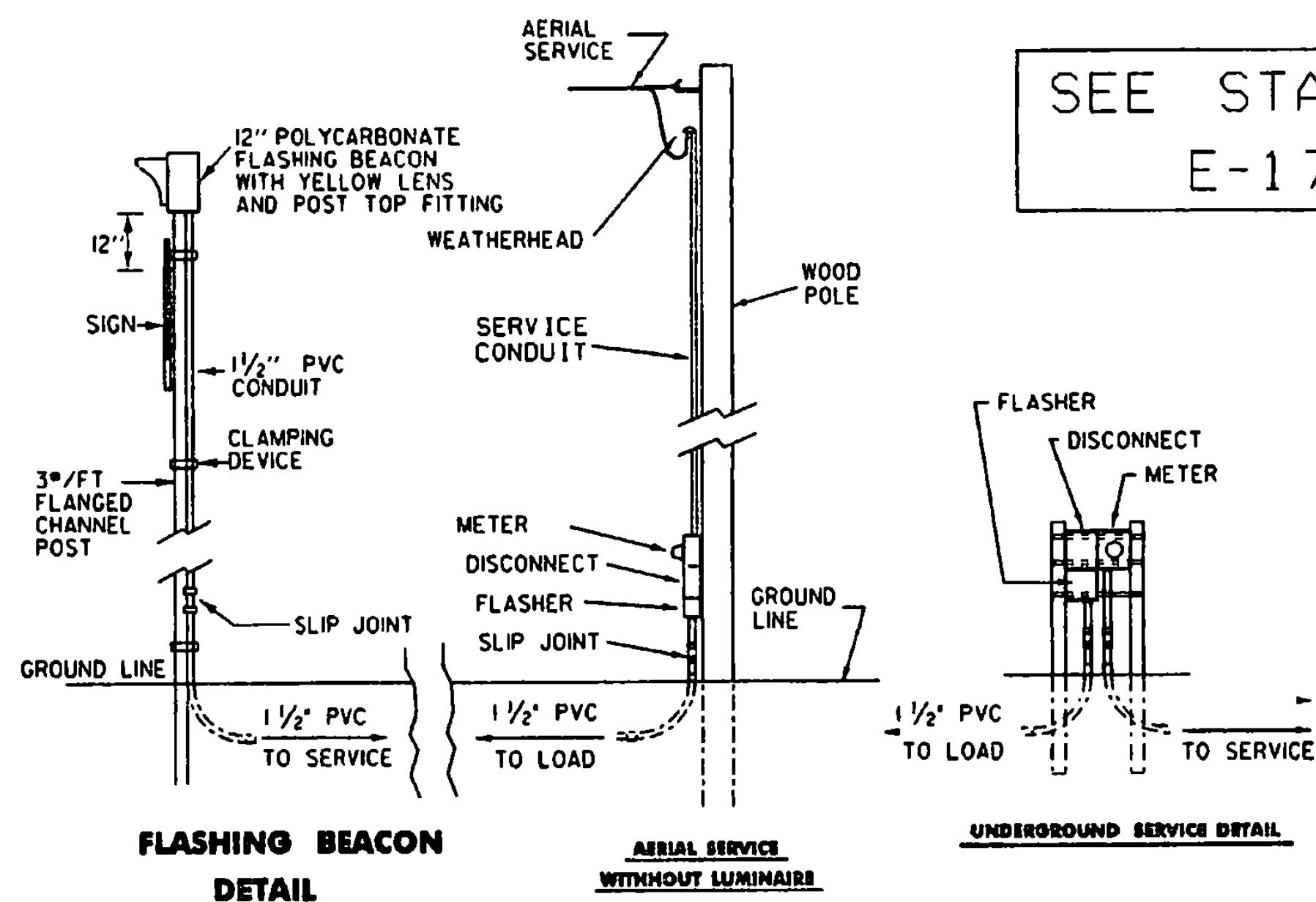


NOTES:

- 1) ADVISORY SPEED AS DETERMINED BY THE RESIDENT ENGINEER (40 M.P.H. MINIMUM RECOMMENDED)
- 2) SIGNS MOUNTED ON FIXED POSTS, (YIELDING TYPE)
- 3) ALL DISTANCES ARE DESIRABLE MINIMUMS. FIELD CONDITION SHALL CONTROL THE ACTUAL PLACEMENT.
- 4) THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED, SEE STD.E-103.

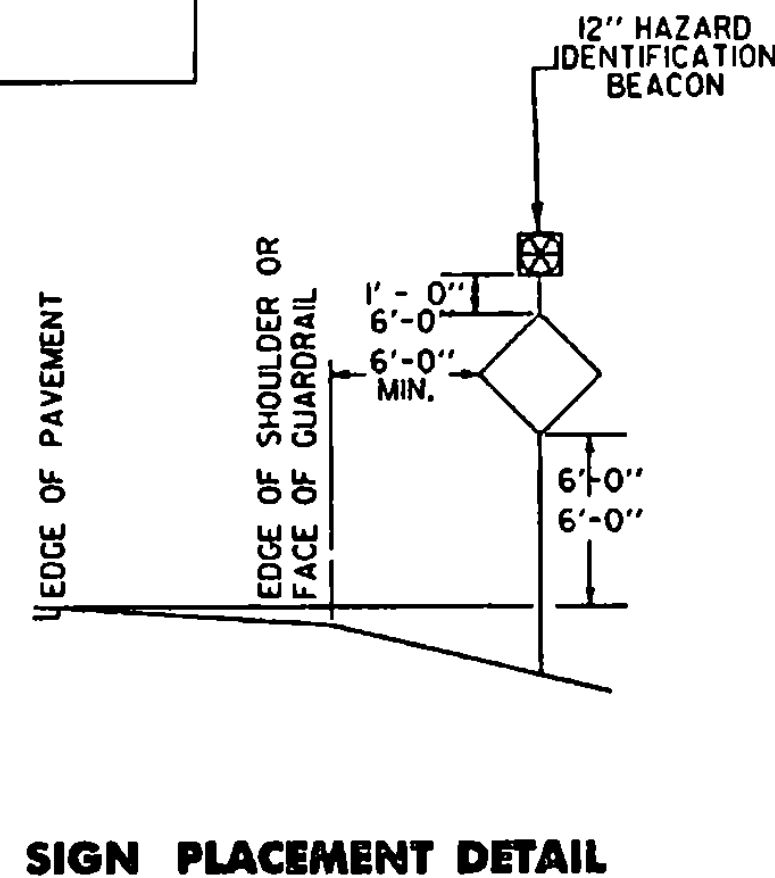
NOT TO SCALE

ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES.



FLASHING BEACON DETAIL

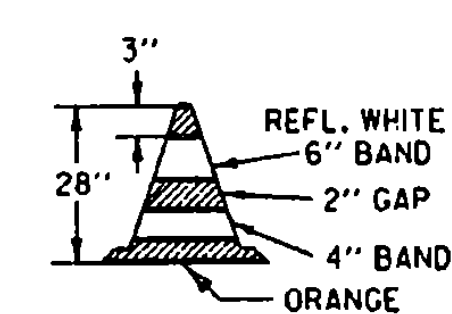
SEE STANDARD E-175



SIGN PLACEMENT DETAIL

NOTES:

- 1.) AT THE CONTRACTOR'S OPTION:
A. THE POWER SUPPLY MAY BE AERIAL OR UNDERGROUND (SEE DETAIL).
B. POWER FOR A FLASHING BEACON MAY BE COMBINED WITH POWER FOR A TRAFFIC SIGNAL OR THEY MAY HAVE SEPARATE POWER SOURCES.
C. THE FLASHER MAY BE INSTALLED ON A STANCHION NEAR THE SIGN, ON A UTILITY POLE (WITH UTILITY COMPANY APPROVAL) OR AT THE SAME LOCATION AS A TRAFFIC SIGNAL CONTROLLER.
- 2.) THE FLASHER UNIT SHALL BE ONE CIRCUIT AND INCLUDE A RADIO INTERFERENCE FILTER.
- 3.) BATTERY OPERATED FLASHERS WILL NOT BE ALLOWED.
- 4.) BOTTOM OF THE BEACON SHALL BE A MIN. OF 8'-0" AND A MAX. OF 12'-0" ABOVE THE EDGE OF THE PAVEMENT.
- 5.) FOR URBAN AREA PLACEMENT SEE STD. E-121.

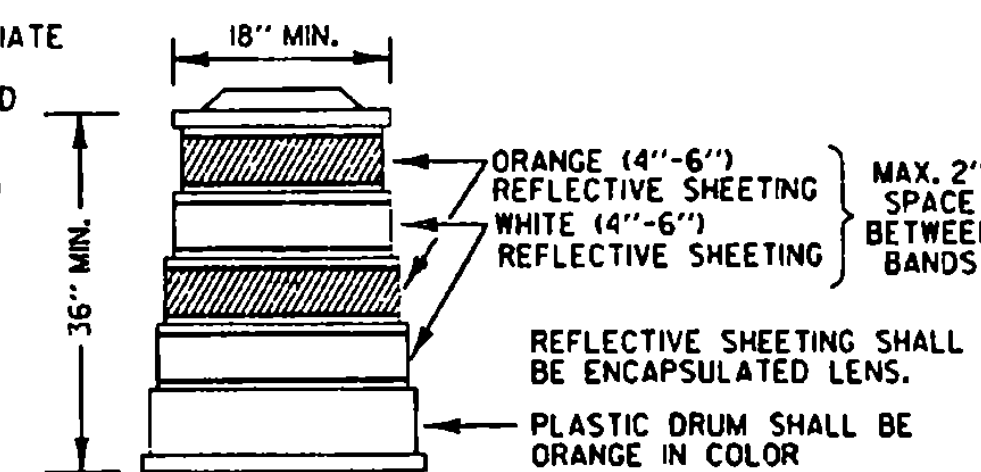


NOTES:

- 1.) 28" CONES SHALL BE USED ON ROADWAYS WITH SPEED LIMITS OF 35 MPH OR MORE AND ON ALL ROADWAYS DURING HOURS OF DARKNESS.
- 2.) CONES MAY BE WEIGHTED TO PREVENT OVERTURNING, HOWEVER THE WEIGHTS SHALL NOT PRESENT A HAZARD IF THE CONE IS STRUCK.
- 3.) REFLECTIVE SHEETING SHALL BE ENCAPSULATED LENS.

28" REFLECTORIZED CONE

SAND BAGS OR AN APPROPRIATE BALLASTING DEVICE, WHICH DOES NOT PRESENT A HAZARD TO THE IMPACTING VEHICLE OR BECOME A PROJECTILE UPON IMPACT, SHALL BE USED TO WEIGHT DRUMS.



REFLECTORIZED PLASTIC DRUM

OTHER STDS. REQUIRED:	E-101 E-102	E-102A E-103	E-107A E-136	E-150 E-175
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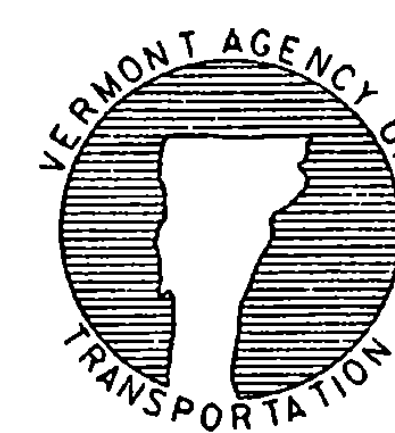
REVISIONS AND CORRECTIONS
 APR 12, 1988 - DATE OF ORIGINAL ISSUE
 JAN 23, 1989 - REVISED EXIT SIGN - CLARIFIED EXIT TAPER
 SEPT 20, 1993 - REVISED RAMP CLOSURES, FLASHING BEACON DETAILS AND MOVED TYPE III BARRICADE (MOD) TO STD.E-107A
 AUG 08, 1995 - REVISED BEACON SIZE

APPROVED

Stephen D. McArthur
 DIRECTOR OF ENGINEERING

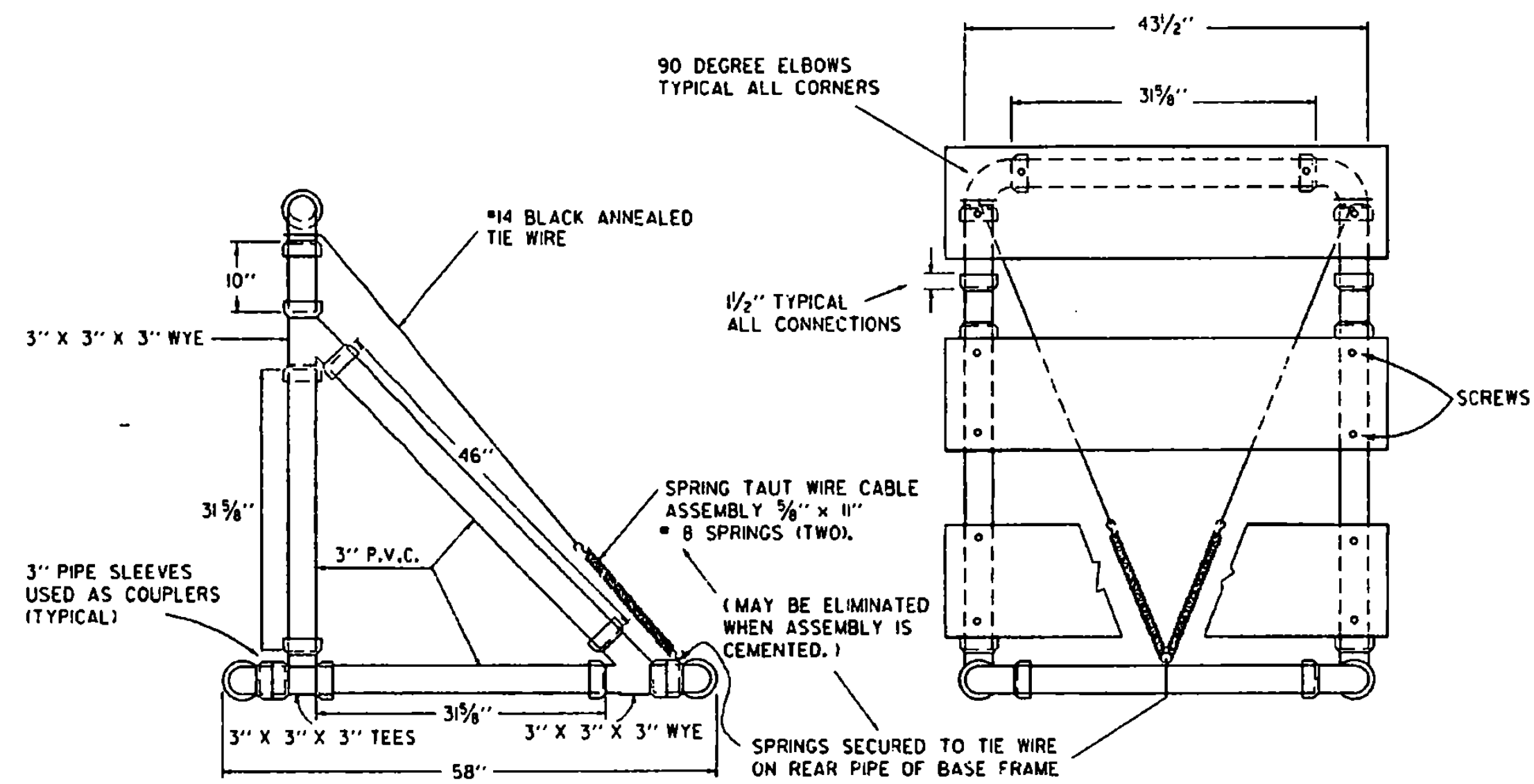
David A. Ross
 TRAFFIC AND SAFETY ENGINEER

TRAFFIC CONTROL MISCELLANEOUS DETAILS



STANDARD E-106

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

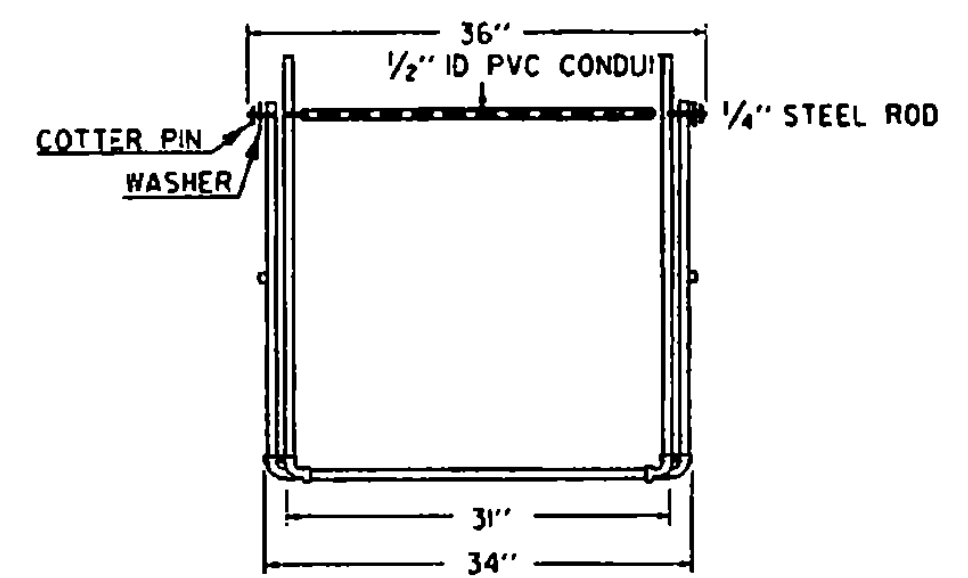
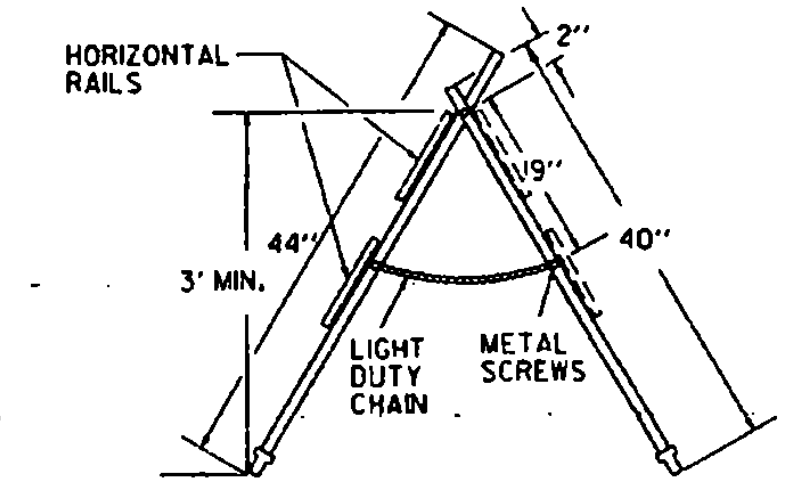


**SIDE VIEW
TYPE III BARRICADE**

**FRONT VIEW
TYPE III BARRICADE**

- MATERIALS FOR TYPE I AND II BARRICADES**
- 20' - 1" PVC
 - 4 - 1" PVC 90° ELBOWS
 - 30" - 1/2" ID THINWALL PVC CONDUIT
 - 36" - 1/4" STEEL ROD
 - 4 - 1" WASHERS
 - 24" - LIGHT DUTY CHAIN
 - 1/2" - #14 PAN HEAD METAL SCREWS (AS REQUIRED)
 - 2 - 3/4" COTTER PINS
 - 2 OR 4 - 8" OR 12" X 36" X 0.025" BARRICADE RAILS (AS REQUIRED)

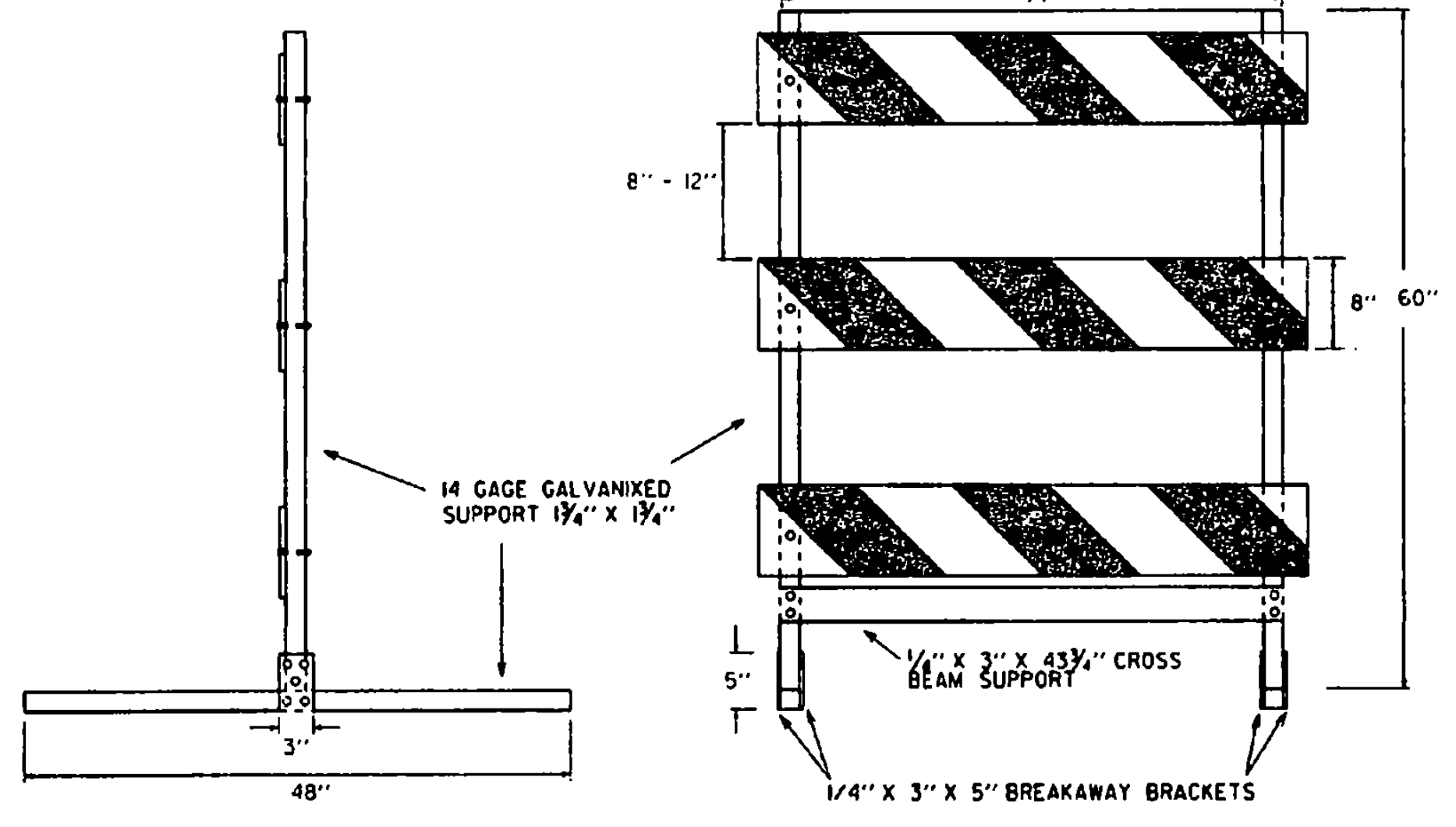
- MATERIALS FOR TYPE III BARRICADES**
- 30 LF - 3" I.D. PVC PIPE
 - 6 - 3" 90° ELBOWS
 - 2 - 3" TEES
 - 4 - 3" WYES
 - 3 - 8" OR 12" X 48" X 0.025" BARRICADE RAILS
 - 2 - 5/8" X 11" #8 SPRING (IF ASSEMBLY IS NOT CEMENTED)
 - 12 - 1" #14 PAN HEAD METAL SCREWS (IF ASSEMBLY IS NOT CEMENTED)
 - 15 LF - #14 BLACK ANNEALED TIE WIRE (IF ASSEMBLY IS NOT CEMENTED)



TYPE I AND TYPE II BARRICADE

**TYPE III (MODIFIED) BARRICADE
(STRIPING IS SHOWN WITH TRAFFIC PASSING TO THE RIGHT)**

- MATERIALS FOR METAL TYPE III BARRICADES**
- PANELS (3):**
8" X 48" GALVANIZED STEEL... COVERED
1 OR 2 SIDES WITH WHITE/ORANGE, DIAGONALLY STRIPED REFLECTIVE SHEETING
- VERTICAL SUPPORTS (2):** 14 GAGE GALVANIZED TUBING 1 3/4" X 1 3/4" X 60"
- HORIZONTAL SUPPORTS (2):** 14 GAGE GALVANIZED TUBING 1 3/4" X 1 3/4" X 48"
- CROSS BEAM SUPPORT (1):** COLD GALVANIZED STEEL 1/4" X 3" X 43 3/4"
- BREAKAWAY BRACKETS (4):** COLD GALVANIZED STEEL 1/4" X 3" X 5"
- FASTENERS:**
6 - SHEAR BOLTS WITH LOCK NUTS 1/4" D X 2 3/4"
4 - FULCRUM BOLTS WITH LOCK NUTS 3/8" D X 2 3/4"
4 - FASTENER BOLTS WITH LOCK NUTS 3/8" D X 2 3/4"
6 - PANEL BOLTS WITH LOCK NUTS AND WASHERS 1/4" D X 2"
- ALL FASTENERS GALVANIZED STEEL.
ALL BOLTS HEX HEAD.



SIDE AND FRONT VIEW OF TYPE III METAL BARRICADE

MATERIALS

THE PIPE, WYES, TEES AND ELBOWS USED TO CONSTRUCT BARRICADES SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 2241 FOR P.V.C. 1/20 OR 1/220 SDR-21, PRESSURE RATING 200 PSI. THE WYES, TEES AND ELBOWS SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 2466, TYPE II, GRADE I. ALL JOINTS SHALL BE SLIP-FIT AND MAY BE LIGHTLY CEMENTED. THE BARRICADE RAILS SHALL BE FABRICATED FROM 0.025" ANODIZED ALUMINUM AND SHALL HAVE REFLECTORIZED ALTERNATING ORANGE AND WHITE STRIPES (SLOPING DOWNWARD AT AN

MAINTENANCE

BARRICADES SHALL BE MAINTAINED IN CLEAN AND LEGIBLE CONDITIONS SATISFACTORY TO THE ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO APPROACHING TRAFFIC AT ALL TIMES. DAMAGED, DEFACED, OR DIRTY BARRICADES SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER. THE P.V.C. PIPE AND FITTINGS SHALL BE WHITE IN COLOR. AT LEAST TWO (2) HOLES SHALL BE DRILLED (3/8" DIAM.) IN EACH SECTION OF PIPE AND FITTINGS IF THE ASSEMBLY IS NOT CEMENTED.

WHICH WILL NOT CONSTITUTE A HAZARD IF THE BARRICADE IS HIT, THESE SHALL BE PLACED ONLY ON THE FRONT AND REAR PIPES OF THE BASE FRAME BE A HAZARD TO VEHICLES PASSING ON EITHER SIDE. GLUED JOINTS MAY PROVIDE ADDITIONAL STABILITY TO THE INSTALLATION.

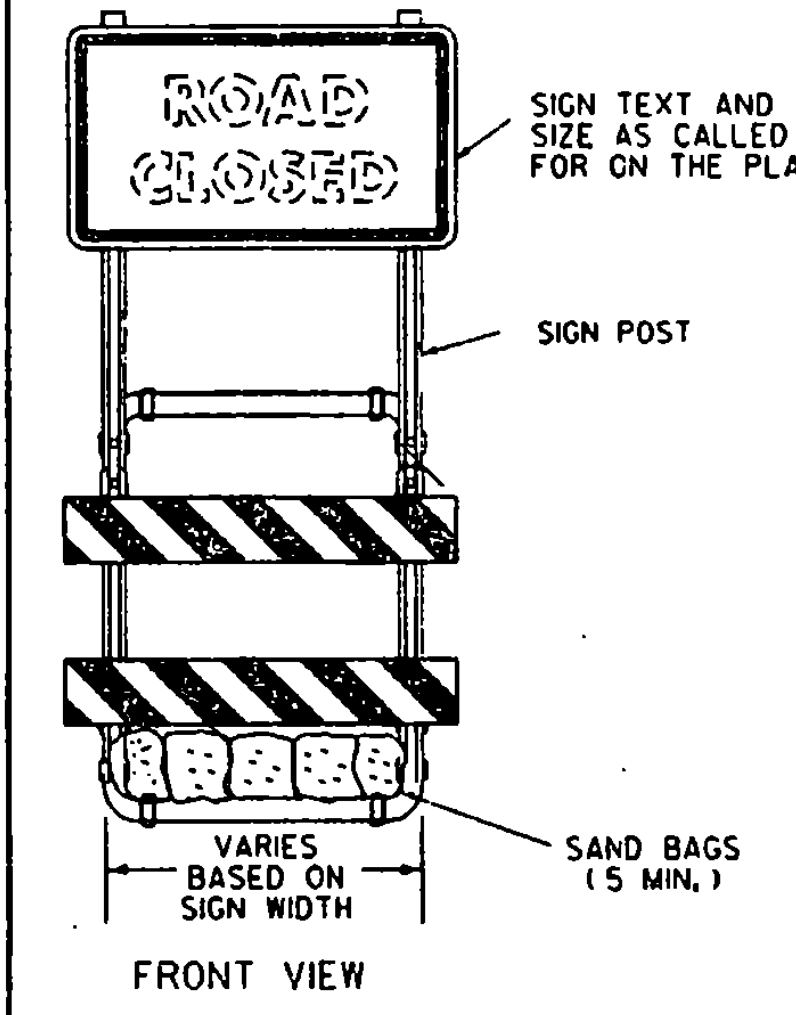
TYPE I BARRICADES SHALL UTILIZE ONE HORIZONTAL RAIL IN EACH DIRECTION. TYPE II BARRICADES SHALL BE A TYPE I BARRICADE WITH AN ADDITIONAL HORIZONTAL RAIL MOUNTED BELOW THE OTHER IN EACH DIRECTION.

TYPE III BARRICADES (MODIFIED) SHALL CONSIST OF THE BREAKAWAY 3" PVC DESIGN SHOWN ON THIS SHEET WITH THE TWO RAIL LAYOUT DETAILED ABOVE LEFT.

SEE STD E-107 FOR ADDITIONAL INFORMATION.

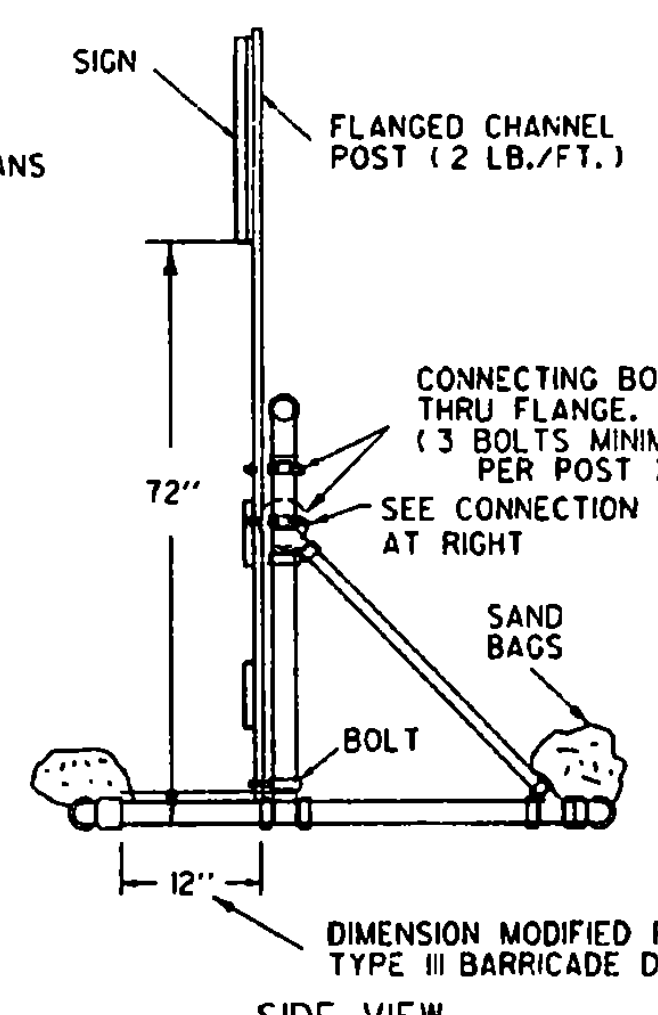
NOTES:

- 1) REFER TO STANDARD TYPE III BARRICADE (ABOVE LEFT)
- 2) ALL BARRICADE JOINTS SHALL BE GLUED.
- 3) FIVE SAND BAGS ARE REQUIRED BOTH FRONT AND BACK, 50 LB. MINIMUM EACH.

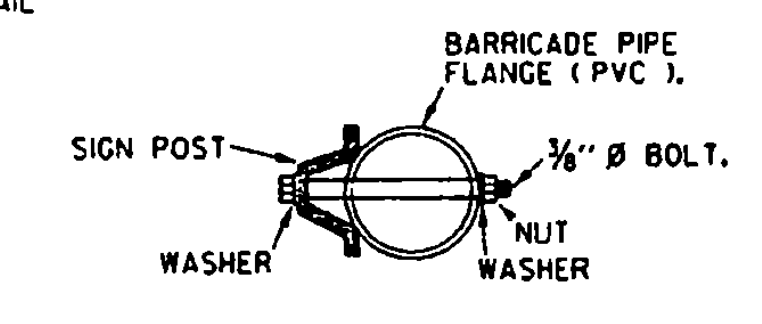


FRONT VIEW

**SIGN MOUNTING ON
TYPE III BARRICADE (MODIFIED)**



SIDE VIEW



CONNECTION DETAIL

**OTHER STDS. E-107
REQUIRED:**

REVISIONS AND CORRECTIONS

- SEPT. 10, 1987 - ADDED METAL TYPE III BARRICADE
- SEPT. 20, 1993 - REVISED NOTES AND TYPE III (MOD.) BARRICADE DETAIL
- AUG. 08, 1995 - ADDED METAL TYPE III BARRICADE

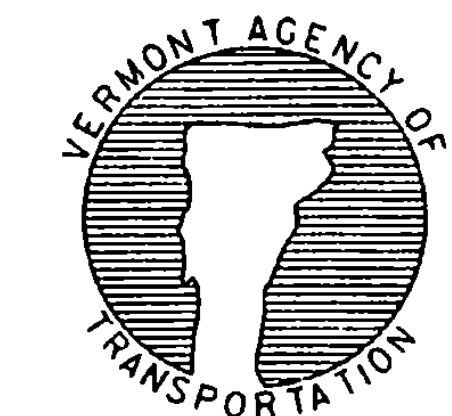
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

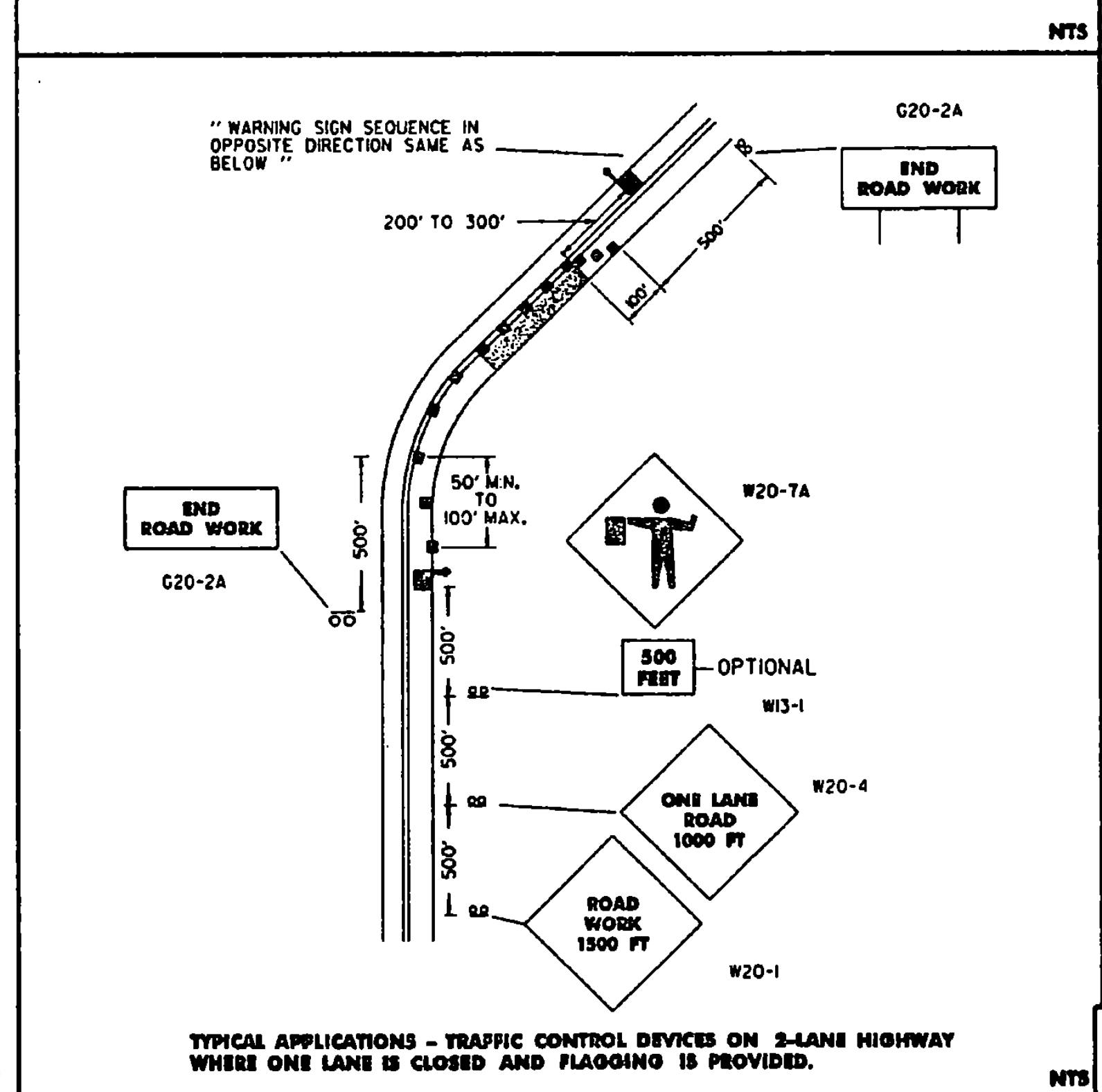
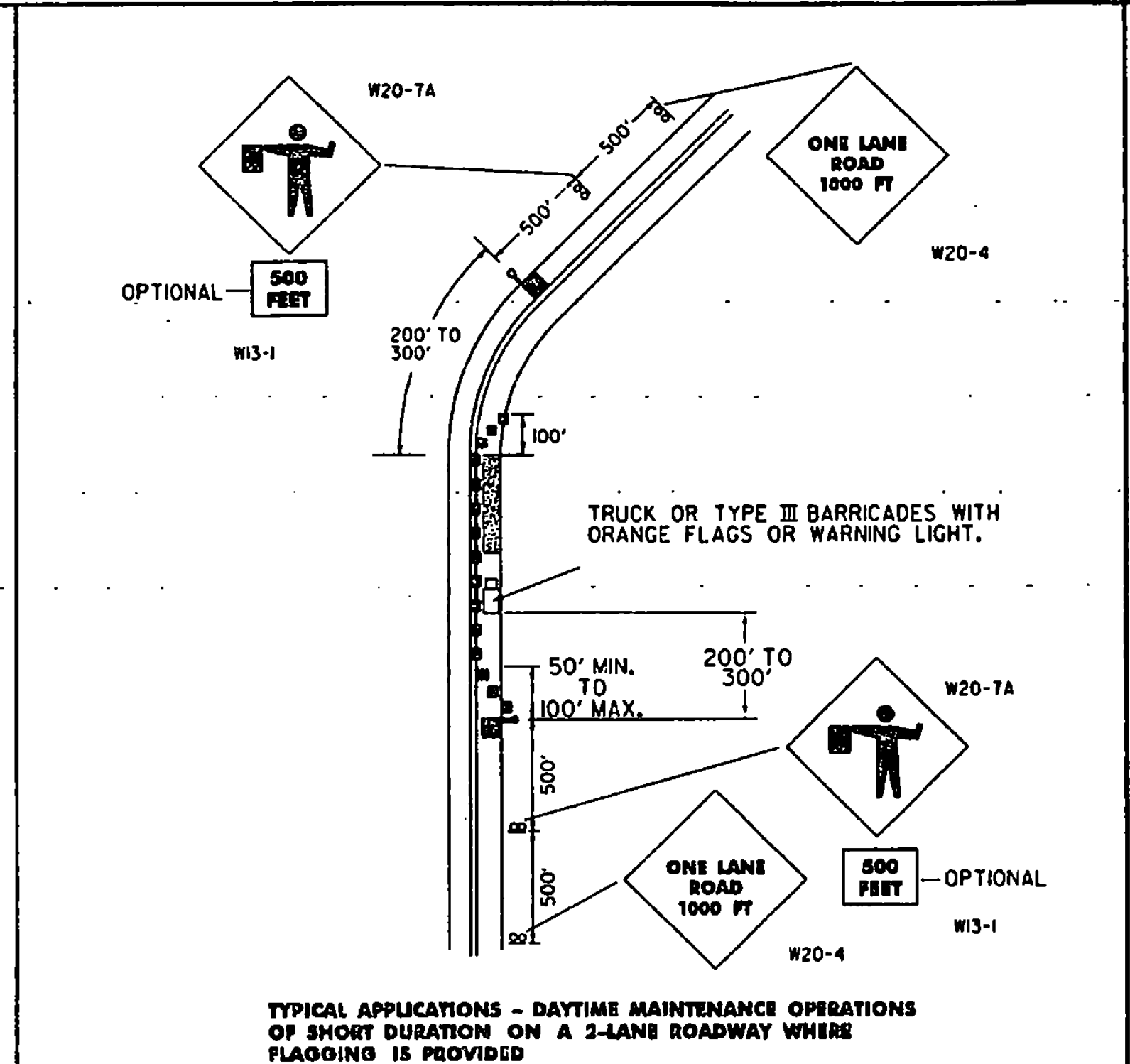
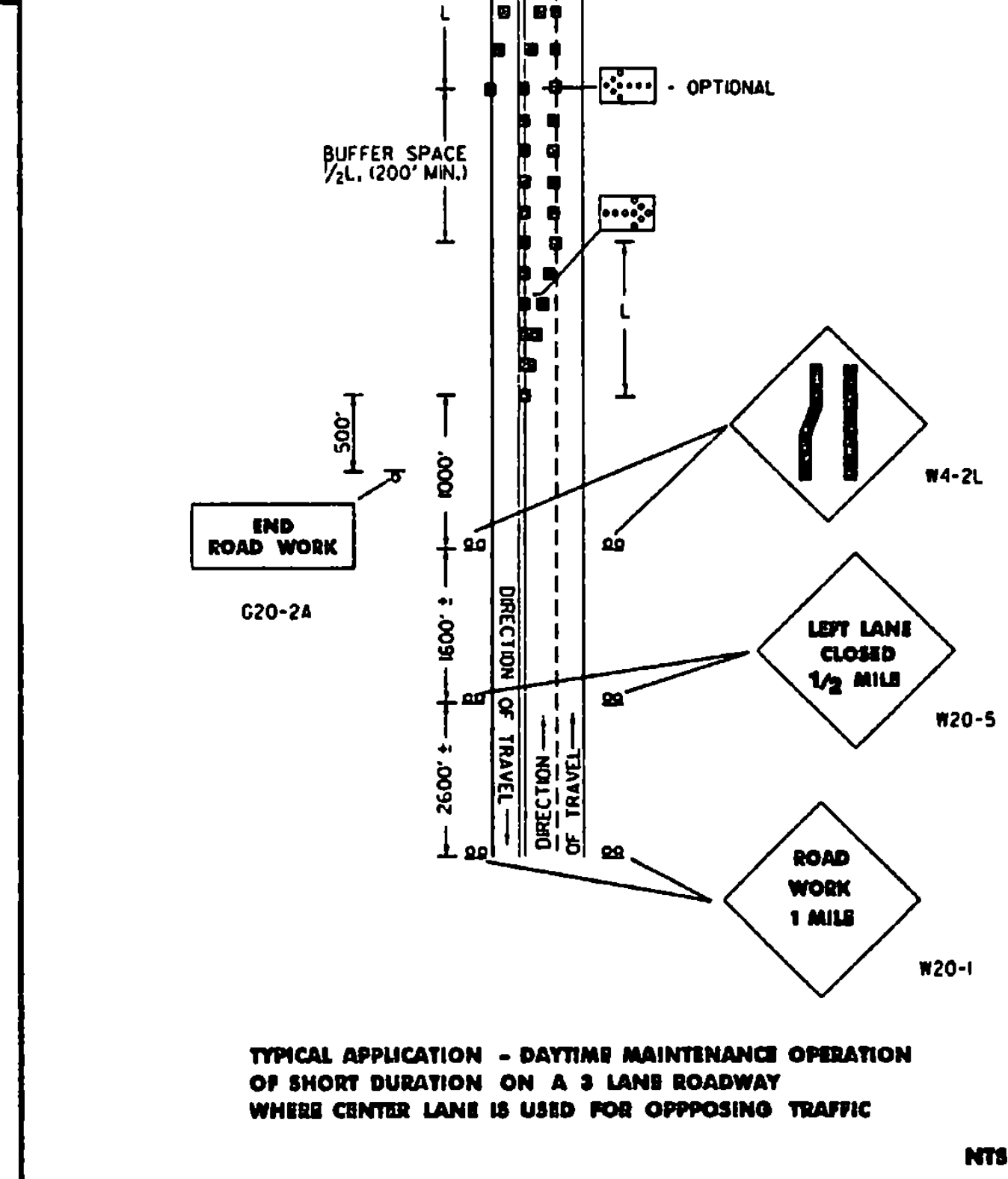
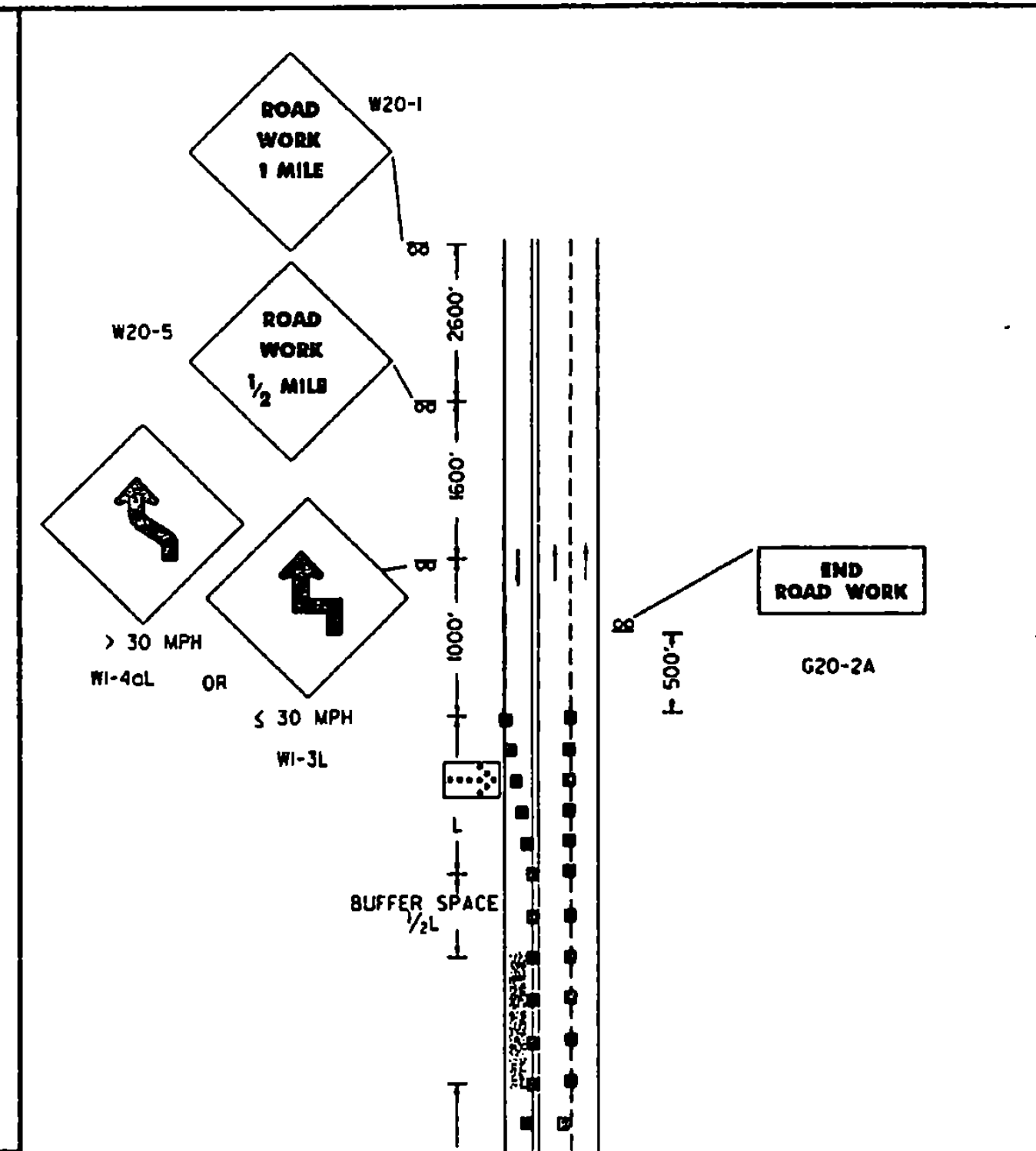
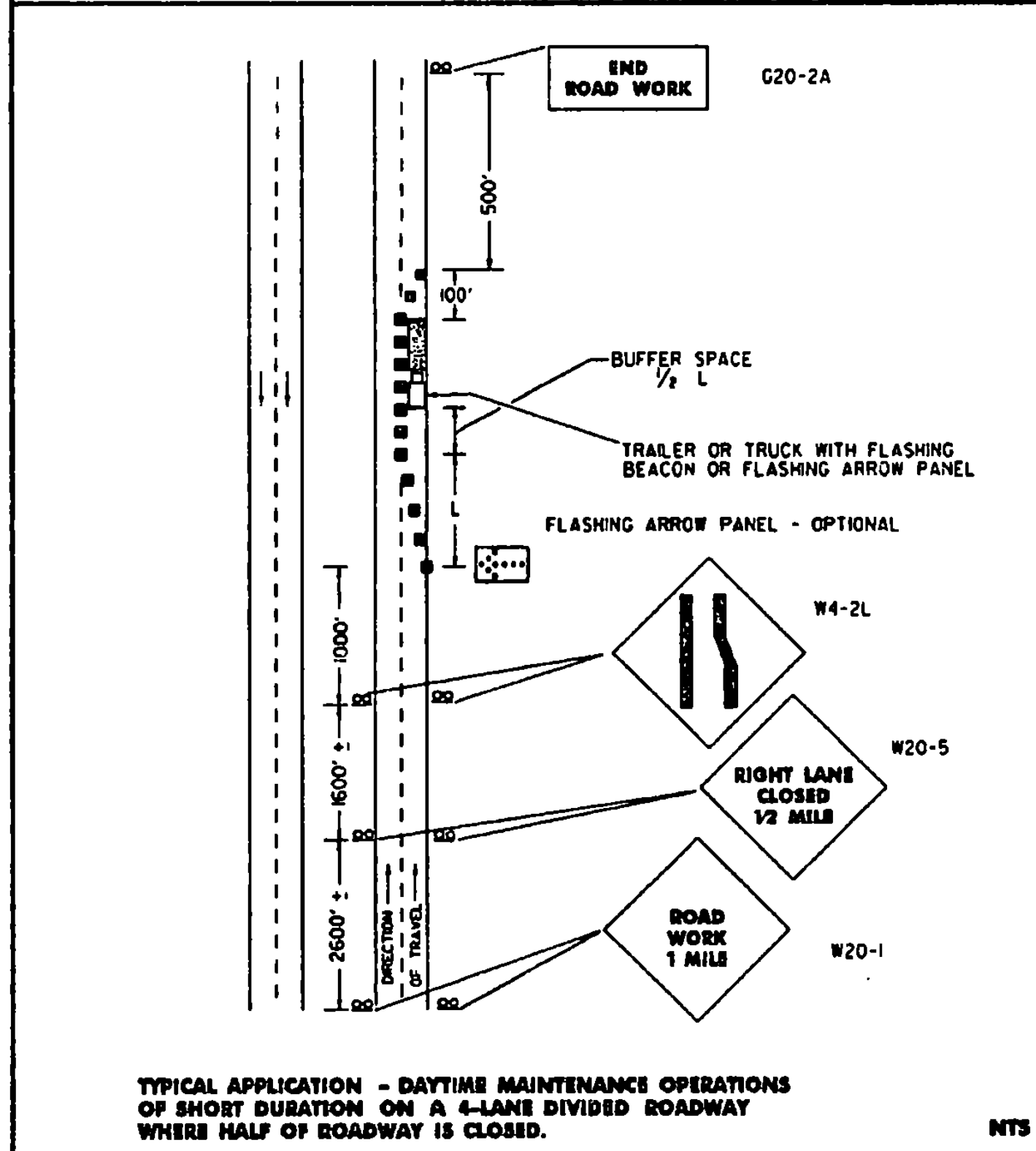
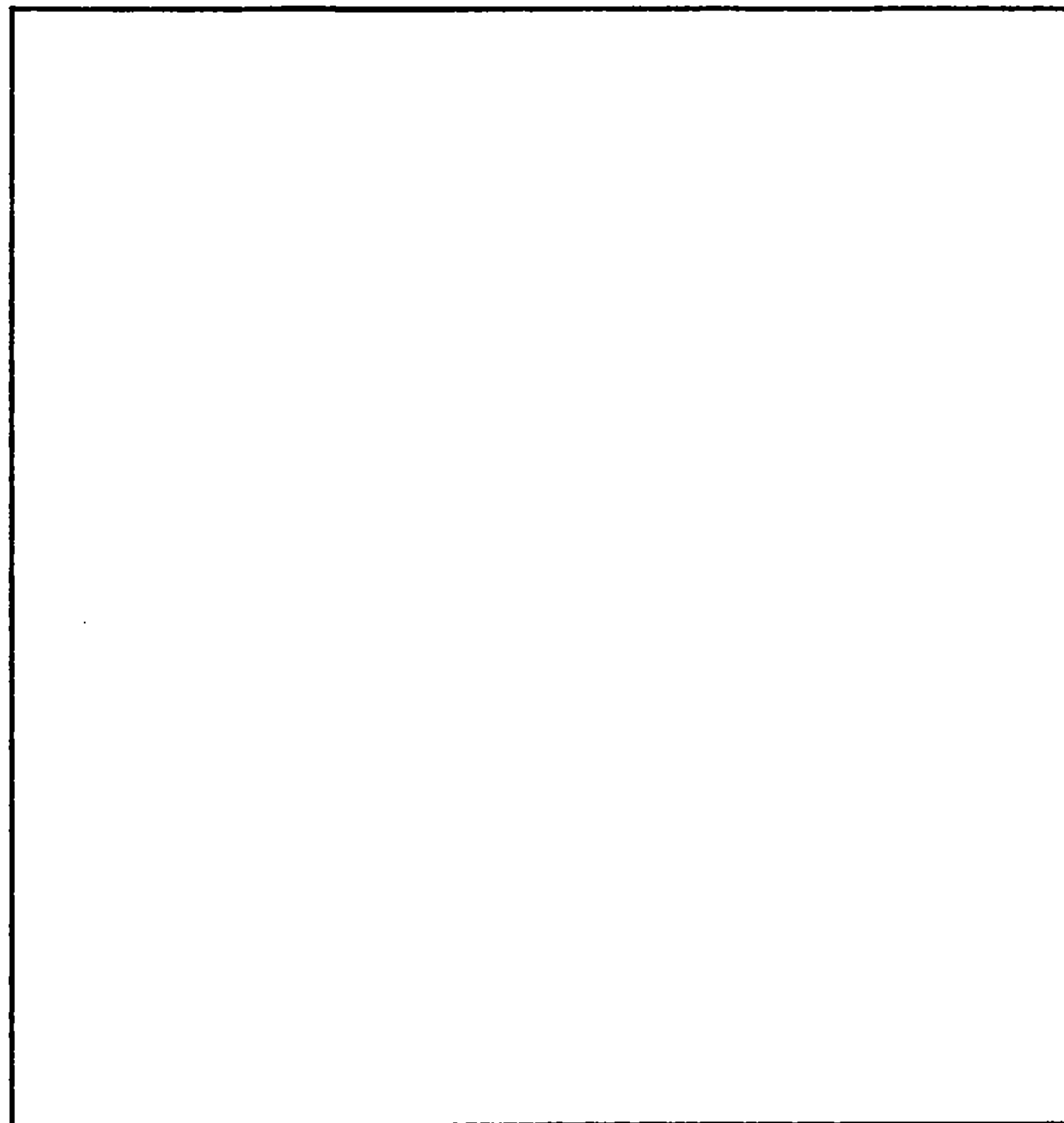
Stephen D. MacArthur
DIRECTOR OF ENGINEERING

Don A. Ross
TRAFFIC AND SAFETY ENGINEER

**BREAKAWAY BARRICADE
DETAILS**



**STANDARD
E-107 A**



NOTES

REFLECTORIZATION
ALL SIGNS USED DURING THE HOURS OF DARKNESS SHALL BE REFLECTORIZED (TYPE II OR III). CONES USED FOR TRAFFIC CONTROL AT NIGHT SHALL COMPLY WITH STANDARD E-106.

COLORS
THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT, BORDER, AND SYMBOLS ON AN ORANGE BACKGROUND. THE TEXT AND BORDERS MAY BE SCREENED, LETTERING FILM, OR HAND PAINTED. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

TEXT DESIGN
LETTERS, DIGITS, SPACING, AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD ALPHABETS FOR HIGHWAY SIGNS" AS REFERENCED IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

SPECIFICATIONS
WARNING SIGNS SHALL MEET THE STANDARD STATE SPECIFICATIONS FOR TRAFFIC SIGNS.

SIGN BASE MATERIAL
THE SIGN BASE MATERIAL USED FOR THE WARNING SIGNS ON THIS SHEET MAY BE OF ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED:
 FLAT STEEL OR ALUMINUM 0.125 INCHES
 HIGH DENSITY OVERLAYED PLYWOOD 1/2, 3/8, OR 3/4 INCHES
 GALVANIZED SHEET STEEL 1/2 GAGE

- SIGNS WITH "ROAD WORK 1500 FT." AND "END ROAD WORK" TEXT SHALL BE USED WHEN THE WORK IS NOT COMPLETE AND A HAZARD REMAINS OVERNIGHT.
- THE FLAGPERSON SHALL USE THE SIGN PADDLE DETAILED ON STANDARD SHEET E-102.
- ALL SIGNS SHALL BE COVERED OR REMOVED AT THE END OF THE WORKING DAY UNLESS REQUIRED FOR THE PROTECTION AND SAFETY OF THE TRAVELING PUBLIC.
- INSTALLATION, SIGNS AND BARRICADES SHALL BE IN PLACE PRIOR TO THE START OF THE MAINTENANCE OPERATION TO WHICH THEY APPLY AND SHALL BE REMOVED PROMPTLY WHEN THE NEED NO LONGER EXISTS. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER ON YIELDING WOOD OR METAL POSTS SET SECURELY IN THE GROUND (IN ACCORDANCE WITH STD. E-121), OR ON PORTABLE SUPPORTS WHEN APPROPRIATE. THE INSTALLATION OF SIGNS AND BARRICADES SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
- ALTHOUGH LISTED AS A MAINTENANCE OPERATION STANDARD SIGN SHEET, THE APPROACH SIGNS SHOWN SHALL BE USED BY CONTRACTORS WHEN WORKING WITHIN OR OUTSIDE PROJECT LIMITS.
- ALL DISTANCES ARE DESIRABLE SPECIFICATIONS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
- SIGN DETAILS NOT SHOWN ON THIS SHEET CAN BE FOUND ON STANDARD SHEETS E-100, E-101, AND E-102.
- TAPER FORMULA
 $L = \frac{SW}{60}$ FOR SPEEDS OF 45 OR MORE
 $L = \frac{WS}{60}$ FOR SPEEDS OF 40 OR LESS
 WHERE:
 L = MINIMUM LENGTH OF TAPER
 S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK OR 85 PERCENTILE SPEED.
 W = WIDTH OF OFFSET.
- THE MAXIMUM SPACING BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD BE APPROXIMATELY EQUAL IN FEET TO THE SPEED LIMIT IN M.P.H., ON TANGENT SECTIONS THE MAXIMUM SPACING SHOULD BE APPROXIMATELY EQUAL TO TWICE THE POSTED SPEED LIMIT.
- FLOOD LIGHTS SHOULD BE PROVIDED TO MARK THE FLAGPERSON STATIONS AT NIGHT AS NEEDED.
- AT SHORT WORK ZONES WHERE ADEQUATE SIGHT DISTANCE IS AVAILABLE FOR THE SAFE HANDLING OF TRAFFIC ONE FLAGGER MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
- CHANNELIZING DEVICES SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
- THE NUMBER OF CHANNELIZING AND OTHER TRAFFIC CONTROL DEVICES SHOWN ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE ACTUAL NUMBER REQUIRED SHALL BE DETERMINED BASED ON INDIVIDUAL DETOUR CONDITIONS (TAPERS, SPEED LIMITS, LENGTH OF DETOUR CURVE, ETC.).

LEGEND:

◻	FLAGPERSON	◻	WORK AREA
◻	CHANNELIZING DEVICES (CONES OR DRUMS)	◻	SIGN & POSTS
◻	FLASHING ARROW PANEL	◻	TYPE III BARRICADES

REVISIONS AND CORRECTIONS

SEPT 10, 1987 - DATE OF ORIGINAL ISSUE
 MAR 01, 1988 - FHWA REVIEW COMMENTS

SEP 20, 1993 - REVISED NOTES & MISC. DETAILS

AUG 08, 1995 - DELETED SIGN DETAILS

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

APPROVED

Stephen D. McCall
 DIRECTOR OF ENGINEERING

David A. Ross
 TRAFFIC AND SAFETY ENGINEER

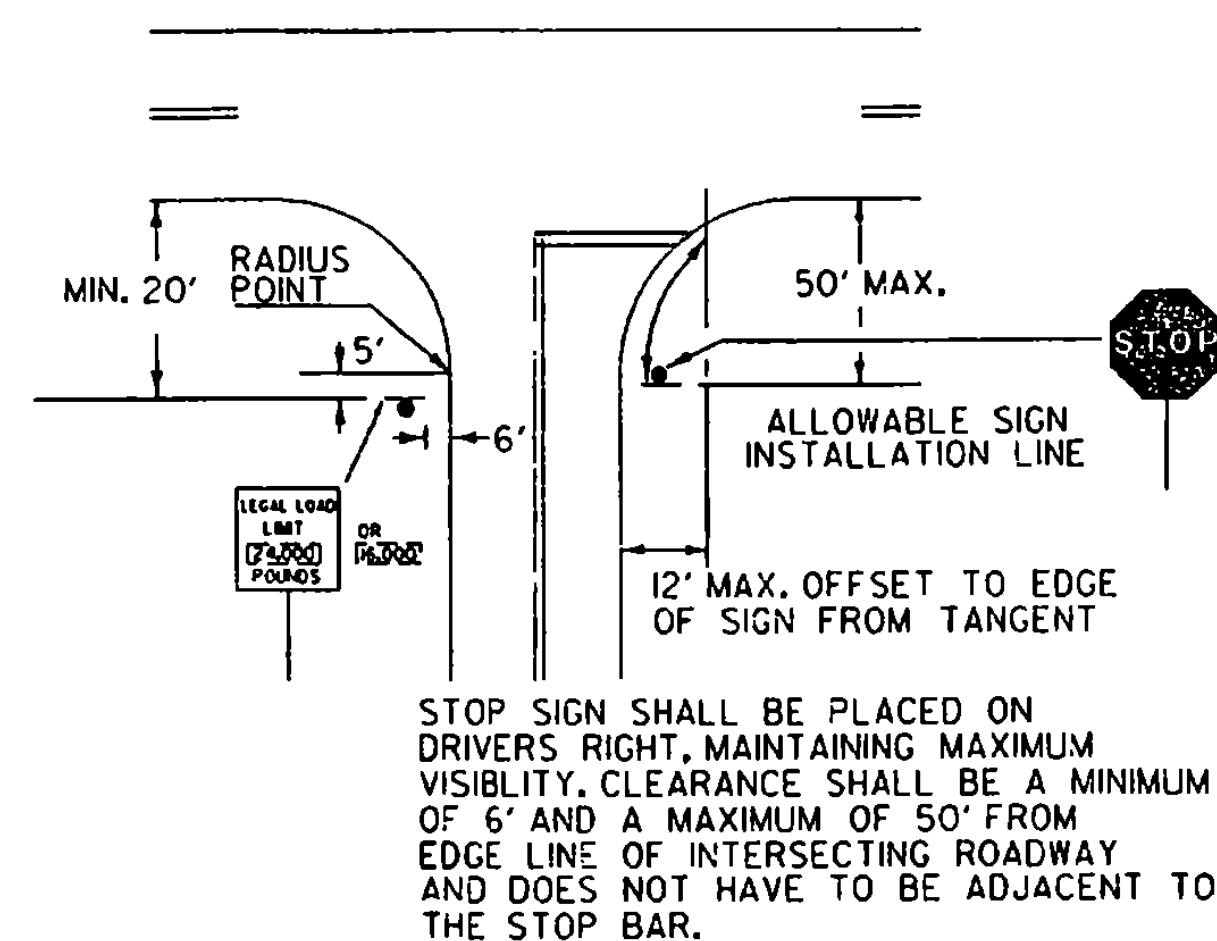
MAJOR MAINTENANCE OPERATION LANE CLOSURE

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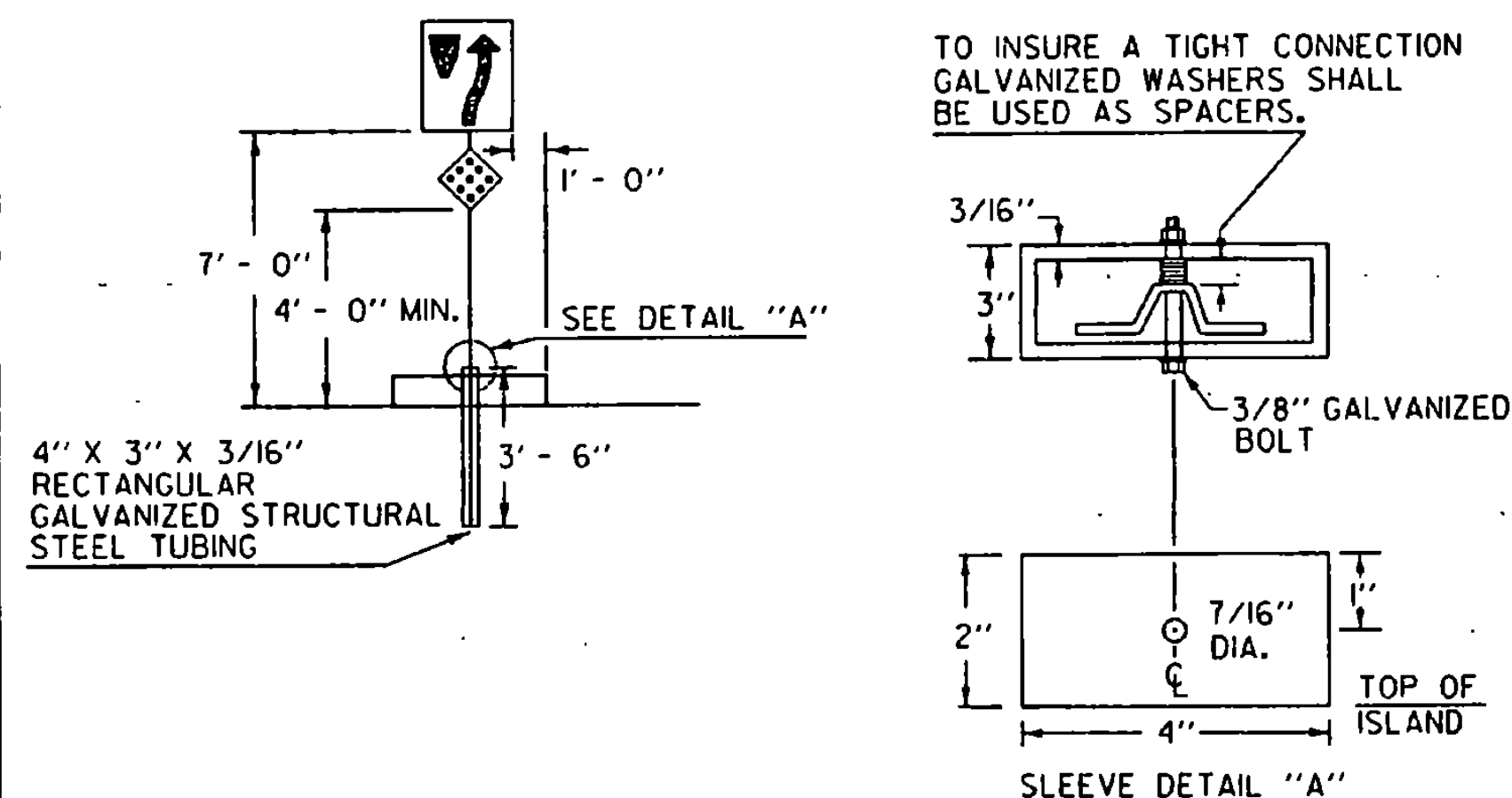
OTHER STDS. REQUIRED: E-100 E-101 E-102 E-106

VERMONT AGENCY OF TRANSPORTATION

STANDARD E-110

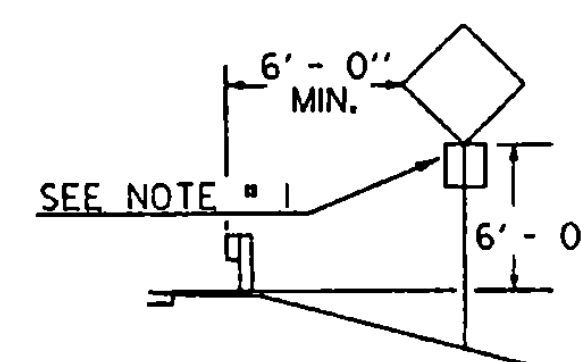
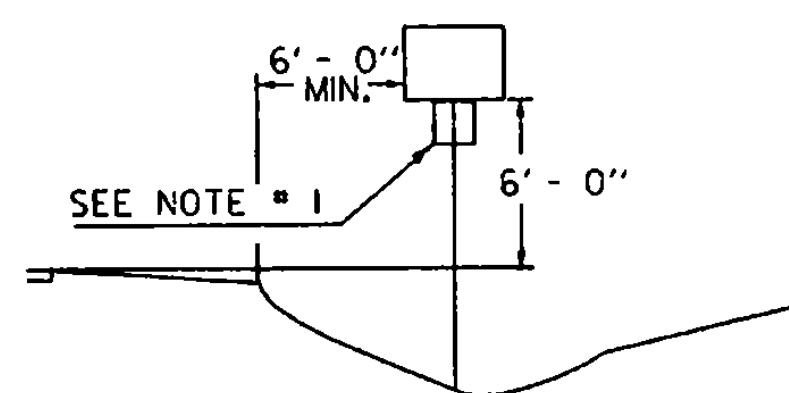
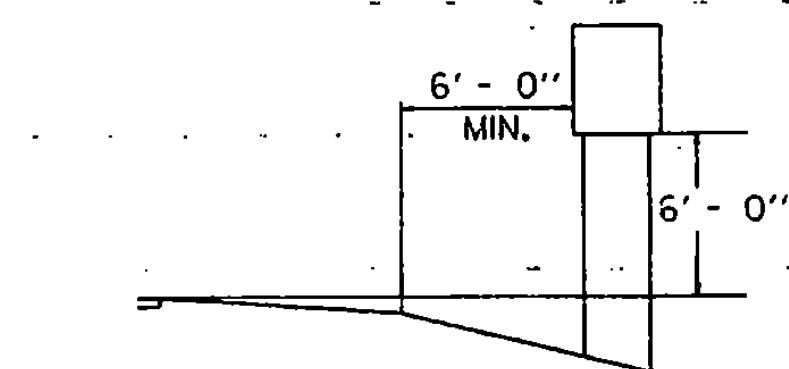


LEGAL LOAD LIMIT AND STOP SIGNS AT INTERSECTIONS WITH TOWN HIGHWAYS

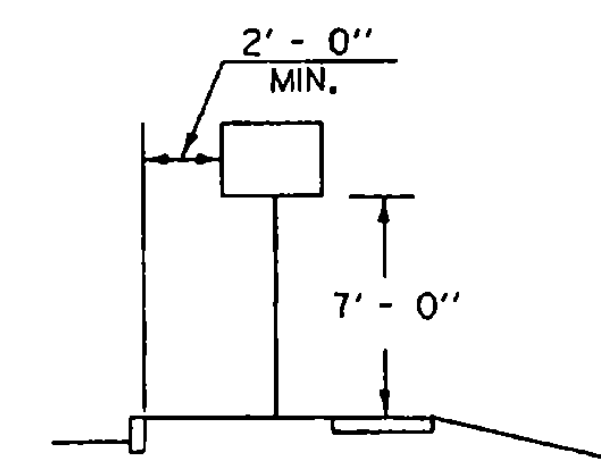
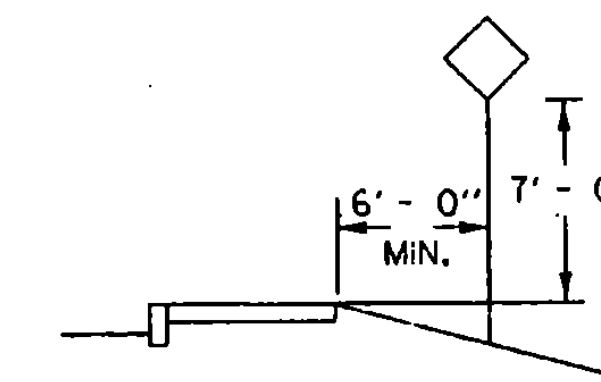


SIGNS ON MEDIAN ISLANDS IN THE LINE OF TRAFFIC

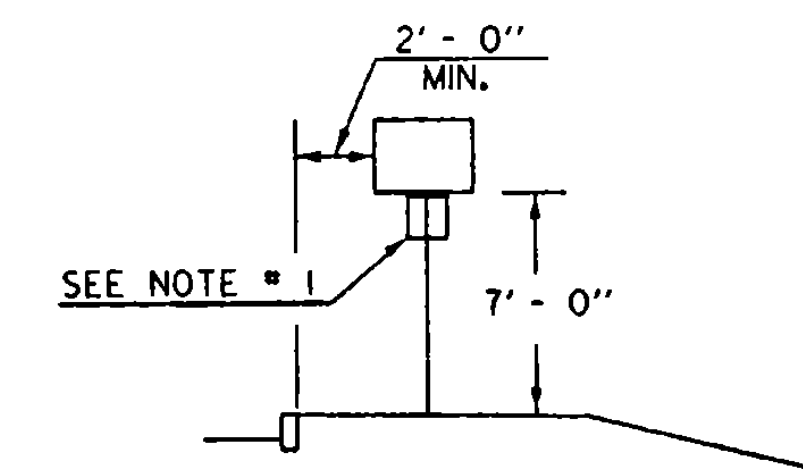
INCREASE VERTICAL CLEARANCE TO 7' IN AREAS OF FREQUENT ROADSIDE PARKING OR PEDESTRIAN ACTIVITY



RURAL



IF SUFFICIENT CLEARANCE IS NOT AVAILABLE BETWEEN CURB AND SIDEWALK MOUNT SIGN BEHIND SIDEWALK AS SHOWN AT TOP. CHECK FOR ADEQUATE R.O.W..



URBAN

NOTES:

1. IN BOTH RURAL AND URBAN LOCATIONS, IF A SECONDARY SIGN IS MOUNTED BELOW ANOTHER SIGN, THE MINIMUM CLEARANCE MAY BE REDUCED BY ONE FOOT.
2. IN RURAL AREAS WITH NO OR MINIMAL SHOULDER, THE LATERAL CLEARANCE TO THE EDGE OF A SIGN SHOULD BE A MINIMUM OF 12' FROM THE EDGE OF THE TRAVELED WAY.
3. ALSO SEE OTHER STANDARD SHEETS FOR MOUNTING CLEARANCE AND SPACING OF DESTINATION AND ROUTE MARKER ASSEMBLIES AND TOWN LINE SIGNS.

POST REFERENCE:

REFER TO THE DETAILS ON THE APPROPRIATE STANDARD DRAWING FOR INFORMATION CONCERNING THE PROPER MOUNTING OF SIGNS ON APPROPRIATE POSTS.

OTHER STDS. E-160 E-161 E-162 E-163 E-164 REQUIRED:

REVISIONS AND CORRECTIONS

JAN. 23, 1995 - DATE OF ORIGINAL ISSUE
AUG. 08, 1995 - VARIOUS MINOR NOTE REVISIONS

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

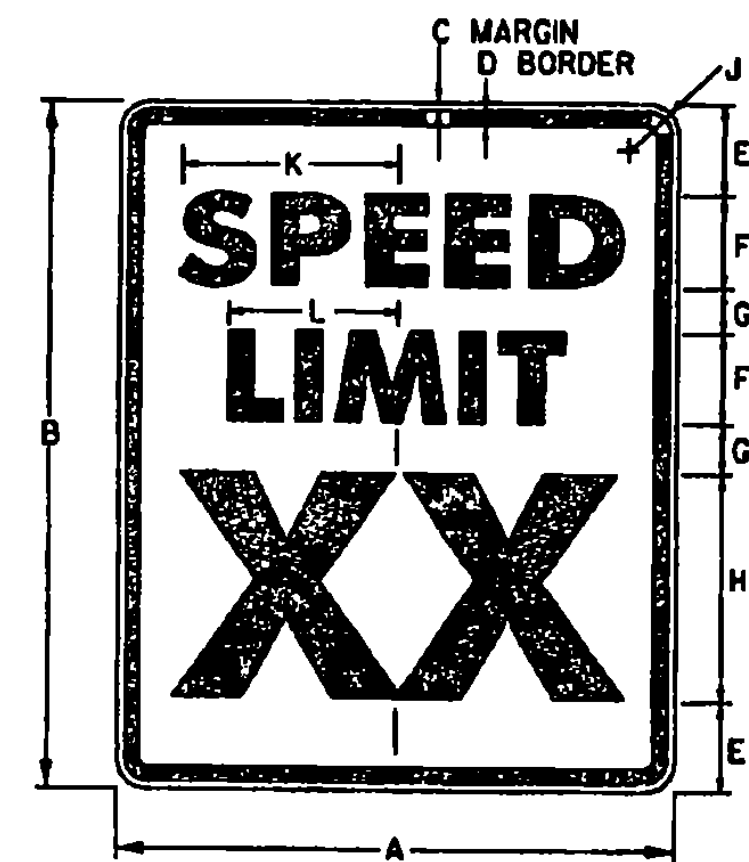
Stephen D. McArthur
DIRECTOR OF ENGINEERING

David A. Ross
TRAFFIC AND SAFETY ENGINEER

**STANDARD SIGN PLACEMENT
CONVENTIONAL ROAD**



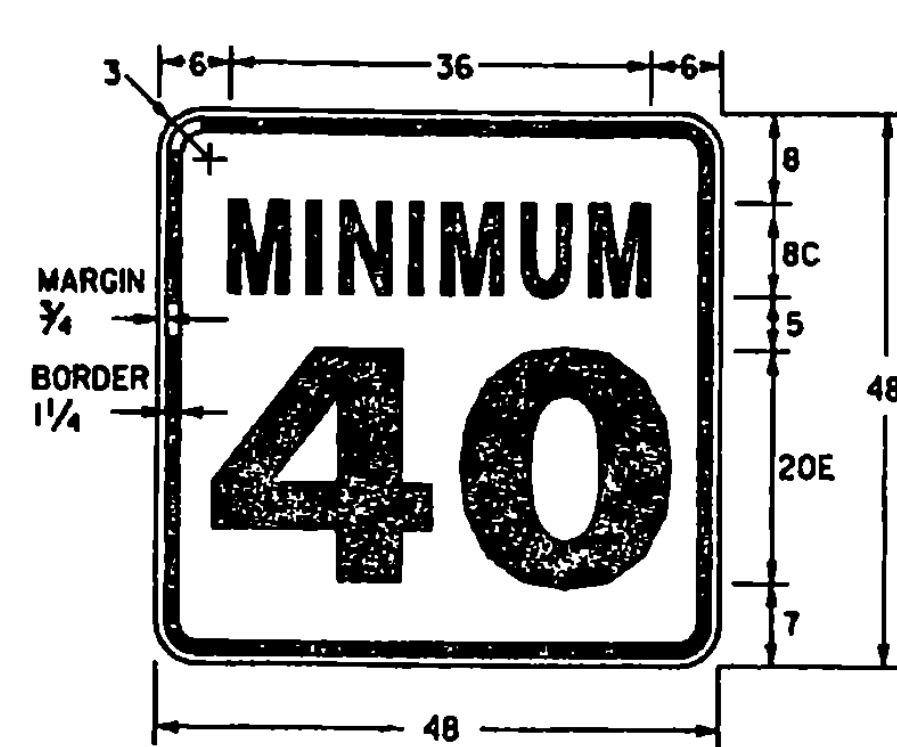
**STANDARD
E-121**



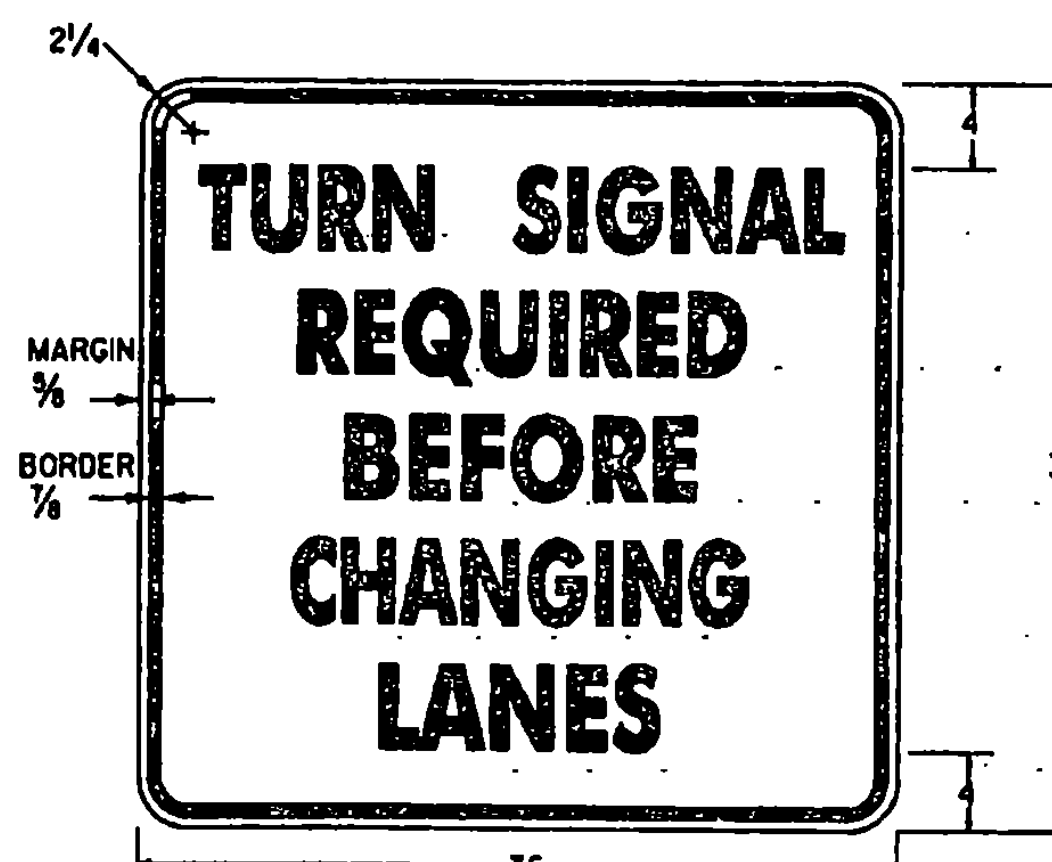
• OPTICALLY SPACE NUMERALS ABOUT VERTICAL CENTERLINE.

R2-1

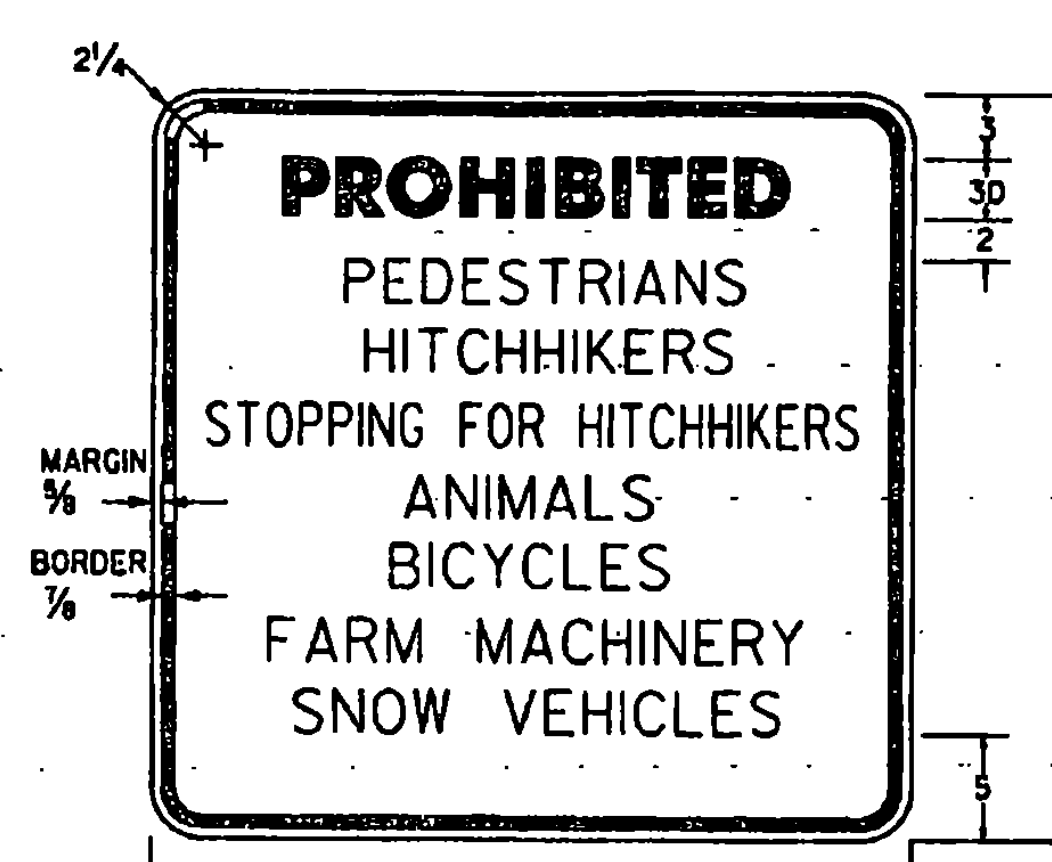
SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
MIN.	18	24	3/8	3/8	3 1/2	4C	2 1/2	6 3/8	5 1/2	7	1 1/2
STD.	24	30	3/8	3/8	4	4E	2	10E	1 1/2	9 3/8	7 3/8
EXPWY.	36	48	3/8	3/8	6	6E	5	14E	2 1/4	14 3/8	11
FWY.	48	60	3/4	1/4	8	8E	4	20E	3	19 1/8	14 3/8



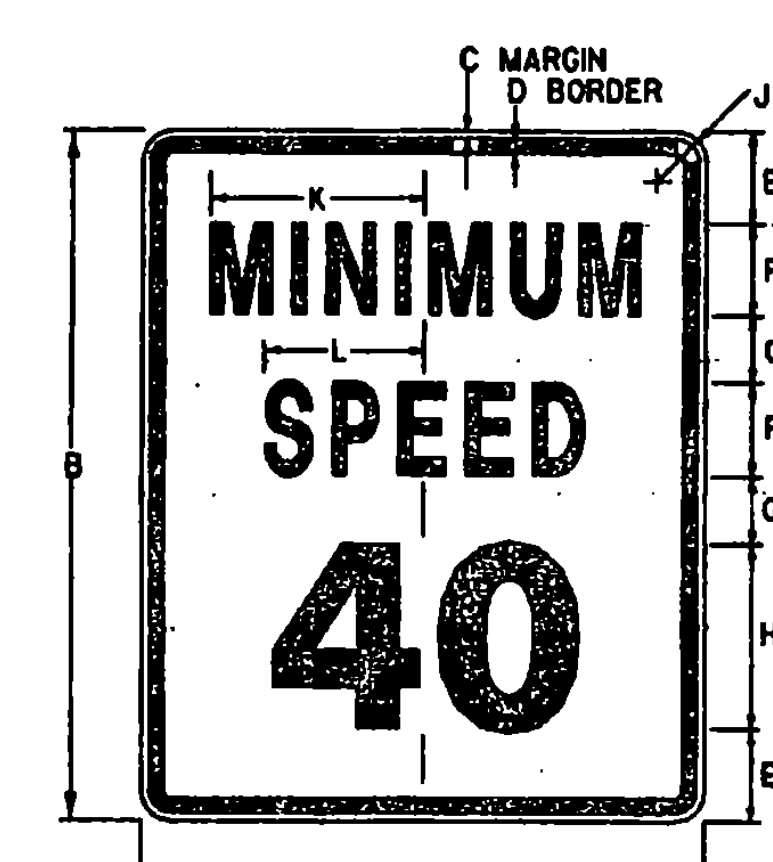
TO BE USED WITH "SPEED LIMIT 55" OR "65" FWY SIGN ONLY
VR-141



TEXT 4" C₁ SPACING 2"
VR-002



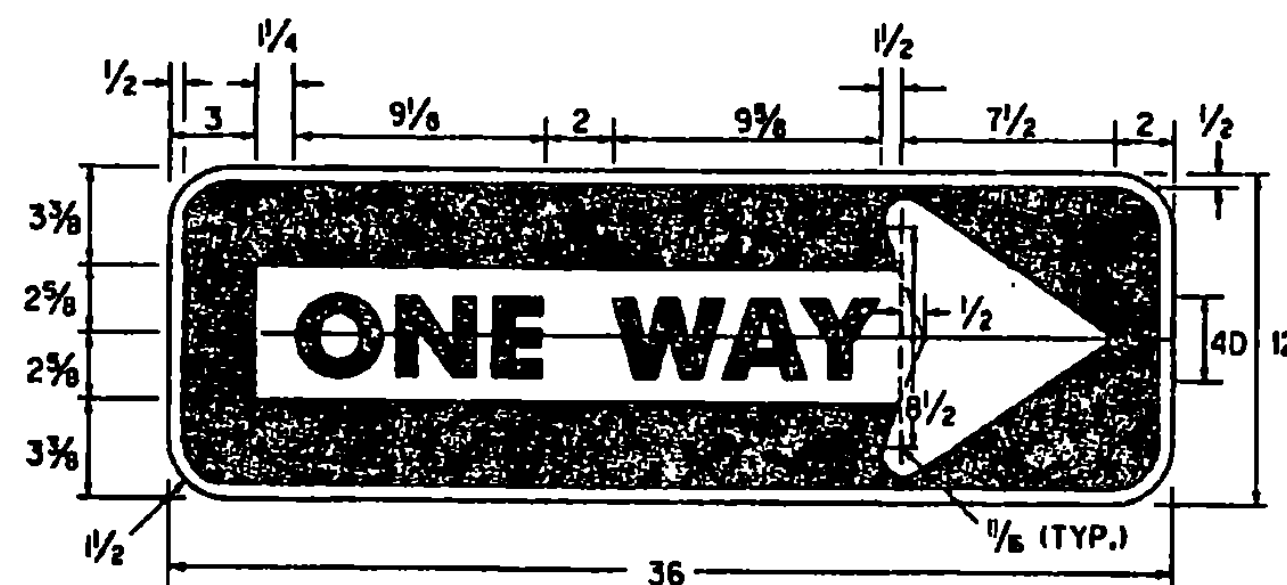
TEXT 2" C₁ SPACING 1 1/2", EXCEPT WHERE NOTED.
VR-046



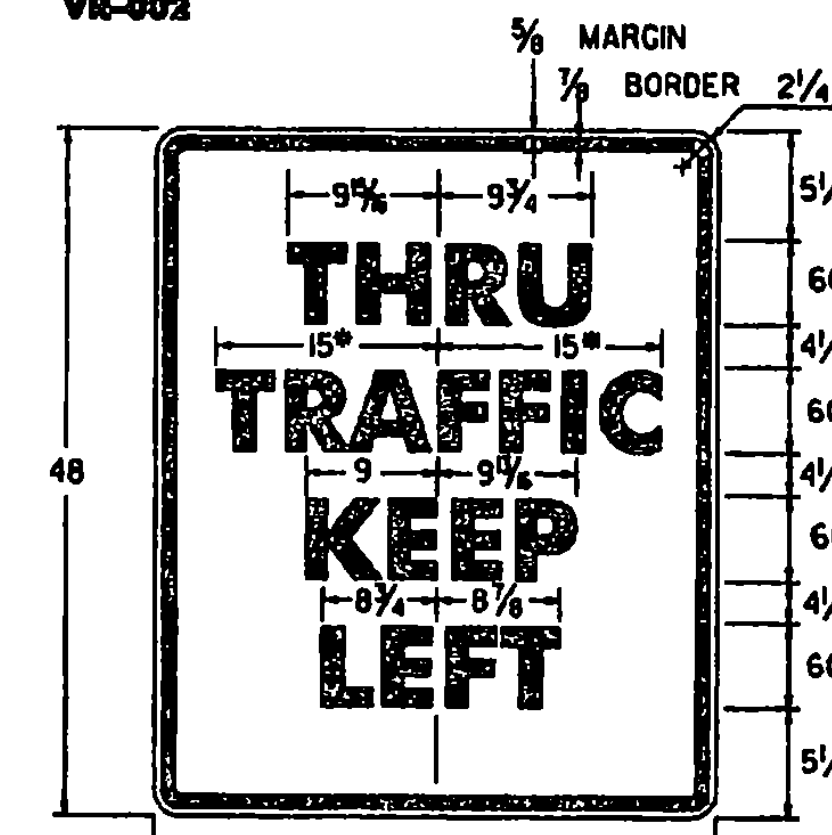
• OPTICALLY SPACE NUMERALS ABOUT VERTICAL CENTERLINE.

R2-4

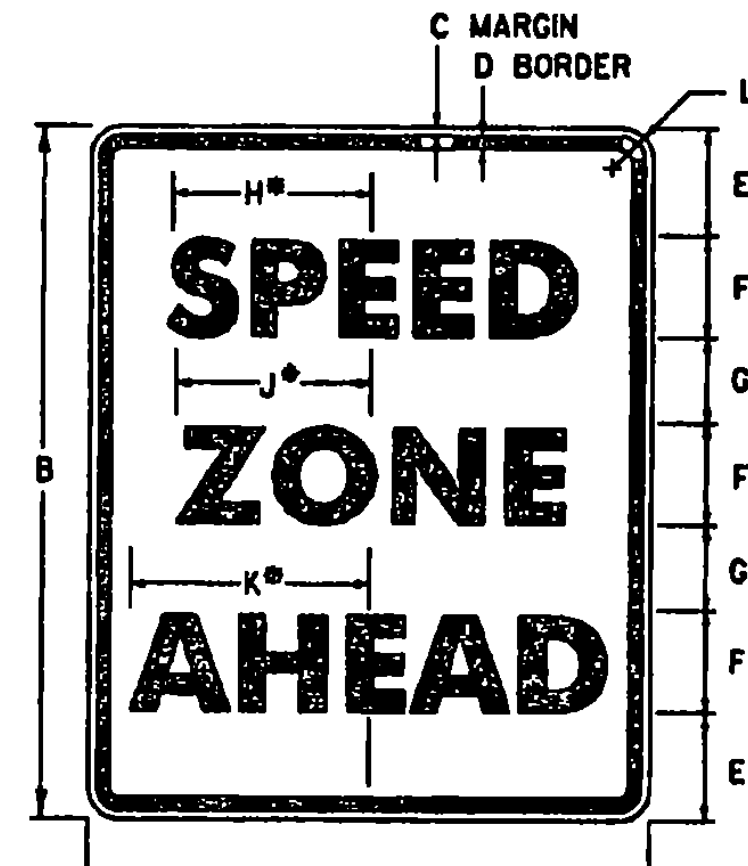
SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
STD.	24	30	3/8	3/8	4	4E	2	10E	1 1/2	9 3/8	6 3/8
EXPWY.	36	48	3/8	3/8	6	6E	5	14E	2 1/4	13 3/8	10 3/8
FWY.	48	60	3/4	1/4	8	8E	4	20E	3	18 3/8	13 3/8



R6-1B



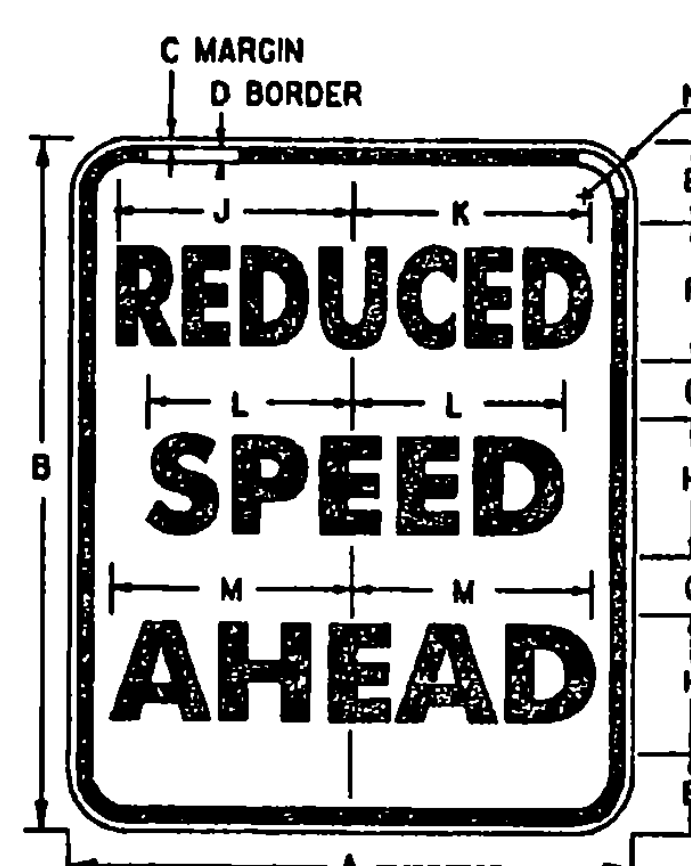
• REDUCE SPACING 25 %
VR-118L



• FOR STD SIZE, REDUCE SPACING 40 %

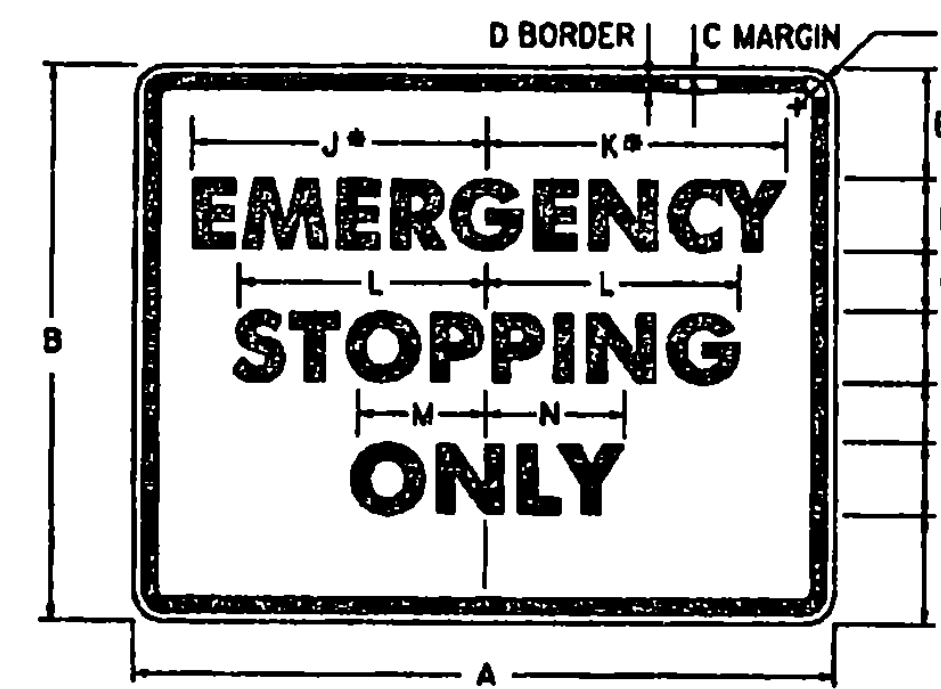
R2-5C

SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
MIN.	18	24	3/8	3/8	3 1/2	4C	2 1/2	6 3/8	5 1/2	7	1 1/2
STD.	24	30	3/8	3/8	3 1/2	6C	2 1/2	9 3/8	7 3/8	9 3/4	1 1/2
EXPWY.	36	48	3/8	3/8	7	8C	5	13 3/8	11 3/8	14	2 1/4
FWY.	48	60	3/4	1/4	9	10C	6	17	13 3/8	17 1/2	3



R2-5A

SIGN	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L	M	N
MIN.	18	24	3/8	3/8	3 1/2	4B	2 1/2	4C	6 3/8	7	6 3/8	7	1 1/2
STD.	24	30	3/8	3/8	3 1/2	6B	2 1/2	6C	10 3/4	9 3/4	9 3/4	1 1/2	
EXPWY.	36	48	3/8	3/8	7	8B	5	8C	14 1/4	14 3/4	13 3/8	14	2 1/4
FWY.	48	60	3/4	1/4	9	10B	6	10C	17 3/4	18 3/8	17	17 1/2	3



• FOR FWY SIZE, REDUCE SPACING 50 %
R2-7

SIGN	DIMENSIONS (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
EXPWY.	30	24	3/8	3/8	3 1/2	4C	2 1/2	4D	12 1/2	13	12 3/4	6 3/8	7	1 1/2
FWY.	48	36	3/8	3/8	5	6D	4	6D	20 3/8	21 1/8	19 1/8	10 3/8	10 3/8	2 1/4

GENERAL:

1. ALL DIMENSIONS IN INCHES.

COLORS:

THE REGULATORY SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT ON REFLECTORIZED WHITE BACKGROUND, UNLESS OTHERWISE NOTED. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

MATERIALS:

THE SIGN BASE MATERIALS USED FOR REGULATORY SIGNS SHOWN ON THIS SHEET MAY BE ANY OF THE FOLLOWING OF THE MINIMUM THICKNESS NOTED.

	18' X 24'	24' X 30'	30' X 24'	36' X 12'	36' X 36'	36' X 48'	48' X 36'	48' X 48'	48' X 60'
FLAT SHEET ALUMINUM	0.060"	0.080"	0.100"						
HIGH DENSITY OVERLAID PLYWOOD	1/2"	1/2"	5/8"						
GALVANIZED FLAT SHEET STEEL	18 GAGE	16 GAGE	14 GAGE						

THE REFLECTIVE MATERIAL FOR GROUND MOUNTED SIGNS SHALL BE AASHTO TYPE II OR III WHITE REFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND OF THE SIGN. THE TEXT OF THE SIGNS MAY BE LETTERING FILM, SILK SCREENED OR HAND PAINTED. HAND PAINTING MUST BE COMPARABLE IN QUALITY TO THE RESULTS OBTAINED BY SILK SCREENING.

SPECIFICATIONS:

REGULATORY SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR TRAFFIC SIGNS.

TEXT DESIGN:

LETTERS, DIGITS, ARROWS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD ALPHABET FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AND DESIGNS PRESCRIBED IN THE STANDARD HIGHWAY SIGNS AS SPECIFIED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

OTHER STDS.: NONE REQUIRED



STANDARD
E-142

REVISIONS AND CORRECTIONS

OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
SEPT. 20, 1995 - ADDED AND DELETED SIGN DETAILS.
ADDED SIGN ID NUMBERS, MINOR NOTE REVISIONS.

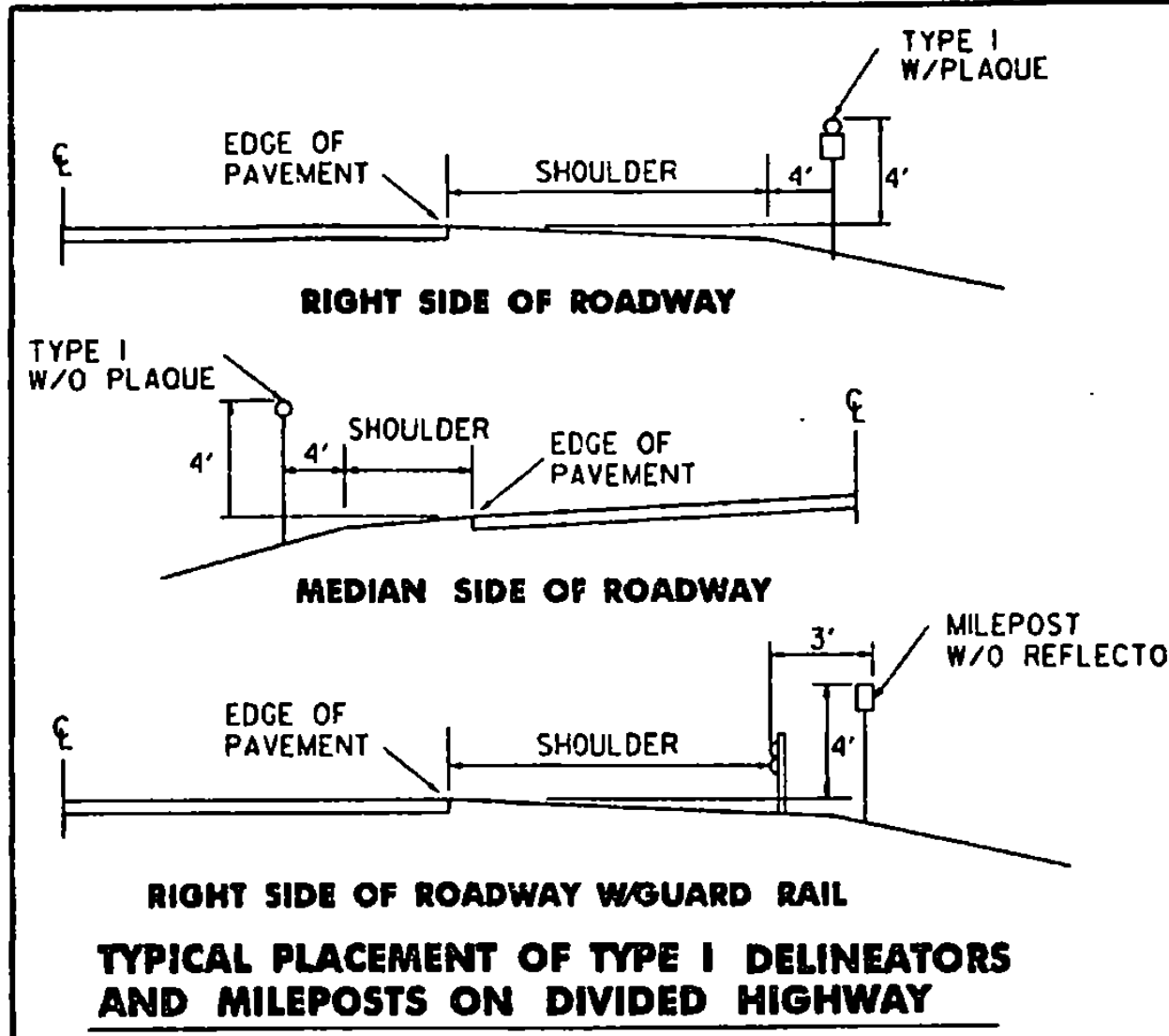
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

Stephen D. McArthur
DIRECTOR OF ENGINEERING

David A. Ross
TRAFFIC AND SAFETY ENGINEER

REGULATORY SIGN
DETAILS



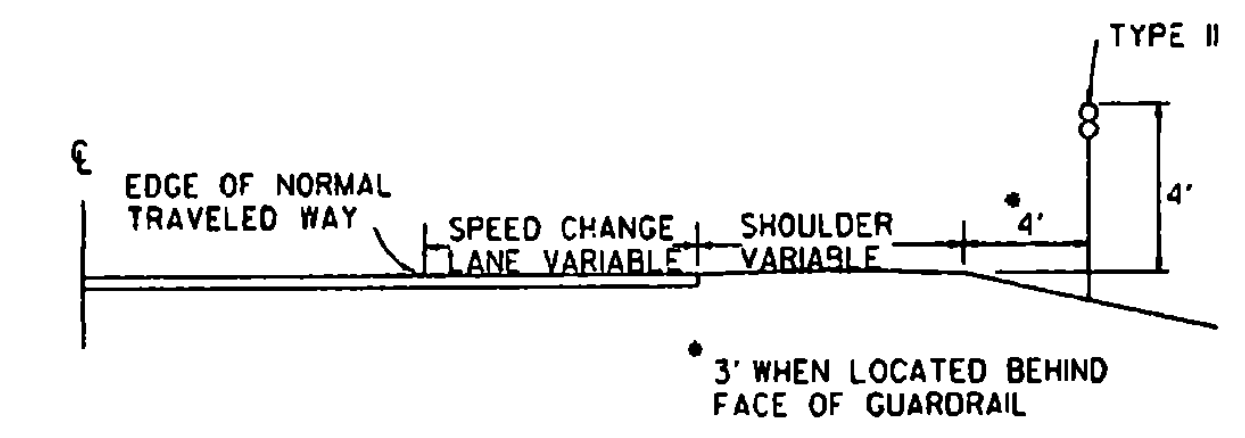
TYPICAL PLACEMENT OF TYPE I DELINEATORS AND MILEPOSTS ON DIVIDED HIGHWAY

TYPE I DELINEATORS WITH WHITE REFLECTOR UNITS AND THE APPROPRIATE MILEPOST PLAQUES SHALL BE ERECTED CONTINUOUSLY ALONG THE RIGHT SIDE OF THE DIVIDED HIGHWAYS BETWEEN MILEMARKERS, EXCEPT THAT BEHIND GUARD RAIL MILEPOSTS WITHOUT REFLECTORS SHALL BE ERECTED.

THE TYPE I DELINEATORS WITH OR WITHOUT MILEPOST PLAQUES SHALL BE OMITTED ALONG DECELERATION AND ACCELERATION LANES, BUT THE SUCCEEDING SPACING SHALL BE AS IF THE DELINEATORS HAD BEEN ERECTED CONTINUOUSLY AND SHALL BE SO INDICATED.

THE LOCATION OF TYPE I DELINEATORS AND MILEPOSTS ARE TO BE COMPUTED AND MARKED IN THE FIELD BY THE ENGINEER IN ACCORDANCE WITH THE LATEST REVISION OF THE AGENCY'S "POLICY ON LOCATION MARKING FOR VERMONT DIVIDED HIGHWAYS."

TYPE I AMBER DELINEATORS WITHOUT MILEPOST PLAQUES SHALL BE ERECTED CONTINUOUSLY ALONG THE LEFT OR MEDIAN SIDE ON THE DIVIDED HIGHWAYS EXCEPT BEHIND GUARD RAIL, AND CONTINUED AT APPROXIMATELY THE SAME SPACING THROUGH INTERCHANGES AND REST AREAS WHERE THERE MAY NOT BE ANY TYPE I DELINEATORS ON THE RIGHT SIDE. THE SAME LATERAL PLACEMENT SHALL BE FOLLOWED ON THE LEFT AS ON THE RIGHT. TYPE I DELINEATORS WITHOUT MILEPOST PLAQUE SHALL BE INSTALLED ON INTERSTATE RAMP AS SHOWN ON THE PLANS.



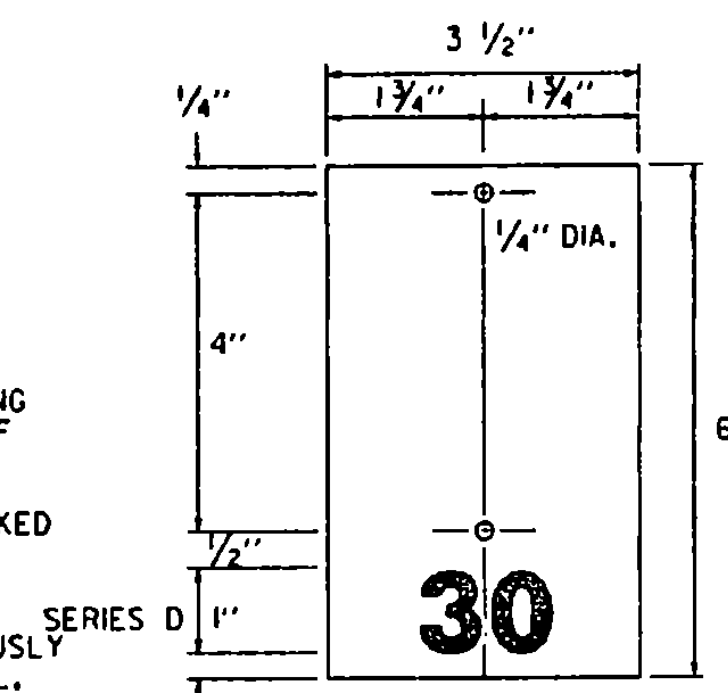
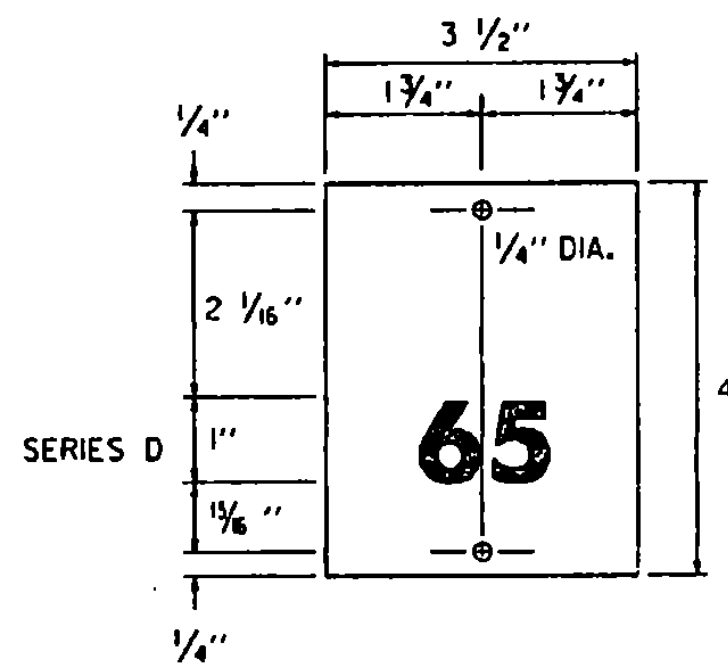
TYPICAL PLACEMENT OF TYPE II DELINEATORS ON SPEED CHANGE LANES

TYPE II DELINEATORS SHALL BE ERECTED CONTINUOUSLY ALONG THE RIGHT SIDE OF THE DECELERATION AND ACCELERATION LANES AT 100' INTERVALS INCLUDING GUARDRAIL SECTIONS THE DELINEATORS SHALL START AT THE BEGINNING OF THE TAPER AND END AT THE NOSE OF THE EXIT OR ENTRANCE GORE. THEY SHALL HAVE WHITE REFLECTOR UNITS.

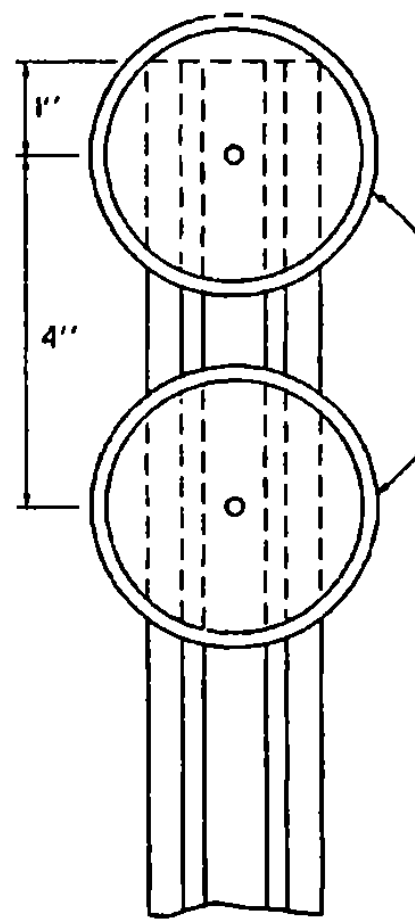
TYPE III DELINEATORS - SEE NOTE # 1

TYPE III DELINEATORS SHALL BEGIN 50' FROM WRONG WAY SIGNS AND EXTEND EVERY 50' TO A POINT NOT LESS THAN 25' FROM THE DIVIDED HIGHWAY AND BE MOUNTED ON BOTH SIDES OF THE ROAD AS SHOWN ON THE PLANS.

MILEPOST PLAQUE "A"
(THE NUMERALS ON PART "A"
INDICATE THE MILE.)

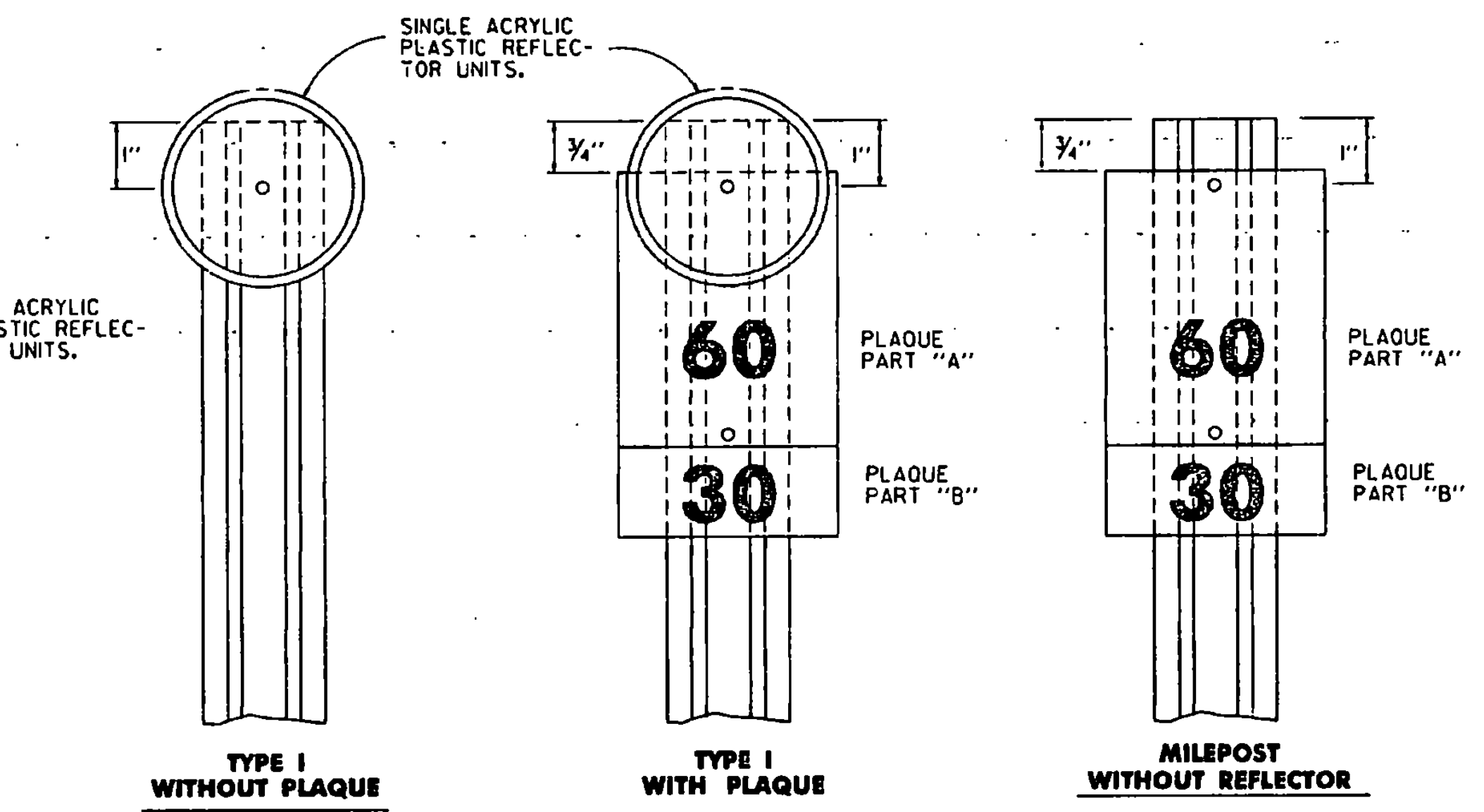


MILEPOST PLAQUE PART "B"
(THE NUMERAL ON PART "B"
INDICATES IN FIVE
ONE-HUNDREDTHS OF A MILE
BETWEEN MILE INCREMENTS.)



TYPE II

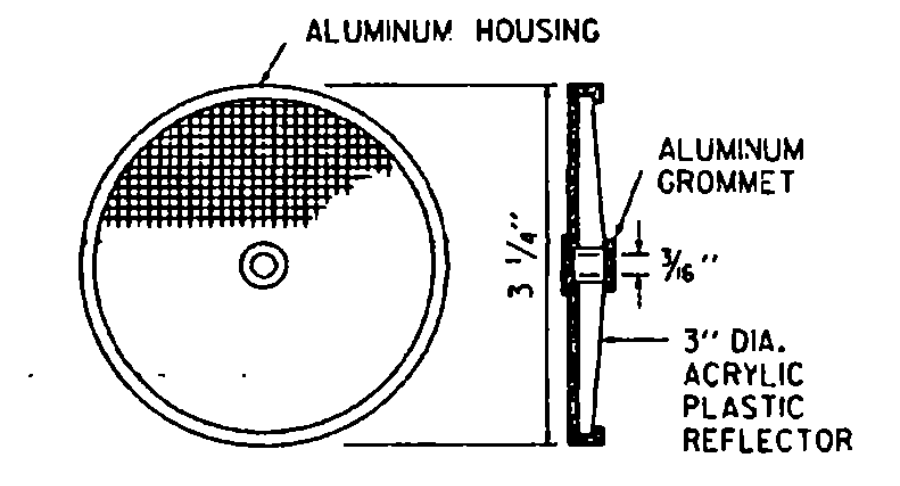
DELINEATORS WITH ACRYLIC PLASTIC REFLECTORS



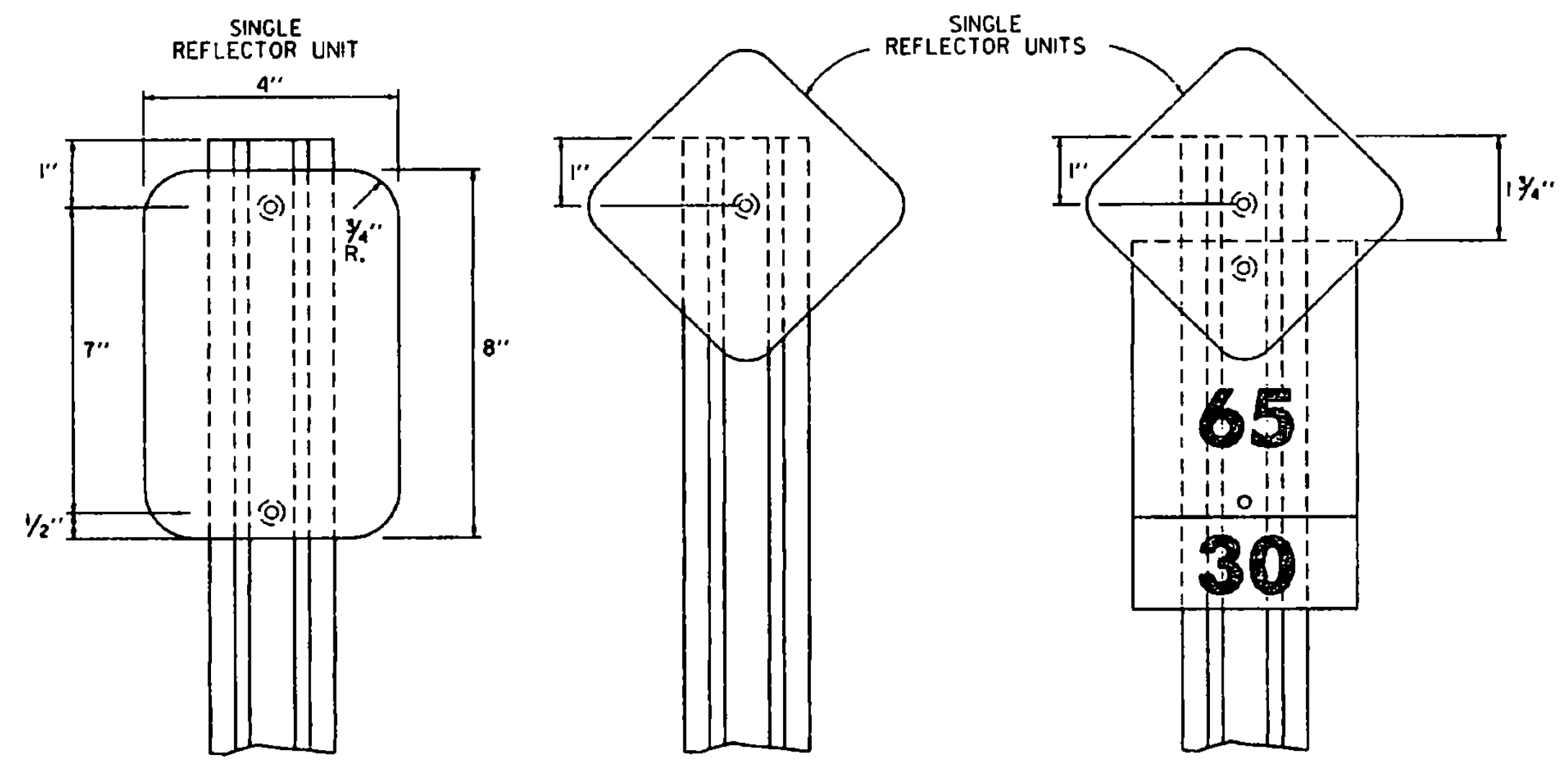
TYPE I WITHOUT PLAQUE

TYPE I WITH PLAQUE

MILEPOST WITHOUT REFLECTOR



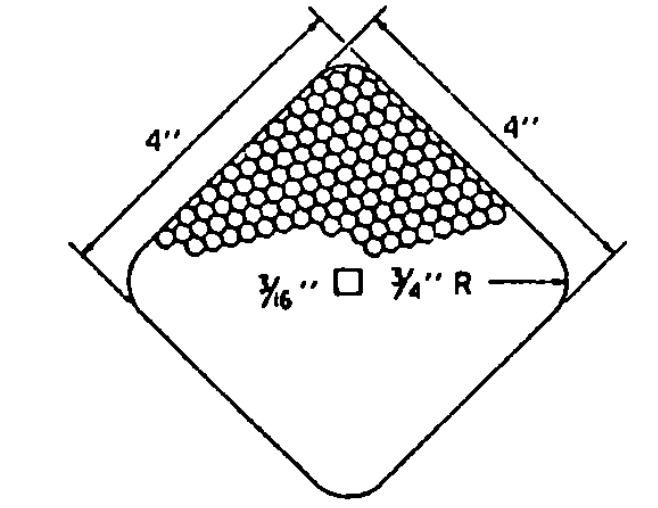
DELINEATOR PLASTIC REFLECTOR UNIT



TYPE II

TYPE I WITHOUT PLAQUE

TYPE I WITH PLAQUE



DELINEATOR REFLECTIVE SHEETING UNIT

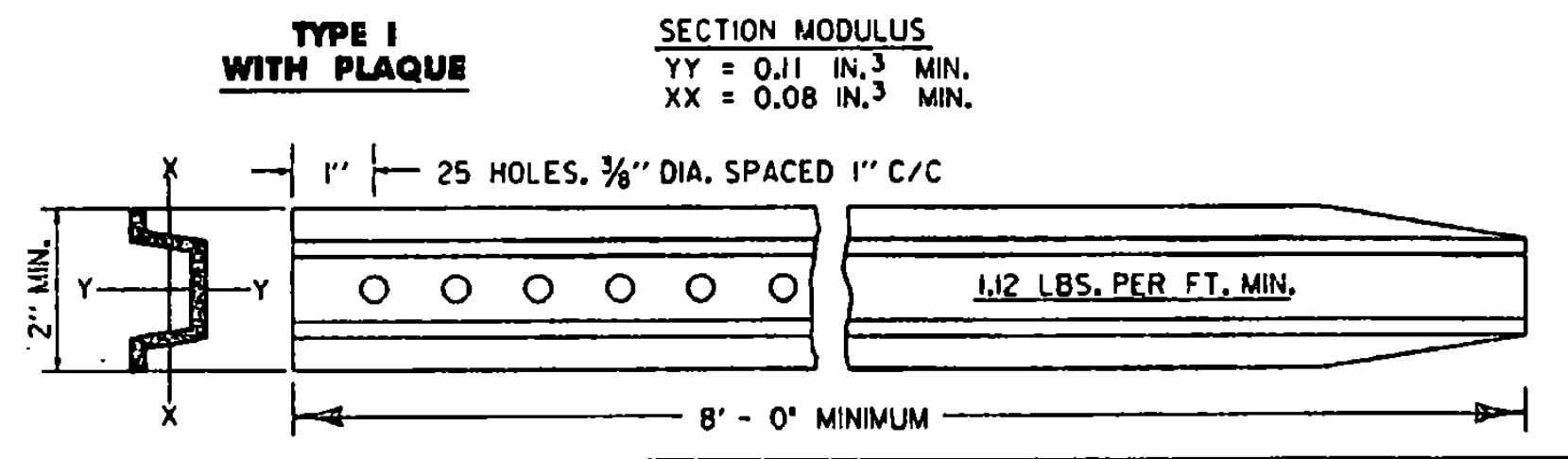
MATERIAL FOR REFLECTIVE SHEETING DELINEATORS SHALL BE A 0.063" ALUMINUM BACKING WITH A SILVER, AMBER OR RED HIGH INTENSITY REFLECTIVE SHEETING.

NOTES

- TYPE III DELINEATORS WILL BE TYPE I DELINEATORS WITH AN ADDITIONAL RED REFLECTIVE UNIT MOUNTED ON THE REVERSE SIDE. THEY SHALL BE ERECTED ON THE RIGHT AND LEFT SIDE OF THE RAMP AS INDICATED ON THE PLANS.
- EACH UNIT COMPLETE IN PLACE OF DELINEATOR TYPE I WITH OR WITHOUT PLAQUE, DELINEATOR TYPE II, DELINEATOR TYPE III, OR MILEPOST WITHOUT REFLECTOR SHALL BE PAID FOR AS "DELINEATOR."
- FOR MOUNTING DELINEATORS AND MILEPOSTS ON BRIDGES, SEE STANDARD E-199.
- DELINEATOR POSTS SHALL HAVE A MINIMUM EMBEDMENT OF 2' IN THE GROUND.

DELINEATORS WITH REFLECTIVE SHEETING

MILEPOST PLAQUES WITH OR A WITHOUT REFLECTOR UNIT SHALL BE MOUNTED ON THE POST WITH TWO OR THREE 3/8" DIA. BY 1 1/2" LONG ALUMINUM BOLTS WITH 1/2" DIA. ALUMINUM VANDAL RESISTANT NUTS, OR 3/8" DIA. BY 1 1/2" LONG VANDAL RESISTANT FASTENERS.



SECTION MODULUS
YY = 0.11 IN.³ MIN.
XX = 0.08 IN.³ MIN.

NOT TO SCALE

OTHER STDS. REQUIRED:

REVISIONS AND CORRECTIONS

SEPT. 10, 1987 - DATE OF ORIGINAL ISSUE
AUG. 18, 1995 - MINOR NOTE REVISIONS

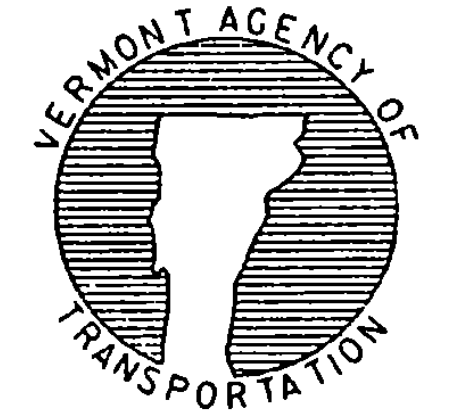
APPROVED

Stephen D. McArthur
DIRECTOR OF ENGINEERING

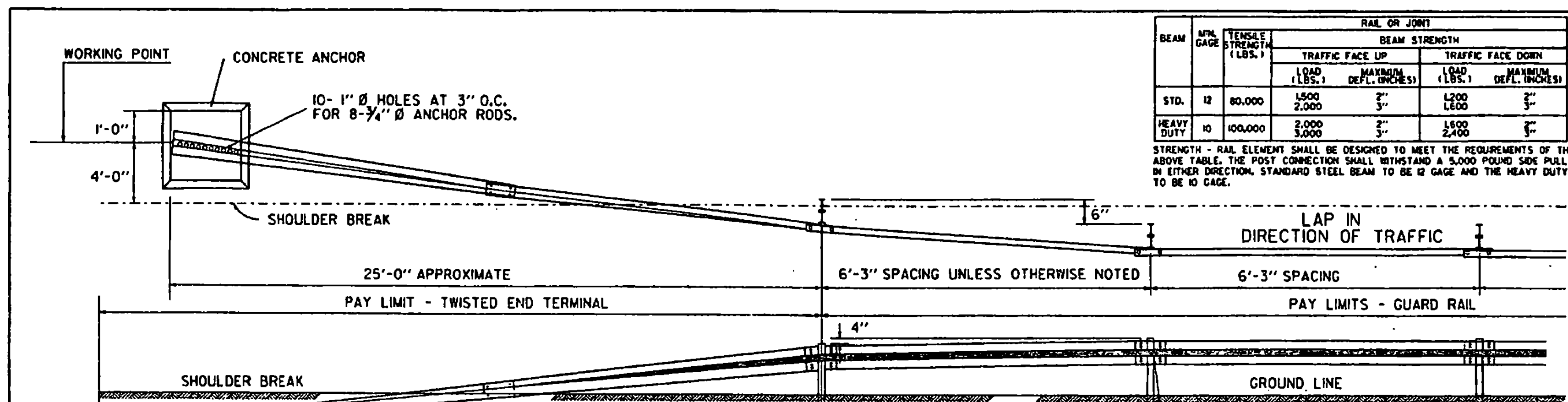
Paul A. Ross
TRAFFIC AND SAFETY ENGINEER

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

**FREEWAY - EXPRESSWAY
DELINEATORS AND MILEPOSTS**

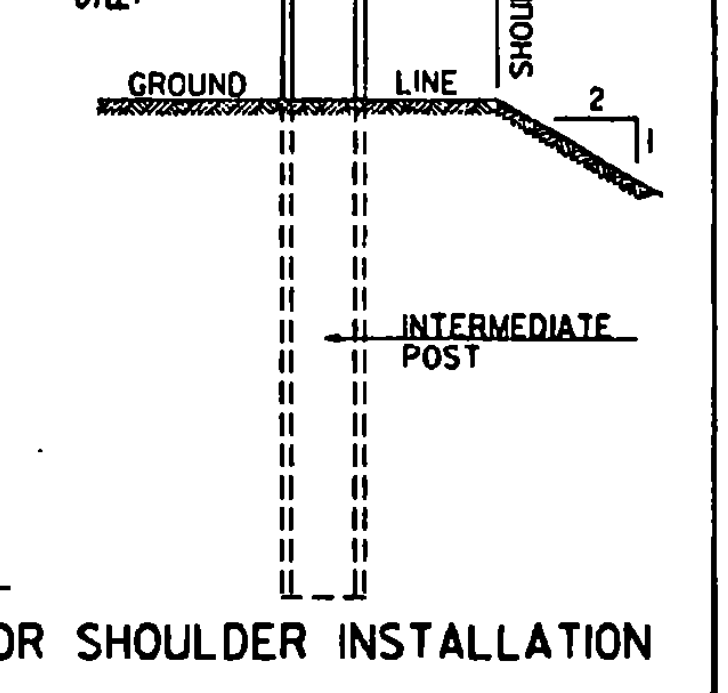
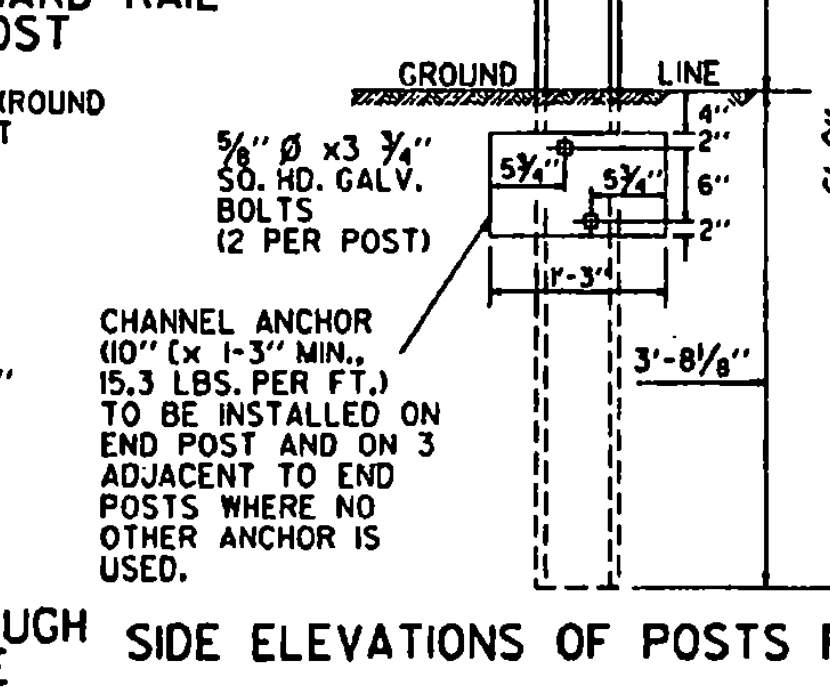
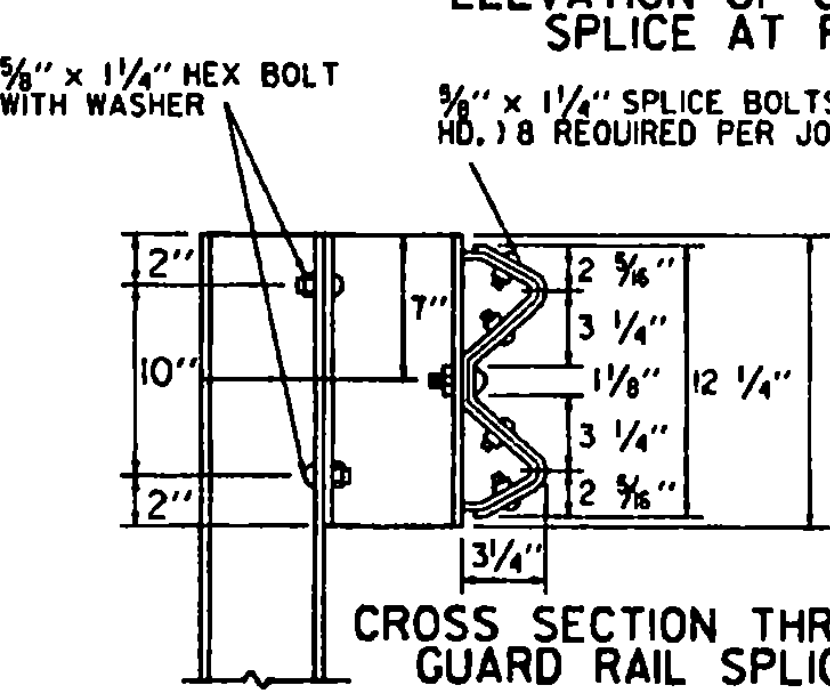
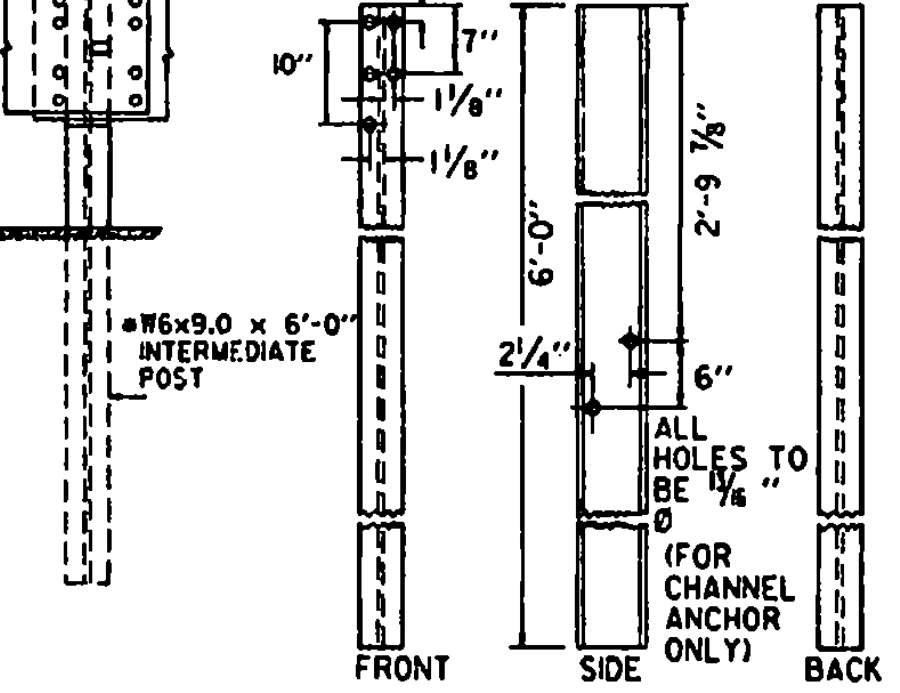
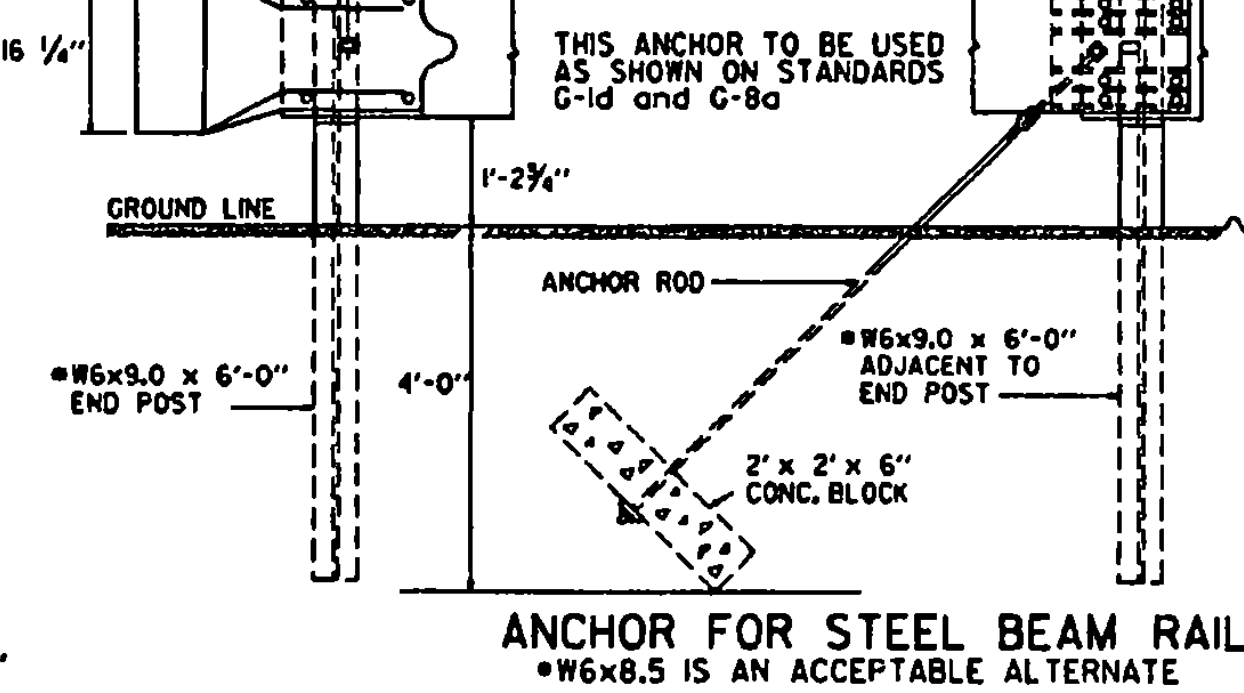
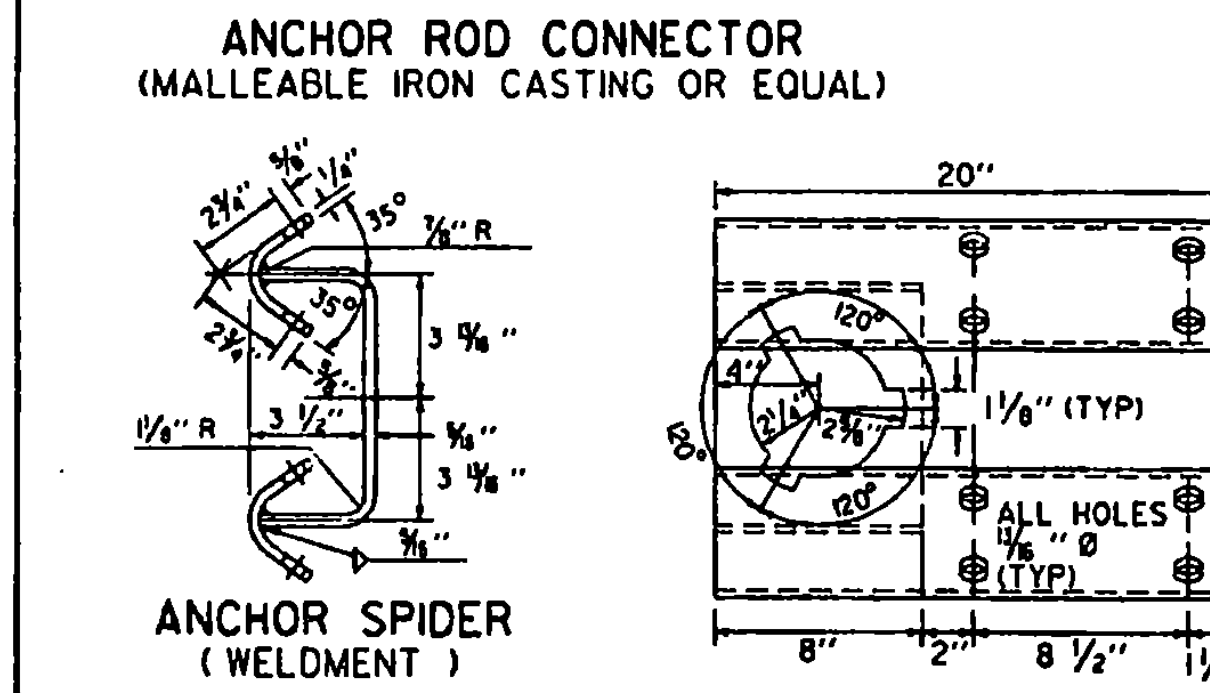
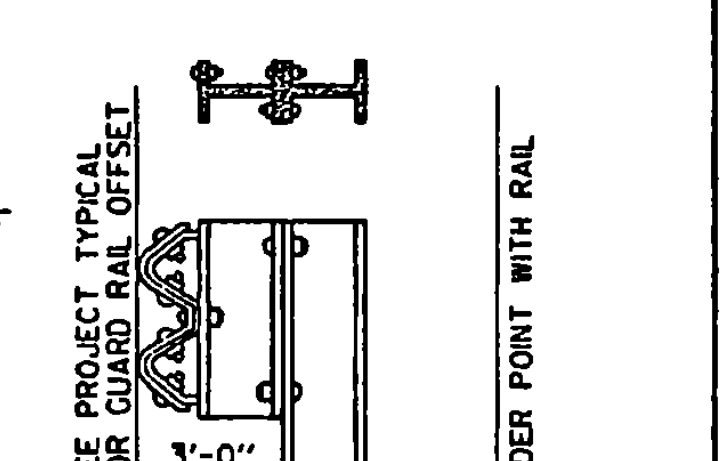
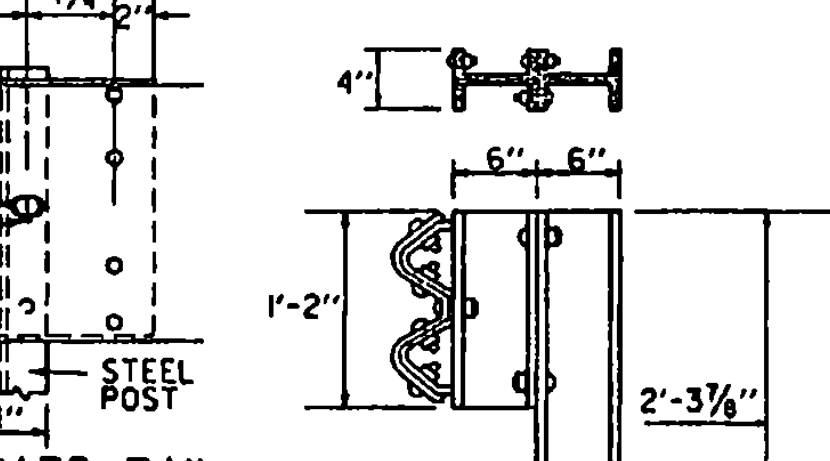
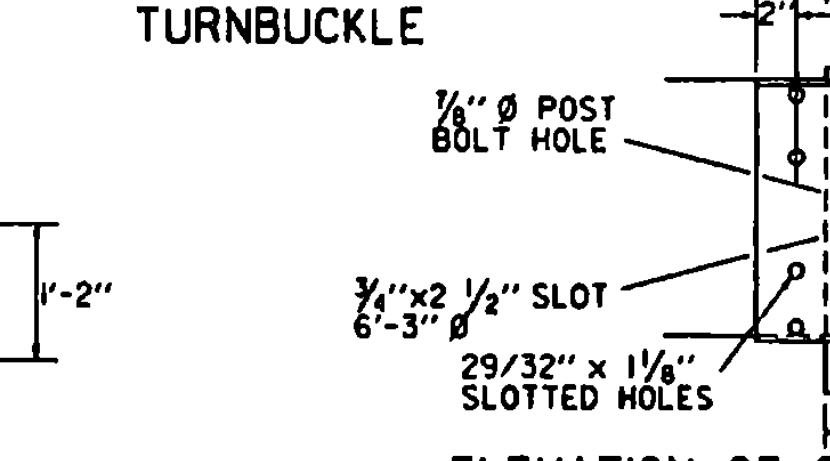
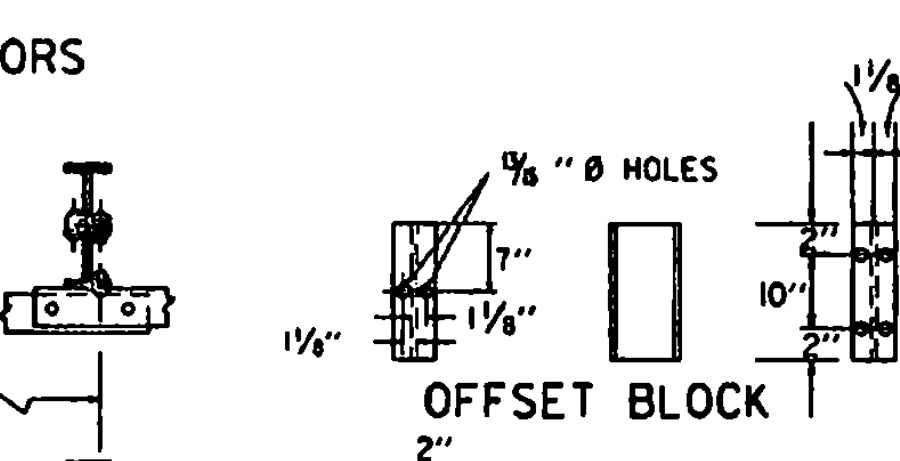
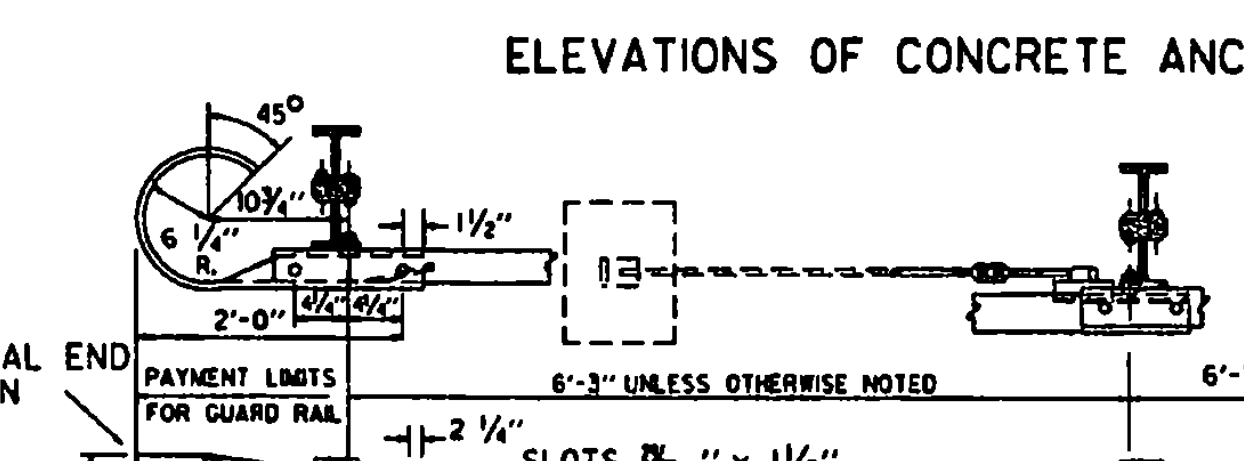
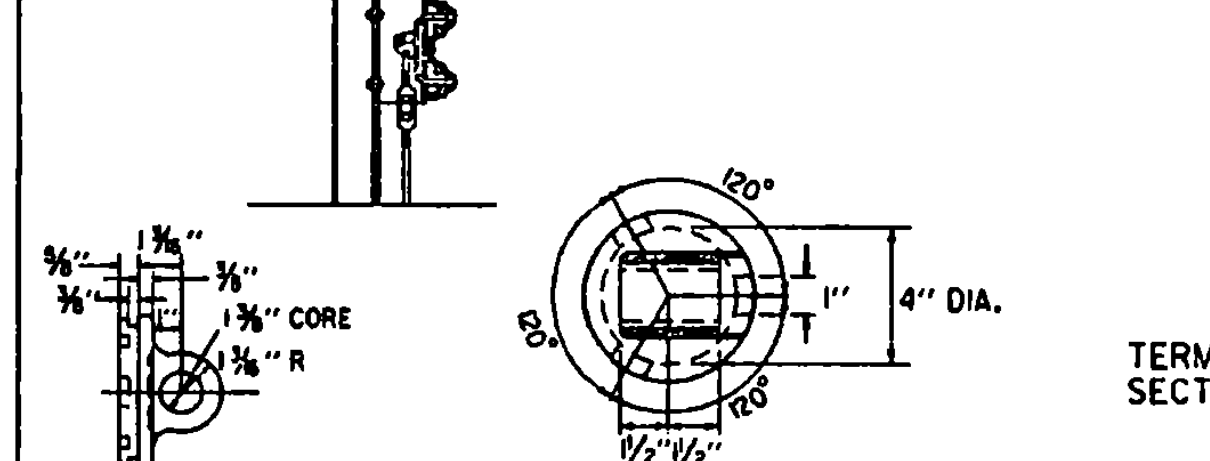
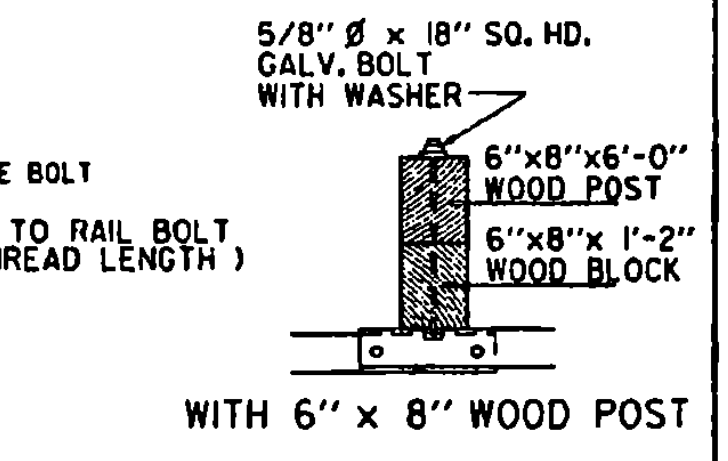
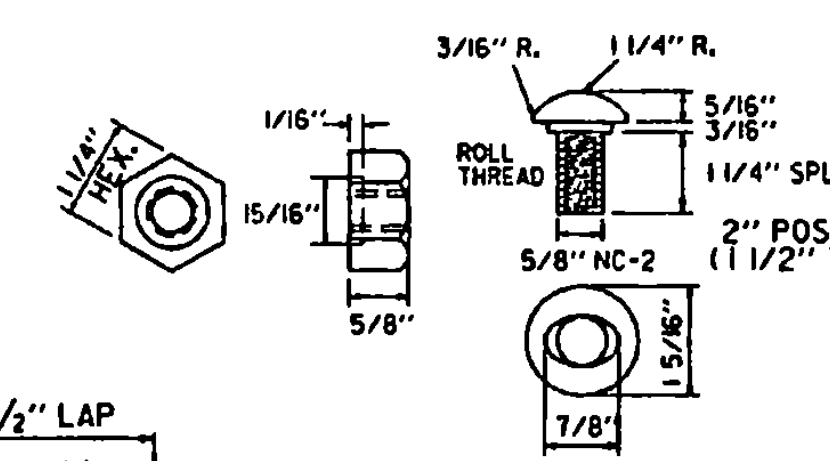
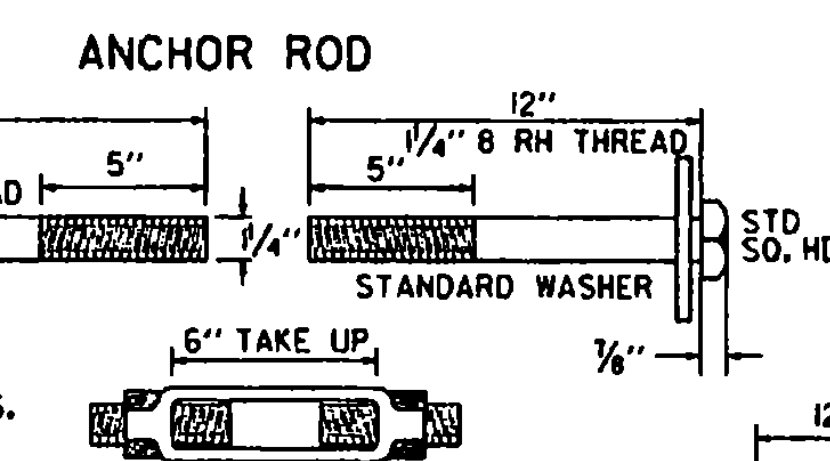
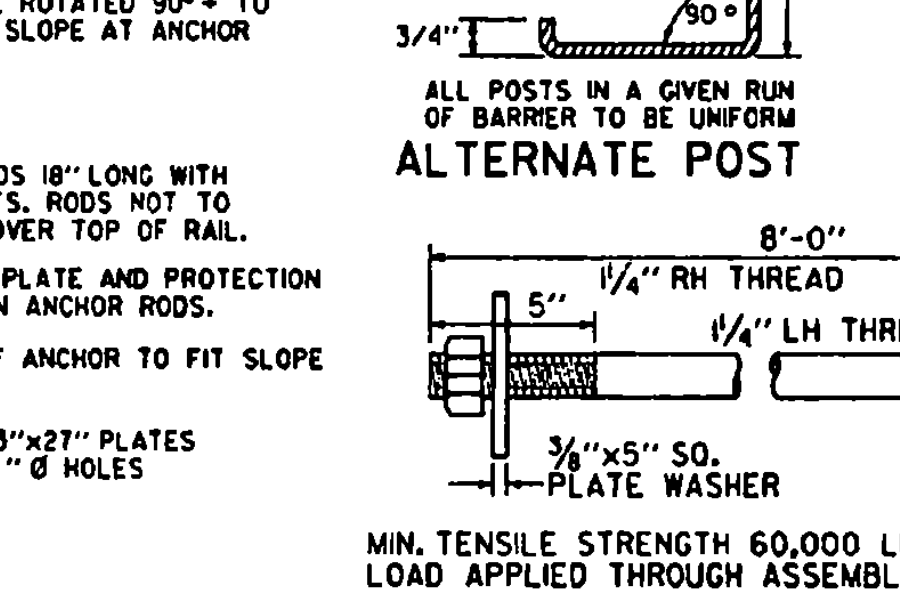
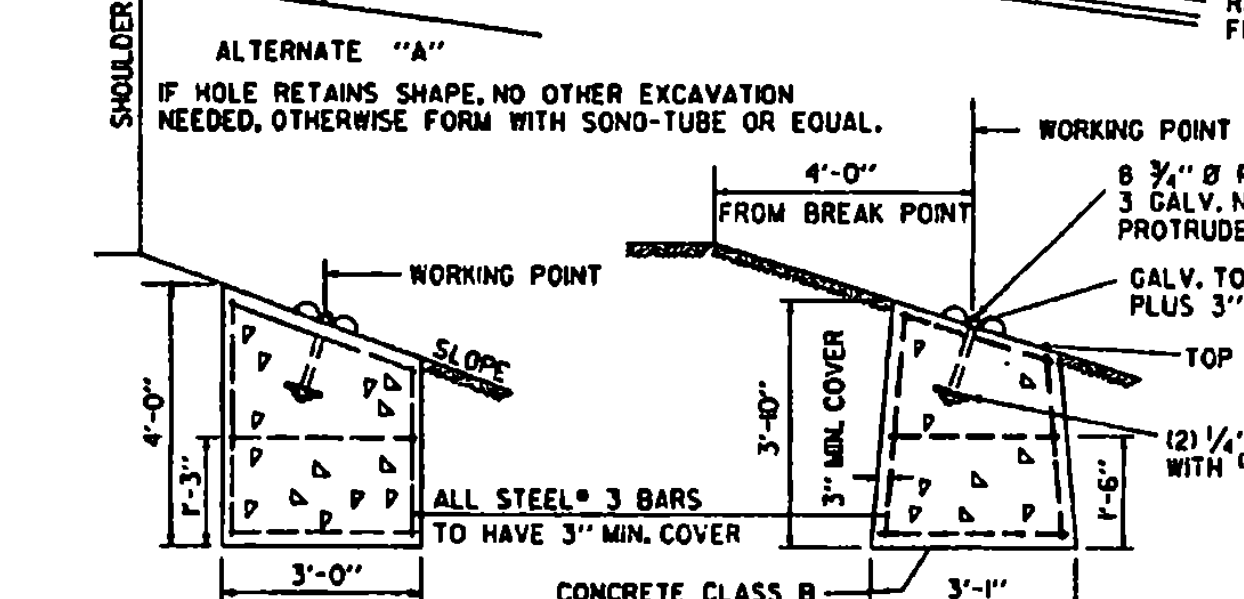
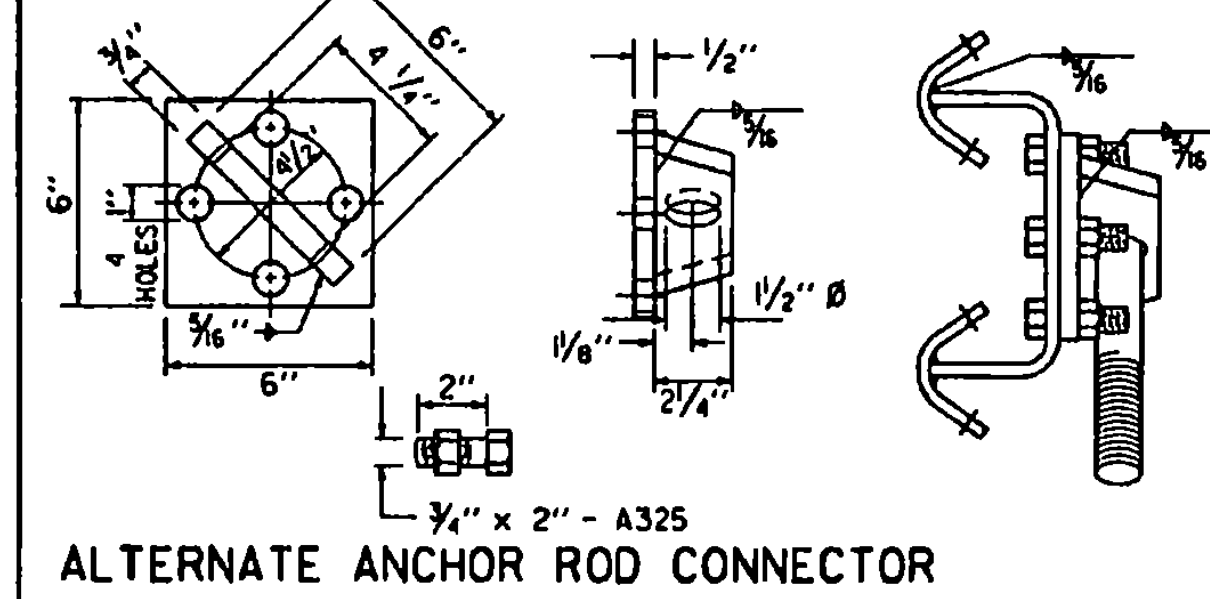
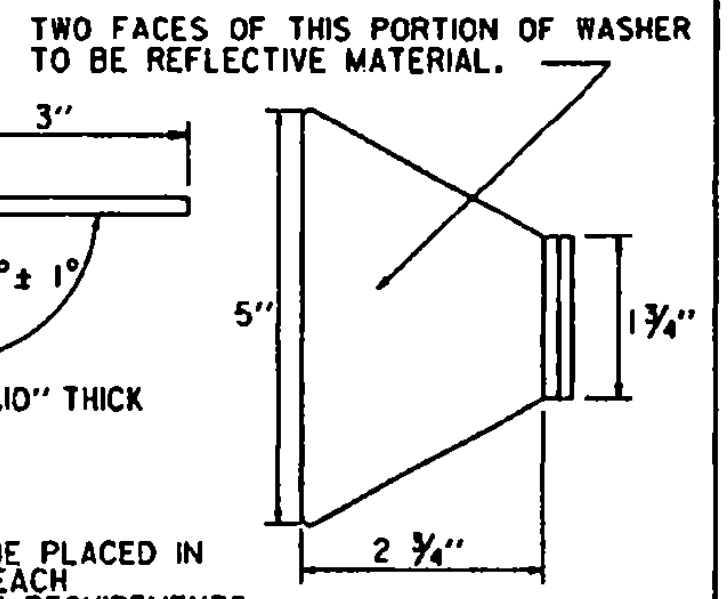
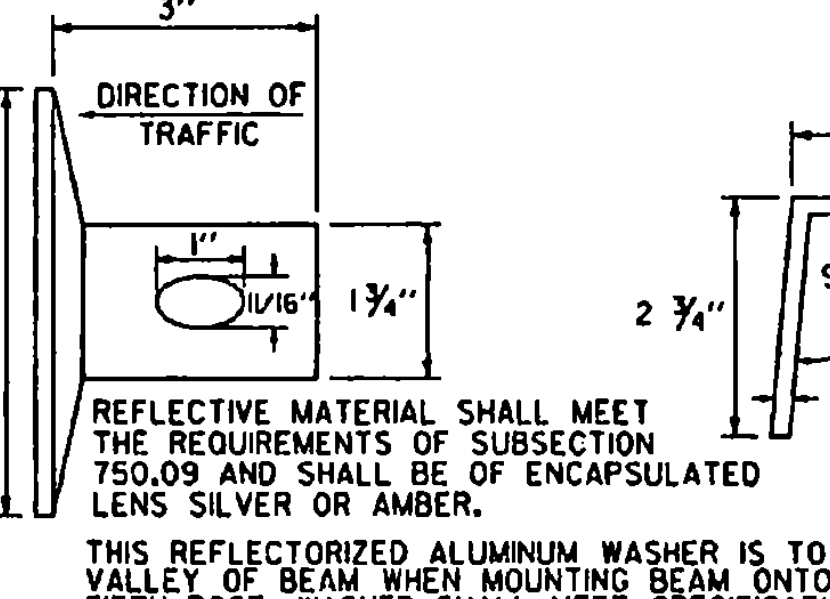
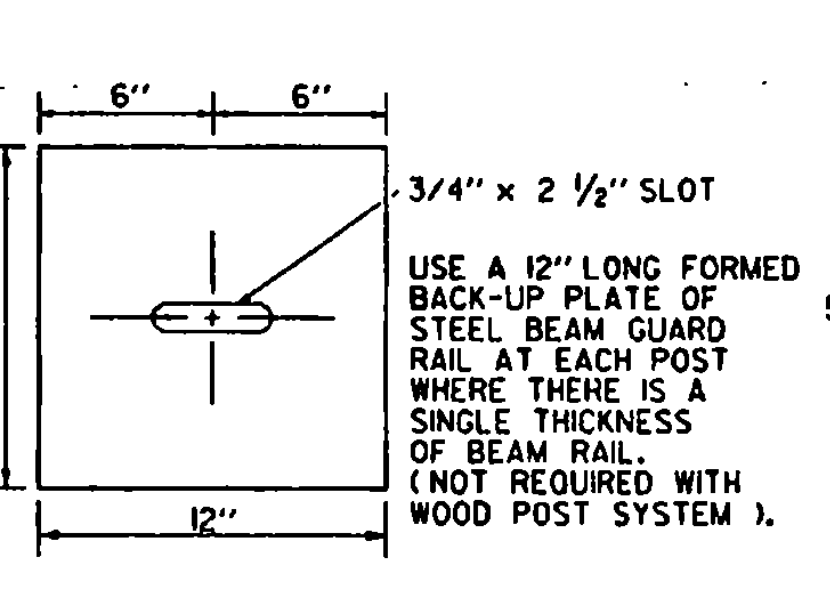
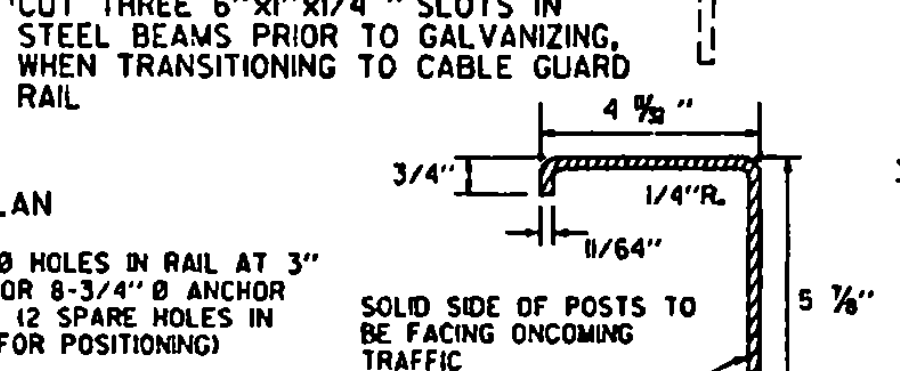
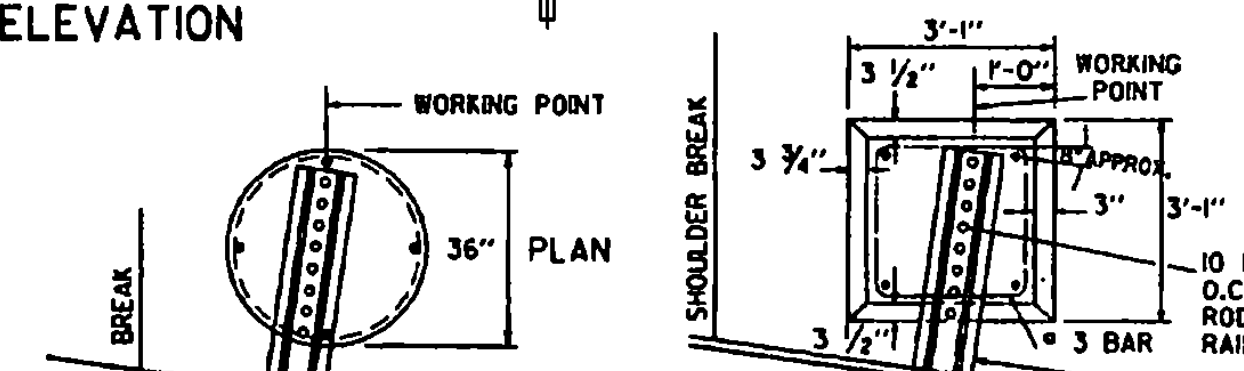
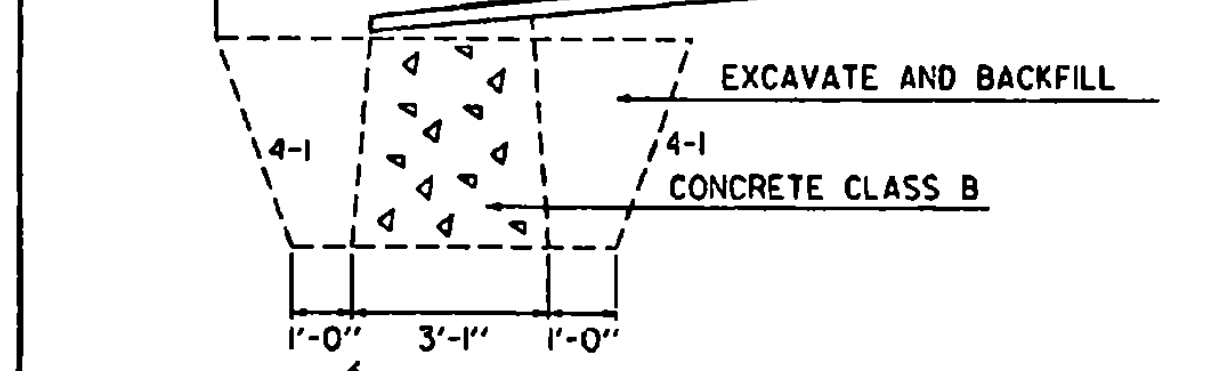
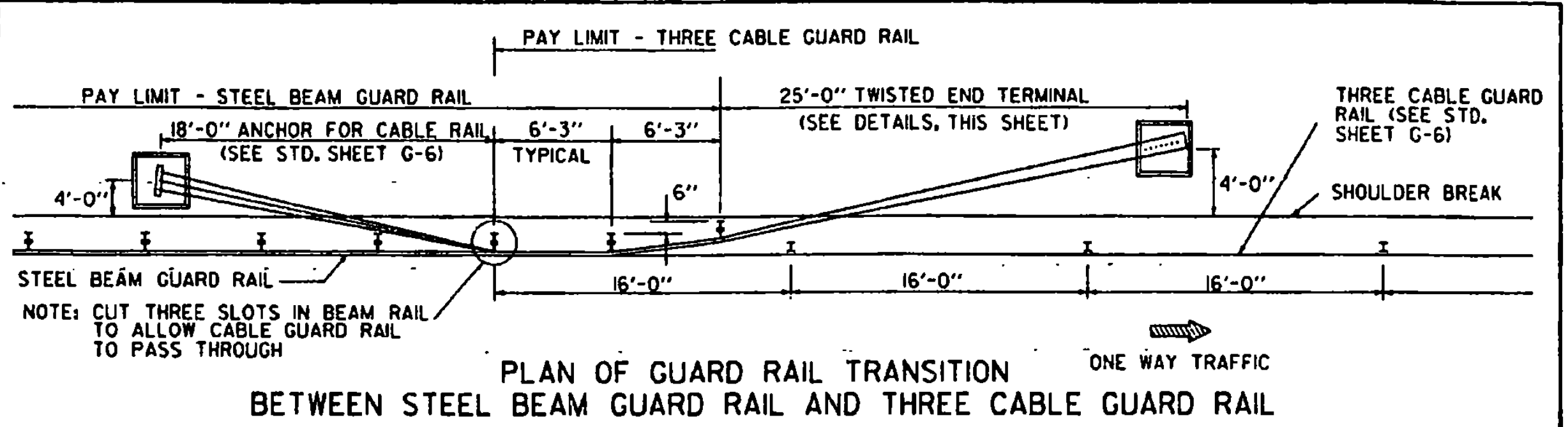


**STANDARD
E-198**



BEAM GAGE	MIN. TENSILE STRENGTH (LBS.)	RAIL OR JOINT			
		TRAFFIC FACE UP		TRAFFIC FACE DOWN	
		LOAD (LBS.)	MAXIMUM DEFL. (INCHES)	LOAD (LBS.)	MAXIMUM DEFL. (INCHES)
STD.	80,000	1,500	5"	1,500	5"
HEAVY DUTY	100,000	2,000	3"	1,500	5"

STRENGTH - RAIL ELEMENT SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF THE ABOVE TABLE. THE POST CONNECTION SHALL WITHSTAND A 5,000 POUND SIDE RAIL IN EITHER DIRECTION. STANDARD STEEL BEAM TO BE 12 GAGE AND THE HEAVY DUTY TO BE 10 GAGE.



REVISIONS AND CORRECTIONS

DEC. 8, 1971 - ORIGINAL APPROVAL DATE
 APR. 10, 1972 - POST HEIGHT INCREASED
 JAN. 17, 1978 - REVISED ANCHOR DETAIL
 JUNE 1, 1978 - CHANNEL ANCHOR DETAILS CHANGED
 MAY 28, 1979 - NOTE ON REFLECTIVE MATERIAL CHANGED
 DEC. 18, 1980 - INCREASED SHOULDER WIDENING FOR GUARD RAIL
 MAR. 12, 1984 - REVISED ANCHOR SPIDER DETAILS
 JUNE 5, 1984 - POST SIZE AND BACK UP PLATE NOTE CHANGED
 DEC. 21, 1984 - REMOVED POST WASHER
 OCT. 31, 1985 - REVISED TO CONFORM TO 1986 SPECIFICATIONS
 JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

George D. McCallum, PE
 DIRECTOR OF ENGINEERING

John M. Murphy, PE
 DESIGN ENGINEER

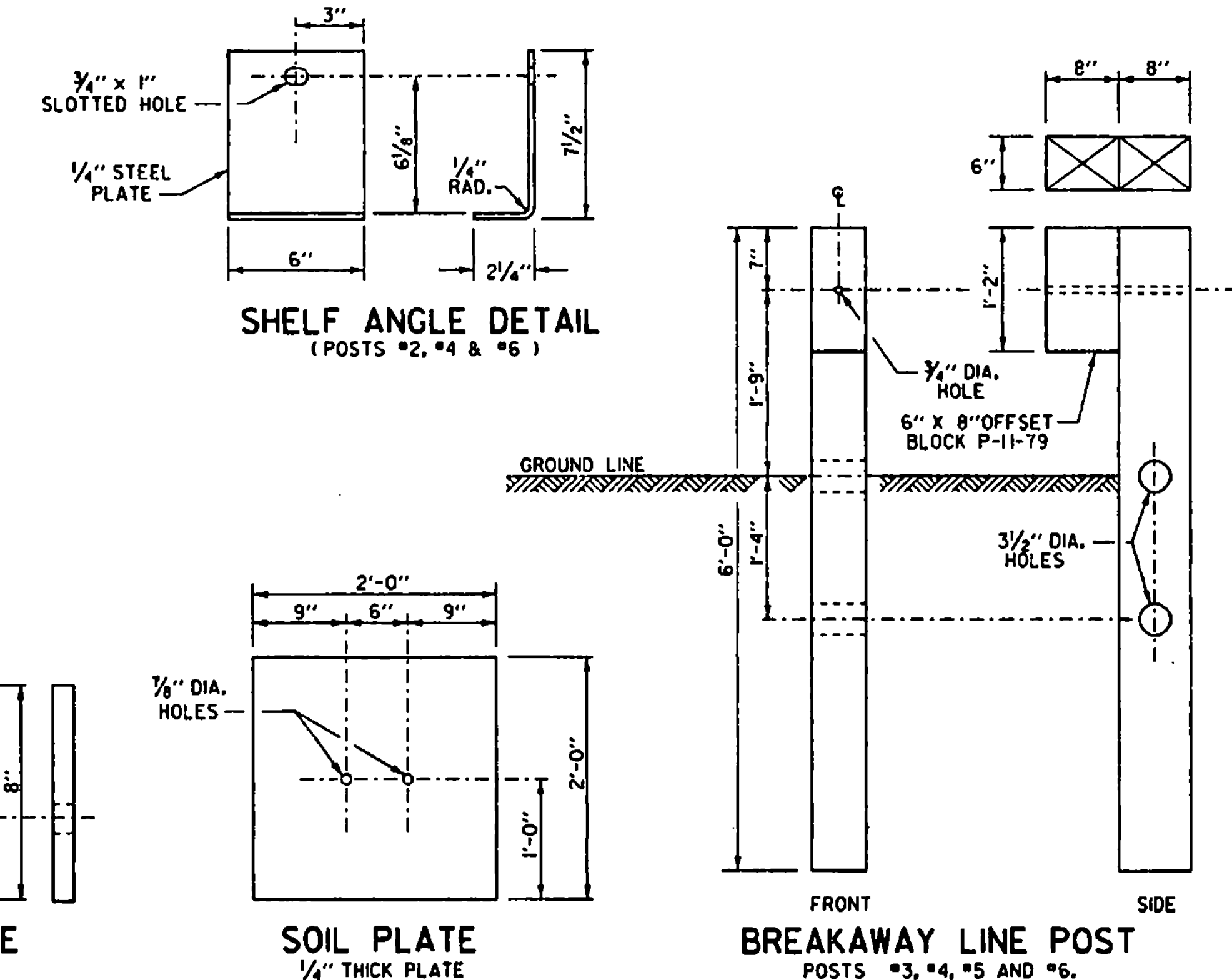
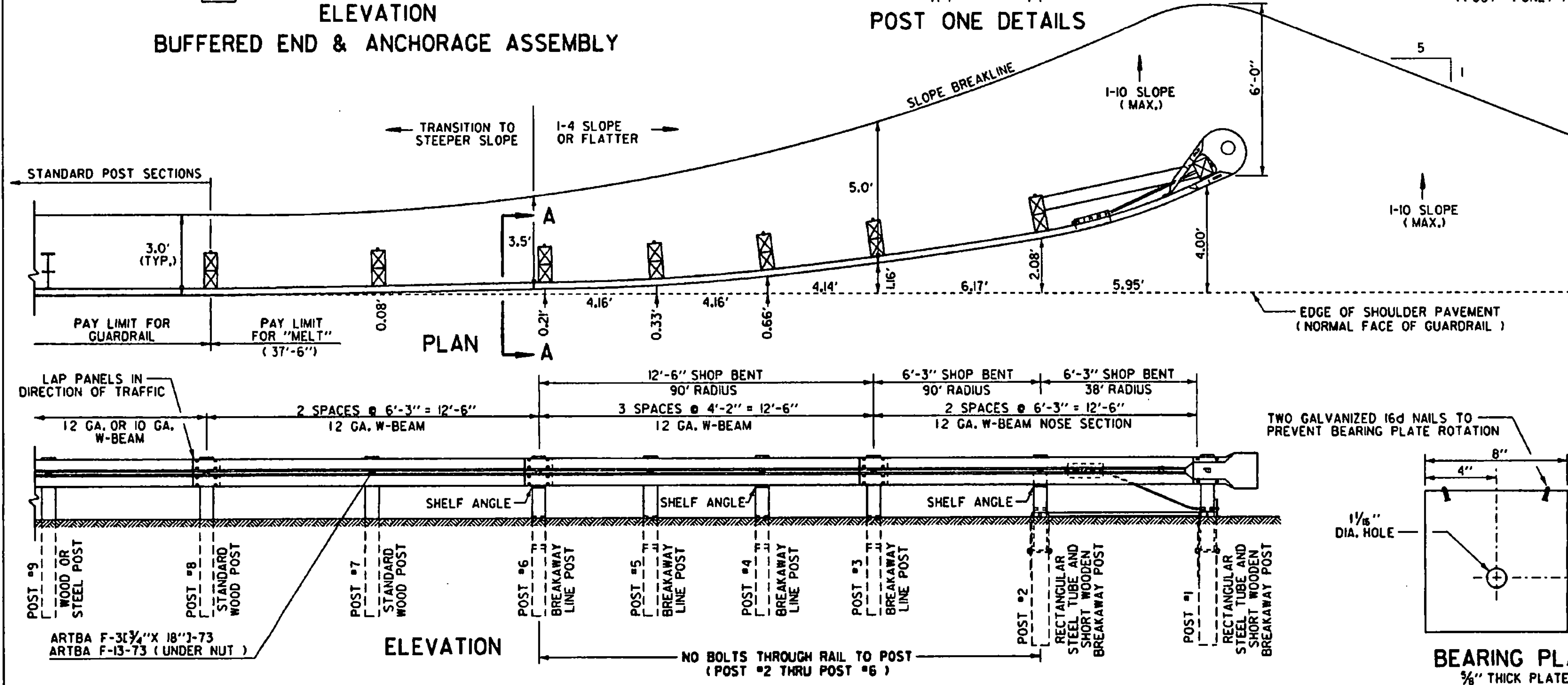
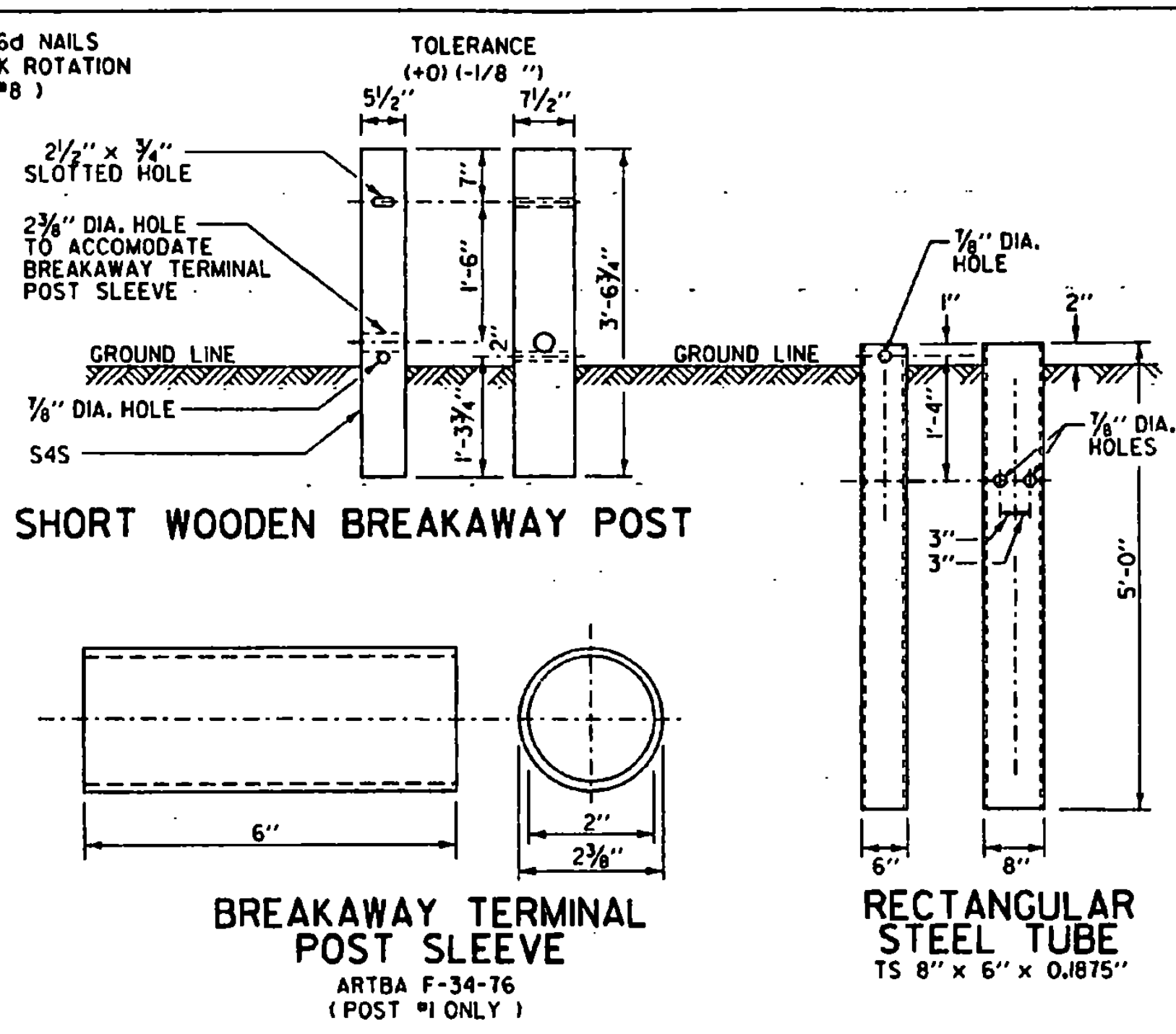
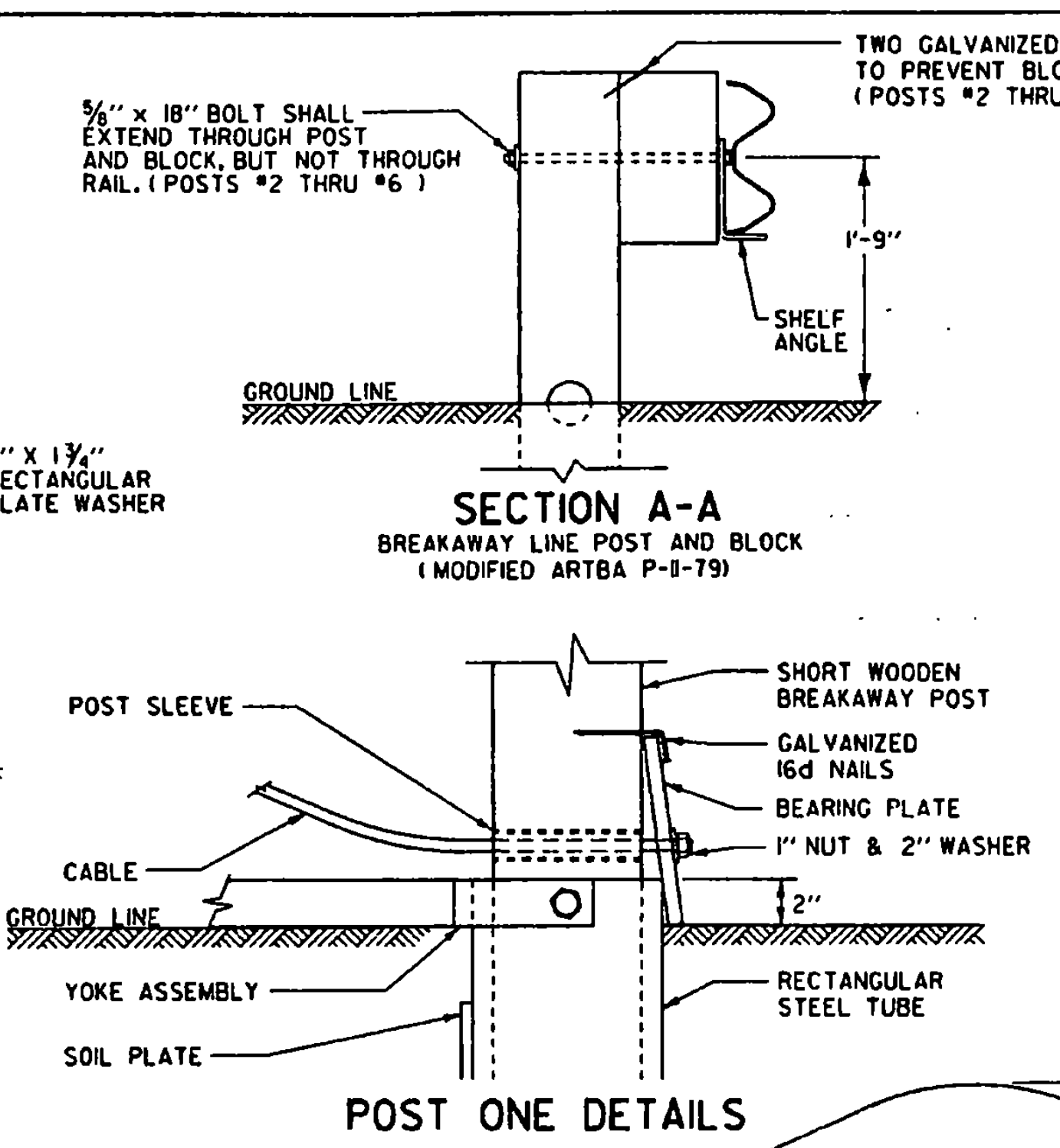
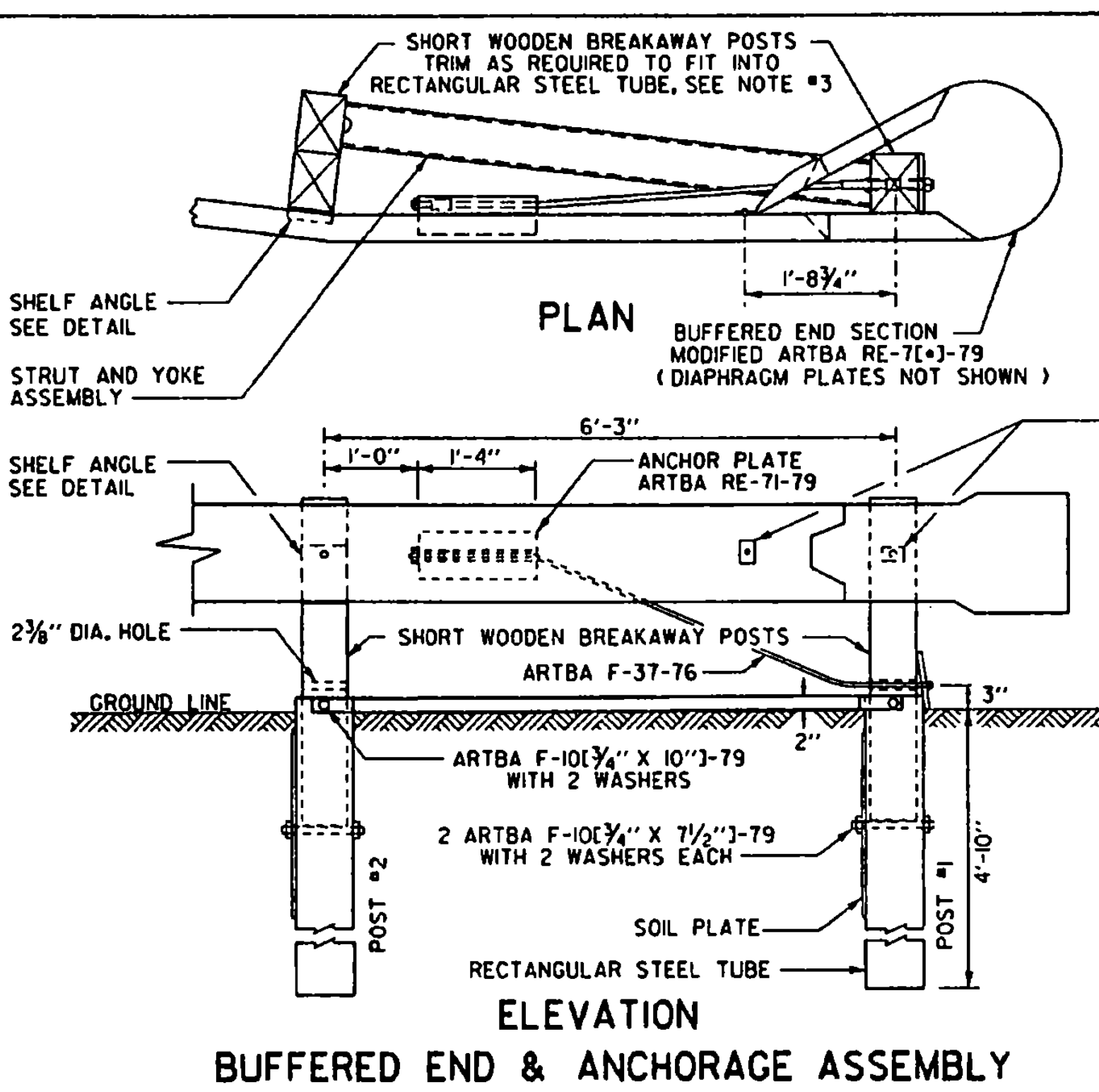
**STEEL BEAM GUARD RAIL
 HEAVY DUTY STEEL BEAM GUARD RAIL
 TWISTED END TERMINAL
 ANCHOR FOR STEEL BEAM RAIL**

VERMONT AGENCY OF TRANSPORTATION

STANDARD G-1

GENERAL NOTES:

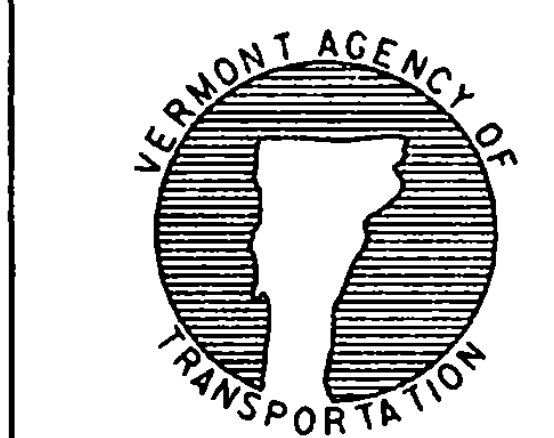
1. FOR DESCRIPTION AND SPECIFICATION OF PART IDENTIFIED - "ARTBA" SEE LATEST REPORT PREPARED AND APPROVED BY THE AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE. "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE".
2. ALL ANGLES, CHANNELS, PLATES, DIAPHRAGM PLATES AND RECTANGULAR STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF THE VAOT STANDARD SPECIFICATIONS, SUBSECTION 714.11. WELDING SHALL MEET THE CURRENT REQUIREMENTS OF THE VAOT STANDARD SPECIFICATIONS, SUBSECTION 506.10. ALL STRUCTURAL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS, SECTION 714 - STRUCTURAL STEEL.
3. SHORT WOODEN BREAKAWAY POSTS SHALL BE MADE OF S4S TIMBER WITH A BENDING STRESS GRADE OF 1200 PSI MINIMUM AND SHALL BE GRADE MARKED OR CERTIFIED BY A RECOGNIZED ASSOCIATION OR AGENCY WHICH IS CERTIFIED BY THE BOARD OF REVIEW, AMERICAN LUMBER STANDARDS COMMITTEE, TO GRADE THE SPECIES. THE POSTS SHALL RECEIVE A PRESERVATIVE TREATMENT, AFTER ANY TRIMMING OR DRILLING, IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS, SUBSECTION 728.01.
4. THE POST OFFSET DIMENSIONS ARE GIVEN TO THE FACE OF GUARDRAIL. THE POSTS ARE TO BE SET RADIAL TO THE RAILING AT EACH POST LOCATION.
5. NOTE: THE AREA OUTSIDE AND DOWNSTREAM OF THE FIRST 12 1/2' (BREAKAWAY NOSE SECTION) OF THE MELT SHOULD BE FREE OF OBSTACLES AND GRADED IN SUCH A WAY AS TO ALLOW A VEHICLE TO BREAK THROUGH THE BREAKAWAY NOSE SECTION AND COME TO A SAFE STOP.



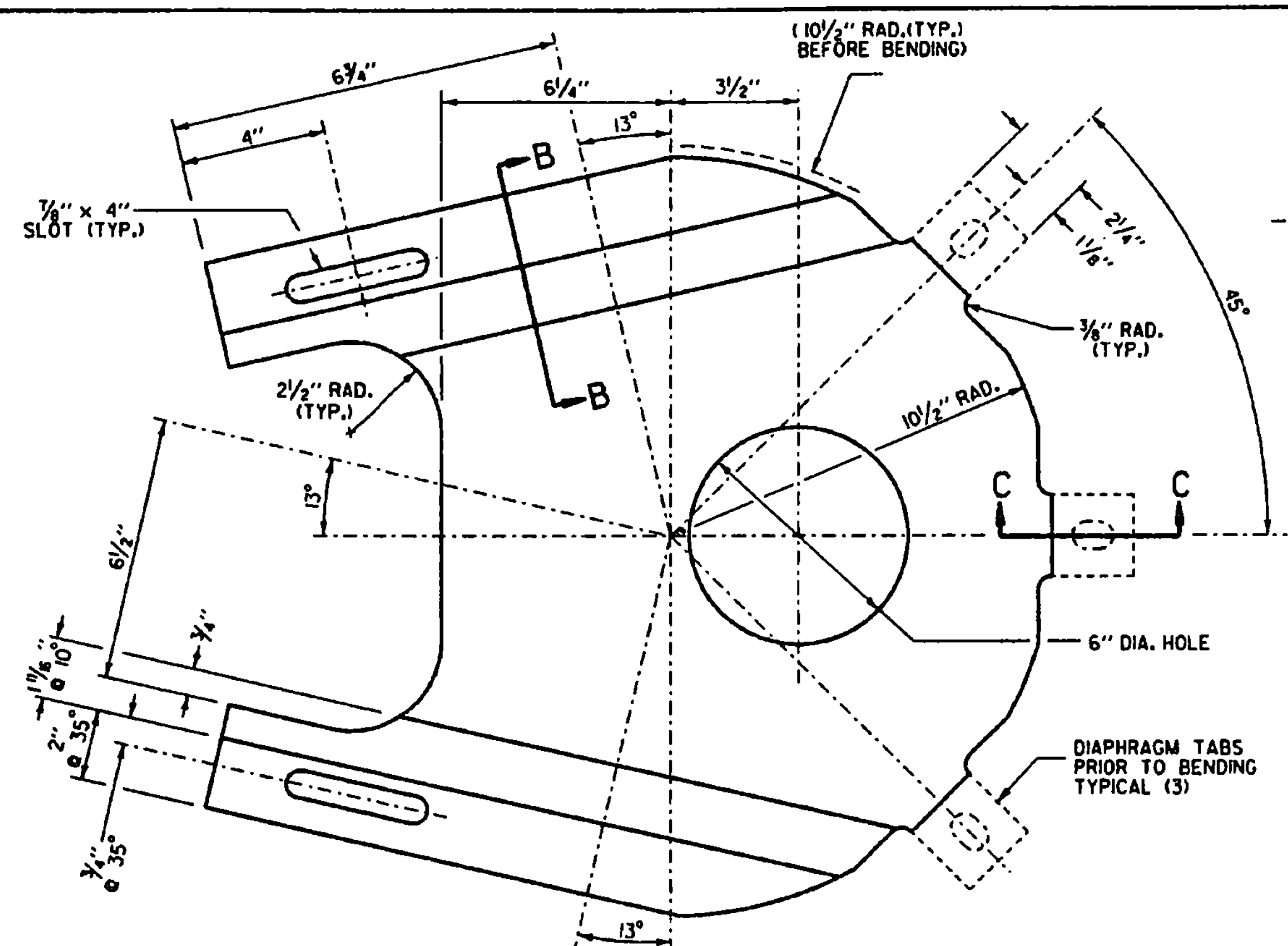
REVISIONS AND CORRECTIONS
JUNE 30, 1995 ORIGINAL APPROVAL
JANUARY 18, 1996 CHANGED DIAMETER AND LENGTH OF BOLT (SECTION A-A)

APPROVED
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FIVE FINAL APPROVAL PENDING.
Julie Egan
DIRECTOR OF ENGINEERING
Michael Murphy
DESIGN ENGINEER

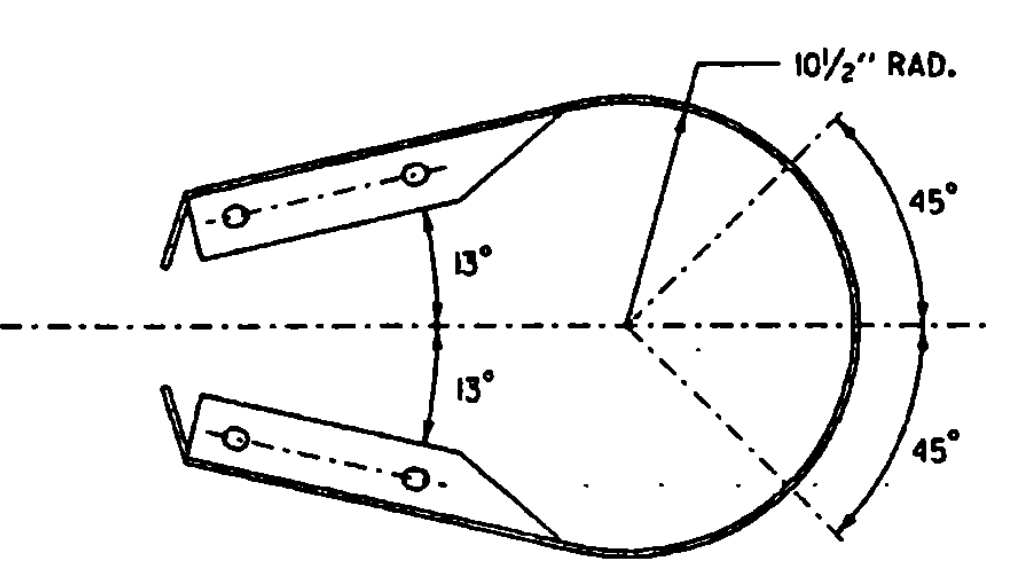
MODIFIED ECCENTRIC LOADER TERMINAL WITH WOOD POSTS (MELT)



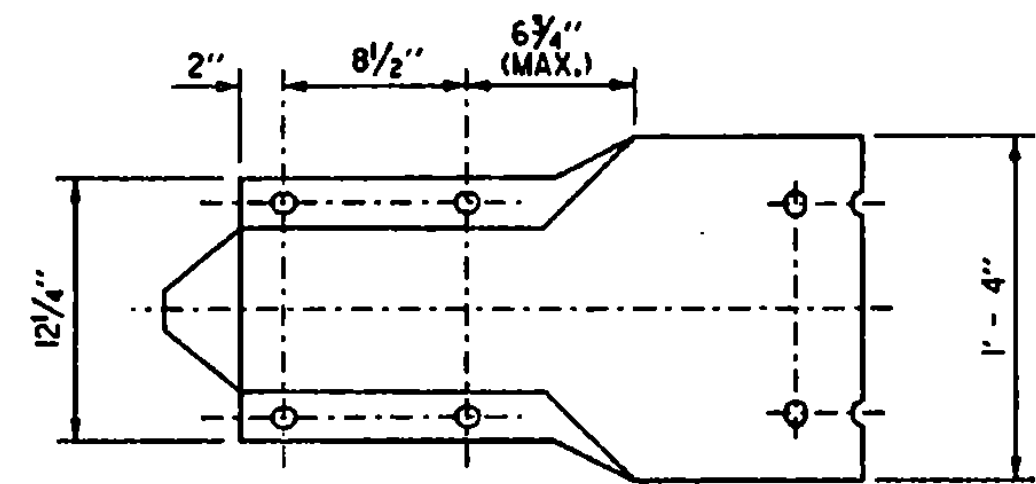
STANDARD G-17 a



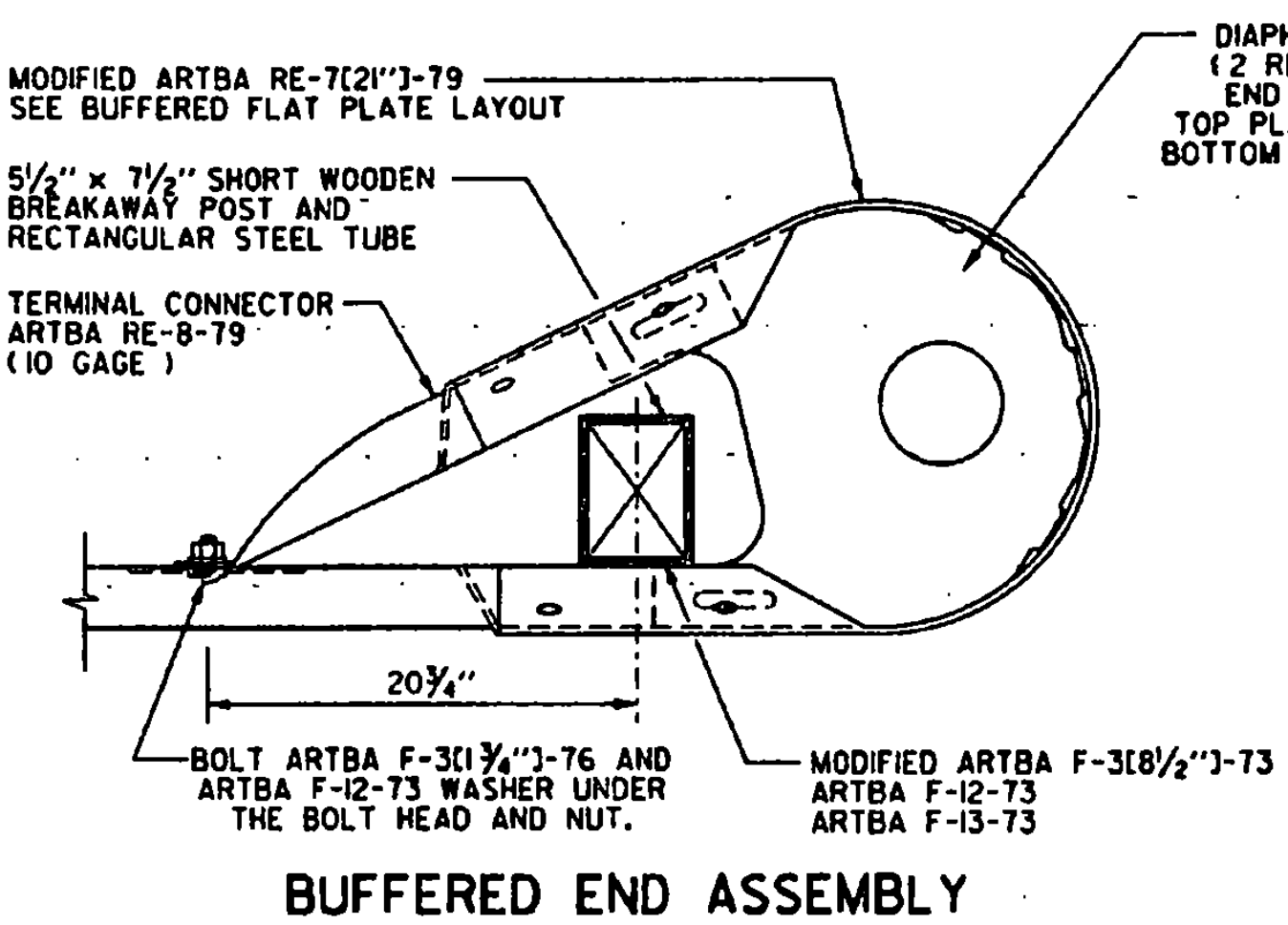
DIAPHRAGM PLATE DETAIL
12 GAGE - (2 REQUIRED EACH TERMINAL)



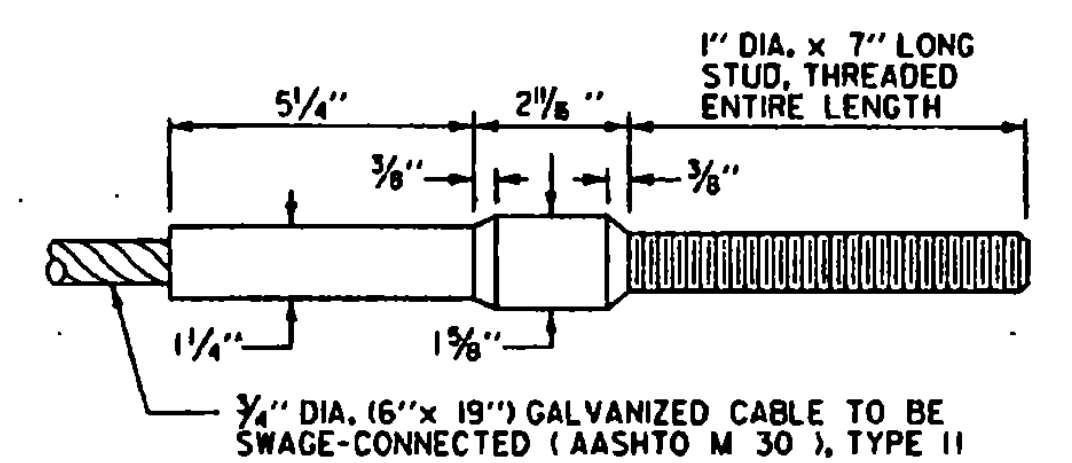
BUFFERED END SECTION PLAN



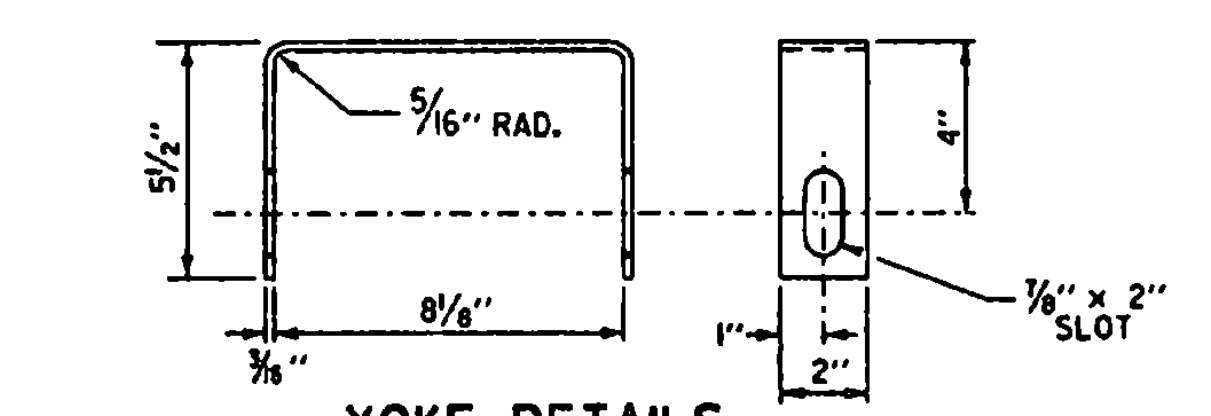
BUFFERED END SECTION ELEVATION



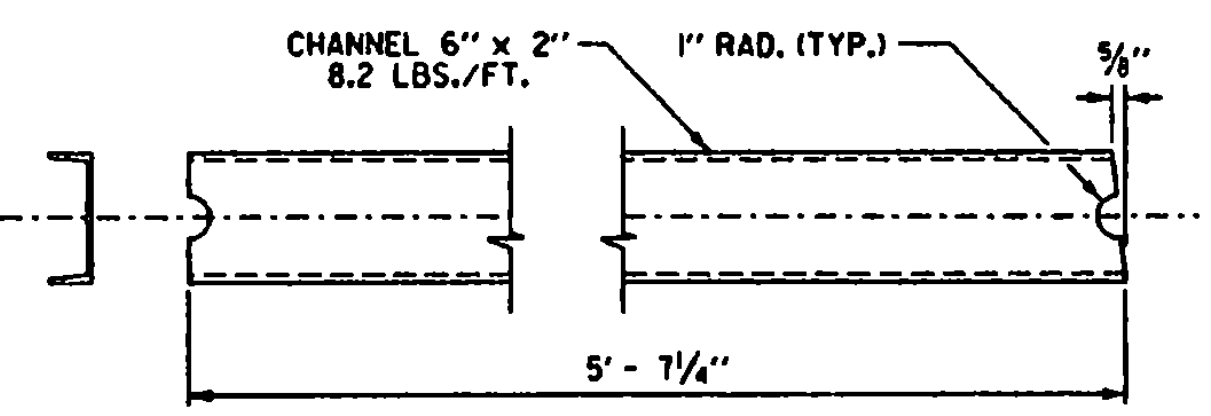
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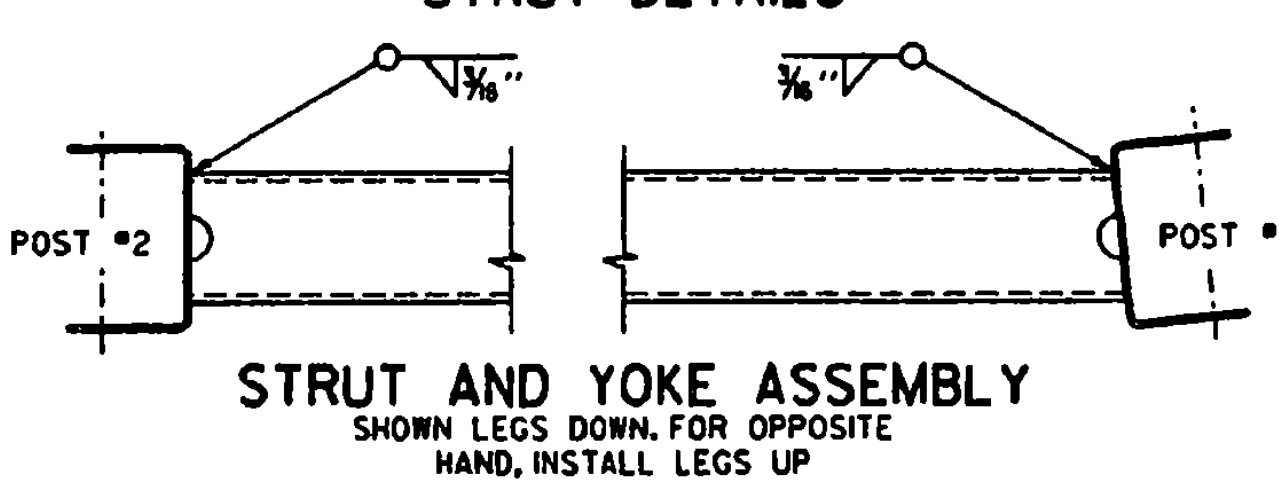
STANDARD SWAGED FITTING AND STUD CABLE ASSEMBLY ARTBA F-37-76



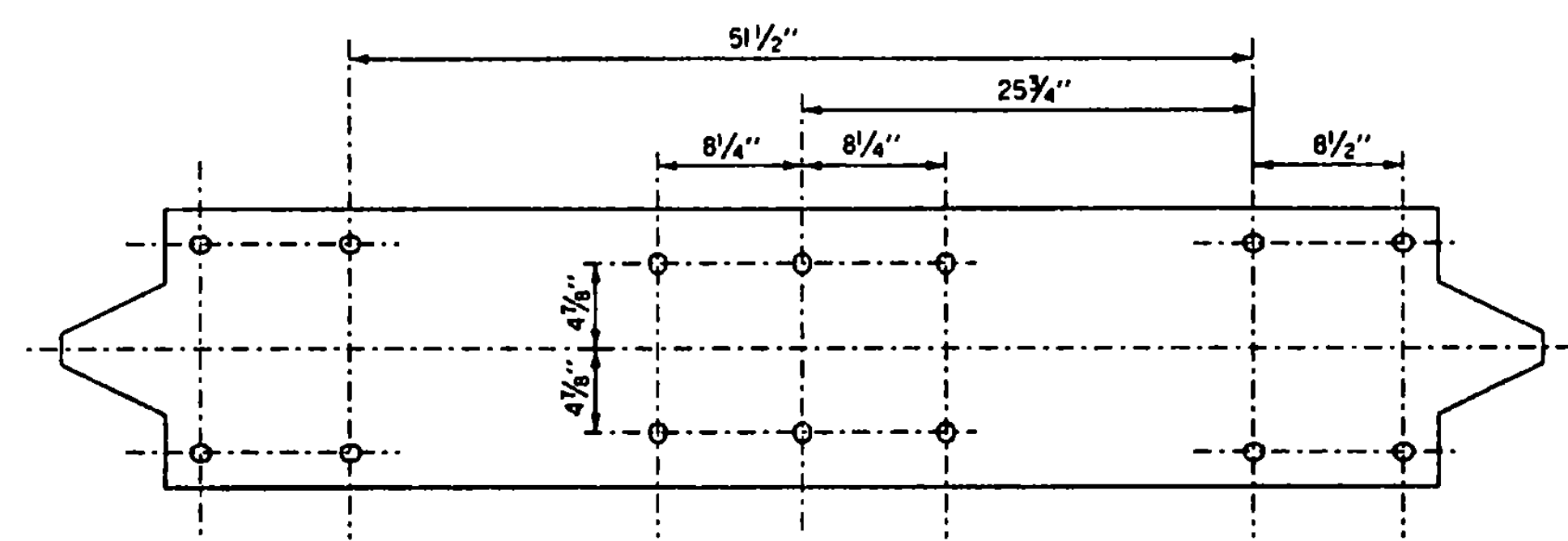
YOKE DETAILS



STRUT DETAILS

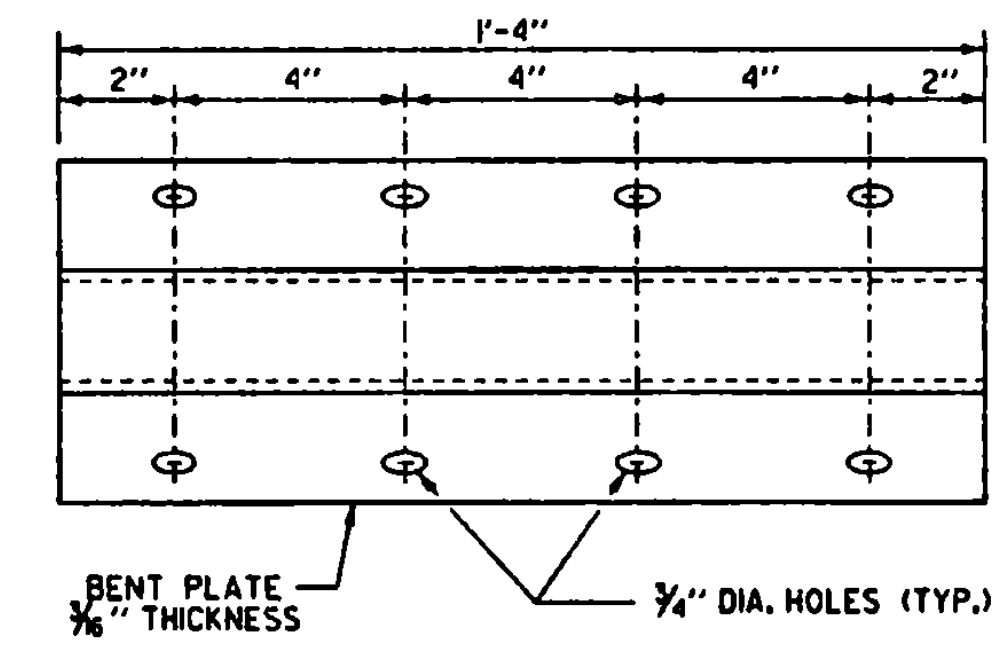


STRUT AND YOKE ASSEMBLY
SHOWN LEGS DOWN FOR OPPOSITE HAND, INSTALL LEGS UP

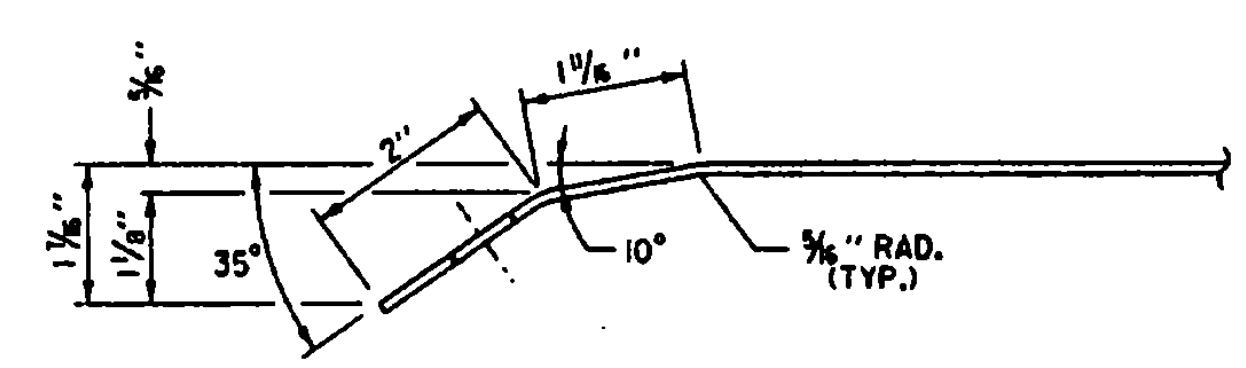
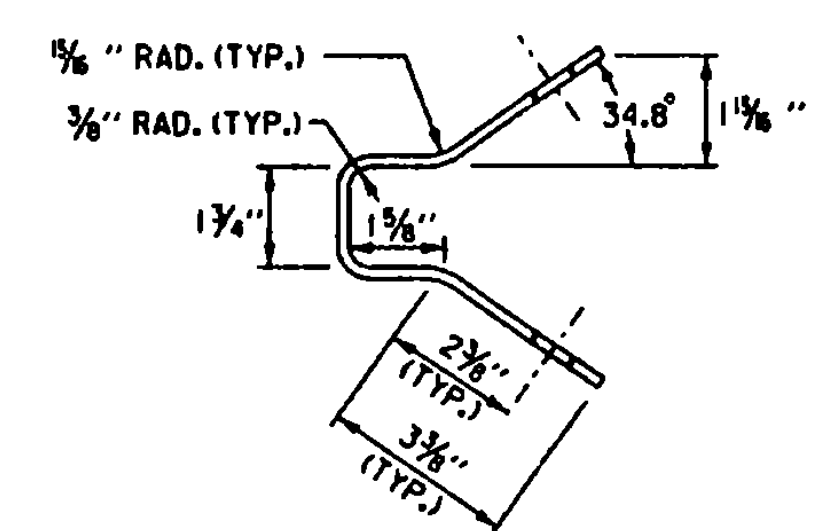


BUFFERED END SECTION FLAT PLATE LAYOUT
(MODIFIED ARTBA RE-7(21)3-79)

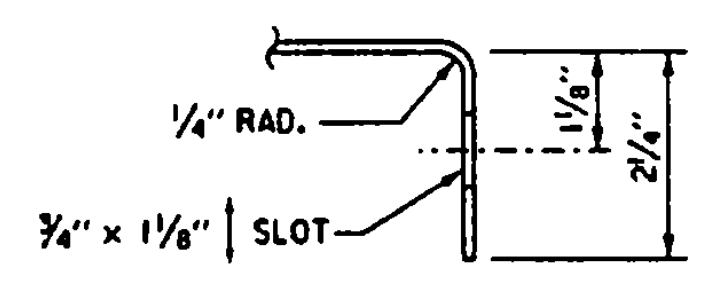
ALL SLOTS 3/32" x 1 1/8"
ALL BOLTS ARTBA F-3(1 1/4)3-76



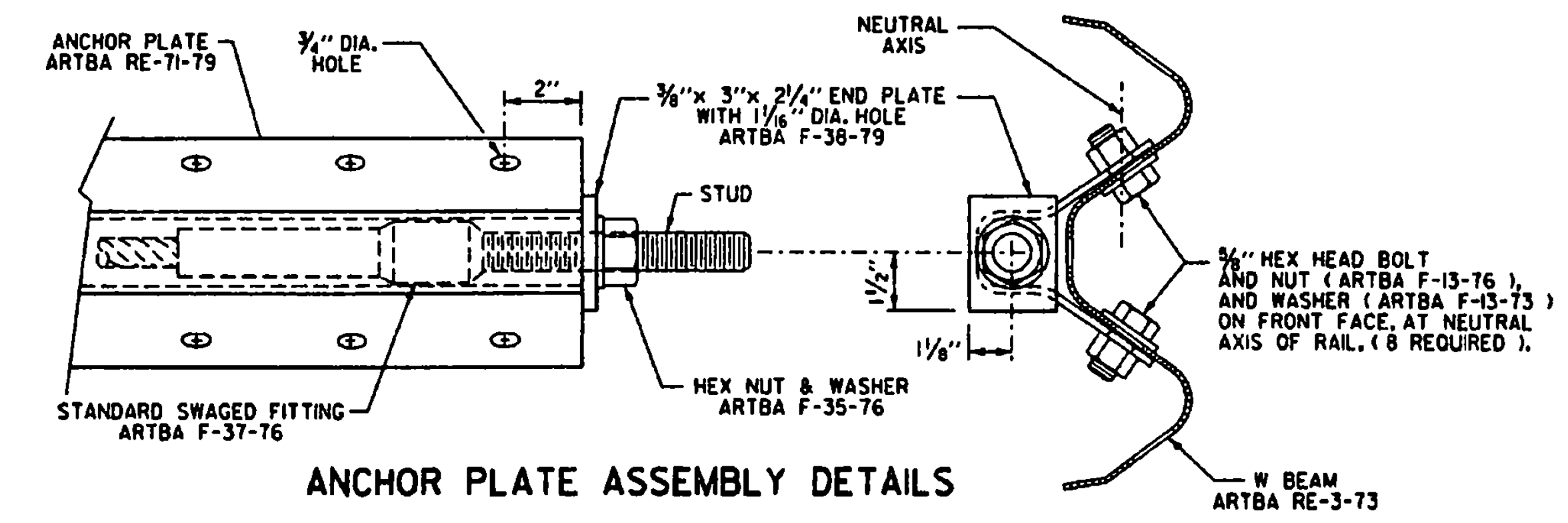
ANCHOR PLATE ARTBA RE-71-79



DIAPHRAGM PLATE DETAIL SECTION B-B



DIAPHRAGM PLATE DETAIL SECTION C-C

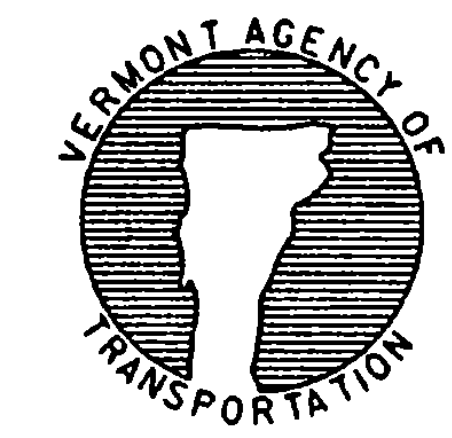


ANCHOR PLATE ASSEMBLY DETAILS

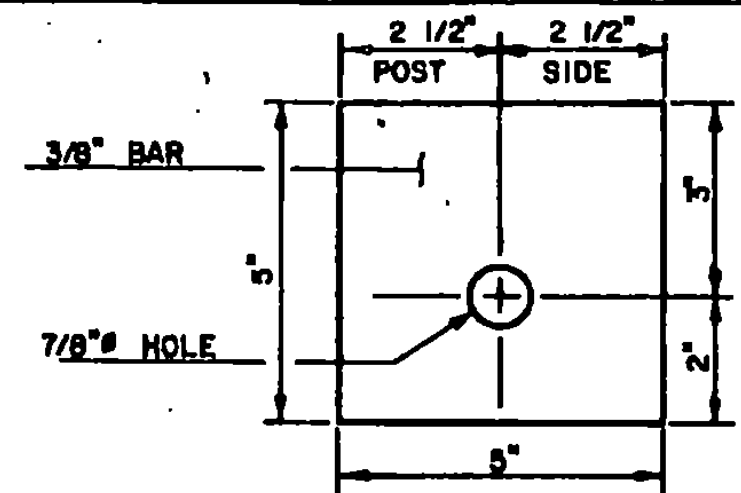
REVISIONS AND CORRECTIONS
JUNE 30, 1995 ORIGINAL APPROVAL

APPROVED
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, PTHA FINAL APPROVAL PENDING.
Samuel A. McArthur
DIRECTOR OF ENGINEERING
Robert M. Munch
DESIGN ENGINEER

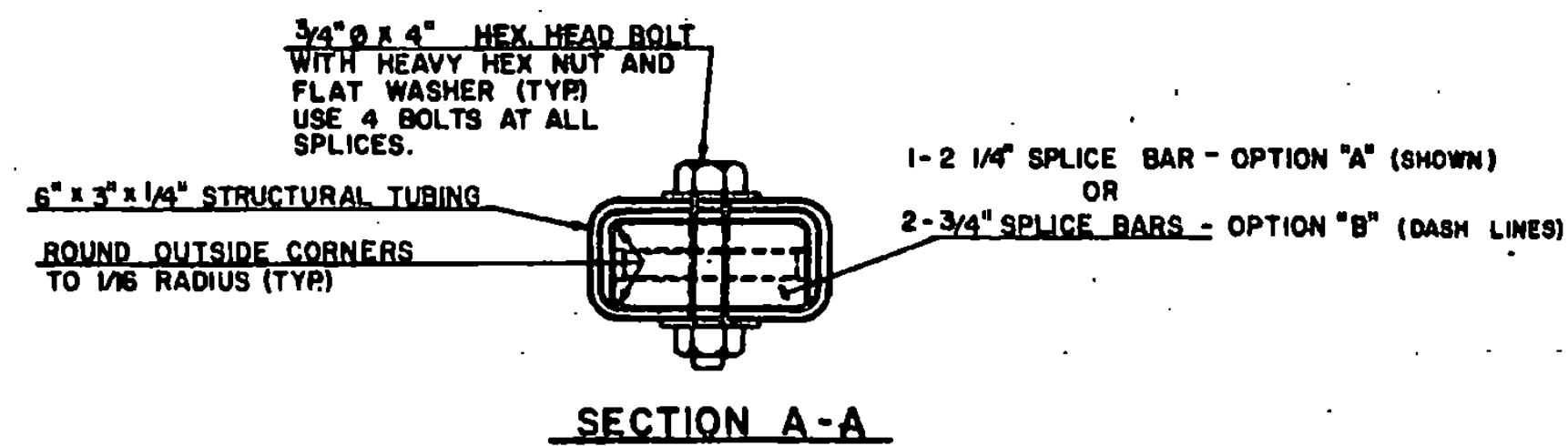
MODIFIED ECCENTRIC LOADER TERMINAL WITH WOOD POSTS (MELT)



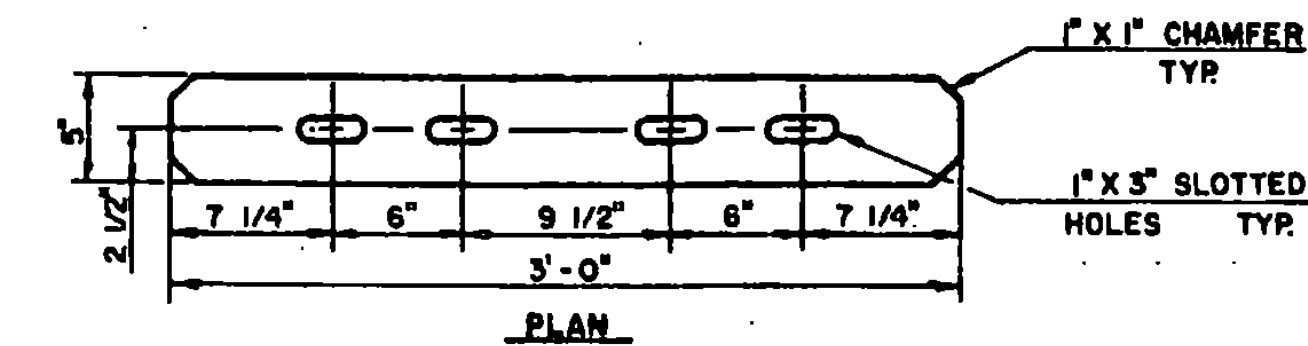
STANDARD G-17 b



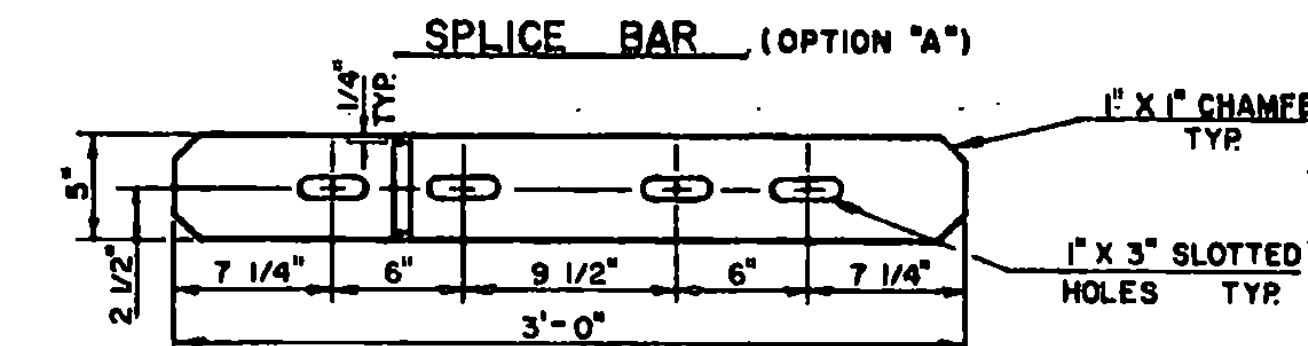
SHELF BRACKET DETAIL



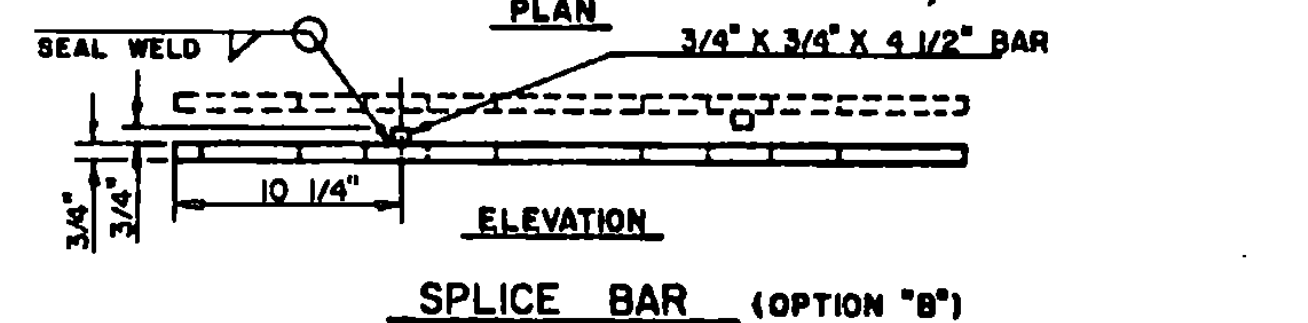
SECTION A-A



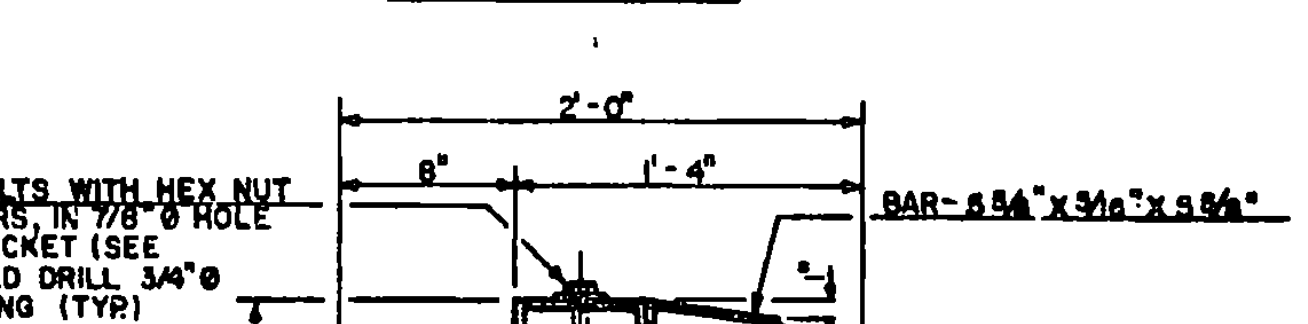
PLAN



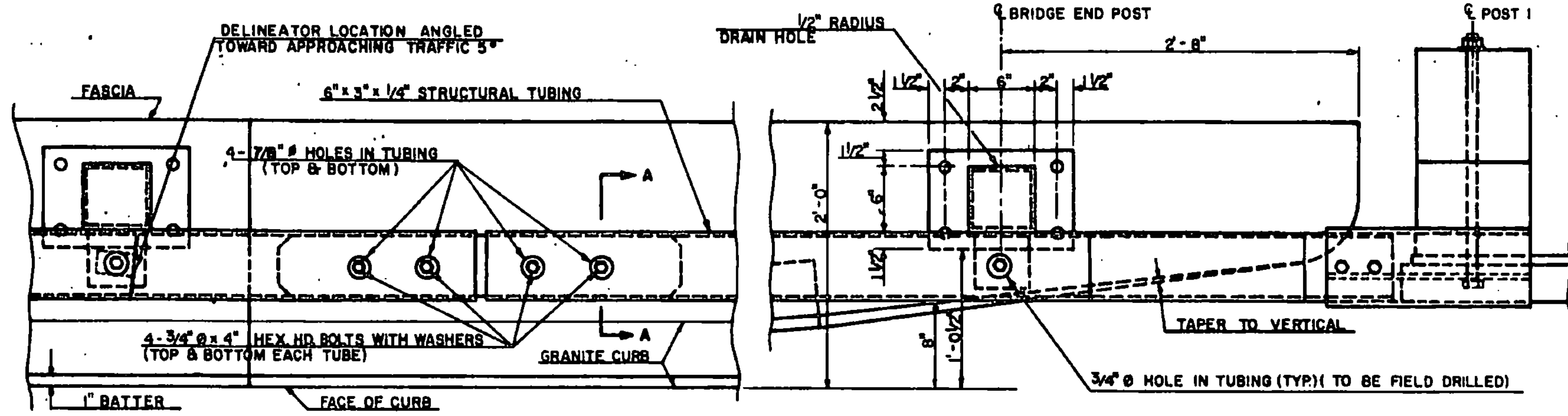
ELEVATION



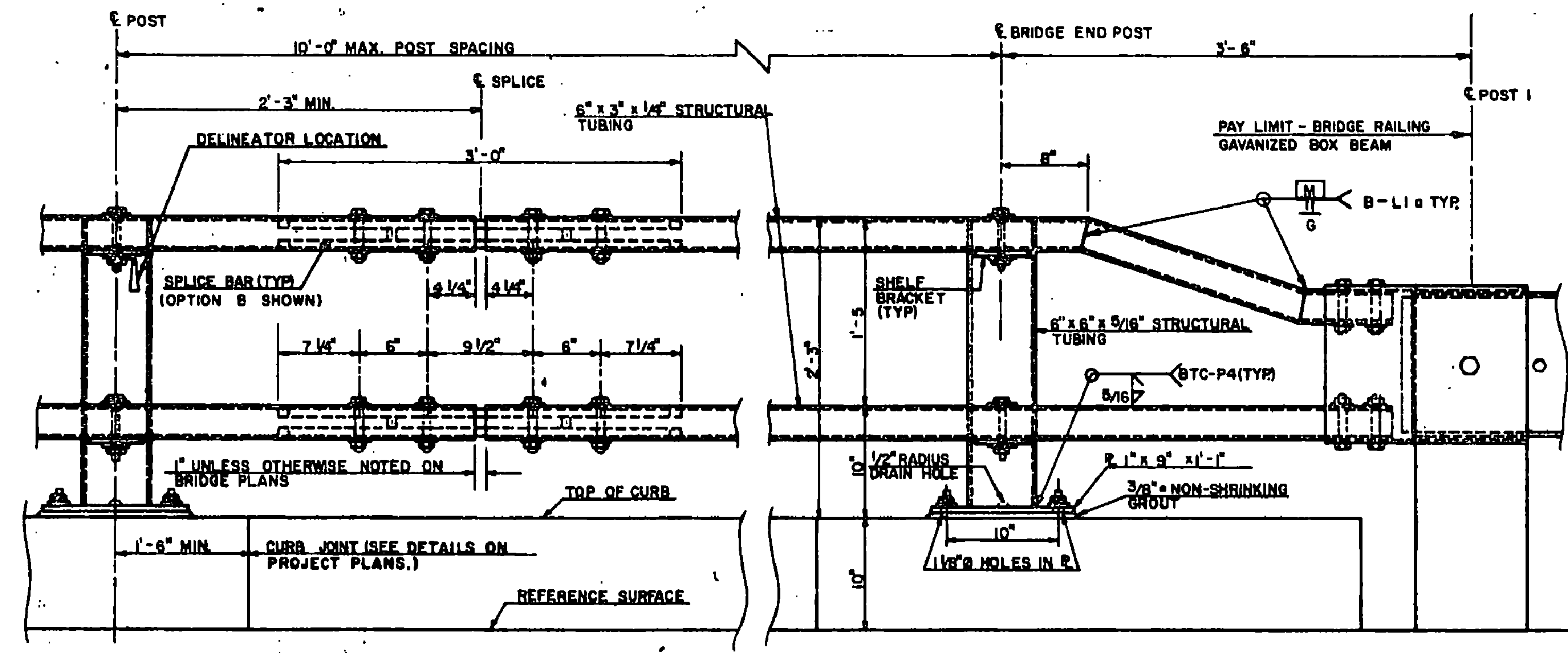
PLAN



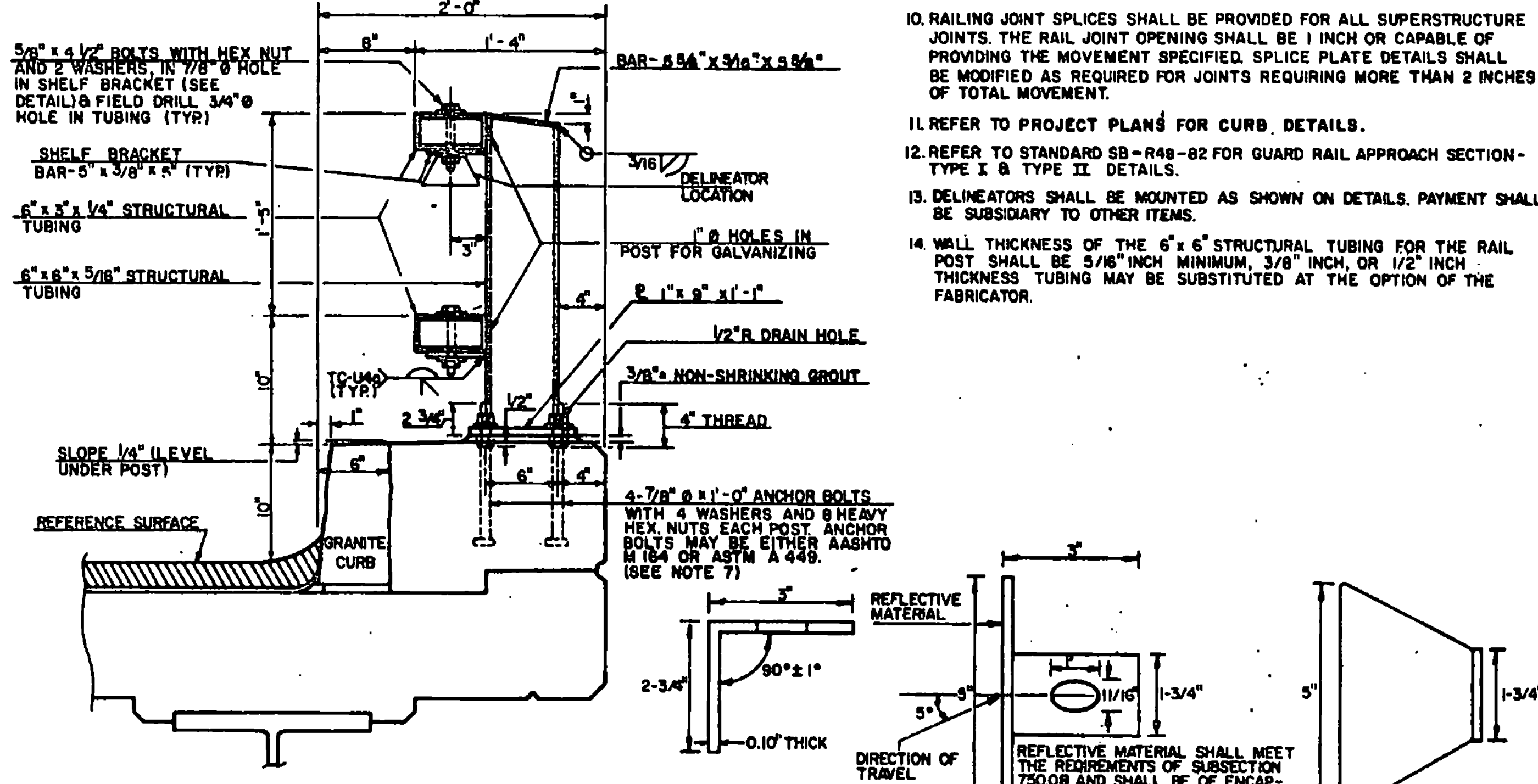
ELEVATION



PLAN OF BOX BEAM BRIDGE RAIL



ELEVATION OF BOX BEAM BRIDGE RAIL



TYPICAL SECTION OF BOX BEAM BRIDGE RAIL

NOTES

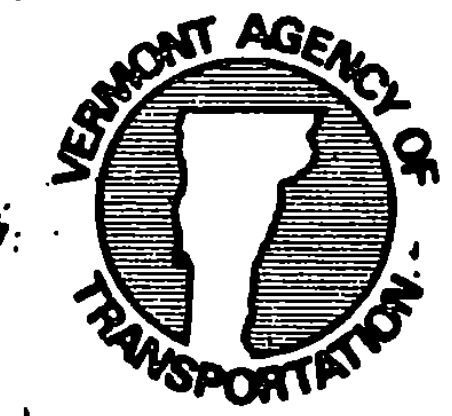
1. RAILING IS DESIGNED IN ACCORDANCE WITH THE 1988 AASHTO SPECIFICATIONS.
2. ALL PLATES, BARS, AND ANGLES SHALL BE ASTM A 36 STEEL, UNLESS OTHERWISE SPECIFIED. ALL BOLTS SHALL BE ASTM A 307 STRUCTURAL STEEL TUBING SHALL BE ASTM A 500 COLD-FORMED GRADE B AS MODIFIED IN SECTION 732.03 (e).
3. ALL BOX BEAM BRIDGE RAILING, COMPONENTS, ANCHOR BOLTS AND ATTACHMENT HARDWARE SHALL BE GALVANIZED TO ASTM A-123 AFTER FABRICATION.
4. THE FABRICATOR SHALL SUBMIT SHOP DRAWINGS, INCLUDING WELDING PROCEDURES, TO THE STRUCTURES DIVISION FOR APPROVAL IN ACCORDANCE WITH THE PROVISIONS OF SECTION 506.04 - SHOP DRAWINGS. ALL WELDING SHALL CONFORM WITH SECTION 506.10.
5. PROCEDURE QUALIFICATION FOR ALL WELDS SHALL BE PERFORMED AND APPROVED PRIOR TO FABRICATION. WELDER QUALIFICATION WILL BE REQUIRED FOR EACH PROCEDURE. PROCEDURE AND WELDER QUALIFICATION ACCEPTANCE SHALL BE APPROVED BY RADIOGRAPHIC TESTING.
6. THE RAIL SYSTEM SHALL BE CONTINUOUS WITH EACH TUBE SECTION ATTACHED TO A MINIMUM OF TWO POSTS. ALL JOINTS SHALL BE SPLICED AS DETAILED, WITH ALL SPLICE CONNECTIONS IN THE SAME PANEL LOCATED ONE DIRECTLY ABOVE THE OTHER.
7. ALL POSTS SHALL BE SET NORMAL TO GRADE. NUTS PLACED IN CONCRETE ARE TO BE ROTATED WITHIN 24 HOURS AFTER CONCRETE IS PLACED TO BREAK BOND BETWEEN NUT AND CONCRETE. NUTS SHALL THEN BE USED TO ALIGN THE POSTS BOTH HORIZONTALLY AND VERTICALLY. AFTER FINAL POSITION HAS BEEN APPROVED, ALL VOIDS BETWEEN THE BASE PLATE AND CONCRETE SURFACE SHALL BE GROUTED WITH NON-SHRINK GROUT CONFORMING WITH SECTION 707.03, MORTAR, TYPE II.
8. ANCHOR BOLTS SHALL BE PRECAST IN THE CURB SECTION, AND CONFORM WITH THE REQUIREMENTS OF SECTION 714.07.
9. FOR RADII LESS THAN 950 FEET, THE BEAM RAIL SHALL BE SHOP BENT TO FIT THE APPLICABLE CURVE.
10. RAILING JOINT SPLICES SHALL BE PROVIDED FOR ALL SUPERSTRUCTURE JOINTS. THE RAIL JOINT OPENING SHALL BE 1 INCH OR CAPABLE OF PROVIDING THE MOVEMENT SPECIFIED. SPLICE PLATE DETAILS SHALL BE MODIFIED AS REQUIRED FOR JOINTS REQUIRING MORE THAN 2 INCHES OF TOTAL MOVEMENT.
11. REFER TO PROJECT PLANS FOR CURB DETAILS.
12. REFER TO STANDARD SB-R4B-82 FOR GUARD RAIL APPROACH SECTION-TYPE I & TYPE II DETAILS.
13. DELINEATORS SHALL BE MOUNTED AS SHOWN ON DETAILS. PAYMENT SHALL BE SUBSIDIARY TO OTHER ITEMS.
14. WALL THICKNESS OF THE 6" x 6" STRUCTURAL TUBING FOR THE RAIL POST SHALL BE 5/16" INCH MINIMUM, 3/8" INCH, OR 1/2" INCH. THICKNESS TUBING MAY BE SUBSTITUTED AT THE OPTION OF THE FABRICATOR.

THIS REFLECTORIZED ALUMINUM DELINEATOR IS TO BE ERRECTED EVERY 30 FEET OR CLOSEST POST. DELINEATOR SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052-H32.

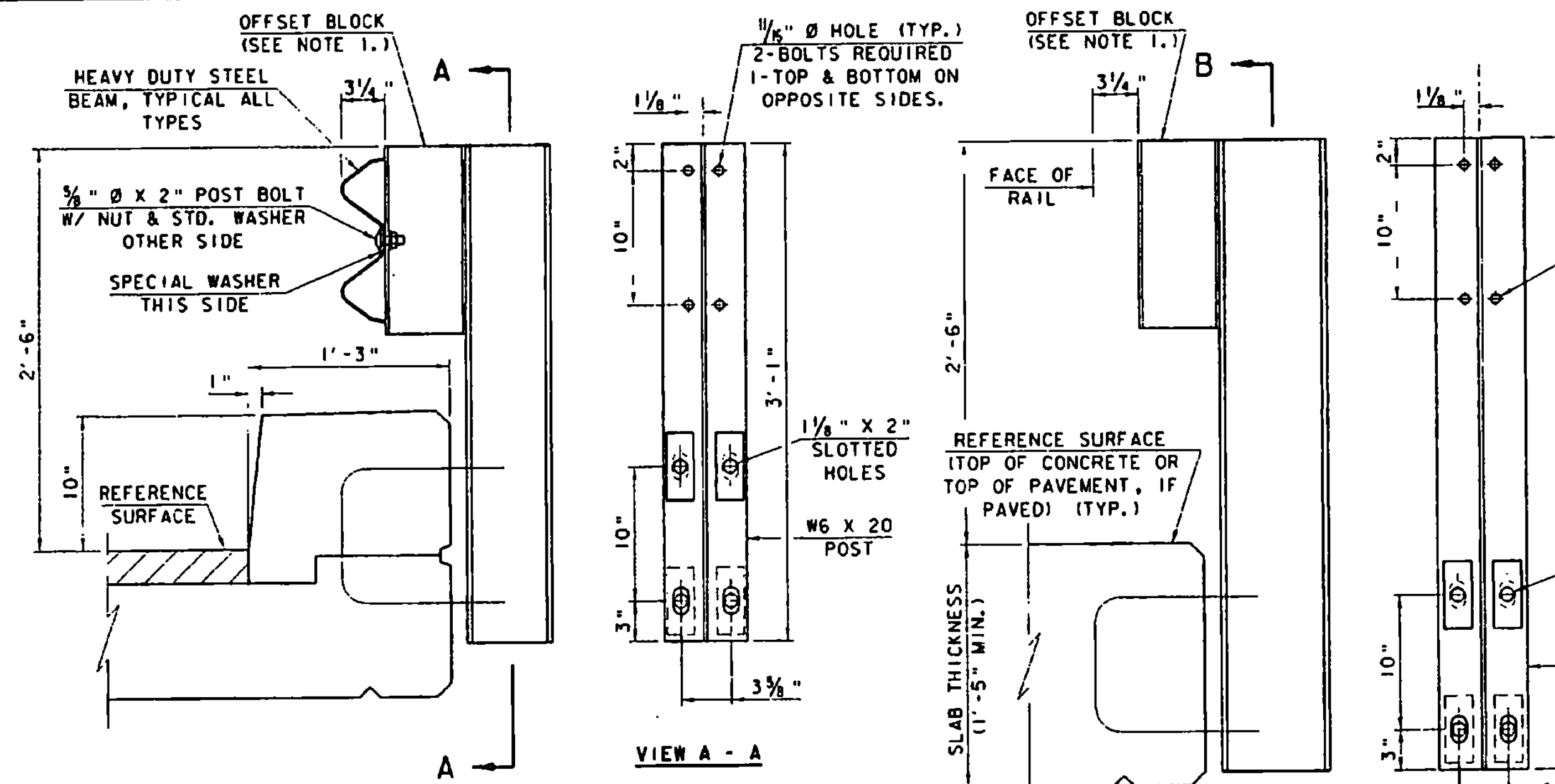
REVISIONS AND CORRECTIONS
 1. REVISION DELINEATORS ADDED D.A.R. 6-8-82
 2. REVISION CHANGED LOCATION OF DELINEATORS D.A.R. 8-22-83
 3. REVISED NOTE #12 TO INCLUDE TYPE II AND REVISED ANCHORAGE CONNECTOR AND SPLICE BAR. R.H.A.U.P.T. 9/7/83
 4. REVISED HOLE DIMENSION IN SHELF BRACKET, ADD DIMENSION TO POST NO. 1, AND ADD NOTE NO. 14. R.S.M. 12-13-84
 5. REVISED WELD FOR TOP RAIL. 3-28-88. M.C.C.
 6. REVISED POST CAP. 12-13-88. R.P.G.
 7. REVISED FOR 1988 SPECIFICATIONS. 8-9-88. R.R.R.

APPROVED: *John J. Goss*
 DATE: DECEMBER 28, 1981
 CHIEF OF DESIGN
W.M. Smith
 STRUCTURES ENGINEER
J. Goss
 DIRECTOR OF ENGINEERING AND CONSTRUCTION

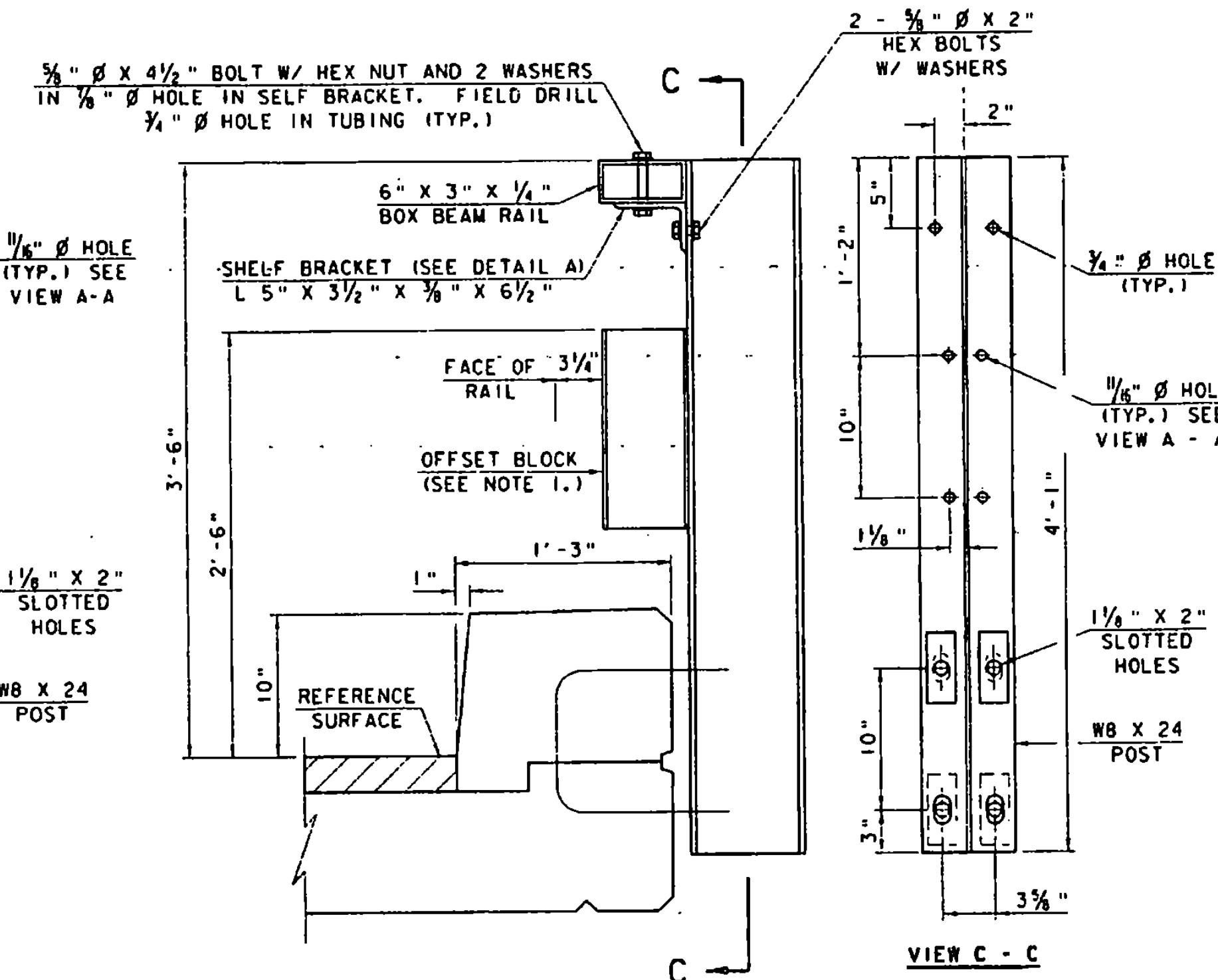
BRIDGE RAILING GALVANIZED BOX BEAM



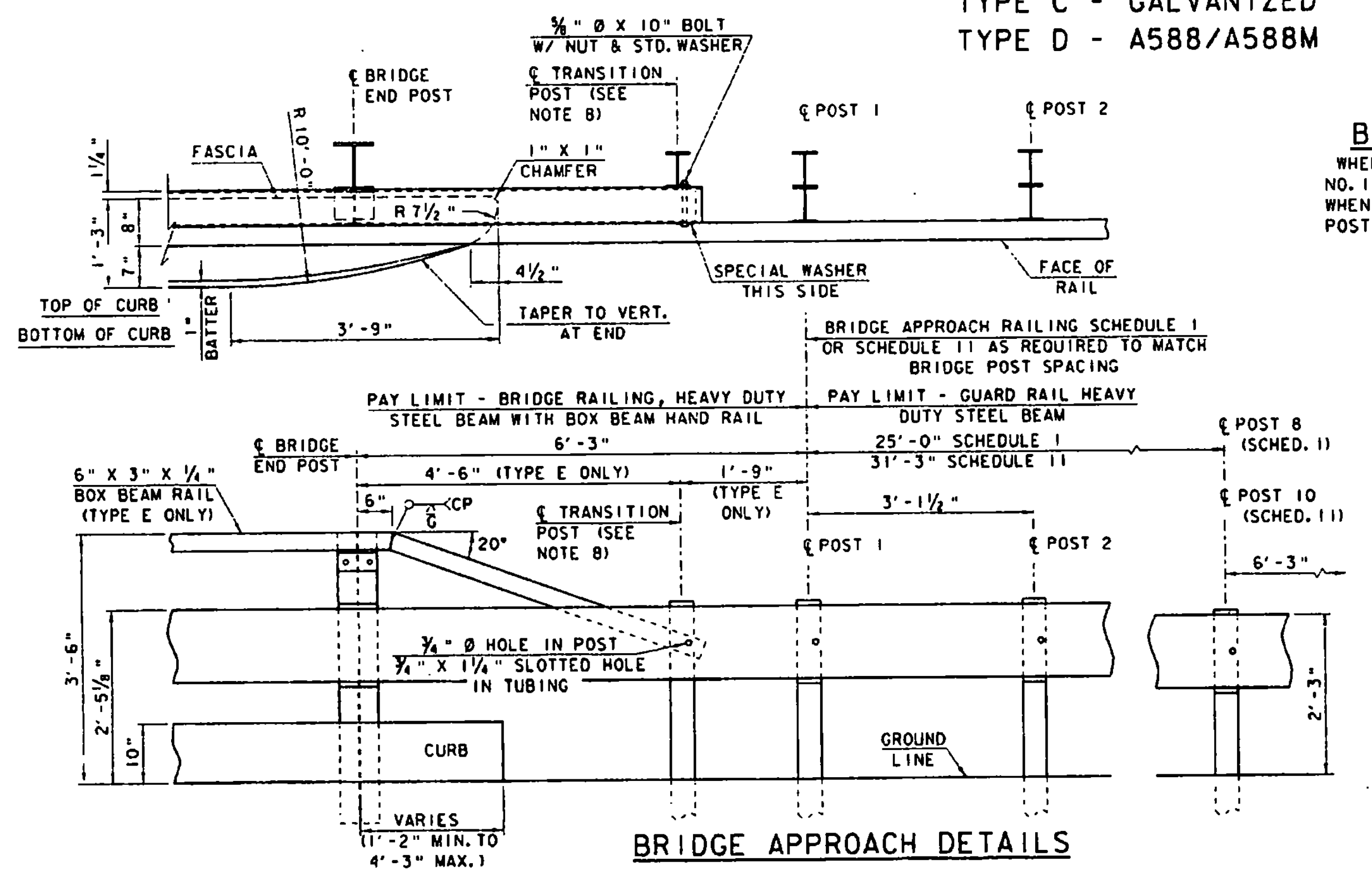
STANDARD SB-R4A-82



FASCIA MOUNTED STEEL POST
 TYPE A - GALVANIZED
 TYPE B - A588/A588M



FASCIA MOUNTED STEEL POST WITH BOX BEAM HAND RAIL
 TYPE E - GALVANIZED

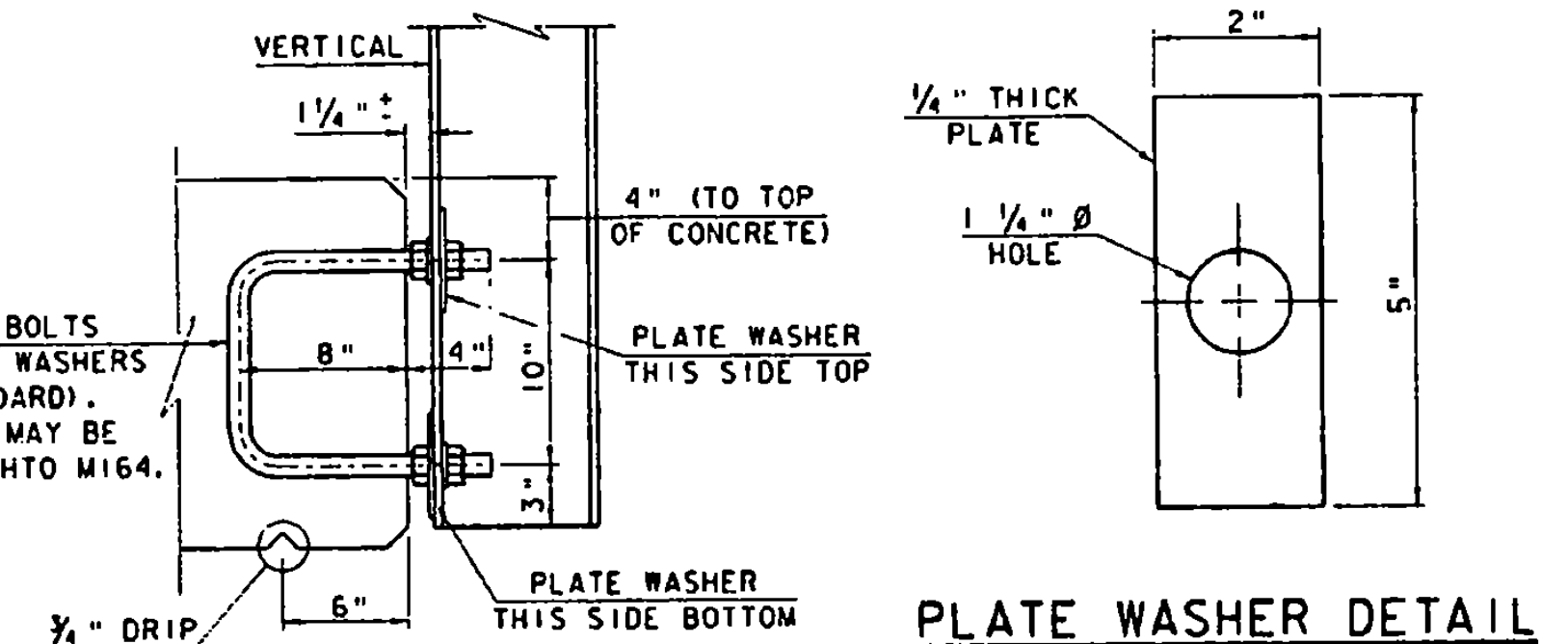


BRIDGE APPROACH RAILING
 WHEN A RAIL PANEL SPLICE OCCURS AT POST NO. 1, USE SCHEDULE I FOR APPROACH RAILING. WHEN A RAIL PANEL SPLICE OCCURS AT BRIDGE END POST USE, SCHEDULE II FOR APPROACH RAILING.

SCHEDULE I		
POST NO.	SPACING	PAYMENT FACTOR
1	3'-1 1/2"	
2	3'-1 1/2"	
3	3'-1 1/2"	1.4 X 12'-6"
4	3'-1 1/2"	
5	3'-1 1/2"	
6	4'-2"	
7	4'-2"	1.2 X 12'-6"
8	4'-2"	
9	6'-3" (TYP.)	1.0 (TYP.)

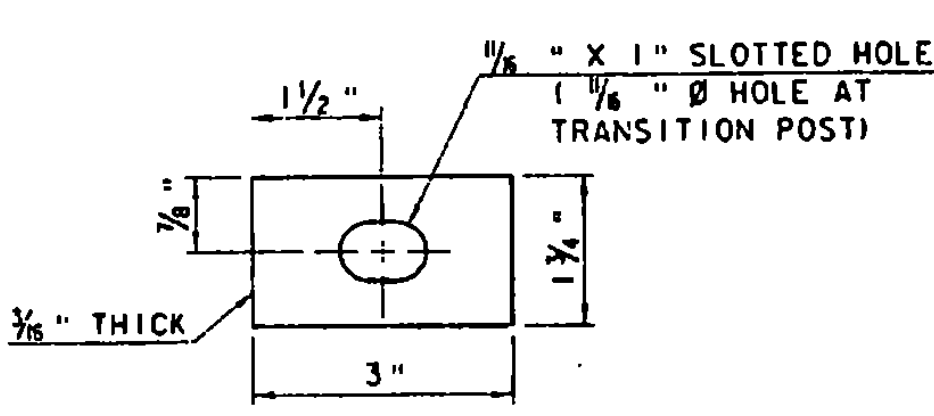
SCHEDULE II		
POST NO.	SPACING	PAYMENT FACTOR
1	3'-1 1/2"	
2	3'-1 1/2"	
3	3'-1 1/2"	1.4 X 18'-9"
4	3'-1 1/2"	
5	3'-1 1/2"	
6	3'-1 1/2"	
7	4'-2"	
8	4'-2"	1.2 X 12'-6"
9	4'-2"	
10	4'-2"	
11	6'-3" (TYP.)	1.0 (TYP.)

- NOTES**
- SEE STANDARD DRAWING G-1 & G-1d FOR ADDITIONAL DETAILS OF STEEL BEAM GUARD RAIL AND STANDARD SB-R6-82 FOR ADDITIONAL DETAILS OF BOX BEAM RAIL.
 - ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AND CONFORM TO SECTION 714.07.
 - BRIDGE RAIL TYPES A, C & E: HEAVY DUTY STEEL BEAM RAIL SHALL BE AASHTO M180, CLASS B-TYPE II. POST AND BRACKETS, AS WELL AS PLATE AND SPECIAL WASHERS, SHALL BE AASHTO M223/M223M STEEL. BOLTS SHALL BE ASTM A307. ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION TO AASHTO M111 OR M232 (HARDWARE).
 - BRIDGE RAIL TYPE B & D: HEAVY DUTY STEEL BEAM RAIL SHALL BE AASHTO M180, CLASS B-TYPE 4. POSTS AND BRACKETS, AS WELL AS PLATE AND SPECIAL WASHERS, SHALL BE AASHTO M222/M222M STEEL. BOLTS SHALL BE AASHTO M164 TYPE III.
 - ALL POSTS SHALL BE SET NORMAL TO GRADE.
 - BRIDGE APPROACH RAIL HEIGHT SHALL BE TRANSITIONED TO NORMAL ROADWAY HEIGHT IN 25 FEET.
 - APPROACH RAILING SHALL BE HEAVY DUTY STEEL BEAM FOR 50 FEET FROM THE END OF THE BRIDGE.
 - FOR THE TYPE A, B, C, OR D BRIDGE RAILING, THE TRANSITION POST SHALL HAVE AN OFFSET BLOCK AND BE LOCATED AS CLOSE AS PRACTICAL TO THE MID-POINT BETWEEN THE BRIDGE END POST AND APPROACH RAIL POST 1.
 - SPLICES SHALL LAP IN DIRECTION OF TRAFFIC FLOW.
 - SEE STANDARD SHEET G-1 FOR DELINEATOR DETAILS AND PLACEMENT.
 - ERECT DELINEATOR ON EVERY FIFTH POST OR APPROXIMATELY 30 FEET APART. PAYMENT SHALL BE SUBSIDIARY TO OTHER ITEMS.
 - THE DROP-WEIGHT TEAR TEST IN SECTION 732 SHALL NOT APPLY TO THE STRUCTURAL TUBING ON THIS STANDARD.

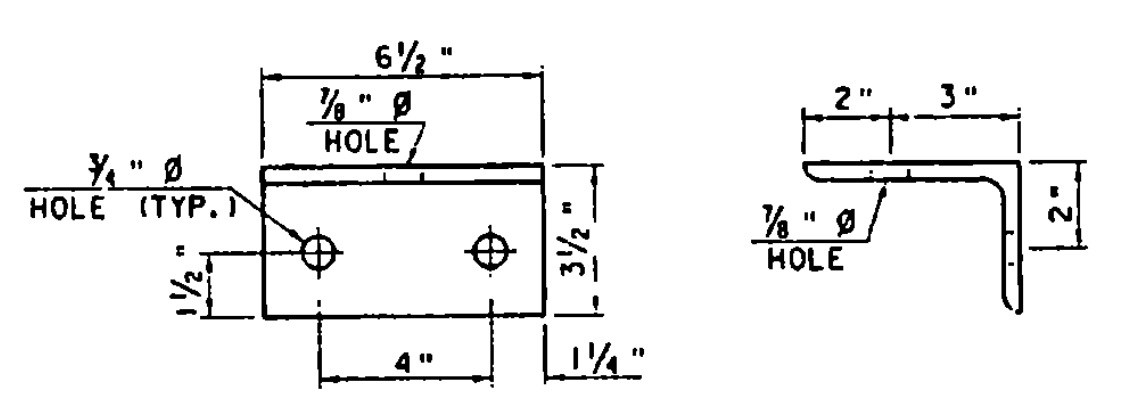


ANCHORAGE DETAIL

PLATE WASHER DETAIL



SPECIAL WASHER DETAIL



DETAIL A - SHELF BRACKET

REVISIONS AND CORRECTIONS

REVISION: DELINEATORS ADDED D.A.R 6-18-82
 REVISION: BOLTS THRU BOX BEAM RAIL R.S.H. 12-13-84
 REVISION: CHANGED BOLT HOLE THROUGH SELF BRACKET R.S.H. 12-13-84
 REVISION: CLARIFIED BLOCK BOLT INSTALLATION R.P.G. 11-13-91
 REVISION: ADDED SPECIAL WASHER AND CHANGED STEEL REFERENCE TO AASHTO M223/M223M (NOTE 3.) STEEL POSTS AND OFFSET BLOCKS SHOWN FOR APPROACH RAIL. J.H.W. 1-6-95

APPROVED *1/6/95* DATE
[Signature]
 DIRECTOR OF CONSTRUCTION AND MAINTENANCE
[Signature]
 DIRECTOR OF ENGINEERING
[Signature]
 STRUCTURES ENGINEER

BRIDGE RAILING HEAVY DUTY STEEL BEAM (TYPE A, TYPE B, TYPE C, AND TYPE D)
BRIDGE RAILING HEAVY DUTY STEEL BEAM WITH BOX BEAM HAND RAIL (TYPE E)



STANDARD SB-R6-82