INDEX OF SHEETS

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

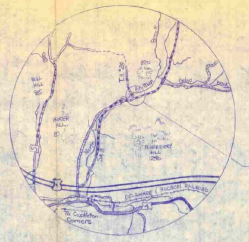
PROPOSED IMPROVEMENT

BRIDGE PROJECT
TOWN OF CASTLETON
COUNTY OF RUTLAND
ROUTE NO: CL3 TH #28 BRIDGE NO: 35

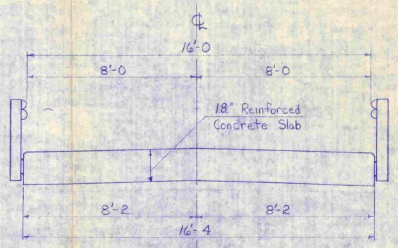
PROJECT LOCATION: CL3 T.H. #28, BR. 35 over Brittain Brook beginning at a point 250 ft. from the intersection of TH 3 and T.H. #28 and extending northerly 220 ft.

PROJECT DESCRIPTION: The project shall consist of removal of existing abutments; construction of new reinforced concrete slab bridge and abutments, roadway approaches, and, necessary channel work.

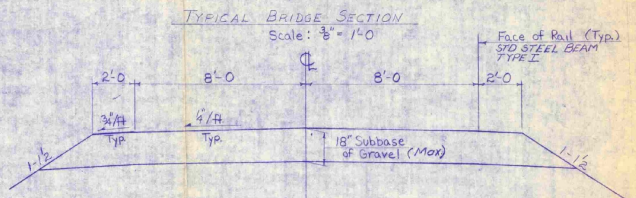
LENGTH OF STRUCTURE:	29'-0	FEET
LENGTH OF PARTICIPATION ROADWAY:	191	FEET
LENGTH OF NON-PARTICIPATION ROADWAY:	0	FEET
LENGTH OF PROJECT:	220	FEET

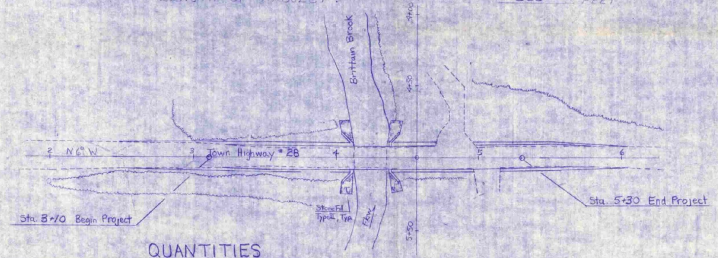


LOCATION MAP
(TRACED FROM COUNTY MAP)



TYPICAL BRIDGE SECTION
Scale: 3/8" = 1'-0





QUANTITIES

No.	ITEM	Unit	Superstructure	Abut #1	Abut #2	Channel	Roadway		TOTAL
202.25	Removal of Structure	Ea.	1						1
203.27	Unclassified Channel Excavation	C.Y.				30			30
203.30	Earth Borrow	C.Y.					30		30
204.25	Structure Excavation	C.Y.		165	165				330
204.30	Granular Backfill for Structure	C.Y.		65	65				130
301.15	Subbase of Gravel	C.Y.		15	15		170		200
501.25	Concrete, Class B	C.Y.	28	13	43				119
507.15	Reinforcing Steel	LBS.	1980	3670	3650				12,300
613.11	Stone Fill, Type II	C.Y.		25	25				50
617.34	Bridge Rail, Standard Steel Beam	L.F.	58						58
621.25	Guard Rail, Standard Steel Beam w/Steel Posts, Type I	L.F.					126		126

CONVENTIONAL SIGNS

COUNTY LINE
TOWN LINE
LIMITS OF ACCESS
POINT OF ACCESS
FENCE LINE
STONE WALL
TRAVELED WAY
GUARD RAIL
RAILROAD
SURVEY LINE
CULVERT
POWER POLE
TELEPHONE POLE
TREES
F.A. CONST. IDENTIFICATION SIGNS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS
TOP OF CUT
TOE OF SLOPE

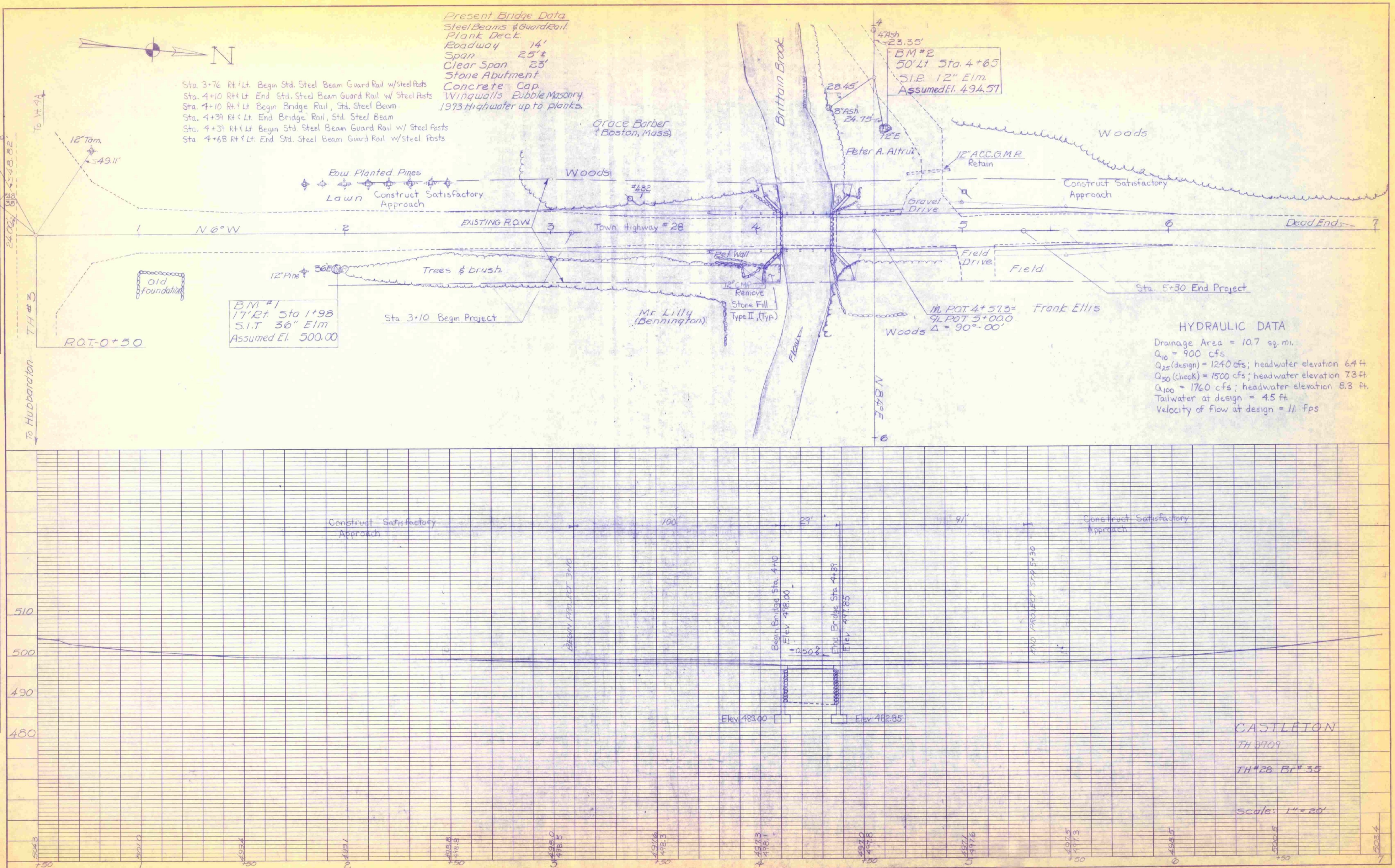
Date Sept 14, 1976
Contractor
Signature
Title
Acting Commissioner's Signature

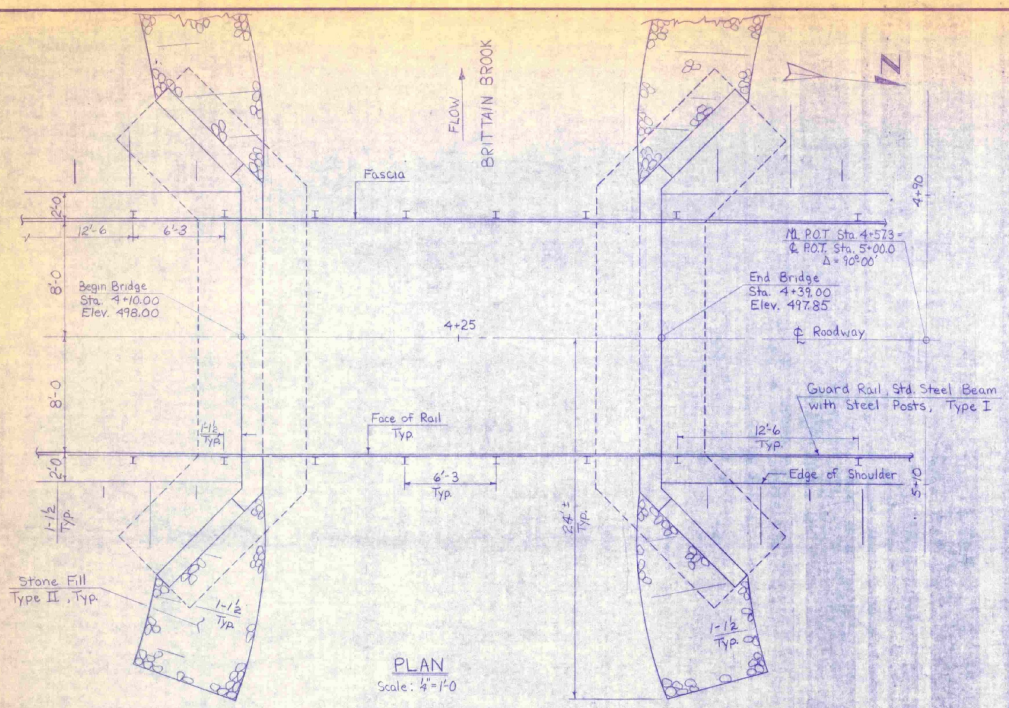
TYPICAL ROADWAY SECTION
Scale: 3/8" = 1'-0

SUBMITTED BY ORDER OF THE STATE HIGHWAY BOARD
APPROVED C.H. Stickney CHIEF ENGINEER DATE 6/22/76

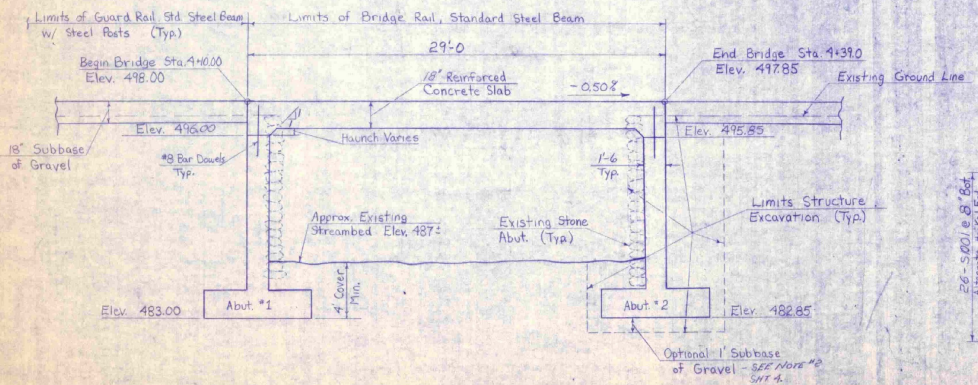
PROJECT CASTLETON
No. TH 3709
SHEET 1 OF 14 SHEETS

1057
1057

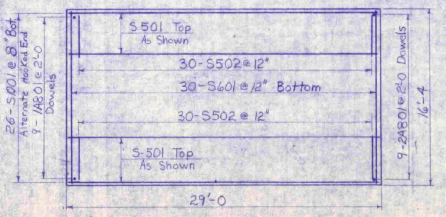




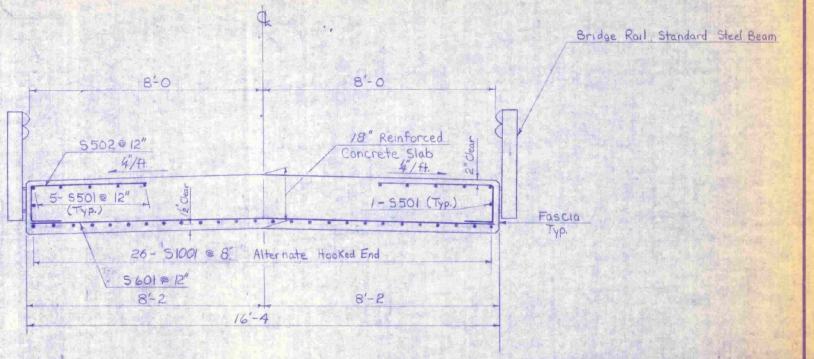
PLAN
Scale: 1/4" = 1'-0



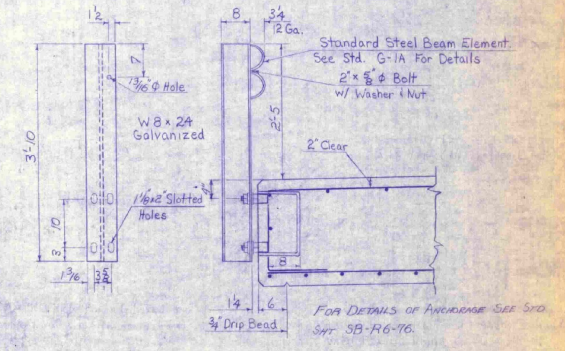
ELEVATION ALONG ℄
Scale: 1/4" = 1'-0



SLAB REINFORCING LAYOUT
Scale: 3/16" = 1'-0



TYPICAL SECTON
Scale: NTS



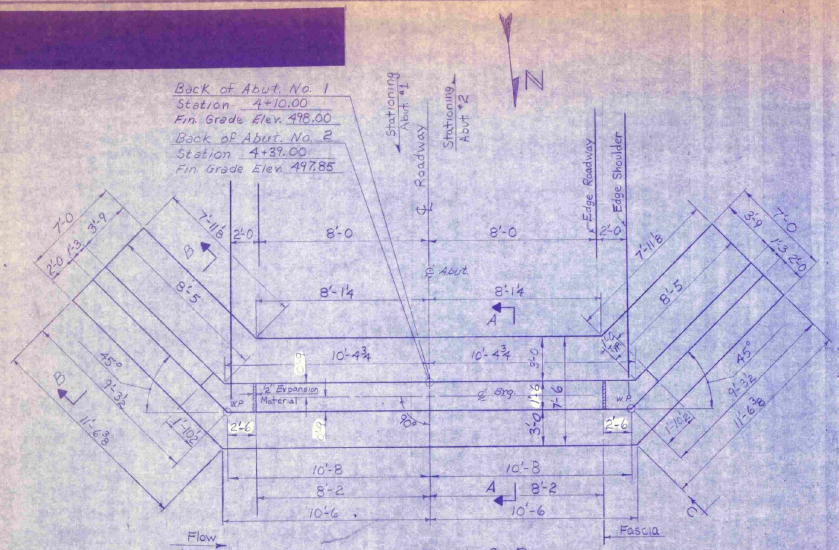
FOR DETAILS OF ANCHORAGE SEE STD. SHT. SB-R6-76.

CURB AND RAIL DETAIL
Scale: NTS

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

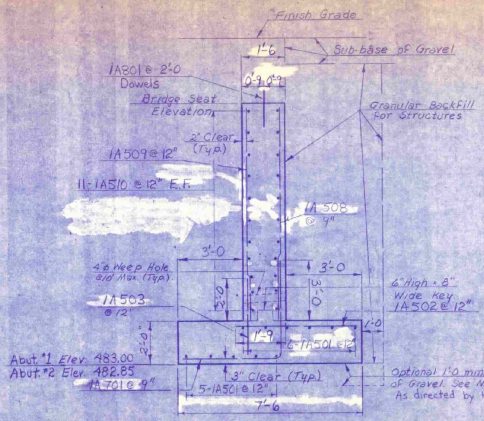
TOWN OF CASTLETON	Bridge No. 35
	Log Sta.
HIGHWAY NO. T.H. # 28	Surv. Sta. 4+25
Ck 3 TH #28 over Brittain Brook	
Superstructure Details	
Designed by J.R. Guilmette	Drawn by J.R. Guilmette
Checked by G. HOPKINS date 7/16/76	Bridge Design Supervisor W. TRIPP date 6/76
PROJECT CASTLETON	PROJECT NO. TH 3709
Bridge Sheet No.	Sheet 3 of 14

BR-4



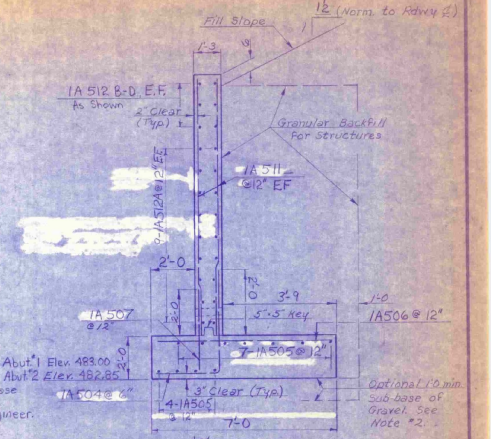
ABUTMENT No. 1 & 2 PLAN

NOT TO SCALE



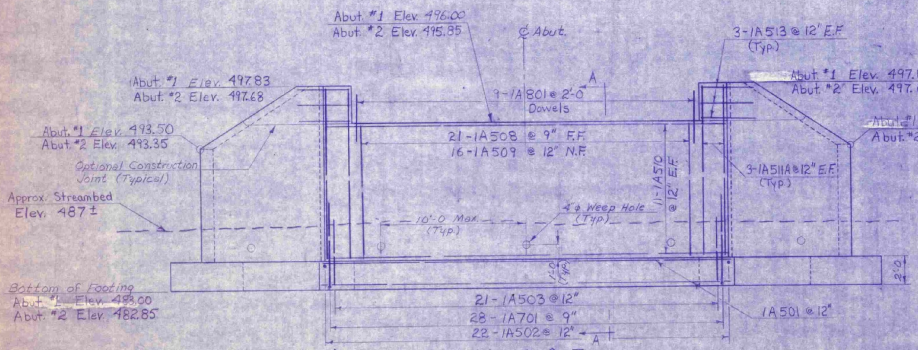
ABUTMENT SECTION A-A

NOT TO SCALE



WINGWALL SECTION B-B

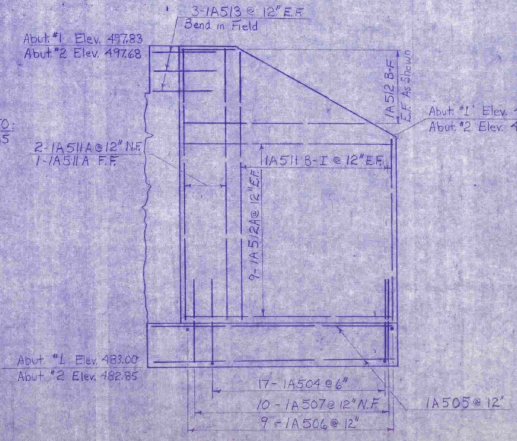
NOT TO SCALE



ABUTMENT No. 1 & 2 ELEVATION

NOT TO SCALE

Abutment 2 Reinforcing Bar Marks Prefix 2A (Typ.)



ELEVATION C-C

Not to Scale

NOTES:

1. All materials and construction shall conform to Vermont Standard Specification for Highway and Bridge Construction, M.M.S.I.H.C. and A.A.S.H.T.O. Standard Specifications for Highway Bridges.
2. Abutments and wingwalls are designed for a maximum bearing of 4 K.S.F. Use 1'0 min. Sub-base of Gravel under Footings in areas of poor foundation material.
3. Reinforcing steel design stress: F_s = 24,000 psi. All bar reinforcement shall conform to "Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement" AASHO M-31 (ASTM A-615) Grade 60.
4. Concrete shall be Class B, F'_c = 3,000 psi, F'_c = 4,000 psi.

[redacted]

5. All reinforcing steel shall be lapped 30 bar diameters (2'-6" minimum lap).
6. All exposed concrete shall be chamfered ¾" x ¾".

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

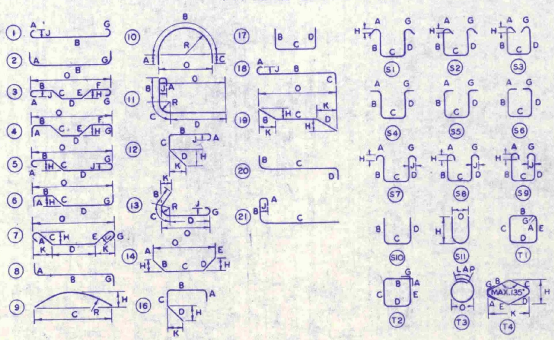
TOWN OF CASTLETON	Bridge No. 35
HIGHWAY NO. T.H. # 28	Log Sta.
	Surv. Sta. 4+25
C/L T.H. # 28 over Brittan Brook	
Abutment & Wingwall Details	
Designed by J.R. Guilmette	Drawn by J.R. Guilmette
Checked by G Hopkins date 7/6/76	Bridge Design Supervisor W. TRIPP date 8/1/76
PROJECT CASTLETON	PROJECT NO. TH 3709
Bridge Sheet No.	Sheet 4 of 14

ITEM	NO. PIECES	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O
1																	
2			ABUTMENT #1														
3																	
4																	
5	11	5	20'-8	1A501	Str.												
6	22	5	4'-9	1A502													
7	21	5	3'-9	1A503													
8	22	5	11'-1	1A505													
9	18	5	6'-6	1A506													
10	20	5	3'-9	1A507													
11	21	5	10'-9	1A508													
12	16	5	10'-9	1A509													
13	22	5	20'-1	1A510													
14	18	5	12'-7	1A511A													
15	4	5	12'-4	1A511B													
16	↓	↓	↓	↓		4 Ea Vary in 7 increments of 0'-7											
17	4	5	8'-3	1A511I													
18	36	5	9'-1	1A512A													
19	4	5	7'-6	1A512B													
20	↓	↓	↓	↓		4 Ea Vary in 4 increments of 1'-5½											
21	4	5	1'-8	1A512F													
22	13*	5	4'-3	1A513	↓		Bend in Field										
23	9	8	3'-6	1A801	Str.												
24																	
25	34	5	6'-6	1A504	17		3'-9	2'-9									
26	29*	7	8'-9	1A701	17		4'-9	4'-0									
27																	
28																	
29																	
30																	
31																	
32																	
33			ABUTMENT #2														
34																	
35																	
36	11	5	20'-8	2A501	Str.												
37	22	5	4'-9	2A502													
38	21	5	3'-9	2A503													
39	22	5	11'-1	2A505													
40	18	5	6'-6	2A506													
41	20	5	3'-9	2A507													
42	21	5	10'-9	2A508													
43	16	5	10'-9	2A509													
44	22	5	20'-1	2A510													
45	18	5	12'-7	2A511A													
46	4	5	12'-4	2A511B													
47	↓	↓	↓	↓		4 Ea. Vary in 7 increments of 0'-7											
48	4	5	8'-3	2A511I													
49	36	5	9'-1	2A512A													
50	4	5	7'-6	2A512B													
51	↓	↓	↓	↓		4 Ea. Vary in 4 increments of 1'-5½											
52	4	5	1'-8	2A512F													
53	12	5	4'-3	2A513	↓		Bend in Field										
54	9	8	3'-6	2A801	Str.												
55																	
56	34	5	6'-6	2A504	17		3'-9	2'-9									
57	28	7	8'-9	1A701	17		4'-9	4'-0									
58																	
59																	
60																	
61																	
62																	
63			SUPERSTRUCTURE														
64																	
65																	
66	12	5	28'-8	S501	Str.												
67	31*	6	16'-0	S601	Str.												
68																	
69																	
70	60	5	6'-5	S502	17		4'-0	1'-5	1'-0								
71																	
72	27*	10	29'-11	S1001	1	1'-5	28'-6										
73																	
74																	
75																	
76																	
77																	
78																	
79																	
80																	
81																	
82																	
83																	
84																	
85																	
86																	
87																	
88																	
89																	
90																	
91																	
92																	
93																	
94																	
95																	
96																	
97																	
98																	
99																	
100																	
101																	
102																	
103																	
104																	
105																	
106																	
107																	
108																	
109																	
110																	
111																	
112																	
113																	
114																	
115																	
116																	
117																	
118																	
119																	
120																	
121																	
122																	
123																	
124																	
125																	
126																	
127																	
128																	
129																	
130																	
131																	
132																	
133																	
134																	
135																	
136																	
137																	
138																	
139																	
140																	
141																	
142																	
143																	
144																	
145																	
146																	
147																	
148																	
149																	
150																	
151																	
152																	
153																	
154																	
155																	
156																	
157																	
158																	
159																	
160																	
161																	
162																	
163																	
164																	
165																	
166																	
167																	
168																	
169																	
170																	
171																	
172																	
173																	
174																	
175																	
176																	
177																	
178																	
179																	
180																	

ASTM STANDARD REINFORCING BARS

BAR SIZE DESIGNATION	WEIGHT POUNDS PER FOOT	NOMINAL DIMENSIONS ROUND SECTION: DIAMETER INCHES	CROSS SECTIONAL AREA SQ. INCHES	PERIMETER INCHES
#3	.376	.375	.11	1.178
#4	.668	.500	.20	1.571
#5	1.043	.625	.31	1.963
#6	1.502	.750	.44	2.356
#7	2.044	.875	.60	2.749
#8	2.670	1.000	.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.65	1.693	2.25	5.32
#18	13.60	2.257	4.00	7.09

TYPICAL BAR BENDS



NOTES

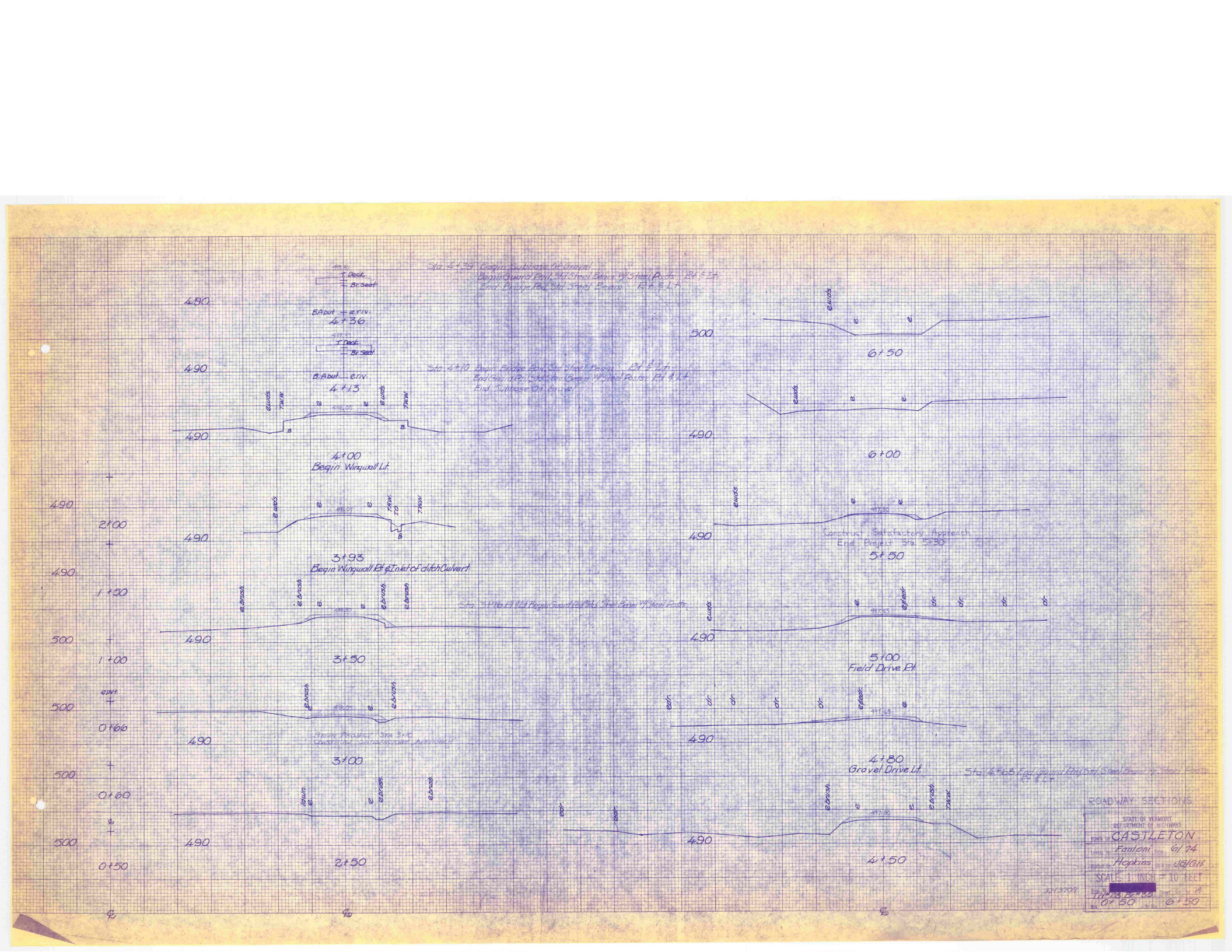
1. UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT," ASSHTO M 31 (ASTM A 615), GRADE 60.
2. FOR TYPICAL BENDING DETAILS, RECOMMENDED PIN DIAMETER "D" OF BENDS AND HOOKS AND OTHER STANDARD PRACTICE SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE."
3. BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
4. ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180° AND 135° HOOKS.
5. "J" DIMENSION ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD HOOKS ARE TO BE USED.
6. "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
7. WHERE SLOPE DIFFERS FROM 45° DIMENSIONS "H" AND "K" MUST BE SHOWN.

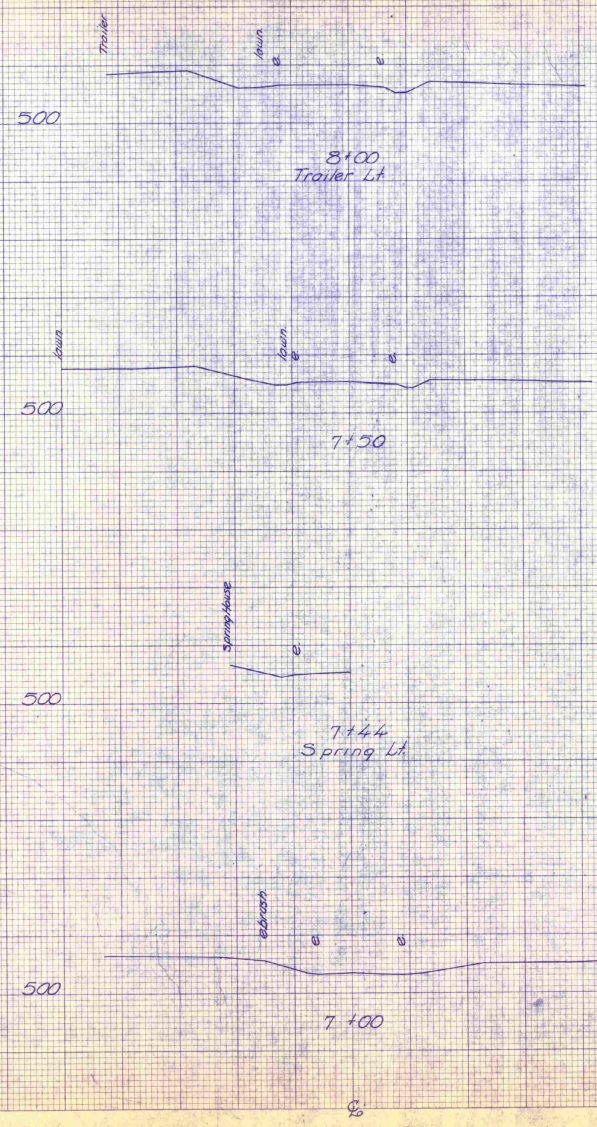
* DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.

REV. NO.	MADE BY	DATE	DESCRIPTION

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

TOWN OF CASTLETON	BRIDGE NO. 35
	LOG STA.
HIGHWAY NO. T.H. #28	SURV. STA. 4+25
CL3 TH #28 over Brittian Brook	
REINFORCING STEEL SCHEDULE	
DESIGNED BY J.R. Guilmette	DRAWN BY J.R. Guilmette
CHECKED BY G. Hopkins DATE 7/16/74	BRIDGE DESIGN SUPERVISOR W. TRIPP DATE 6/76
PROJECT CASTLETON	PROJECT NO. TH 3709
BRIDGE SHEET NO.	SHEET 5 OF 14

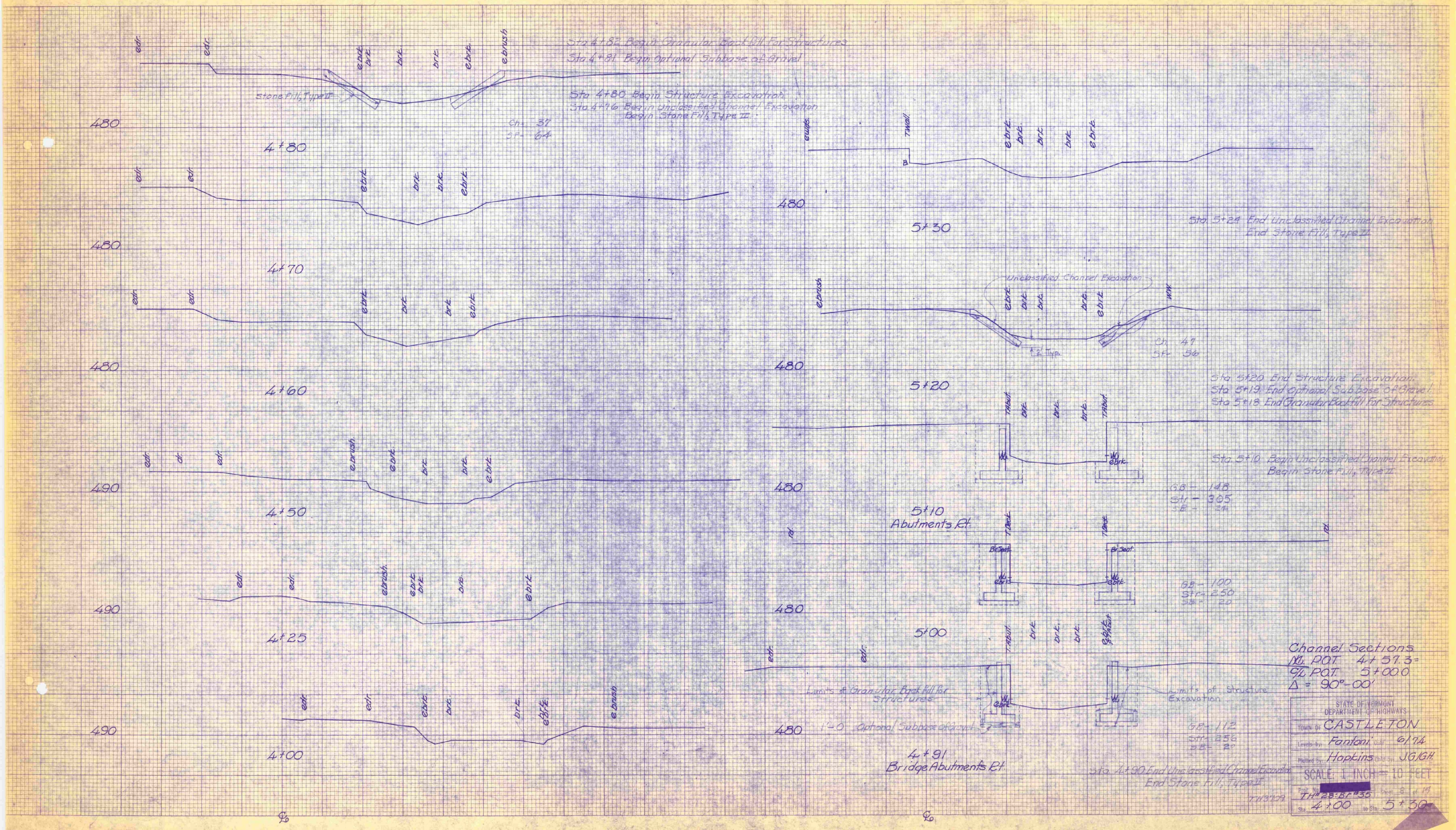

Sta. 4+39 Begin Subbase Of Gravel
Begin Guard Rail, Std. Steel Beam W/Steel Posts Rt & Lt
End Bridge Rail, Std. Steel Beam Rt & Lt
Sta 4+10 Begin Bridge Rail, Std. Steel Beam Rt & Lt
End Guard Rail, Std. Steel Beam W/Steel Posts Rt & Lt
End Subbase Of Gravel
4+00
Begin Wingwall Lt.
3+95
Begin Wingwall Rt. & Inlet of ditch Culvert
Sta. 3+76.13 End Begin Guard Rail, Std. Steel Beam W/Steel Posts
Begin Project Sta. 3+10
Construct Gravel Shoulders Approach
3+00
2+50
5+00
Field Drive Rt.
4+80
Gravel Drive Lt.
Sta. 4+68 End Guard Rail, Std. Steel Beam W/Steel Posts Rt & Lt
6+50
6+00
Construct Satisfactory Approach
End Project Sta. 5+30
5+50
4+50
ROADWAY SECTIONS
STATE OF VERMONT
DEPARTMENT OF HIGHWAYS
TOWN OF CASTLETON
Fantoni 6/74
Hopkins JG/GH
SCALE 1 INCH = 10 FEET
0+50 to 6+50

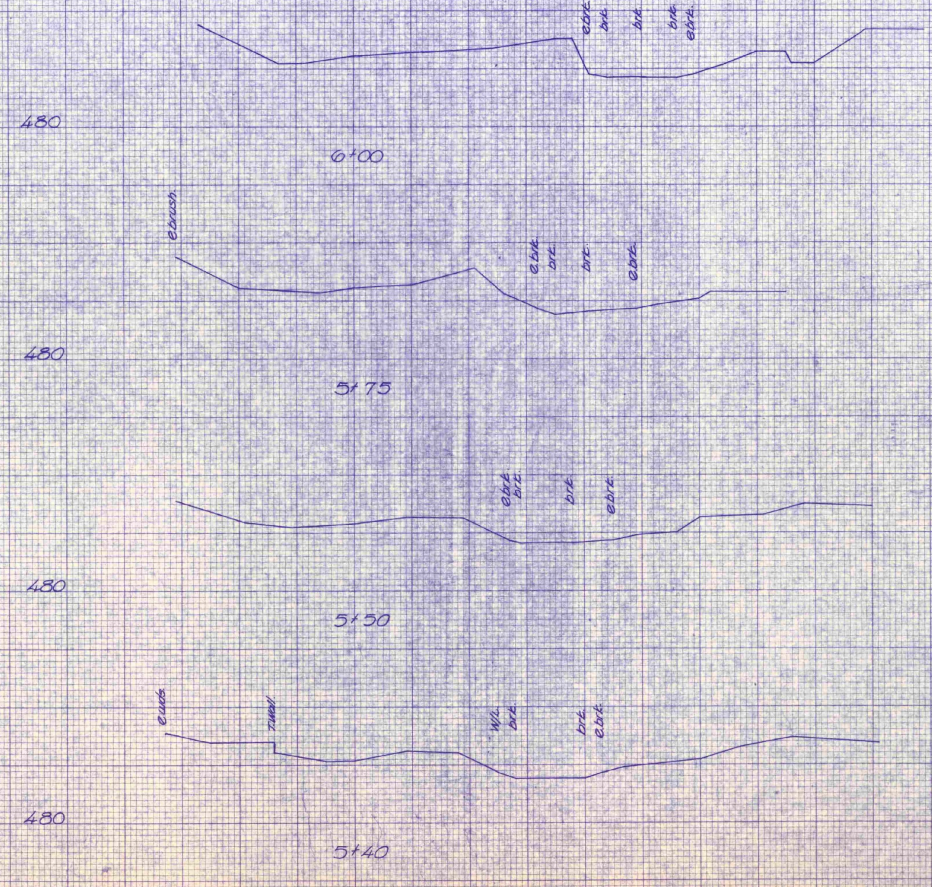


ROADWAY SECTIONS

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS
TOWN OF CASTLETON
Levels by Fantoni Date 6/74
Plotted by Hopkins JG/GH
SCALE: 1 INCH = 10 FEET
Proj. [redacted] Sheet 7 of 9
Sta. 7+00 to Sta. 8+00

TH 3709

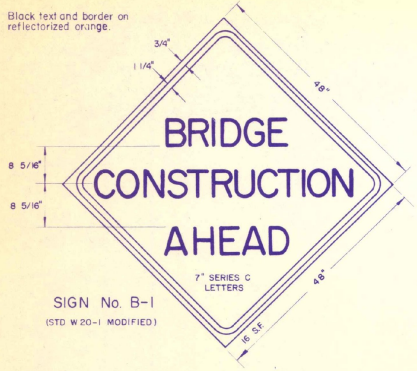

Sta 4+82 Begin Granular Back Fill For Structures
Sta 4+81 Begin Optional Subbase of Gravel
Sta 4+80 Begin Structure Excavation
Sta 4+76 Begin Unclassified Channel Excavation
Begin Stone Fill, Type II
Stone Fill, Type II
4+80
4+70
4+60
4+50
4+25
4+00
5+30
Sta 5+24 End Unclassified Channel Excavation
End Stone Fill, Type II
Unclassified Channel Excavation
5+20
Sta 5+20 End Structure Excavation
Sta 5+19 End Optional Subbase of Gravel
Sta 5+18 End Granular Back Fill For Structures
Sta 5+10 Begin Unclassified Channel Excavation
Begin Stone Fill, Type II
5+10
Abutments Rt.
5+00
Limits of Granular Back Fill For Structures
Limits of Structure Excavation
1'-0" Optional Subbase of Gravel
4+91
Bridge Abutments Rt.
Sta 4+90 End Unclassified Channel Excavation
End Stone Fill, Type II
Channel Sections
NL P.O.T. 4+57.3=
C/L P.O.T. 5+00.0
Δ = 90°-00'
STATE OF VERMONT
DEPARTMENT OF HIGHWAYS
TOWN OF CASTLETON
Levels by: Fantoni Date 6/74
Plotted by: Hopkins Chk'd by: J.G./G.H.
SCALE: 1 INCH = 10 FEET
Proj. No. [redacted]
TH#28: Br#35
Sheet 8 of 14
Sta 4+00 to Sta 5+30
TH3709



Channel Sections
No. P.O.T. 4+57.3=
Sta. P.O.T. 5+00.0
Δ = 90°-00'

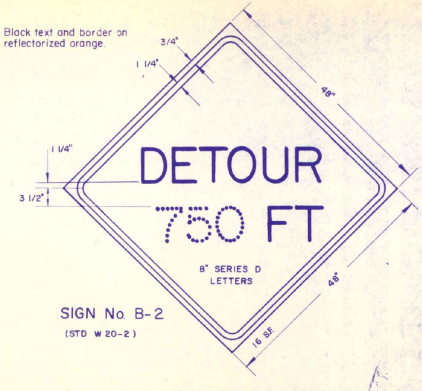
STATE OF VERMONT
DEPARTMENT OF HIGHWAYS
TOWN OF CASTLETON
Drawn by Fontaine 6/72
Traced by Hopkins JG/GH
SCALE: 1 INCH = 10 FEET
Proj. No. [redacted] Sheet No. 9 of 13
Sta. 5+40 to Sta. 6+00

Black text and border on reflectorized orange.



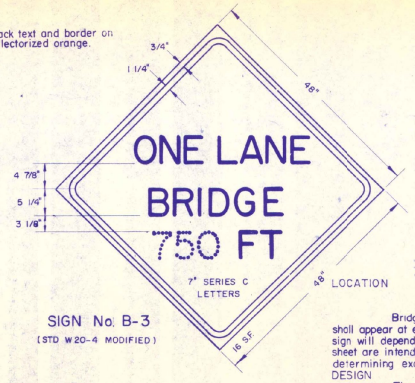
SIGN No. B-1
(STD W 20-1 MODIFIED)

Black text and border on reflectorized orange.



SIGN No. B-2
(STD W 20-2)

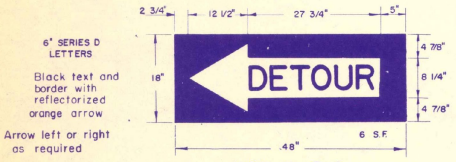
Black text and border on reflectorized orange.



SIGN No. B-3
(STD W20-4 MODIFIED)

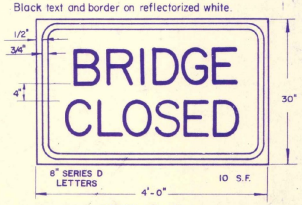
SIGN B-4

Black text and border on reflectorized orange background.



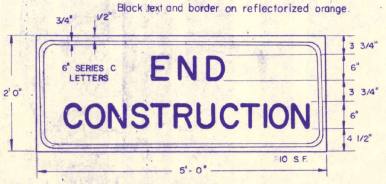
SIGN No. B-6
(STD. M 4-10)

Black text and border on reflectorized white.



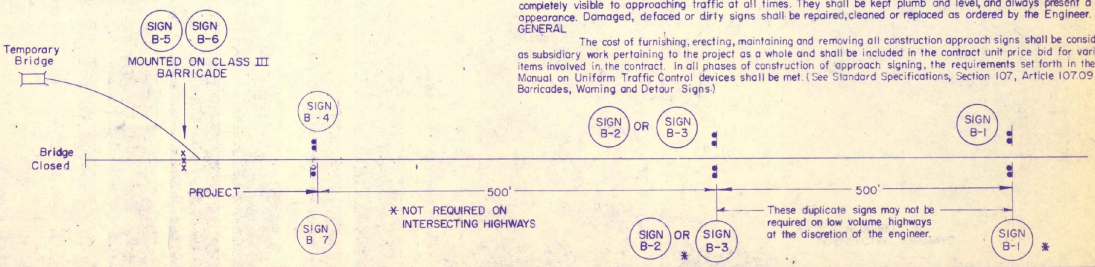
SIGN B-5
(STD. R 11-2 MODIFIED)

Black text and border on reflectorized orange.



SIGN B-7
(STD. G 20-2)

The bridge construction approach signs shown on this sheet are intended for use in providing warning and information at isolated bridge projects, although they may be ordered by the Engineer at bridge work on a road construction project. When additional approach signs or other types of signing or control are necessary, the plans and/or the Special Provisions for that project will give the details of the signs and controls required.



LOCATION

Bridge construction approach signs shall be located as detailed on this sheet or otherwise shown on the plans. They shall appear at each end of the project under construction, and on intersecting public highways. The exact placement of any sign will depend upon the alignment of the highway and the character of the roadsides. The location measurements on this sheet are intended to indicate the sequence to be followed, and the minimum spacing to be observed by the Engineer in determining exact locations.

DESIGN

The designs of the signs shall conform with the details shown on this sheet and with the standards prescribed in the Manual on Uniform Traffic Control Devices prepared by National Joint Committee on Uniform Traffic Control Devices.

MATERIALS

The signs shall be of metal, wood, plywood, hardboard or any other material satisfactory to the Engineer. No material shall be approved that will deteriorate by exposure to the weather during the required life of the sign.

REFLECTORIZATION

All new signs requiring an orange background shall have encapsolated lens reflective sheeting material as of January 1, 1975.

ILLUMINATION

If desired by the contractor, and approved by the Engineer, a sign may be illuminated instead of reflectorized. The illumination may be provided by incandescent or flourescent lamps, or by spotlights. Lamps shall be properly shielded to protect drivers from glare. Torches, lanterns, or existing street lighting are not acceptable for sign illumination. If the Engineer considers that a reflectorized sign is not adequate, he may order that it be illuminated.

INSTALLATION

The signs shall be in place at the time the project officially commences. Each sign shall be erected in a neat and workmanlike manner on wood or metal posts set securely in the ground. The bottom of a sign shall be at least 5 feet above road level, and the nearest edge of a sign shall be at least 6 feet outside the shoulder point or 2 feet outside the guard rail, curbing or sidewalk. Posts and signs shall be braced or reinforced in back as necessary. The installation of signs and barricades shall be subject to the approval of the Engineer.

When project is closed down for temporary periods the signs shall be covered in a workmanlike manner.

MAINTENANCE

Signs shall be maintained in a clean and legible condition satisfactory to the Engineer. They shall be completely visible to approaching traffic at all times. They shall be kept plumb and level, and always present a neat appearance. Damaged, defaced or dirty signs shall be repaired, cleaned or replaced as ordered by the Engineer.

GENERAL

The cost of furnishing, erecting, maintaining and removing all construction approach signs shall be considered as 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. In all phases of construction of approach signing, the requirements set forth in the Manual on Uniform Traffic Control devices shall be met. (See Standard Specifications, Section 107, Article 107.09 Barricades, Warning and Detour Signs.)

REVISIONS AND CORRECTIONS

SEPT. 11, 1973 – REVISED PER ORDER OF FHWA., SEPT 11, 1973.
NOV. 2, 1973 – REVISED PER ORDER OF FHWA.
MAY 14, 1974 – REVISED TO CONFORM TO EFFECTIVE MATERIAL STANDARD.
DEC. 12, 1975 – REVISED TO CONFORM TO STANDARD E-2.
JULY 20, 1976 – REVISED PER ORDER OF F.H.W.A.

APPROVED Dec. 14, 1971 DATE

R. H. Carnell CHIEF ENGINEER

E. H. Stickney ASST. CHIEF ENGINEER

G. M. Lane HIGHWAY ENGINEER

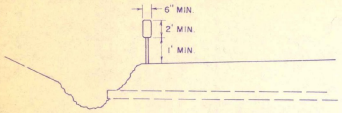
TRAFFIC SIGNS

BRIDGE CONSTRUCTION APPROACH SIGNS

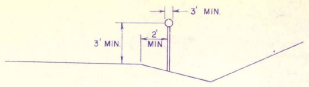
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

E-3

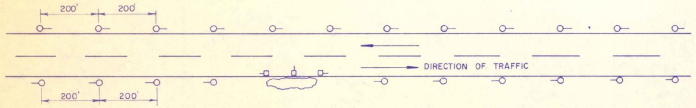
DELINEATOR AND HAZARD MARKER DETAILS
FOR CONSTRUCTION AREAS WHERE TRAFFIC IS MAINTAINED



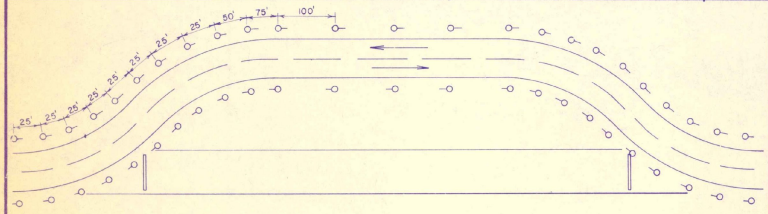
HAZARD MARKER TYPICAL



DELINEATOR TYPICAL

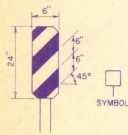


DELINEATOR AND HAZARD MARKER LOCATION DETAIL FOR TWO WAY TRAFFIC
(FOR INTERSTATE TYPE HIGHWAYS
200' SPACING ON RT.
AND 400' SPACING ON MEDIAN EDGE)



DELINEATOR LOCATION DETAIL FOR CONSTRUCTION DETOUR

HAZARD MARKER
TO BE USED AROUND EXCAVATION DURING NON-WORKING HOURS
OR WHEN AN OPERATION IS NOT BEING CARRIED ON



HAZARD MARKER

HAZARD MARKERS SHALL HAVE ALTERNATING ORANGE AND WHITE REFLECTORIZED STRIPES (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.)

POSTS

POSTS SHALL BE OF SUITABLE MATERIAL TO SUPPORT DELINEATORS OR HAZARD MARKERS, SHARPENED TO DRIVE.

SYMBOL

DELINEATORS SHALL BE OF A REFLECTORIZED SILVER OR WHITE COLOR. THEY SHALL HAVE A MINIMUM OF 7 SQUARE INCHES. THEY MAY BE ROUND, SQUARE, OR OBLONG. THEY SHALL BE OF THE FOLLOWING:
1 - REFLECTORIZED TAPE WITH METAL BACKING.
2 - REFLECTIVE TAPE APPLIED DIRECTLY TO POSTS.
3 - REFLECTORIZED PAINT APPLIED DIRECTLY TO POSTS. WHEN PAINT OR TAPE IS APPLIED DIRECTLY TO POST, A SURFACE OF 3" MINIMUM WIDTH FACING TRAFFIC IS REQUIRED.

MATERIALS

The barricades shown on this sheet normally will be of wood or wood and metal construction and Type II barricades may be of metal construction.

DESIGN

The design of the barricades shall conform with the details shown on this sheet and the markings on the barricades shall be alternate orange and white stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass).

COLORS

The barricades shown on this sheet shall have alternating reflectorized white and orange stripes. The orange shall conform with the standard color adopted by the American Association of State Highway Officials and approved by the U.S. Department of Transportation Federal Highway Administration.

REFLECTORIZATION

The barricades shall be reflectorized with reflective sheeting.

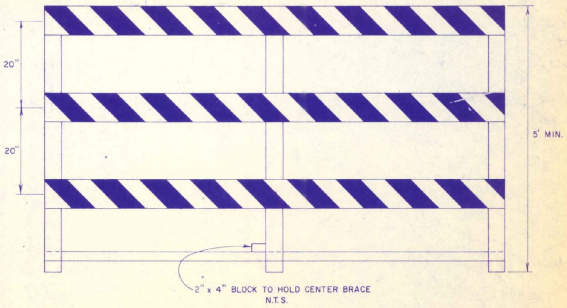
LOCATION

The barricades shown on this sheet will be located by the Engineer in the field or as shown on the plans. The locations of the barricades shall follow the procedures set forth in the Manual on Uniform Traffic Control Devices.

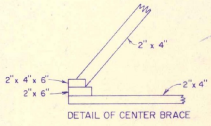
MAINTENANCE

Barricades shall be maintained in a clean and legible condition 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.

TYPE III

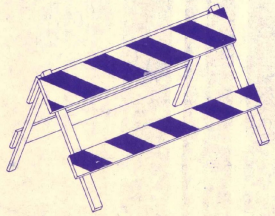


TYPE I

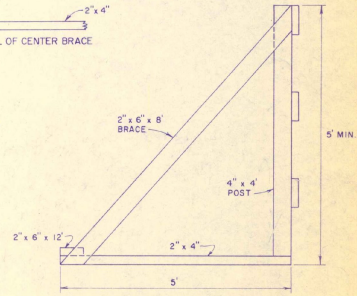


DETAIL OF CENTER BRACE

TYPE II



	I	II	III
WIDTH OF RAIL	8" min. 12" max.	8" min. 12" max.	8" min. 12" max.
LENGTH OF RAIL	6' - 8'	3' min. 4' max.	12'
WIDTH OF STRIPES	6"	6"	6"
HEIGHT	3' min.	3' min.	5' min.
TYPE OF FRAME	Demountable or Heavy 'A' Frame	Light 'A' Frame	Skids or Posts
FLEXIBILITY	Essentially Moveable	Portable	Essentially Permanent
ANGLE OF STRIPE	45°	45°	45°
COLOR OF STRIPES	Orange and White	Orange and White	Orange and White



DETAIL OF END BRACE

REVISIONS AND CORRECTIONS
MAR. 12, 1973 - DELINEATOR SPACING REVISED.
SEPT. 19, 1973 - DELINEATOR SPACING REVISED.

APPROVED
Feb 15, 1973
DATE
for CHIEF ENGINEER
ASST. CHIEF ENGINEER
HIGHWAY ENGINEER

TRAFFIC SIGNS

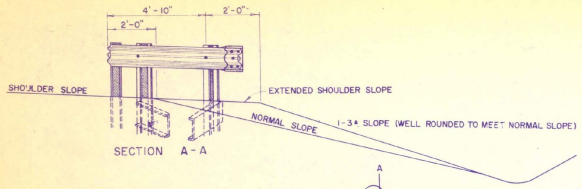
DELINEATION AND BARRICADES FOR CONSTRUCTION AREAS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

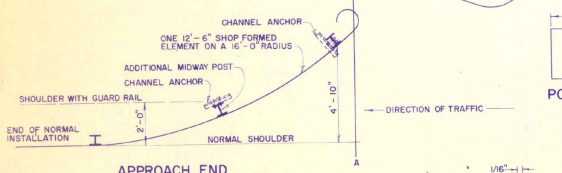
E-7

D-7

THIS STANDARD TO BE USED IN AREAS OF LOW SPEED TRAFFIC (UNDER 50 M.P.H.)

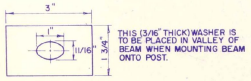


SECTION A-A

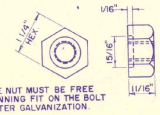


APPROACH END

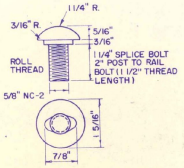
TO BE USED WHEN APPLICABLE
104 FEET MINIMUM INSTALLATION
RAIL TO BE LOCATED 75 FEET IN ADVANCE OF POINT OF NEED

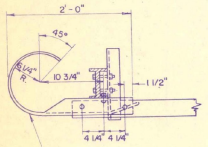


POST WASHER 'A'

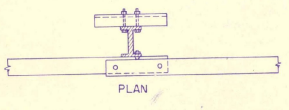


THE NUT MUST BE FREE RUNNING FIT ON THE BOLT AFTER GALVANIZATION.

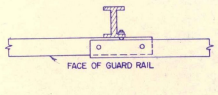




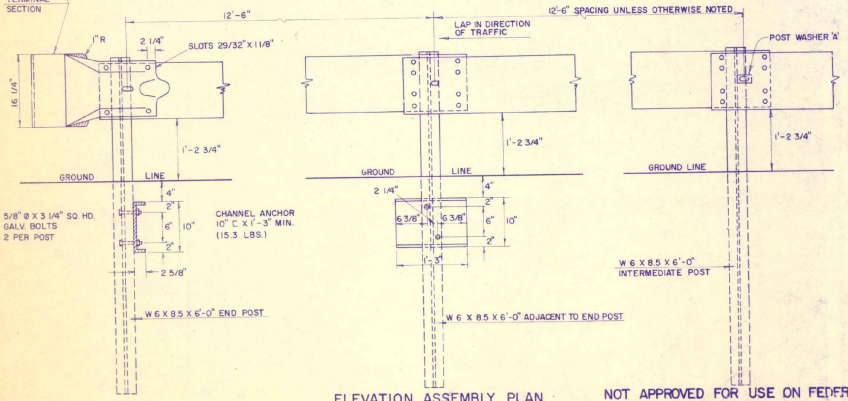
TERMINAL SECTION



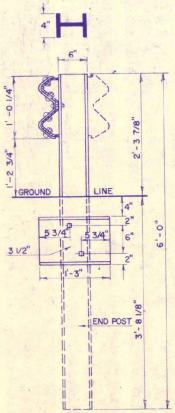
PLAN

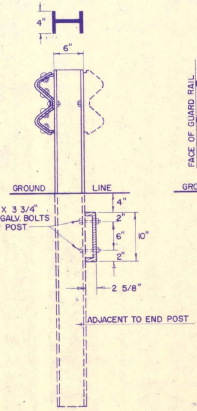


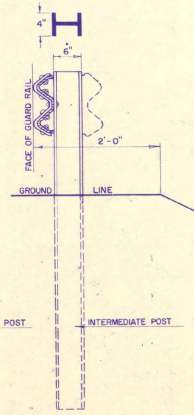
FACE OF GUARD RAIL



ELEVATION ASSEMBLY PLAN

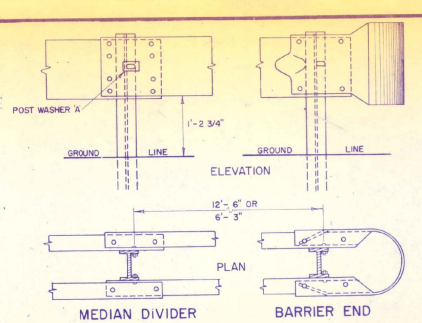


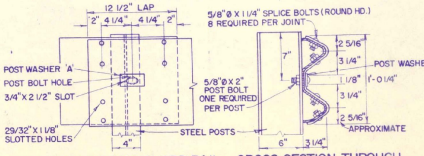




SIDE ELEVATIONS OF POSTS FOR SHOULDER OR MEDIAN INSTALLATION

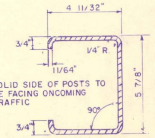
NOT APPROVED FOR USE ON FEDERAL AID PROJECTS





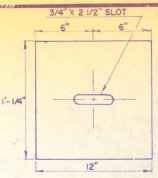
ELEVATION OF GUARD RAIL SPLICE AT POST

CROSS SECTION THROUGH GUARD RAIL SPLICE

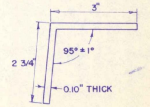


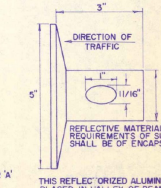
ALL POSTS IN A GIVEN RUN OF BARRIER TO BE UNIFORM

ALTERNATE POST



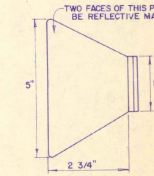
USE A 12' LONG FORMED BACK-UP PLATE OF STEEL BEAM GUARD RAIL AT EACH POST WHERE THERE IS A SINGLE THICKNESS OF BEAM RAIL.





REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER.

THIS REFLECTORIZED ALUMINUM WASHER IS TO BE PLACED IN VALLEY OF BEAM WHEN MOUNTING BEAM ONTO EACH FIFTH POST. WASHER SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM. B-209 ALLOY 5052-H-32.



BEAM	MIN. GAGE	TENSILE STRENGTH (LBS.)	RAIL OR JOINT BEAM STRENGTH			
			TRAFFIC FACE UP		TRAFFIC FACE DOWN	
			LOAD (LBS.)	MAXIMUM DEFLECTION (INCHES)	LOAD (LBS)	MAXIMUM DEFLECTION (INCHES)
STANDARD	12	80,000	1,500 2,000	2" 3"	1,200 1,600	2" 3"
HEAVY DUTY	10	100,000	2,000 3,000	2" 3"	1,600 2,400	2" 3"

STRENGTH - THE RAIL ELEMENT SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF THE ABOVE TABLE.

THE POST CONNECTION SHALL WITHSTAND A 5,000 POUND SIDE PULL IN EITHER DIRECTION.

ALL METAL PARTS SHALL BE GALVANIZED.

ALL WOOD POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

FINISHED ROUND WOOD POSTS TO BE ADDED AT POINT OF CONTACT WITH STEEL BEAM PANEL TO PROVIDE AN EVEN BEARING SURFACE.

STANDARD STEEL BEAM TO BE 12 GAGE AND THE HEAVY DUTY TO BE 10 GAGE.

REVISIONS & CORRECTIONS

DEC 19, 1972 NON FEDERAL AID NOTE ADDED
MAY 23, 1974 ALTERNATE POST ADDED
POST SPACING REVISED TO 12'-6"

APPROVED:

Dec. 8, 1971
DATE

R. N. Arnold
CHIEF ENGINEER

E. H. Hickmey
ASST. CHIEF ENGINEER

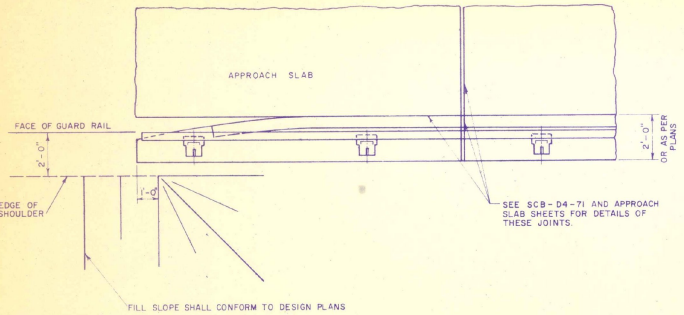
L. M. Lane
HIGHWAY ENGINEER

GUARD RAIL, STANDARD STEEL BEAM WITH STEEL POSTS, TYPE I
GUARD RAIL, STANDARD STEEL BEAM WITH WOOD POSTS, TYPE I
GUARD RAIL, HEAVY DUTY STEEL BEAM WITH STEEL POSTS, TYPE I
GUARD RAIL, HEAVY DUTY STEEL BEAM WITH WOOD POSTS, TYPE I

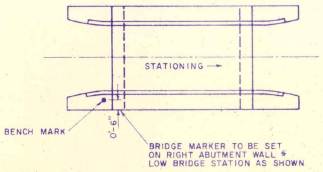
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

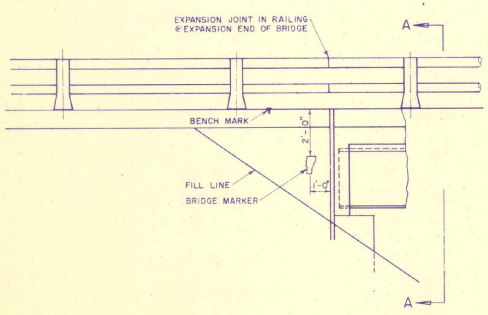
G-1a

D-7

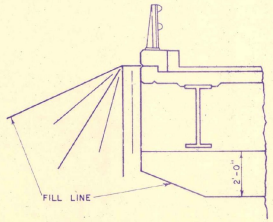


PLAN AT ABUTMENT





ELEVATION AT ABUTMENT



SECTION A-A

GENERAL NOTES

ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO STATE OF VERMONT, DEPARTMENT OF HIGHWAYS, STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, DATED MARCH 1976 AND ITS LATEST REVISIONS AND THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, DATED 1973 AND ITS LATEST REVISIONS. DESIGN IS FOR HS-20-44 LOADING MODIFIED FOR THE NATIONAL SYSTEM OF INTERSTATE HIGHWAYS, APPLIED IN ACCORDANCE WITH THE PROVISIONS OF AASHTO STANDARD SPECIFICATIONS.

THE FOLLOWING NOTES SHALL APPLY UNLESS OTHERWISE NOTED ON PROJECT PLANS.

1. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM DESIGNATION A-588 (UNPAINTED). ALL FIELD CONNECTIONS SHALL BE MADE WITH 7/8" Ø ASTM A-325, TYPE III BOLTS IN 15/16" Ø HOLES. WHERE CONNECTIONS ARE NOT DETAILED ON THE PLANS THEY SHALL BE DETAILED BY THE FABRICATOR AND SUBMITTED TO THE STATE FOR APPROVAL.

2. WHEN NOT DETAILED ON THE PLANS, SIMPLE SPAN BEAMS SHALL BE CAMBERED FOR THE DEAD LOAD DEFLECTION PLUS ONE-EIGHTH (1/8) INCH FOR EACH TEN FEET OF SPAN OR FRACTION THEREOF. THE CAMBER SHALL APPROXIMATE A SIMPLE CIRCULAR CURVE FROM END TO END OF BEAM. TOLERANCES IN CAMBER SHALL BE AS INDICATED IN THE AISC HANDBOOK FOR ROLLED BEAMS AND AS INDICATED IN THE AWS SPECIFICATION FOR WELDED GIRDERS.

3. ALL WELDING AND DIMENSIONAL TOLERANCES OF WELDED MEMBERS SHALL CONFORM TO AWS D1.1-72 "STRUCTURAL WELDING CODE" AND ITS LATEST REVISIONS EXCEPT AS MODIFIED BY THE AASHTO STANDARD SPECIFICATIONS FOR WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES, DATED 1974 AND ITS LATEST REVISIONS.

4. ALLOWABLE DESIGN STRESSES: *

CONCRETE	CLASS A	f'c	3,000 psi	f'c	1400 psi
	CLASS B	f'c	3,500 psi	f'c	1400 psi
STRUCTURAL STEEL	A-588 MAX. DESIGN STRESS= 27000 psi (or as per AASHTO Specs.)				
REINFORCING STEEL			GRADE 40		GRADE 60
	DESIGN STRESS (TENSION)		20,000 psi		24,000 psi
	DESIGN STRESS (COMPRESSION)		16,000 psi		20,000 psi

5. AFTER SUPERSTRUCTURE STEEL HAS BEEN ERECTED, ELEVATIONS ALONG THE TOP OF ERECTED BEAMS SHALL BE TAKEN UNDER THE DIRECTION OF THE ENGINEER FOR USE IN DETERMINING THE FINAL GRADE.

6. MINIMUM COVER FOR REINFORCEMENT STEEL SHALL BE 2" MEASURED FROM THE CONCRETE SURFACE TO THE FACE OF THE REINFORCEMENT (3" IN ALL FOOTINGS).

7. ALL EXPOSED EDGES OF CONCRETE IN THE SUBSTRUCTURE AND SUPERSTRUCTURE SHALL BE CHAMFERED 1" x 1".

8. DECK CONCRETE SHALL BE CONCRETE CLASS A. ALL OTHER CONCRETE SHALL BE CONCRETE CLASS B.

9. BRIDGE SEATS OF ALL PIERS AND ABUTMENTS SHALL BE SLOPED 1/2" PER FOOT EXCEPT UNDER BEARING PLATES WHERE THE SURFACES SHALL BE LEVEL. ABUTMENTS SHALL BE SLOPED FULL WIDTH. PIERS SHALL BE SLOPED EACH WAY FROM CENTER. THE ENTIRE BRIDGE SEAT SURFACE SHALL BE SMOOTH STEEL TROWEL FINISHED.

10. ABUTMENT CONCRETE ABOVE THE ADJACENT BRIDGE SEAT ELEVATIONS SHALL PREFERABLY NOT BE PLACED UNTIL FINAL FINISHED GRADE OF DECK IS ESTABLISHED BY THE ENGINEER.

11. BRIDGE DECKS AND APPROACH SLABS CALLING FOR BITUMINOUS CONCRETE PAVEMENT SHALL BE PAVED WITH A TYPE IX MIX APPLIED IN TWO COURSES.

12. GRANULAR BORROW USED IN AREAS THROUGH WHICH PILES ARE TO BE DRIVEN SHALL HAVE A MAXIMUM STONE SIZE OF NINE INCHES.

13. BORINGS INDICATED ON THE DRAWINGS HAVE BEEN MADE FOR DESIGN PURPOSES ONLY AND DO NOT WARRANT ACTUAL SUB-SURFACE CONDITIONS.

14. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL.

* NOTE: SPECIFICATIONS CALL FOR A CLASS A CONCRETE WHICH WILL PRODUCE 4000 PSI AT 28 DAYS. HOWEVER, SUPERSTRUCTURE CONCRETE IS DESIGNED ON THE BASIS OF f'c = 3500 THUS PROVIDING AN ADDITIONAL FACTOR OF SAFETY IN BRIDGE SLABS.

15. ANY FORM BRACKET HOLES IN FASCIA BEAMS OR GIRDER WEBS SHALL BE FILLED WITH BUTTON-HEAD BOLTS (TYPE III ON A-588 STEEL).

REVISIONS AND CORRECTIONS
1- Added word seat in line 3 of Note #9 J. WOOD 4-23-75
2. CHANGED VERMONT SPEC. DATE, GEN. NOTE, AND ADDED NOTE NO. 15, W. TRIPP, 4-26-76.

APPROVED DATE 4-26-76

E. H. Tierney
CHIEF ENGINEER

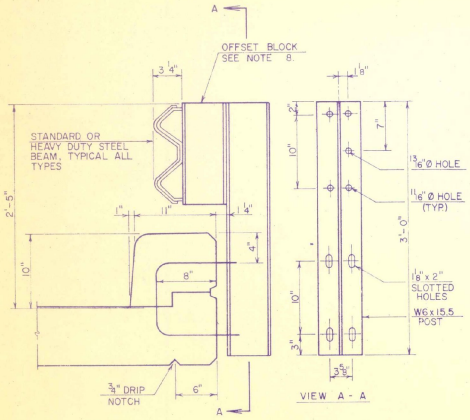
R. O. Munn
ASST. CHIEF ENGINEER

K. M. Smith
BRIDGE ENGINEER

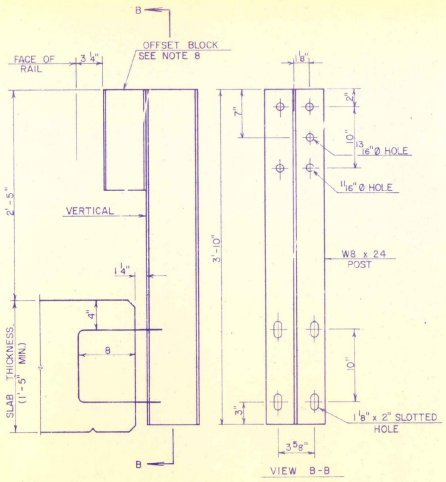
DETAILS OF W BEAM BRIDGES GENERAL INFORMATION AND GENERAL NOTES

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

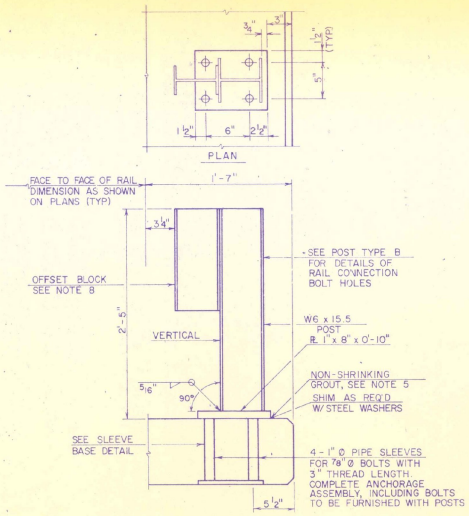
SCB-D1-75



FASCIA MOUNTED STEEL POST TYPE A



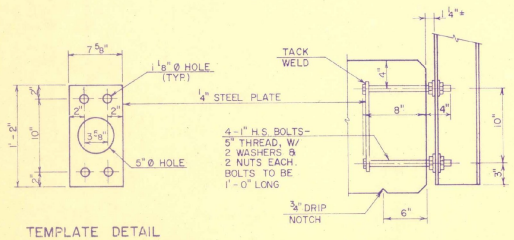
FASCIA MOUNTED STEEL POST TYPE B



PEDESTAL MOUNTED STEEL POST TYPE C

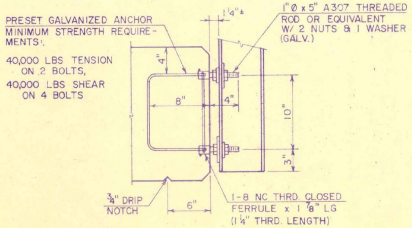
- NOTES -

1. SEE STANDARD DRAWINGS G-1 AND G-1a FOR ADDITIONAL DETAILS.
2. FASCIA MOUNTED POSTS (TYPE A & B) MAY BE USED WITH EITHER ANCHORAGE TYPE 1, 2 OR 3 UNLESS OTHERWISE SPECIFIED ON PROJECT PLANS.
3. ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF STD. SPEC. SUBSECTION 714.16, "ANCHOR BOLTS".
4. DESIGN STRESSES:
   ULTIMATE STRENGTH DESIGN USED IN SELECTION OF POSTS.
   f_y = 29,000 PSI STEEL POSTS
5. NON-SHRINKING GROUT SHALL CONFORM WITH SUBSECTION 707.04, MORTAR TYPE IV. PACK UNDER BASE PLATE.
6. ALL STEEL POSTS AND FIXTURES SHALL BE ASTM A-36 EXCEPT AS OTHERWISE NOTED, AND SHALL BE GALVANIZED AFTER FABRICATION TO CONFORM WITH ASTM A-123.
7. ALL RAIL POSTS SHALL BE SET NORMAL TO GRADE UNLESS OTHERWISE NOTED.
8. OFFSET BLOCKS ARE TO BE USED UNLESS OTHERWISE DESIGNATED ON PROJECT PLANS. SEE STANDARD DRAWING G-1 FOR OFFSET BLOCK DETAIL.

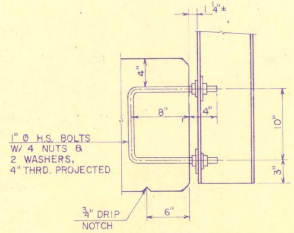


TEMPLATE DETAIL

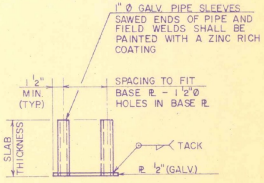
ANCHORAGE TYPE 1



ANCHORAGE TYPE 2



ANCHORAGE TYPE 3



SLEEVE BASE, DETAIL

REVISIONS AND CORRECTIONS

APPROVED:

JAN. 8 1976
DATE

E. H. Stickney
CHIEF ENGINEER

R. O. Munn
ASST. CHIEF ENGINEER

W. M. Smith
BRIDGE ENGINEER

STANDARD STEEL BRIDGE RAILING MOUNTINGS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

SB-R6-76

D-8