INDEX OF SHEETS

1. TITLE SHEET
2. TYPICAL SHEET
3. QUANTITY SHEET
4. EARTHWORK SHEET
5-6. BLANK
7-9. R.O.W. SHEETS
10-12. PLAN & PROFILE SHEETS
13. LANDSCAPING DETAILS
14-15. BLANK
16. A-61 SLOPES IN SOLID ROCK EXCAVATION 8/26/81 R.
17. B-1 BANKING TABLES 12/8/71
18. B-5 TYPICAL SLOPE ROUNDING 12/6/71
19. C-1 TREATED TIMBER CURB 12/16/80 R.
20. D-2 UNDERDRAIN 12/16/76 R.
21. D-3 TREATED GUTTERS 4/27/73 R.
22. D-4 M.E.S., FLUSHING BASINS, ELBOWS 7/24/75 R.
23. D-6 REINFORCED CONC. DROP INLET 4/4/73 R.
24. D-11 CAST IRON GRATE, TYPE A 5/24/81 R.
25. D-16 P.R.C.C.D.I., TYPE B GRATE 11/14/72 R.
26. E-2 ROAD CONSTRUCTION APPROACH SIGNS 3/4/81 R.
27. E-6 CONSTRUCTION SIGNS, ON PROJECT 4/1/80 R.
28. E-7 DELINEATION, BARRICADES, & DETOURS 2/2/83
29. E-15 REGULATORY SIGNS 7/29/81
30. E-17 REGULATORY SIGNS 1/8/74 R.
31. E-19 WARNING SIGNS 12/20/82 R.
32. E-23 GUIDE SIGNS 2/10/83
33. E-24A SIGN SUPPORTS, YIELDING, FOR TYPE A SIGNS 1/8/81 R.
34. E-29 STANDARD SIGN PLACEMENT - NON EXPRESSWAY 8/25/81 R.
35-36. BLANK
37. G-1d GUARD RAIL, STD. ST. BEAM W/ WOOD POSTS, TYPE II 12/16/80 R.
38. G-4 WOOD MARKER POSTS 5/25/82 R.
39. J-1 PROJECT & BOUNDARY MARKERS 6/27/80
40. T-1 TEMPORARY EROSION CONTROL DETAILS 12/7/76 R.
41. T-2 TEMPORARY EROSION CONTROL DETAILS 7/5/72
42-43. BLANK
44-52. TH. 49 CROSS SECTIONS
53-60. U.S. ROUTE 4 CROSS SECTIONS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PROPOSED IMPROVEMENT

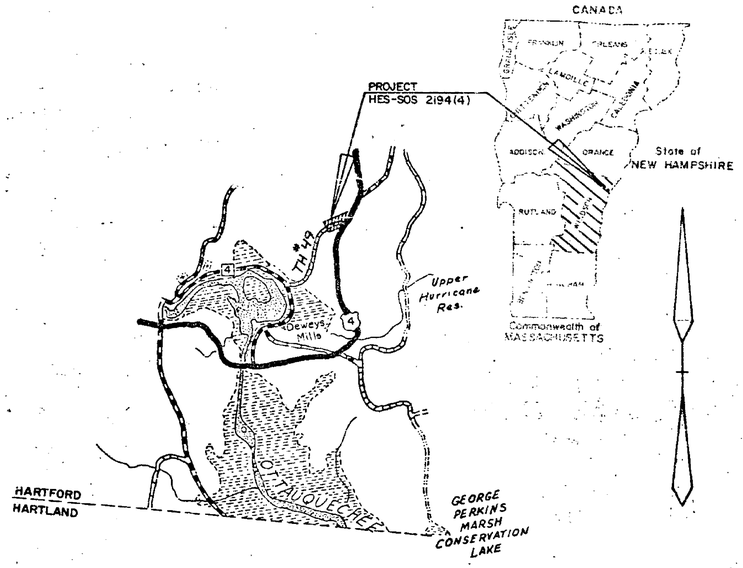
TOWN OF HARTFORD
COUNTY OF WINDSOR
TOWN HIGHWAY NO. 49, CLASS 3

ON TH # 49 IN HARTFORD, BEGINNING AT A POINT WHICH IS APPROXIMATELY 0.478 MI. NORTHEASTERLY OF THE INTERSECTION OF TH # 49 WITH TH # 4 AND PROCEEDING NORTHEASTERLY FOR APPROXIMATELY 0.262 MI. THENCE INTERSECTING US ROUTE 4. PROJECT LENGTH DOES NOT INCLUDE DECELERATION LANE ON US 4

LENGTH OF PROJECT = 1385.0 FEET 0.262 MILE

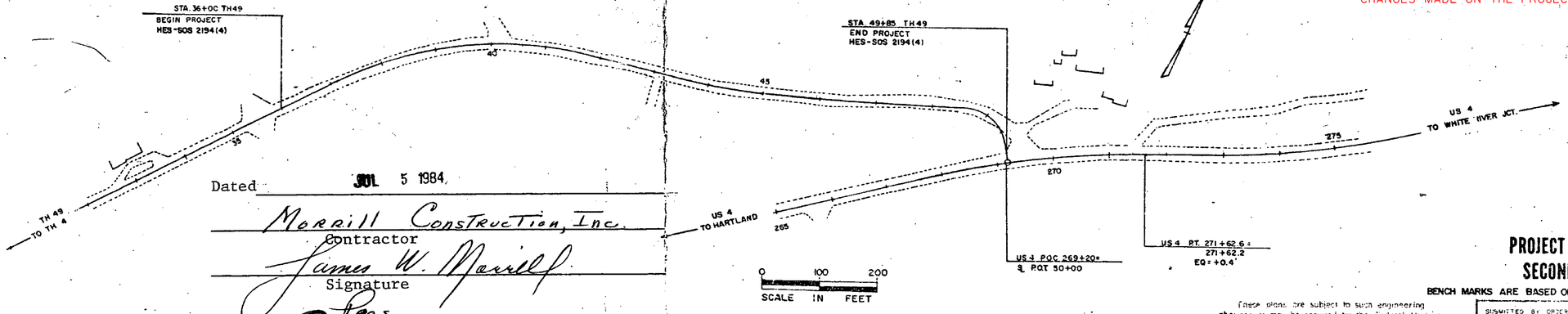
US 4 TRAFFIC DATA	
1978 AADT	5660
1998 AADT	9470(EST)
1998 DHV	1120(EST)
D	56%
T	5%
V	50

TH # 49 TRAFFIC DATA	
1978 AADT	940
1998 AADT	1330(EST)
1998 DHV	200(EST)
D	52%
T	5%
V	35



CONTRACT PLANS

THESE PLANS DO NOT REFLECT CHANGES MADE ON THE PROJECT.



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
CONTROL OF ACCESS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS
TOP OF CUT
TOE OF SLOPE

DATUM
VERTICAL
HORIZONTAL

Dated JUL 5 1984

Morrill Construction, Inc.
Contractor

James W. Morrill
Signature

Pres.
Title

Transportation Secretary's Signature

These plans are subject to such engineering changes as may be required by the Federal Highway Administration or the Dir. of Eng. and Constr.

Construction is to be carried on in accordance with these plans and the Standard Specifications for Highway and Bridge Construction dated March, 1975, as covered by the Federal Highway Administration on October 27, 1976 for use on this project, including all subsequent revisions and such revised specifications and special provisions as are incorporated in these plans

PROJECT PROCESSED UNDER SECONDARY ROAD PLAN

BENCH MARKS ARE BASED ON ASSUMED ELEVATIONS

SUBMITTED BY ORDER OF THE STATE TRANSPORTATION BOARD

APPROVED S.J. Page P.E. 3-7-84
DIRECTOR OF ENGINEERING AND CONSTRUCTION

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

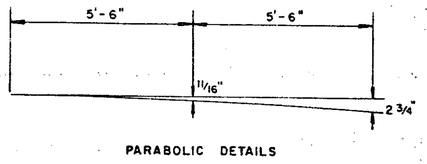
APPROVED _____ DATE _____
DIVISION ADMINISTRATOR

PROJECT HES-SOS 2194(4)

SHEET 1 OF 60 SHEETS

S.R.S. 12/1970

TYPICAL SECTIONS



PARABOLIC DETAILS

1- 1/2" BITUMINOUS CONCRETE PAVEMENT, ITEM 406.25 TYPE III

3" PLANT MIXED BASE COURSE, ITEM 303.25

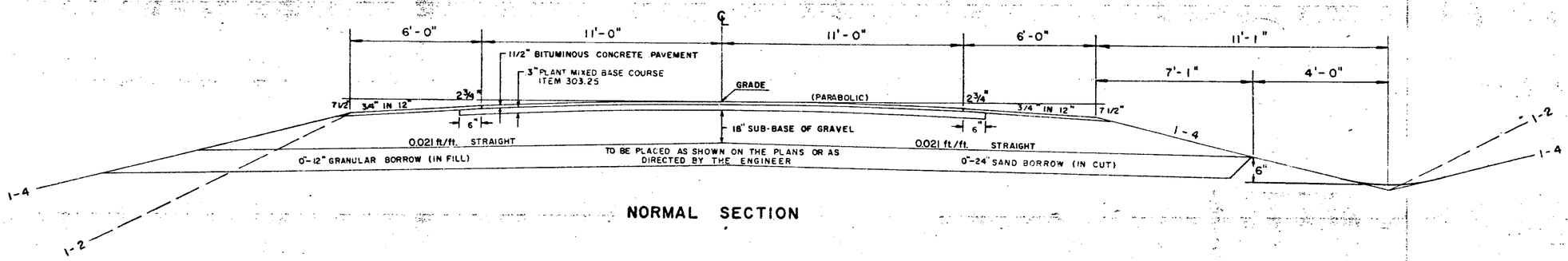
18" SUB BASE OF GRAVEL, ITEM 301.15

SHOULDERS: 1-1/2" BITUMINOUS CONCRETE PAVEMENT, ITEM 406.25

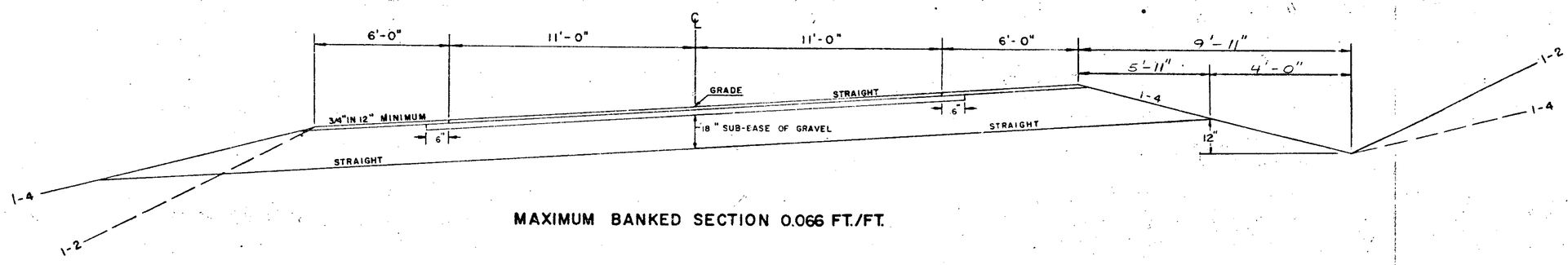
0-12" GRANULAR BORROW, ITEM 203.32 (IN FILL)

0"-24" SAND BORROW, ITEM 203.31 (IN CUT)

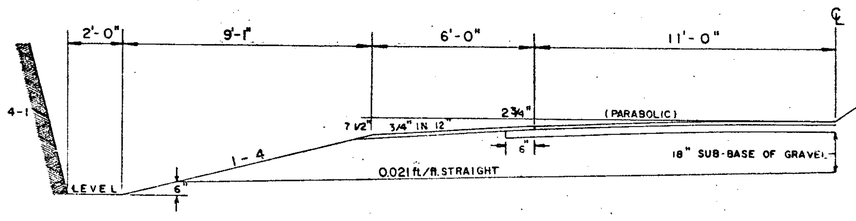
} TO BE AS NOTED ON THE PLANS OR AS DIRECTED BY THE ENGINEER



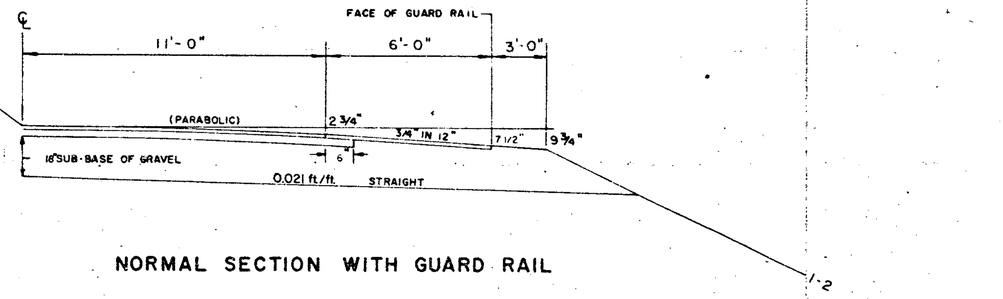
NORMAL SECTION



MAXIMUM BANKED SECTION 0.066 FT./FT.



NORMAL SECTION IN SOLID ROCK EXCAVATION
(SEE STANDARD SHEET A-61 FOR ADDITIONAL DETAILS)



NORMAL SECTION WITH GUARD RAIL

GENERAL NOTES

SEED, ITEM 651.10
TO BE APPLIED AS DIRECTED BY THE ENGINEER

%WT	LBS/A	NAME	PUR%	GERM%
3.33	2	CROWN VETCH	97	75
50.00	30	CREEPING RED FESCUE	98	85
8.33	5	TIMOTHY	99	85
16.67	10	PERENNIAL RYE GRASS (VAR. PENNFINE)	95	85
8.34	5	ALFALFA (VAR. SARANAC)	99	85
8.33	5	BIRDSFOOT TREFOIL (VAR. EMPIRE)	98	85
5.00	3	HIGHLAND BENT GRASS	92	85
100.00	60	LBS/ACRE		

THE SEED MIXTURE SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS WEED SEED.

MARKER POSTS, (WOOD OR STEEL AS SPECIFIED)
TO BE PLACED AS DIRECTED BY THE ENGINEER

FERTILIZER, ITEM 651.15
FORMULA 10-20-10 TO BE USED WITH SEED, ITEM 651.10 APPLIED AT THE RATE OF 500 LBS/ACRE

AGRICULTURAL LIMESTONE, ITEM 651.20
TO BE APPLIED AT RATE OF 2 TONS/ACRE OR AS DIRECTED BY THE ENGINEER

HAY MULCH, ITEM 651.25
TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE

TOPSOIL, ITEM 653.10
TO BE USED WITH SEED, ITEM 651.10 IN RESIDENTIAL AREAS, AS DIRECTED BY THE ENGINEER

SEE STANDARD SHEET B-5 FOR TYPICAL SLOPE ROUNDING

SEE STANDARD SHEET D-2 FOR PAY LIMITS OF SAND BORROW WHEN USED IN CONJUNCTION WITH UNDERDRAIN

ALLOWABLE THICKNESS TOLERANCES

SUB-BASE	± 1"
BASE COURSE	± 1/2"
PAVEMENT	± 1/4"

FOR SANDY SOILS, THE FERTILIZER MIX SHOULD BE CHANGED TO NITROGEN - 10%, PHOSPHORUS - 20%, POTASH - 20%.

TOWN OF HARTFORD

STATE OF VERMONT
AGENCY OF TRANSPORTATION

DRAWN BY: DHB 1966 | TRACED BY: DHB 1966

PROJ. HES-SOS 2194(4) | SHEET 2 OF 60

DRAINAGE AND ITEM QUANTITY SHEET

STATE OF VERMONT DEPARTMENT OF HIGHWAYS

PROJECT HARTFORD NO. HES-SOS-2194(4)

APPROXIMATE SUMMARY OF QUANTITIES

LAND-SCAPING	EROSION CONTROL	BRIDGE	ROADWAY	GRAND TOTAL	UNIT	ITEM (● = NOT A BID ITEM)	ITEM NO.	RND.
			1	1	LS.	CLEARING & GRUBBING plus INDIV. TREES	201.10	
			40	40	L.F.	REMOVAL & DISPOSAL OF EXIST. GUARDRAIL	202.40	1
			9200	9200	C.Y.	COMMON EXCAVATION	203.15	24
			100	100	C.Y.	SOLID ROCK EXCAVATION (EST.)	203.16	
			1	1	C.Y.	EARTH BORROW (EST.)	203.30 ●	
			1800	1800	C.Y.	SAND BORROW	203.31	8
			1325	1325	C.Y.	GRANULAR BORROW	203.32	13
			1150	1150	C.Y.	ROCK BORROW (EST.)	203.33	9
	27		1043	1070	C.Y.	TRENCH EXCAVATION OF EARTH	204.20	
			1	1	C.Y.	TRENCH EXCAVATION OF ROCK (EST.)	204.21 ●	
			1	1	C.Y.	GRANULAR BACKFILL for STRUCTURES (EST.)	204.30 ●	
			1	1	SY.	DRILLING & BLASTING OF SOLID ROCK SUBGRADE (EST.)	206.10 ●	
			750	750	SY.	SCARIFYING EXISTING PAVEMENT	212.20	
	131		4189	4320	C.Y.	SUBBASE OF GRAVEL	301.15	
			730	730	TON	PLANT MIXED BASE COURSE	303.25	
	26		874	900	C.Y.	STRIPPING OF PITS	307.10	
			520	520	TON	BITUMINOUS CONCRETE PAVEMENT	406.25	
			7	7	C.Y.	CONCRETE, CLASS B	501.25	06
			550	550	LB.	REINFORCING STEEL	507.15	3
			430	430	L.F.	18" ACCGMP (.064)	601.1552	
			40	40	L.F.	24" ACCGMP (.064)	601.1572	
			124	124	L.F.	30" ACCGMP (.079)	601.1583	
						BEGIN OPTION PIPES		
			42	42	L.F.	12" ACCGMP (.064)	601.1532	
			42	42	L.F.	12" CAACP (.060)	601.2032	
			52	52	L.F.	15" CGMP (.064)	601.1792	
			52	52	L.F.	15" CAACP (.060)	601.2042	
			52	52	L.F.	15" RCP Class III	601.2613	
			1	1	EA.	12" ACCGMP ELBOW (.064)	601.5532	
			1	1	EA.	12 CAAP ELBOW (.060)	601.6032	
						END OPTION PIPES		
			3	3	EA.	METAL END SECTION FOR 18" ACCGMP (.064)	601.6222	
			1	1	EA.	METAL END SECTION FOR 30" ACCGMP (.079)	601.6243	
			1	1	EA.	PRECAST REINFORCED CONC. CURB, D.I.	604.30	
			1	1	EA.	CAST IRON GRATE W/FRAME, TYPE A	604.45	
			2	2	EA.	CAST IRON GRATE W/FRAME, TYPE B	604.46	
			970	970	L.F.	6" UNDERDRAIN (EST.)	605.101	
			120	120	L.F.	6" UNDERDRAIN CARRIER PIPE (EST.)	605.151	4
			2	2	EA.	UNDERDRAIN FLUSHING BASINS (EST.)	605.95	
			60	60	HR.	ROADWAY PATROL MAINTENANCE (EST.)	607.10	
	3		5	8	HR.	BULLDOZER RENTAL, TYPE I (EST.)	608.10	
	3		5	6	HR.	ALL PURPOSE EXCAVATOR RENTAL, TYPE I (EST.)	608.25	
	3			3	HR.	TRUCK RENTAL (EST.)	608.37	
			100	100	M/GAL.	DUST CONTROL W/WATER (EST.)	609.10	
			1	1	TON	DUST & ICE CONTROL W/CALCIUM CHLORIDE (EST.)	609.15	
	445			445	C.Y.	STONE FILL, TYPE I	613.10	
	10			10	C.Y.	STONE FILL, TYPE II	613.11	
			340	340	L.F.	TREATED TIMBER CURB	616.35	
			8	8	EA.	BOUNDARY MARKERS (EST.)	619.10	
			15	15	EA.	WOOD MARKER POSTS	619.15	
			4	4	EA.	REMOVING & RESETTING PROPERTY MARKERS (EST.)	619.20	
			600	600	L.F.	GUARD RAIL, STANDARD STEEL BEAM W/WOOD POST, TYPE II	621.28	
			4	4	EA.	ANCHOR FOR STEEL BEAM GUARD RAIL W/WOOD POSTS	621.70	
			110	110	HR.	UNIFORMED TRAFFIC OFFICERS	630.10	
			350	350	HR.	FLAGPERSONS	630.15	
			1	1	LS.	MOBILIZATION	635.10	
			850	850	L.F.	4" REFLECTORIZED WHITE LINES	646.10	
			2944	2944	L.F.	4" REFLECTORIZED YELLOW LINES	646.11	
			19	19	L.F.	24" STOP BARS	646.20	
	200			200	LB.	SEED (INCLUDES 16 lbs. WINTER RYE)	651.10	6
	1110			1110	LB.	FERTILIZER	651.15	
	5			5	TON	AGRICULTURAL LIMESTONE	651.20	
	6			6	TON	HAY MULCH	651.25	
	100			100	SY.	EROSION MATTING	654.20	4
7				7	EA.	SUGAR MAPLE (1¾"-2" Cal.) (B & B)	656.336	
			35	35	SF.	TRAFFIC SIGNS, TYPE A	675.20	01
			208	208	LB.	TRAFFIC SIGN POSTS, TYPE A	675.35	
			8	8	SF.	REMOVING SIGNS	675.51	

DETAILED SUMMARY OF QUANTITIES

QUANTITY	UNIT	ITEM
		COMMON EXCAVATION
4767	C.Y.	MAINLINE (TH #49)
337	C.Y.	BEGIN APPROACH (TH #49)
2126	C.Y.	DECEL. LANE & TAPER (U.S. 4)
146	C.Y.	DRIVES & APPROACHES
1800	C.Y.	SAND BORROW (IN CUTS)
24	C.Y.	ROUND
9200	C.Y.	TOTAL
		TRENCH EXCAVATION OF EARTH
407	C.Y.	PIPES
83	C.Y.	SPECIAL DITCHES
529	C.Y.	UNDERDRAIN (EST.)
18	C.Y.	TEST TRENCH
6	C.Y.	ROUND
1043	C.Y.	TOTAL
		SUBBASE OF GRAVEL
3116	C.Y.	MAINLINE (H304)
205	C.Y.	BEGIN APPROACH
201	C.Y.	TH #49 & US 4 INTERSECTION
363	C.Y.	DECEL. LANE & TAPER
290	C.Y.	DRIVES & APPROACHES
14	C.Y.	ROUND
4189	C.Y.	TOTAL
		PLANT MIXED BASE COURSE
554	TON	MAINLINE (H304)
43	TON	BEGIN APPROACH
61	TON	TH #49 & US 4 INTERSECTION
66	TON	DECEL. LANE & TAPER
6	TON	ROUND
730	TON	TOTAL
		BITUMINOUS CONCRETE PAV'T.
264	TON	MAINLINE PAV'T. (H304)
158	TON	MAINLINE SHOULDERS (H304)
44	TON	DECEL. LANE & TAPER
21	TON	TH #49 & US 4 INTERSECTION
29	TON	BEGIN APPROACH
4	TON	ROUND
520	TON	TOTAL
		TEMPORARY EROSION CONTROL
27	C.Y.	TRENCH EXCAVATION OF EARTH
131	C.Y.	SUBBASE OF GRAVEL
26	C.Y.	STRIPPING OF PITS
3	HR.	BULLDOZER RENTAL, TYPE I
3	HR.	ALL PURPOSE EXCAVATOR RENTAL, TYPE I
13	C.Y.	STONE FILL, TYPE I
16	LB.	SEED, WINTER RYE
1	TON	HAY MULCH
52	SY.	EROSION MATTING
3	HR.	TRUCK RENTAL

DRAINAGE STRUCTURES

STA.	STA.	POS.	ASKEW	TYPE IN / OUT	DITCH IN	DITCH OUT	24" ELBOW CPL. BAND	24" ELBOW D IN	24" ELBOW ∠	ACCGMP D IN	ACCGMP L FT.	ACCGMP TH.	MES	PREC CDI	EROS. MATTING SY.	OPTION D IN	OPTION L FT.	OPTION TH.	RCP CL.	RCP C.G. M.P. TH.	RCP C.P. TH.	DEPTH D.I.	CONC. CL. B CY.	REIN. STEEL LBS.	D.I. GRATE TYPE	TR. EXCAV. EARTH C.Y.	TR. EXCAV. ROCK C.Y.	STONE FILL C.Y.	STONE FILL TYPE	WOOD MRK'R. POSTS LT.	WOOD MRK'R. POSTS RT.	REMARKS
		TH #49																														
35+10	35+72	Lt.		RCDI /						18"	64	.064										3.5	19	158	A	41				1	1	Remove Existing Dr. Culv.
35+32		℄	38°20' R.	MES /						30"	124	.079	1-30"													104		10	II	1	1	Remove Existing 18" ACC.
35+50		Lt.																								7						Remove Existing Dr. Culvert
35+72	39+80	Lt.																										121	I			CONSTRUCT SPECIAL DITCH W/SEE I ITEM 203.15
37+50	39+90	Rt.																										74	I			CONSTRUCT SPECIAL DITCH W/SEE I ITEM 203.15
39+00	39+42	Rt.		PRCCDI /			✓	1-12"	80°					1		12"	42		064	060						7					1	
40+03	40+41	Rt. ~ Lt.		MES /	✓	✓				18"	72	.064	1-18"													71		16	I	1	1	OUTLET & OUTLET DITCHES W/SEE I TYPE I
40+75	43+60	Lt.																										84	I			CONSTRUCT SPECIAL DITCH W/SEE I ITEM 203.15
43+08		Rt.								24"	40	.064														5				1	1	Remove Existing Dr. Culv.
43+27	43+63	Rt. ~ Lt.		MES /			✓			18"	66	.064	1-18"													7				1	1	
43+64	46+20																											80	I			CONSTR. SPECIAL DITCH W/SEE I ITEM 203.15
46+17		℄	60° Lt.	MES /		✓				18"	80	.064	1-18"													21		1	I	1	1	EXISTING 18" PIPE, REMOVE CONSTR. OUTLET DITCH W/SEE I
46+30	48+25	Lt.																								83		54	I			CONST. SPECIAL DITCH W/SEE I ITEM 204.20
49+50	49+62	Rt. ~ Lt.		RCDI /		✓				18"	90	.064										3.5	19	158	B	27		1	I	1	1	CONST. OUTLET DITCH W/SEE I
49+59		℄	73° Lt.																							26						EXISTING 18" RCP REMOVE
	U.S. Route 4																															
268+75	269+12	Lt. ~ Rt.		RCDI /		✓				18"	60	.064										5.0	26	231	B	43		1	I			CONST. OUTLET DITCH W/SEE I
269+05		℄	67° Rt.																							53						EXISTING 15" RCP REMOVE
270+75	271+36	Lt.													27																	EROSION MATTING
271+65		Lt.														15"	52	III	064	060												DRIVE PIPE (IN DITCH)
271+87	272+25	Lt.													17																	EROSION MATTING
TOTALS								1-12"	80°	18"	430	.064	3-18"																	7	8	
										24"	40	.064		1	44	12"	42		064	060		6.4	547	1-A	490		432	F				
										30"	124	.079	1-30"			15"	52	III	064	060				2-B			10	II	15			

UNDERDRAIN

STA.	STA.	TYP	POS.	D	L	TE	TR	FB	MP
35+70	39+90	U	LT.	6"	420	257		1	
42+50	42+70	C	LT.	6"	66	29			
42+70	46+20	U	LT.	6"	350	143	52		
ESTIMATED		U			200	80	30	1	
		C			50	20	8		
TOTALS					1086	529	90	2	

Guard Rail, Standard Steel Beam W/Wood Posts, Type II

STA.	STA.	POS.	LENGTH	621.70 ANCHORS
39+30	42+99	Rt.	375	2
43+17	45+36	Rt.	225	2
TOTAL			600	4

Treated Timber Curb

STA.	STA.	POS.	LENGTH
39+40	42+80	Rt.	340'

Removal & Disposal of Existing Guard Rail

STA.	STA.	POS	LENGTH
268+70	269+07	Lt.	39'

LENGTH OF PROJECT

STA.	STA.	FEET	MILES	REMARKS
36+00	49+85	1385.0	0.262	EXCLUDES DECELERATION LANE ON U.S. ROUTE 4.

HARTFORD

PROJECT HES-SOS 2194(4)

SHEET 3 OF 60

D—8

EARTHWORK

V.C.	% Grade	Station	Elevation On Tangent	Elevation On V. Curves	Corr. V.C.	Dist.	Total Excavation Earth and Rock Area	Total Excavation Cu. Yds.	Area	Cu. Yds.	Embankment Area	Embankment Cu. Yds.	Base Area	Base Cu. Yds.
				TH #49										
640' V.C.	+0.4217 %	32+00	491.85											
						50								
		+50	492.06											
		+95	492.25											
		33+00	492.27	492.27	0.00									
		+50	492.48	492.69	+0.21									
		34+00	492.69	493.46	+0.77									
		+50	492.90	494.57	+1.67								C.	337
		35+00	493.12	496.04	+2.92		BUTT 43						F.	11
								155					F.FAC	1.15
													EX.C	324
		+50	493.33	497.85	+4.52		124				0			
								182	END			11		
		36+00	493.54	500.01	+6.47		73	APPROACH			12			
	+9.3271 %	+15	493.60	500.72	+7.12			139	BEGIN PROJECT			22		
								HES-SOS 2194(4)						
		+50	496.86	502.51	+5.65		77				12			
								156				13		
		37+00	501.53	505.37	+3.84		92				2			
								310				2		
		+50	506.19	508.57	-2.38		243				0			
								491					C.	2883
		38+00	510.86	512.13	+1.27		287						F.	40
								497					F.FAC	1.15
		+50	515.52	516.02	+0.50		250						EX.C	2837
								463						
		39+00	520.18	520.27	+0.09		250							
		+35	523.45	523.45	0.00			458						
		+50	524.85				245				0			
								369				3		
		40+00	529.51				153				3			
								225				14		
		+50	534.17				90				12			
170' V.C.		+65	535.57	535.57	0.00			228				31		
		41+00	538.84	538.96	+0.12		156				22			
								237				85		
	+12.6143 %	+50	543.50	544.20	+0.70		100				70			
								148				157		
		42+00	549.81	549.93	+0.12		60				100		C.	1628
													F.	1965
		+35	554.22	554.22	0.00			110				175	F.FAC	1.15
		+50	556.11				59				89		EX.F	632
								234				144		
		43+00	562.42				194				66			
								197				220		
		+50	568.73				19				172			
								110				370		
		44+00	575.04				100				228			
								102				381		
		+50	581.34				10				184			
								37				388		
		45+00	587.65				30				235			
								50				398		
		+50	593.96				24				195			
								78				308		
		46+00	600.26				60				138			
								56				267		
		+50	606.57				0				150			
												301		
		47+00	612.88								175			
												370		
		+50	619.19								225			
												456		
		48+00	625.49								267			
140' V.C.		+45	631.17	631.17	0.00							568		
						50								
		+50	631.80	631.79	-0.01						346			
						25						346		
		+75	634.95	634.53	-0.42						401			
						25						351		
		49+00	638.11	636.68	-1.43						358			
	-0.5714 %	+15	640.00	637.69	-2.31							339		
						25								
		+25	639.94	638.24	-1.70		0				375			
						25		4				242		
		+50	639.80	639.22	-0.58		9				148			
						25		27				73		
		+75	639.66	639.61	-0.05		50				10			
		CARRIED FORWARD						215				4019		
		COLUMN FOOTINGS						4726				6035		

EARTHWORK

V.C.	% Grade	Station	Elevation On Tangent	Elevation On V. Curves	Corr. V.C.	Dist.	Total Excavation Earth and Rock Area	Total Excavation Cu. Yds.	Rock Area	Rock Cu. Yds.	Embankment Area	Embankment Cu. Yds.	Base Area	Base Cu. Yds.
	-0.5714 %	49+75	639.66	639.61	-0.05		50				10		C.	256
						10		41	END PROJ.			2	F.	4021
													F.FAC	1.15
		+85	639.60	639.60	0.00		170 BUTT		HES-SOS 2194(4)		0		EX.F	4368
		TH #49 Sta. 50+00.00 = ℄ POC 269+20.00												
							U.S. ROUTE 4							
	+4.0347 %	269+72.5	641.72				BUTT 21		BEGIN DECEL. LANE		0		BUTT 29	
						27.5		22				2		31
		270+00	642.83				23				4		31	
						50		32				15		57
		+50	644.85				12				12		31	
						50		27				14		57
		271+00	646.86				17				3		31	
		+42.5	648.58		271+42.5		END DECEL. LANE - BEGIN TAPER							
						50		131				3		57
		+50	648.83				124				0		31	
		+62.6 = 62.2	649.39											
						504		245						54
		272+00	650.92	650.92	0.00		138						27	
						50		399						45
		+50	652.93	652.80	-0.13		293		0				22	
						50		563		8				33
		273+00	654.95	654.42	-0.53		315		9				14	
						50		636		55				24
		+50	656.97	655.78	-1.19		372		50				12	
						22.5		155		21				5
		+72.5	657.87	656.30	-1.57		0		0				0	
		274+00	658.98	656.87	-2.11									
		+50	661.00	657.70	-3.30									
											C.	2210		
											R	84		
											F.	34		
											R.FAC	0.495		
											F.FAC	1.15		
											EX.C	2212		
											SB	363		
		CARRIED FORWARD												
		COLUMN FOOTINGS						2251		84		36		363

EARTHWORK SUMMARY

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

SUMMARY OF BALANCES

Station to Station	Total Excav. Earth & Rock Cubic Yards	Rock Excav. Cubic Yards	Embankment Cubic Yards	Excesses Cut	Excesses Fill	Accumulative Excesses Cut	Accumulative Excesses Fill		Base Cubic Yards
TH # 49									
36+00 – 40+00	2883	0	40	2837					
						2837			
40+00 – 45+00	1628	0	1965		632				
						2205			
45+00 – 49+85	256	0	4021		4368				
							2163		
SUB-TOTAL	4767		6026				2163		
BEGIN APPROACH	337	0	11	324					
							1839		
DECEL. LANE & TAPER	2210	84	34	2212					
						373			
TH #201 APPROACH	49	0	58		18				
						355			
TH #224 APPROACH	17	0	16		1				
						354			
DRIVES	80	0	146		88				
						266			
TOTAL	7460	84	6291						

SUMMARY BY COLUMNS

Sheet No.	Col. No.	Excavation Total Cu. Yds.	Excavation Rock Cu. Yds.	Embankment Cubic Yards		Base Cubic Yards

REMARKS

EARTH AND ROCK EXCAVATION	7460
SOLID ROCK EXCAVATION	84
EARTH EXCAVATION	7376
PLANIMETERED FILL	6291
LESS FACTORED SOLID ROCK (TO BE USED IN ROCK FILL AREA)	
LESS DISPLACEMENT OF ANY LARGE STRUCTURES	
NET PLANIMETERED FILL	6291
FACTOR (0.15)	944
PLANIMETERED FILL INCLUDING FACTOR	7235
MATERIALS AVAILABLE FOR FILLS	
EARTH EXCAVATION	7376
CHANNEL EXCAVATION	—
UNDERDRAIN EXCAVATION	450
STRUCTURE EXCAVATION	—
TOTAL MATERIAL AVAILABLE FOR FILL	7826
TOTAL FILL INCLUDING FACTOR	7235
TOTAL MATERIAL FOR FILL	7826
~~BORROW~~ EXCESS EXCAVATION	591
ROCK FILL	1200
LESS FACTORED ROCK (1.3)	109
ROCK BORROW	1091

PROJECT HARTFORD

PROJECT HES-SOS NO. 2194(4)

SHEET 4 OF 60 SHEETS

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS
RIGHT-OF-WAY PLANS
DETAIL SHEET

TABLE OF PROJECT PROPERTY ACQUISITION

PARCEL NO.	GRANTOR	SHEET NO.	BEGINNING STATION	ENDING STATION	TAKING	REM.	RIGHTS	TITLE TAKEN	DATE	TOWN OR CITY RECORDED	BK.	PG.	REMARKS
1	MALETTE, WILFRED E. & MARION C.	4	34+82 LT. 35+10 LT. 35+10 LT.	35+08 LT. 35+18 LT.	NONE	N/A	CULVERT (P) CULVERT (P) DRAINAGE (P)	WDOE					
2A	GUECHEE LAKES CORP.	4	35+68 LT. 37+75 LT.	39+85 LT. 39+65 LT.	0.24 A±	N/A	CONST. EASE.(T) 0.01 A±	WDOE	6-13-80	HARTFORD	90	375-77	620 S.F.±
B		4	35+75 RT. 39+85 RT. 39+95 RT.	40+00 RT. 39+95 RT.	0.24 A±	N/A	DITCH (P) DRAINAGE (P)	WDOE					
C		4	39+73 LT.	40+44 LT.	0.04 A±	N/A		WDOE					1710 S.F.±
D		4	40+66 LT. 42+55 LT. 42+80 LT. 43+63 LT.	45+67 LT. 44+40 LT. 43+28 LT. 44+22 LT. TOTAL	0.22 A± 0.74 A±	N/A	CONST. EASE.(T) 0.04 A± SLOPE (T) SLOPE (T)	WDOE					1700 S.F.± 175 S.F.± 364 S.F.±
3	DELETED												FORMERLY PRESCOTT, KENNETH J. & KATHERINE H.
4	ATWOOD, ALBERT C.	4	39+95 RT. 41+88 RT. 43+10 RT. 43+65 RT. 40+00 RT.	US4 268+80 LT. 42+60 RT. 45+93 RT. 48+00 RT.	0.55 A±	3.00 A±	CONST. EASE.(T) DRIVE (T) CONST. EASE.(T) 0.03 A±	WDOE	6-26-79	HARTFORD	87	374/5	300 S.F.± 1450 S.F.±
5	ALMEIDA, ALMERICO , & TAWA, ELIE	4	40+26 LT. 40+25 LT. 42+83 LT.	42+33 LT. 40+76 LT. 43+07 LT.	0.07 A±	6.30 A±	CONST. EASE.(T) CONST. EASE.(T)	WDOE	7-23-79	HARTFORD	87	503/4	2992 S.F.± 340 S.F.± 48 S.F.±
6	VAUGHN, DONALD G. & JOSEPHINE M.	4,6	45+20 LT. 47+33 LT. US4 271+68 LT.	US4 269+67 LT. 48+35 LT. US4 272+62 LT.	0.45 A±		CONST. EASE.(T) DRIVE (T)	WDOE					350 S.F.± 16' GRAVEL DRIVE M.P. 5.14 DRIVE RELEASE DATE DRIVE PERMIT DATE
			US4 270+77 RT. 45+67 LT.	US4 270+99 LT. US4 269+67 LT.		9.35 A±	ALL R.T. & I						UNUSED WATERLINE
7	CENTRAL VT. PUBLIC SERVICE CORP.												
8	NEW ENGLAND TEL. & TEL.												

TABLE OF REVISIONS

REVISION NO.	SHEET NO.	DESCRIPTION OF REVISION	DATE	MADE BY	APPROVED BY
1	3, 4	PARCEL #3 DELETED PER C.O. #4227	3-2-79	D.O.N.	T.P.M.
2	4	PARCEL #1 MALETTE. CORRECTED LOCATION OF SPRING, WATER LINE, SEPTIC TANK, DRY WELL & SEWER LINE PER C.O. #4304	4-5-79	S.J.B.	T.P.M.
3	4	PARCEL #2A, PRESCOTT: ADDED 7 SUGAR MAPLES & PLANTING DATA PER REVISED DESIGN & C.O. #4310.	4-30-79	S.J.B.	T.P.M.
4	3,4,6	PARCEL #6 VAUGHN, CHANGE OF TITLE PER C.O. #4440 PLANS SENT TO DESIGN 2-23-84	7-6-79	D.O.N.	W.E.B.

MADE BY: J.D. PATERSON DATE FEB. 12, 1979

CHECKED BY: W.S. BRUZZESE DATE FEB. 12, 1979

DR. RT. — DRAINAGE RIGHT
DIT. RT. — DITCHING RIGHT
CH. RT. — CHANNEL RIGHT
DRIVE RT. — DRIVE RIGHT
CUL. RT. — CULVERT RIGHT
(D) — DEMOLITION OR REMOVAL
[W] — WATER SOURCES

PRESENT R.O.W.
TAKING WITHOUT ACCESS
TAKING WITHOUT ACCESS ALONG PROPERTY LINES
TAKING WITH ACCESS
(P) PERMANENT EASEMENT
(T) TEMPORARY EASEMENT

LEGEND
CONST. EASE. — CONST. EASEMENT
SR — SR — SLOPE RIGHTS
P/L — P/L — PROPERTY LINE
TOP OF CUT
TOE OF SLOPE

APPROVED Thomas P. Mayo CHIEF OF PLANS & TITLES DATE 2-26-79

PROJECT HARTFORD
NO. SOS 2194 (4)
SHEET 3 OF 6
7 60

ROW

CONSTRUCT DRIVE
Lt 40+15
Rt 43+10
49+50

CONSTRUCT APPROACH
Lt 35+50 (24' wide)
Rt 35+50 (24' wide)

STANDARD STEEL BEAM GUARD RAIL W/ WOOD POSTS, TYPE II
Rt 40+35 - 43+0
43+20 - 45+35

BM#1
SIR 24"M
Asmd Elev 500.0

BM#2
SIT 12"P
Asmd Elev 543.94

BM#3
SIR 30"M
Asmd Elev. 593.42

BM#4
SIT 18" Butt
Asmd Elev 629.94

TH 49 Curve#3
Δ 1°47' Lt
D 1°00
R 5729.58
T 89.17
L 178.33
E 0.69

TH 49 Curve#2
Δ 10° 32' Lt
D 6°00
R 954.93
T 88.02
L 175.56
E 4.4

TH 49 CURVE #4
Δ 78°37' Rt
D 76.394373
R 75.00
T 61.40
L 102.91
E 21.9

PI 39+59.44
39+35.98

STA 36+00
Construct Satisfactory Approach
Begin Project SOS 2194(4)

PI 49+19.9
49+00.0

PI 46+82.12
46+82.1

PI 44+30.49
44+30.00

PI 41+85.59

PC 43+42.47

PC 47+71.2

PC 37+09.85

PT 47+71.2

PT 41+85.59

US4 P.O.C 269+20
SL POT 50+00.00

Sta 49+85
End Project SOS 2194(4)

ALMEIDA, ALMERICO & TAWA, ELIE

ALMEIDA & TAWA
QUECHEE LAKES CORP.

QUECHEE LAKES CORP.
VAUGHN

VAUGHN, DONALD G. & JOSEPHINE M.

PRESCOTT, KENNETH J. & KATHERINE H.

QUECHEE LAKES CORP.

ATWOOD, ALBERT C.

BRIDGMAN FURNITURE INC.

HERDIC, JOHN D. & CAROL W.

NALETTE, WILFRED E. & MARION C.

TOWN OF HARTFORD

ATWOOD

ST. OF VT.

TO HARTFORD

TO WOODSTOCK

TO QUECHEE VILL.

HARD ROAD

TICKENOR ROAD

PRIVATE ROAD

DRIVE RT. (T)

CONST. EASE. (T)

SPRING

H.O.

Sugar Maple (7) (1¾"-2"Cal) (B&B)

Sugar Maple (1¾"-2"Cal) (B&B)
35+90 - 39+75 Lt - 7

CONSTRUCT SPECIAL DITCH W/STONE FILL, TYPE I
Lt
35+72 - 39+80
40+75 - 43+60
45+64 - 46+20
46+30 - 48+25
Rt
37+50 - 39+90

All existing pavement within 2 feet of the subgrade shall be removed under Item 203.15

Drives are to be constructed with a minimum width of 14 feet and a flare radius of at least 20 feet or as directed by the Resident Engineer.

(000) = 1998 DDHV

Woodstock (OR) (610) (570) (625)
US 4 (510) (450) (495) White River Jct.
(55) (65) (55)

0 50 100
Scale in Feet

BEGIN R.O.W. PROJECT SOS 2194(4)
STA. T.H. 49 34+75 CL

THIS SHEET TO BE USED FOR R.O.W. INFORMATION ONLY

R.O.W. PLANS

Landscape

HARTFORD
SOS 2194(4)

Surveyed by Fontoni 4/78
Drawn by Brunelle 4/78
Traced by Brunelle 4/78

SHEET 4 OF 6

REMOVAL & DISPOSAL OF EXISTING GUARD RAIL

EROSION MATTING

DRIVE RT. (T)

VAUGHN, DONALD G. & JOSEPHINE M.

US 4 Curve #2
L 14.72'
D 3 30
R 1637.02
T 2015
L 4010
S 12 4

US 4 Curve #3
(PI N.I Sta)
D 4°00

US 4 Curve #1
Δ 15° 26
D 4
R 1432.69
T 194.1
L 385.8
E 13.1

VAUGHN

P L

ST. OF VT.

TO WOODSTOCK

TO WHITE RIVER

MATCH LINE

SHEET 4

Existing ROW

U.S. 4

END R.O.W. PROJECT SOS 2194(4)
STA. U.S.4 273+00 CL

PI 269+70
269+68.5

PI 274+00
274+22.0

S/M = 2

4'-0" 12'-0" 4'-0"

1½" B.T. Conc. Pvt.
3" Plant Mixed Base Course
15" Subbase of Gravel

US 4 Decal Lane
Typical Section
(Bank Varies

THIS SHEET TO BE USED
FOR R.O.W. INFORMATION ONLY

R.O.W. PLANS
HARTFORD
SOS 2194(4)
US Rout. 4
SHEET 6 OF 6
9 of 60

PLATE 1, PLAN-PROFILE

CONSTRUCT DRIVE

Lt: 40+15 (16' Wide); 49+50 (14' Wide)

Rt: 43+08 (18' Wide)

CONSTRUCT APPROACH

Lt: 35+50 (24' wide)

Rt: 35+50 (24' wide)

STANDARD STEEL BEAM GUARD RAIL W/ WOOD POSTS, TYPE II

Rt: 39+30 ~ 42+99; 43+17 ~ 45+36

TREATED TIMBER CURB

Rt: 39+40 ~ 42+80

REMOVING SIGNS

Lt: 49+70 (Approx)

Rt: 49+70 (Approx.)

4" REFLECTORIZED YELLOW LINES

℄ 35+00, Match Existing ~ 49+72, (DBL)

TRAFFIC SIGNS, TYPE A

Lt	Rt
~~48+75~~	~~45+00~~
~~49+25~~	~~49+70~~

TRAFFIC SIGN POSTS, TYPE A

Lt	Rt
~~48+75~~	~~45+00~~
~~49+25~~	~~49+70~~

STA 36+00

Construct Satisfactory Approach

Begin Project HES-SOS 2194(4)

BM#1
SIR 24"11
Asmd Elav 500.0

BM#2
SIT 12"P
Asmd Elav 543.94

BM#3
SIR 30"M
Asmd Elav 593.42

BM#4
SIT 18"Butt
Asmd Elav 629.94

PI 39+59.44
39+35.98

PI 44+30.49
44+30.00

PI 46+82.12
46+82.1

PI 49+19.9
49+00.0

TH 49 Curve#1
Δ 42°49'Rt
D 9°00'
R 636.62
T 249.59
L 475.74
E 47.18
Bank 0.066 FT/FT.

TH 49 Curve#2
Δ 10°32'Lt
D 6°00'
R 954.93
T 88.02
L 175.56
E 4.4
Bank 0.052 FT/FT.

TH 49 Curve#3
Δ 1°47' Lt
D 1°00'
R 5729.58
T 89.17
L 178.38
E 0.69

TH 49 CURVE #4
Δ 78°37' Rt
D 76.39+373
R 75.00
T 61.40
L 102.91
E 21.9

All Existing Pavement Within 2 Feet Of Subgrade Shall Be Broken Up And Removed, Maximum Allowable Dimension Will Be 8 Inches. Payment For This Removal Will Be Under The Bid Price For Item 203.15

CONSTRUCT SPECIAL DITCH W/STONE FILL, TYPE I (ITEM 203.15)

Lt	Rt
35+72 ~ 39+80	37+50 ~ 39+90
40+75 ~ 43+60	
45+64 ~ 46+20	

ROCK FILL

40+75 Rt ~ 43+75 Rt

CONSTRUCT SPECIAL DITCH W/STONE FILL, TYPE I (ITEM 204.20)

Lt: 46+30 ~ 48+25

SCARIFYING EXISTING PAVEMENT

43+35 ~ 43+75

46+75 ~ 49+15

Woodstock (610) (570) (625); US 4 (500) (450) (495) White River Jct; (000) (085) (095) (105) (055) (065)

(000) = 1998 DDHV

0 50 100
Scale in Feet

Sta 49+85
End Project HES-SOS 2194(4)

HARTFORD
HES-SOS 2194(4)

Surveyed by Fratoni 4/18
Drawn by Brunelle 4/18
Traced by Brunelle 4/18.

PROFILE
SURVEYED
NOTE BOOK
No.
PLOTTED
CHECKED
BY
DATE
REVISIONS CHECKED

+0.5714

49+15
140' VC
640.00
K = 11

269+20.00 = 50+00.00

US Route 4
TH 49

Sta. 49+85
End Project HES-SOS 2194(4).

+12.643%

42 × 30 Lt. ~ 46+20 Lt.
New 15" ϕ
SP FB @ 46+20 Lt.
350' Underdrain

TH # 49

640
630
620
610
600
590
580
570

44 45 46 47 48 49 50

41+50
170' VC
543.50
K = 52

+12.643%

For Underdrain note, see above profile

Construct Satisfactory Approach

36+00
Begin Project HES-SOS 2194(4)

36+15
640' VC
493.60
K = 72

+9.327%

35+70 ~ 39+90 Lt.
New 6" ϕ
WFB @ 39+90 Lt.
420' Underdrain

+0.427%

570
560
550
540
530
520
510
500
490

32 33 34 35 36 37 38 39 40 41 42 43 44

Scale: 1" = 50' Horiz.
1" = 10' Vert.

HARTFORD
HES-SOS 2194(4)
TH # 49

Sheet VI of 60

PLATE I PLAN-PROFILE

REMOVAL & DISPOSAL OF EXISTING GUARD RAIL
Lt
268+70 ~ 269+07

24" STOP BAR
T.H. 49 49+71, ℄ ~ 14' Rt.

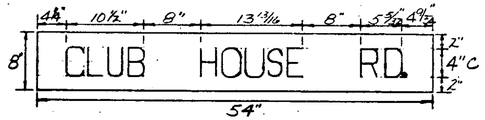
TRAFFIC SIGNS, TYPE A
Lt
269+65, (2)
271+40

TRAFFIC SIGN POSTS, TYPE A
Lt
269+65
271+40

4" REFLECTORIZED WHITE LINES
Lt
268+85, 14' Lt. ~ 269+10, 45' Lt. (30' R)
269+45, 23' Lt. ~ 269+73, 15' Lt. (50' R)
269+73 ~ 271+65, 15' Lt.
269+30, 60' Lt. ~ 269+73, 27' Lt. (50' R)
Rt.
269+73 ~ 271+65, 27' Lt.
271+65, 27' Lt. ~ 272+15, 25' Lt.
272+15, 25' Lt. ~ 272+75, 14' Lt.
272+75, 14' Lt. ~ 274+00, 12' Lt.
274+00 ~ 275+00, 12' Lt.

EROSION MATTING
Lt
270+75 ~ 271+36
271+87 ~ 272+25

CONSTRUCT DRIVE
Lt
271+65



US 4 Curve #3
(PI Not Sat)
D 4°00

See Standard Sheet E-17 for Materials and Colors

US 4 Curve #2
Δ 14°02'
D 3°30'
R 1637.02
T 201.5
L 401.0
E 12.4

US 4 Curve #1
Δ 15° 26'
D 4° 00'
R 1432.40
T 194.1
L 385.8
E 13.1

2 signs back to back
CLUB HOUSE RD.
54"x8"
1-2½" Gal. post

30"x30"
RIGHT LANE MUST TURN RIGHT
1-2½" Gal. post

PI 269+70.9
269+68.5

271+49.25 End Decel/Lane Begin Taper
271+65 Lt New 15'x52' Drive Apr. Option
273+72.5 End Taper
PCC 276+63.5

Existing ROW

N52°00'E
N67°26'E
N53°24'E

℄ POT 50+00.0
US 4 POC 269+20.0

PC 267+76.8
PT 271+62.6
271+62.2
Lp 0.4'
PC 274+62.5

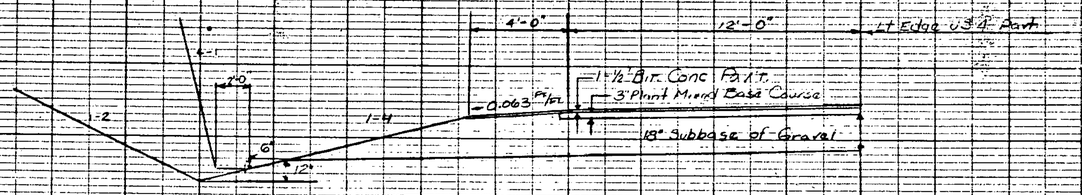
PI 274+62.0
274+62.0

BM #5
15" M S.R.
Assmd Elev 654.10

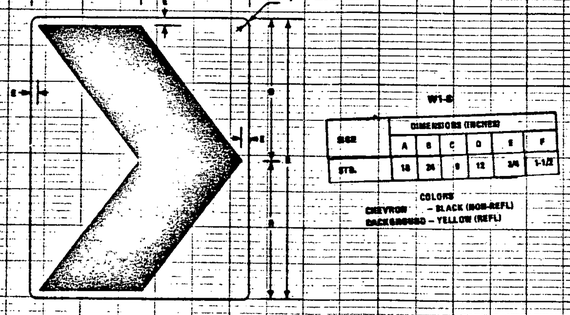
LEGAL LOAD LIMIT 24,000 POUNDS
24" X 24"

Legend - Black (Non-Refl.)
Background - White (Refl.)
For Materials see Standard Sheet E-17.

Note: Any conflicting old pavement markings shall be removed. Payment shall be subsidiary to other contract items. The final sign post lengths shall be determined in the field by the Resident Engineer.



US 4 Decal Lane
Typical Section
(Bank Varies)



HARTFORD
HES-SOS 2194(4)
US Route 4

US Route 4 269+20.00 ± 50+00.00
TH 49

PLATE 1. PLAN-PROFILE
KEUFFEL & ESSER CO.
46 7024 MADE IN U.S.A.

CONSTRUCT DRIVE

Lt	Rt
49+50	43+10

CONSTRUCT APPROACH

Lt	Rt
35+50 (24' wide)	35+50 (24' wide)

STANDARD STEEL BEAM GUARD RAIL W/ WOOD POSTS, TYPE II

Rt
40+35 - 43+0
43+20 - 45+35

BM #3
SIR 30"M
Asmd Elev 593.42

BM #4
SIT 18" Butt
Asmd Elev 629.94

BM #2
SIT 12"P
Asmd Elev 543.94

TH 49 Curve #3
Δ 1°41' Lt
D 1°00
R 5729.58
T 89.17
L 178.33
E 0.69

TH 49 Curve #2
Δ 10° 32' Lt
D 6°00
R 954.93
T 88.02
L 175.56
E 1.4

PI 49+19.9±
49+00.0

PC 48+58.5

PT 47+77.27

PC 45+42.47

PT 45+19.22

PC 45+92.97

PI 39+59.44
39+35.98

STA 36+00
Construct Satisfactory Approach

Begin Project OS 2194(4)

PI 46+82.12±
46+82.1

PI 44+30.49±
44+30.00

48+00
50' RT.

35+75
50' RT.

SUGAR MAPLE (7)
(1¾"-2"Cal)(B&B)

BM #1
SIR-4"M
Asmd Elev 600.0

TH 49 Curve #1
Δ 42°43' Rt
D 9°00'
R 636.62
T 249.59
L 475.74
E 47.15

CONSTRUCT SPECIAL DITCH W/STONE FILL, TYPE I

Lt	Rt
35+72 - 39+80	37+50 - 39+90
40+75 - 43+60	
45+64 - 46+20	
46+30 - 48+25	

All existing pavement within 2 feet of Subgrade shall be removed under item 203.15.

Drives are to be constructed with a minimum width of at least 14 feet and a fillet radius of at least 20 feet or as directed by the Resident Engineer.

Sugar Maple (1¾"-2"Cal) (B&B)
35+90 - 39+75 Lt - 7

TH 49 CURVE #4
Δ 78°37' Rt
D 76.394373
R 75.00
T 61.40
L 102.91
E 21.9

(000) = 1998 DDHV

Scale in Feet

Sta 49+85
End Project OS 2194(4)

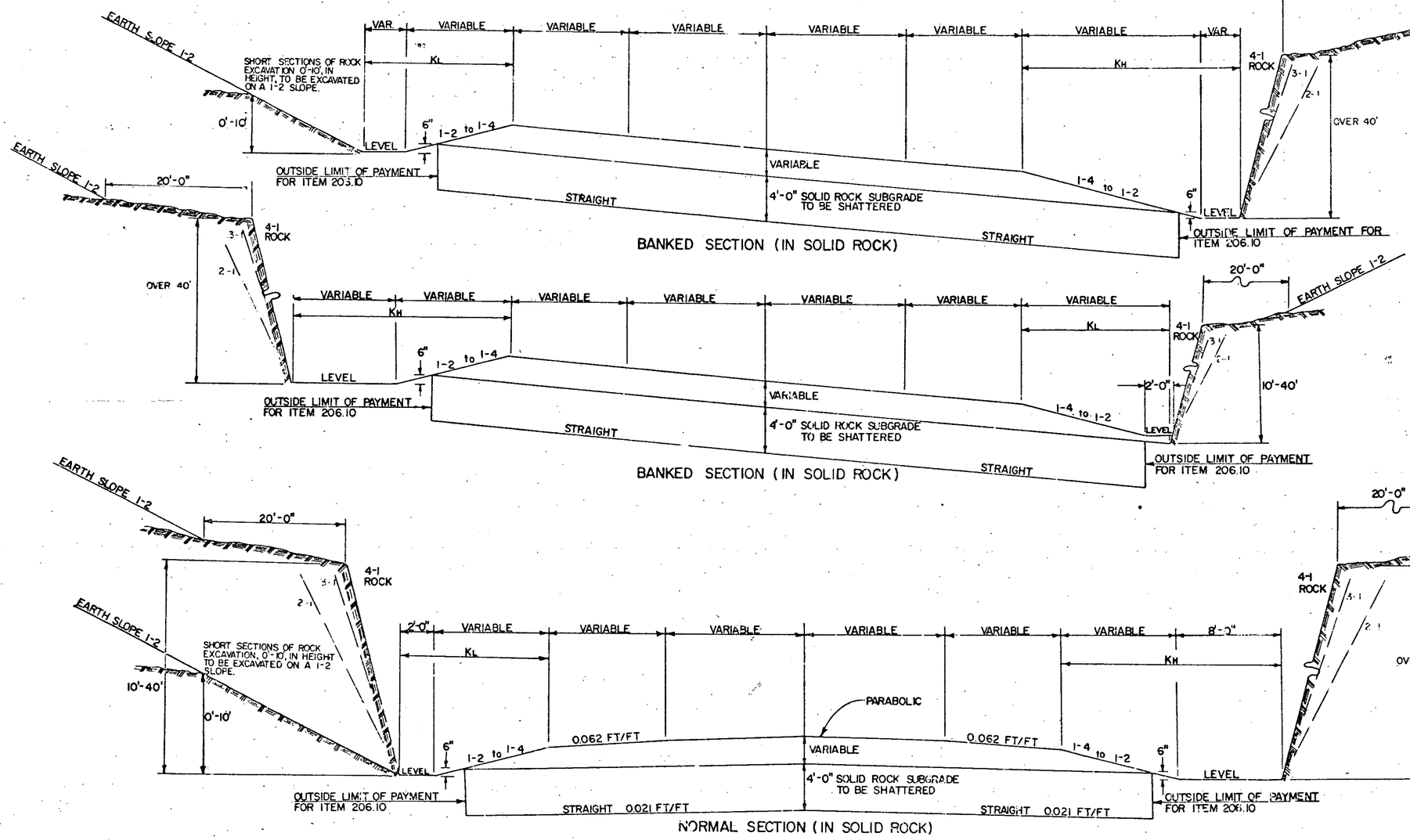
Landscape

HARTFORD
OS 2194(4)

Surveyed by Fontana 4/78
Drawn by Brunelle 4/78
Traced by Brunelle 4/78

TYPICALS FOR SLOPES IN SOLID ROCK EXCAVATION

THIS STANDARD TO BE USED IN AREAS OF LOW VOLUME TRAFFIC (ADT LESS THAN 400 V.P.D.)



THE CONTRACTOR SHOULD USE CARE IN BLASTING SOLID ROCK, SO THAT NO OVERHANGING LEDGE WILL RESULT. ANY OVERHANGING LEDGE OUTSIDE THE NEAT LINE SHALL BE REMOVED AT THE CONTRACTORS EXPENSE.

FOR ROADWAY DETAILS INSIDE BACK OF DITCH SEE STANDARD TYPICAL FOR PARTICULAR CLASS OF ROADWAY INVOLVED.

TEST TRENCHES WILL BE EXCAVATED AS ORDERED BY THE ENGINEER TO ASSURE REQUIRED RESULTS ARE BEING OBTAINED ACCORDING TO SECTION 206. TEST TRENCHES TO BE PAID AS TRENCH EXCAVATION OF EARTH, ITEM 204.20.

THE DISTANCE BETWEEN SHOULDER POINT AND FACE OF SOLID ROCK SLOPE (KL IN ROCK CUTS BELOW 40 FEET, KH IN ROCK CUTS ABOVE 40 FEET) IS DETERMINED BY DITCHES, 6" BELOW SUBGRADE ON NORMAL SECTION, WHICH ARE 2 FEET WIDE IN ROCK CUTS OF LESS THAN 40 FEET AND 8 FEET WIDE IN ROCK CUTS OVER 40 FEET IN ANY ONE ROCK CUT AREA. THE DISTANCE BETWEEN SHOULDER POINT AND FACE OF SOLID ROCK SLOPE REMAINS CONSTANT IN A BANKED OR A NORMAL SECTION BY VARYING THE WIDTH OF THE DITCH.

SELECTION OF APPROPRIATE ROCK SLOPE TO BE DETERMINED FOR EACH ROCK EXCAVATION LOCATION.

REVISIONS AND CORRECTIONS

APRIL 20, 1973 BENCHES REMOVED AND VARIABLE SLOPES ADDED
AUGUST 26, 1981 CHANGED CRITERION FOR USE OF STANDARD FROM LOW SPEED CONDITION TO LOW VOLUME CONDITION.

APPROVED:

DATE: Dec. 8, 1971

R. H. Arnold
CHIEF ENGINEER

E. H. Chickering
ASST. CHIEF ENGINEER

L. M. Lane
HIGHWAY ENGINEER

STANDARD TYPICAL FOR SLOPES IN SOLID ROCK EXCAVATION

DRILLING AND BLASTING OF SOLID ROCK SUBGRADE

VERMONT AGENCY OF TRANSPORTATION

STANDARD

A-61

DEGREE OF CURVE	RADIUS	V = 30 M.P.H.			V = 40 M.P.H.			V = 50 M.P.H.			V = 60 M.P.H.			V = 65 M.P.H.			V = 70 M.P.H.			V = 75 M.P.H.			V = 80 M.P.H.		
		e	L - FEET		e	L - FEET		e	L - FEET		e	L - FEET		e	L - FEET		e	L - FEET		e	L - FEET		e	L - FEET	
			2 LANE	4 LANE		2 LANE	4 LANE		2 LANE	4 LANE		2 LANE	4 LANE		2 LANE	4 LANE		2 LANE	4 LANE		2 LANE	4 LANE		2 LANE	4 LANE
0° 15'	22918'	NC	0	0	NC	0	0	NC	0	0	NC	0	0	NC	0	0	NC	0	0	NC	0	0	RC	240	240
0° 30'	11459'	NC	0	0	NC	0	0	NC	0	0	RC	175	175	RC	190	190	RC	200	200	.022	220	220	.024	240	240
0° 45'	7639'	NC	0	0	NC	0	0	RC	150	150	.022	175	175	.025	190	190	.029	200	200	.032	220	220	.036	240	240
1° 00'	5730'	NC	0	0	RC	125	125	.021	150	150	.029	175	175	.033	190	190	.036	200	200	.043	220	220	.047	240	240
1° 30'	3820'	RC	100	100	.021	125	125	.030	150	150	.040	175	175	.046	190	200	.053	200	240	.060	220	290	.065	240	320
2° 00'	2865'	RC	100	100	.027	125	125	.038	150	150	.051	175	210	.057	190	250	.065	200	290	.072	230	340	.076	250	380
2° 30'	2292'	.021	100	100	.033	125	125	.046	150	170	.060	175	240	.066	190	290	.073	220	330	.078	250	370	.080	260	400
3° 00'	1910'	.025	100	100	.038	125	125	.053	150	190	.067	180	270	.073	210	320	.078	230	350	.080	250	380	.080	260	400
3° 30'	1637'	.028	100	100	.043	125	140	.058	150	210	.073	200	300	.077	220	330	.080	240	360	.080	250	380	D MAX. = 2.5°		
4° 00'	1432'	.032	100	100	.047	125	150	.063	150	230	.077	210	310	.079	230	340	.080	240	360	D MAX. = 3.0°					
5° 00'	1146'	.038	100	100	.055	125	170	.071	170	260	.080	220	320	.080	230	350	D MAX. = 3.5°								
6° 00'	955'	.043	100	120	.061	130	190	.077	180	280	.080	220	320	D MAX. = 4.5°											
7° 00'	819'	.048	100	130	.067	140	210	.079	190	280	D MAX. = 5.0°														
8° 00'	716'	.052	100	140	.071	150	220	.080	190	290															
9° 00'	637'	.056	100	150	.075	160	240	D MAX. = 7.5°																	
10° 00'	573'	.059	110	160	.077	160	240																		
11° 00'	521'	.063	110	170	.079	170	250																		
12° 00'	477'	.066	120	180	.080	170	250																		
13° 00'	441'	.068	120	180	.080	170	250																		
14° 00'	409'	.070	130	190	D MAX. = 12.5°																				
16° 00'	358'	.074	130	200																					
18° 00	318'	.077	140	210																					
20° 00'	286'	.079	140	210																					
22° 00'	260'	.080	140	220																					
		.080	140	220																					
		D MAX. = 23.0°																							

V - ASSUMED DESIGN SPEED

e - RATE OF SUPERELEVATION

L - MINIMUM LENGTH OF RUNOFF OF SPIRAL CURVE

NC - NORMAL CROWN SECTION

RC - REMOVE ADVERSE CROWN, SUPERELEVATE AT NORMAL CROWN SLOPE

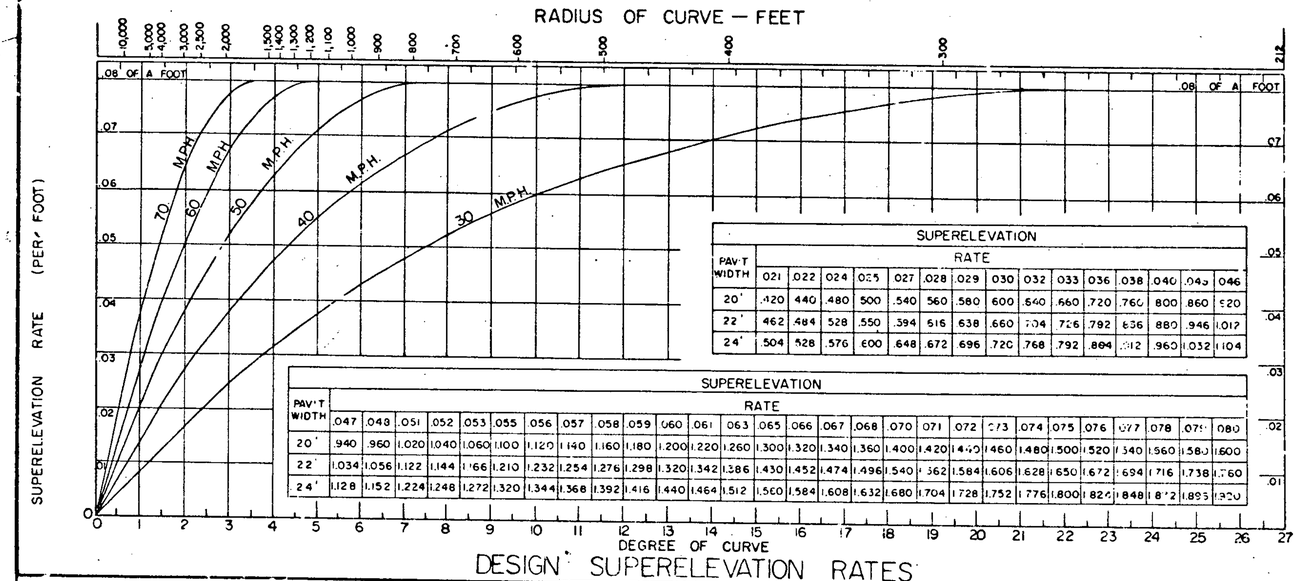
SPIRALS DESIRABLE BUT NOT AS ESSENTIAL ABOVE HEAVY LINE

LENGTHS ROUNDED IN MULTIPLES OF 25 OR 50 FEET PERMIT SIMPLER CALCULATIONS

LENGTH OF RUNOFF FOR A 4 LANE HIGHWAY IS BASED ON A ROADWAY WITH 16 FEET OR LESS MEDIAN

BANKING FOR CURVES NOT LISTED IN TABLES MAY BE DETERMINED FROM GRAPH.

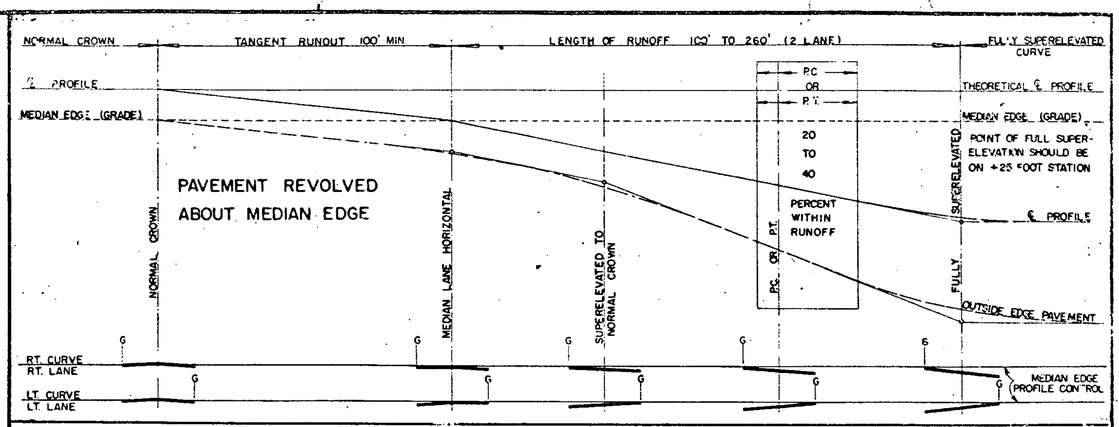
DESIGN VALUES FOR RATE OF SUPERELEVATION AND MINIMUM LENGTH OF RUNOFF

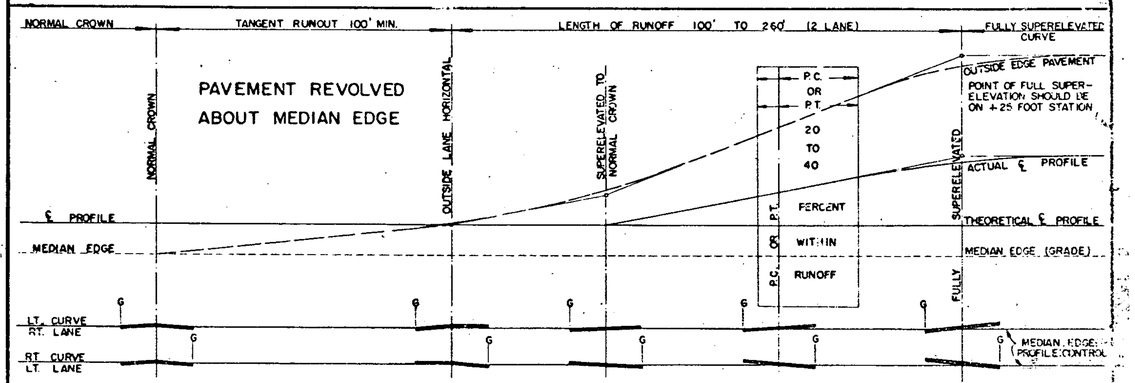


PAVT WIDTH	SUPERELEVATION RATE																								
	.021	.022	.024	.025	.027	.028	.029	.030	.032	.033	.036	.038	.040	.042	.046										
20'	.420	.440	.480	.500	.540	.560	.580	.600	.640	.660	.720	.760	.800	.860	.920										
22'	.462	.484	.528	.550	.594	.616	.638	.660	.704	.726	.792	.836	.880	.946	1.012										
24'	.504	.528	.576	.600	.648	.672	.696	.720	.768	.792	.864	.912	.960	1.032	1.104										

PAVT WIDTH	SUPERELEVATION RATE																								
	.047	.048	.051	.052	.053	.055	.056	.057	.058	.059	.060	.061	.063	.065	.066	.067	.068	.070	.071	.072	.073	.074	.075	.076	.077	.078	.079	.080
20'	.940	.960	1.020	1.040	1.060	1.100	1.120	1.140	1.160	1.180	1.200	1.220	1.260	1.300	1.320	1.340	1.360	1.400	1.420	1.440	1.460	1.480	1.500	1.520	1.540	1.560	1.580	1.600
22'	1.034	1.056	1.122	1.144	1.166	1.210	1.232	1.254	1.276	1.298	1.320	1.342	1.386	1.430	1.452	1.474	1.496	1.540	1.562	1.584	1.606	1.628	1.650	1.672	1.694	1.716	1.738	1.760
24'	1.128	1.152	1.224	1.248	1.272	1.320	1.344	1.368	1.392	1.416	1.440	1.464	1.512	1.560	1.584	1.608	1.632	1.680	1.704	1.728	1.752	1.776	1.800	1.824	1.848	1.872	1.895	1.920

DESIGN SUPERELEVATION RATES



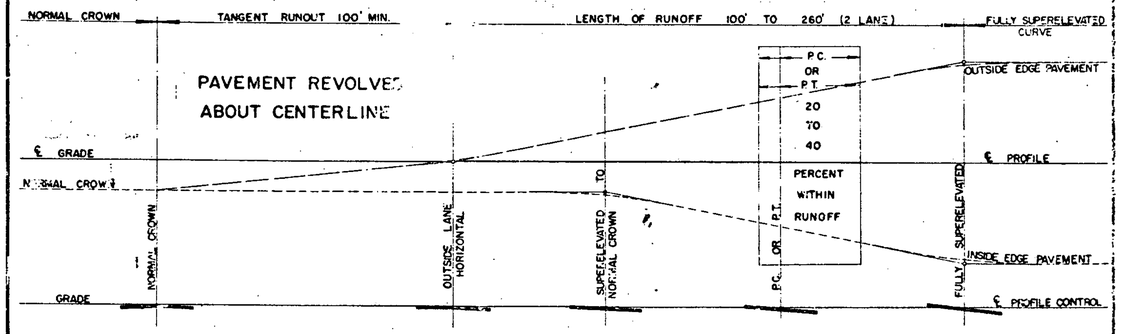


TANGENT RUNOUT: CONSISTS OF MAKING THE LANE OR LANES ON THE OUTSIDE OF THE CURVE, HORIZONTAL WITH THE CENTERLINE, USING 100' MIN. WHERE THE NORMAL CROWN IS APPROXIMATELY 1/4 INCH PER FOOT.

LENGTH OF RUNOFF: FROM 60 TO 80 PERCENT OF THE LENGTH OF RUNOFF PREFERABLY SHOULD BE LOCATED ON THE TANGENT AT CURVES.

CURVES WITH SPIRALS: THE LENGTH OF THE SPIRAL AND THE LENGTH OF RUNOFF ARE THE SAME IN DISTANCE. BREAKS IN PROFILES FOR PAVEMENT EDGES SHOULD BE ROUNDED IN FINAL DESIGN BY INSERTION OF VERTICAL CURVES. THE MINIMUM VERTICAL CURVE LENGTH IN FEET CAN BE USED NUMERICALLY EQUAL TO THE DESIGN SPEED IN M.P.H.

G DENOTES WHERE GRADE IS CARRIED



SUPERELEVATION RATE (PER FOOT)

REVISIONS AND CORRECTIONS

APPROVED

Dec 8, 1971
DATE

R.H. Arnold
CHIEF ENGINEER

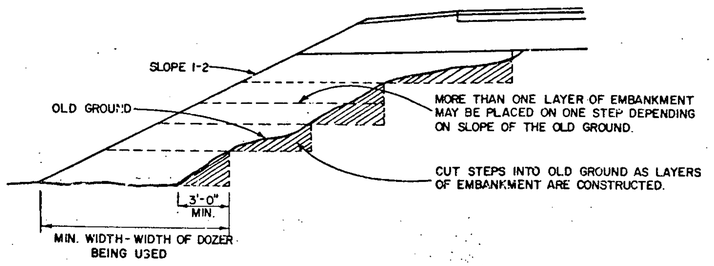
E.H. Dickerson
ASST. CHIEF ENGINEER

G.M. Lane
HIGHWAY ENGINEER

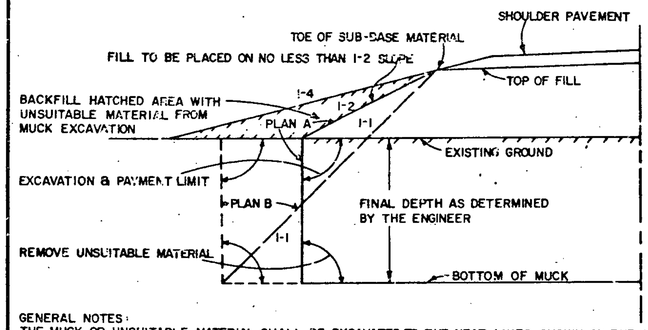
BANKING TABLES

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

B-1



METHOD FOR CONSTRUCTING AN EMBANKMENT ON EARTH SLOPE

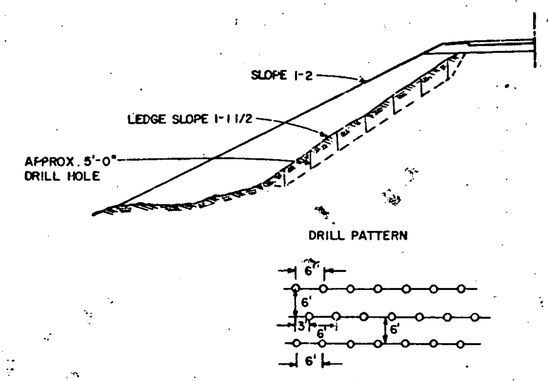


GENERAL NOTES:
THE MUCK OR UNSUITABLE MATERIAL SHALL BE EXCAVATED TO THE NEAT LINES SHOWN ON THE PLANS OR AS DETERMINED BY THE ENGINEER.

EXCAVATION AND PAYMENT LIMIT WILL BE DETERMINED FROM EITHER PLAN "A" OR PLAN "B", WHICHEVER PRODUCES THE GREATER WIDTH IN A GIVEN MUCK AREA.

BACKFILL MATERIAL MUST MEET THE REQUIREMENTS SET FORTH UNDER MUCK EXCAVATION, SECTION 203.

TYPICAL NEAT PAY LINES FOR MUCK EXCAVATION

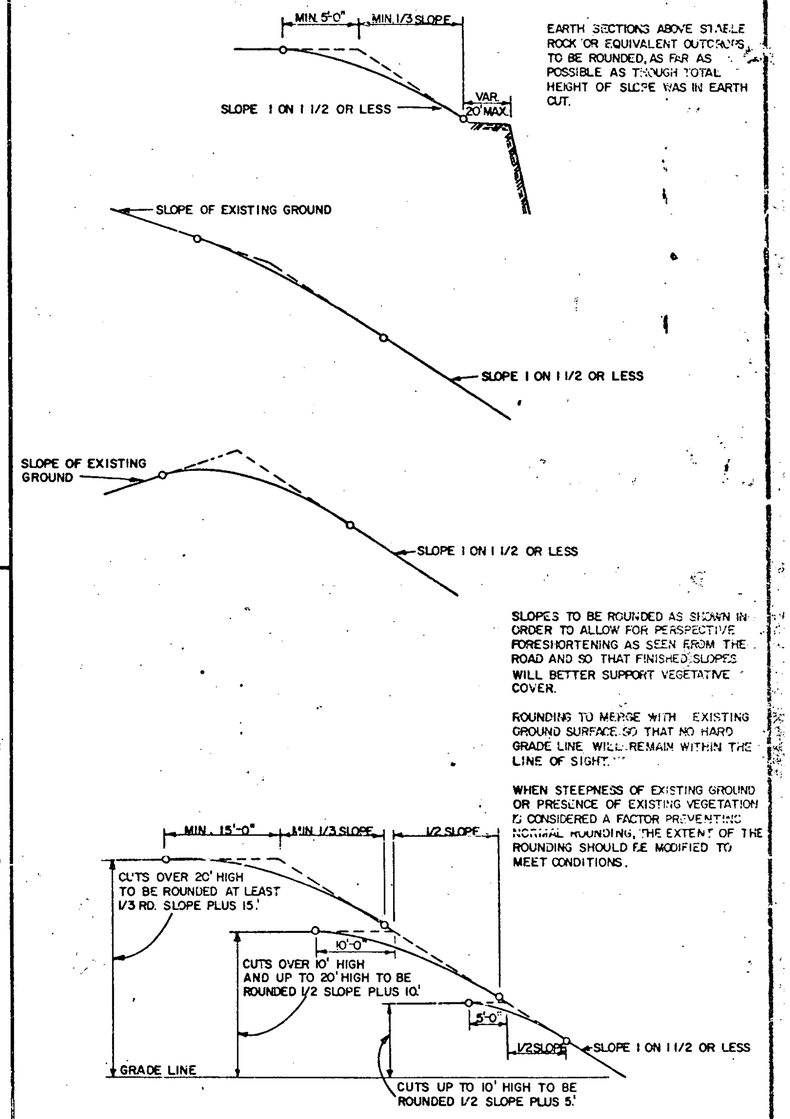


DRILLING AND BLASTING OF SOLID ROCK.

PROCEDURE TO BE FOLLOWED WHEN LEDGE SLOPE ON OLD GROUND IS BETWEEN A 1 ON 1 AND A 1 ON 5 SLOPE.

ALL HOLES TO BE APPROXIMATELY 5'-0" DEEP. HOLES TO BE IN ROWS, SPACED AND STAGGERED AS SHOWN IN DRILL PATTERN, OR AS DIRECTED BY THE ENGINEER, SEE SECTION 205.

A METHOD FOR PREPARING LEDGE SLOPE BEFORE CONSTRUCTING AN EMBANKMENT



TYPICAL SLOPE ROUNDING

REVISIONS AND CORRECTIONS

APPROVED:

DATE: Dec. 6, 1971

R N Arnold
CHIEF ENGINEER

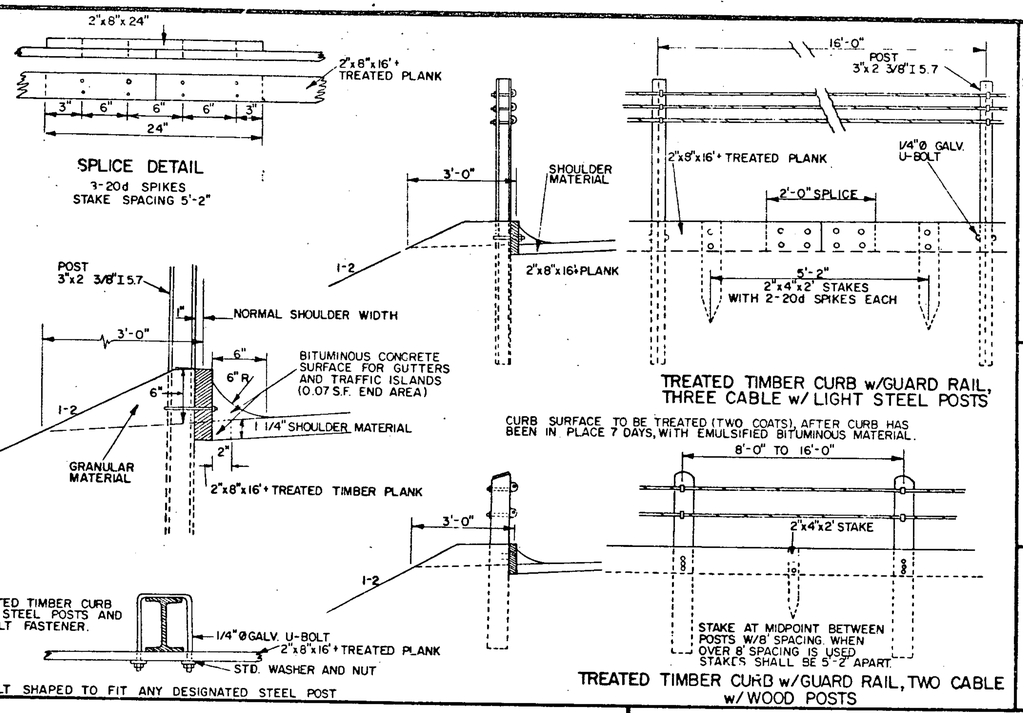
E B Stuchney
ASST. CHIEF ENGINEER

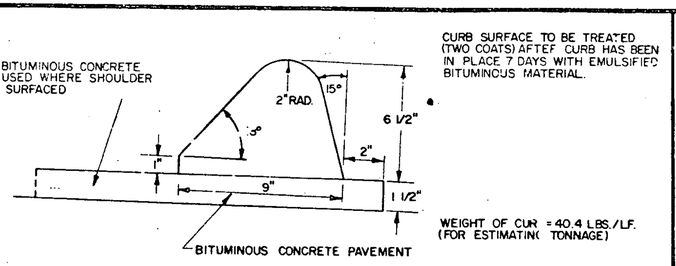
G. M. Lane
HIGHWAY ENGINEER

EMBANKMENT ON EARTH SLOPE
EMBANKMENT ON ROCK SLOPE
MUCK EXCAVATION
TYPICAL SLOPE ROUNDING

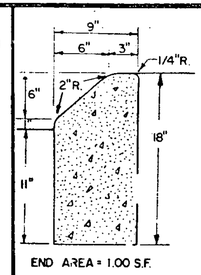
VERMONT DEPARTMENT OF HIGHWAYS STANDARD B-5

D-9





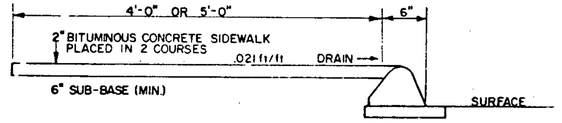
BITUMINOUS CONCRETE CURB, TYPE A



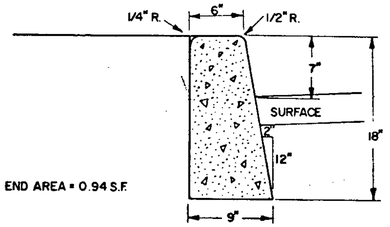
WHEN CONCRETE CURB IS CONSTRUCTED ADJACENT TO CONCRETE SIDEWALK, ASPHALT TREATED FELT SHALL BE PLACED BETWEEN THE SIDEWALK AND CURB.

SEE SPECIFICATIONS FOR DETAILS ON EXPANSION AND CONSTRUCTION JOINTS.

CAST IN PLACE CEMENT CONCRETE CURB, TYPE A



BITUMINOUS CONCRETE SIDEWALK

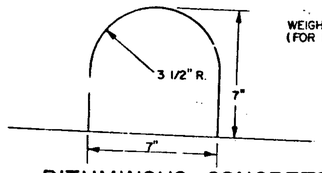


WHEN CONCRETE CURB IS CONSTRUCTED ADJACENT TO CONCRETE SIDEWALK, ASPHALT TREATED FELT SHALL BE PLACED BETWEEN THE SIDEWALK AND CURB.

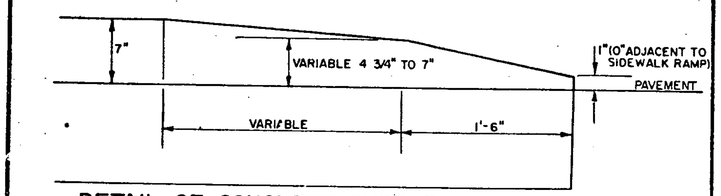
SEE SPECIFICATIONS FOR DETAILS ON EXPANSION AND CONSTRUCTION JOINTS.

CAST IN PLACE CEMENT CONCRETE CURB, TYPE B

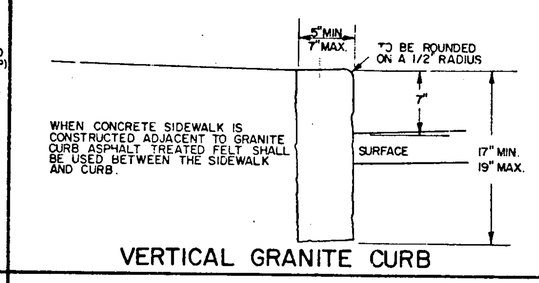
CURB SURFACE TO BE TREATED (TWO COATS), AFTER CURB HAS BEEN IN PLACE 7 DAYS, WITH EMULSIFIED BITUMINOUS MATERIAL.



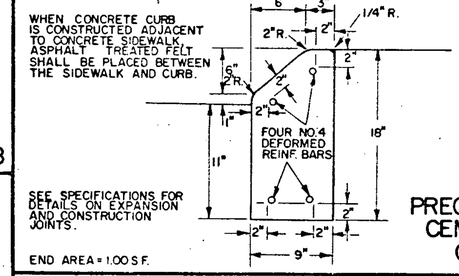
BITUMINOUS CONCRETE CURB, TYPE B



DETAIL OF CONCRETE CURB END FOR PRECAST REINFORCED CEMENT CONCRETE CURB OR CAST IN PLACE CEMENT CONCRETE CURB

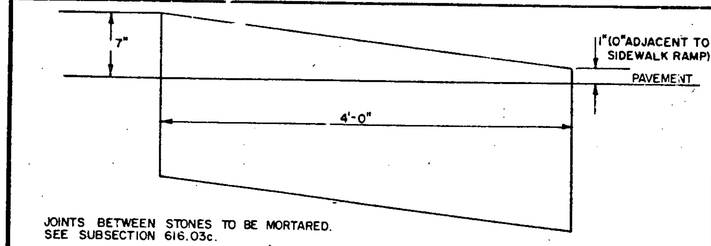


VERTICAL GRANITE CURB

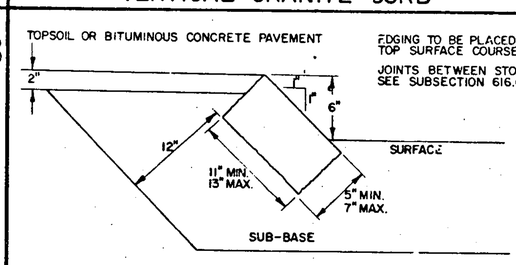


SEE SPECIFICATIONS FOR DETAILS ON EXPANSION AND CONSTRUCTION JOINTS.

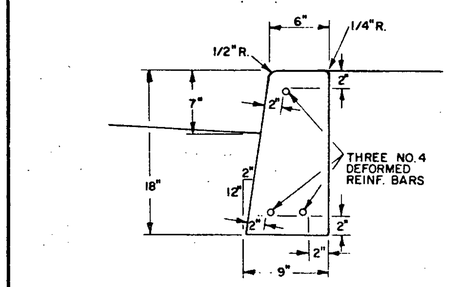
PRECAST REINFORCED CEMENT CONCRETE CURB, TYPE A



DETAIL OF GRANITE CURB END FOR VERTICAL GRANITE CURB



GRANITE SLOPE EDGING



WHEN CONCRETE CURB IS CONSTRUCTED ADJACENT TO CONCRETE SIDEWALK, ASPHALT TREATED FELT SHALL BE PLACED BETWEEN THE SIDEWALK AND CURB.

SEE SPECIFICATIONS FOR DETAILS ON EXPANSION AND CONSTRUCTION JOINTS.

PRECAST REINFORCED CEMENT CONCRETE CURB, TYPE B

REVISIONS AND CORRECTIONS

AUG. 30, 1973 – TREATED TIMBER PLANK INCREASED TO 8" SIZE.
MAY 7, 1976 – TREATED TIMBER CURB HEIGHT INCREASED FROM 4 1/2" TO 6".
DEC. 16, 1980 – INCREASED SHOULDER WIDENING FOR GUARDRAIL.

APPROVED:

DATE: Dec. 8, 1971

R. H. Arnold
CHIEF ENGINEER

E. W. Hichmey
ASST. CHIEF ENGINEER

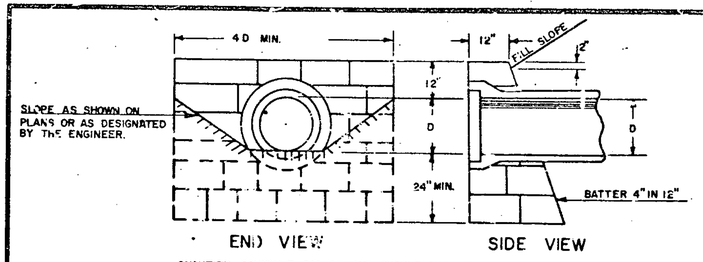
A. M. Lane
HIGHWAY ENGINEER

GRANITE SLOPE EDGING
VERTICAL GRANITE CURB
PRECAST REINFORCED CEMENT CONCRETE CURB
CAST IN PLACE CEMENT CONCRETE CURB
BITUMINOUS CONCRETE CURB
TREATED TIMBER CURB

VERMONT AGENCY OF TRANSPORTATION

STANDARD

C-1



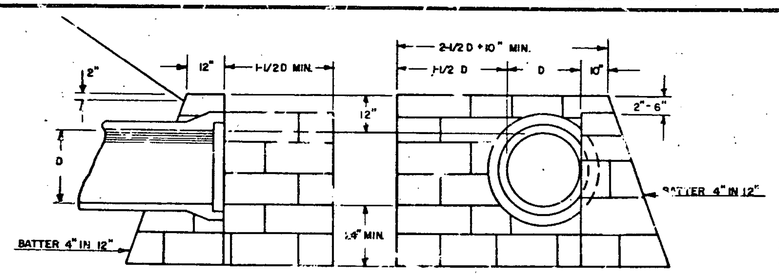
END VIEW SIDE VIEW

QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

PIPE DIAMETER	12"	15"	18"	24"	30"	36"	42"	48"	54"	60"
C.R.M. QUANTITY	1.0	1.3	1.8	2.7	3.5	4.9	6.4	8.0	10.0	12.3

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS FOR METAL PIPE.

CEMENT RUBBLE MASONRY STRAIGHT HEADWALL



SIDE VIEW END VIEW

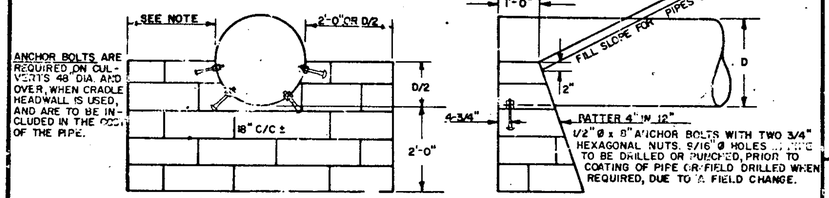
QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

PIPE DIAMETER	12"	15"	18"	24"	30"	36"	42"	48"
C.R.M. QUANTITY	1.3	1.7	2.1	3.2	4.1	5.5	7.1	8.9

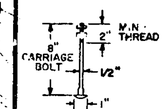
C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS FOR METAL PIPE.

CEMENT RUBBLE MASONRY "L" TYPE HEADWALL

NOTE: USE 2'-0" MIN. UP TO 48" DIAMETER AND THEREAFTER USE D/2.



END VIEW SIDE VIEW



GALV. ANCHOR BOLTS TO BE PLACED 18" C/C.

QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

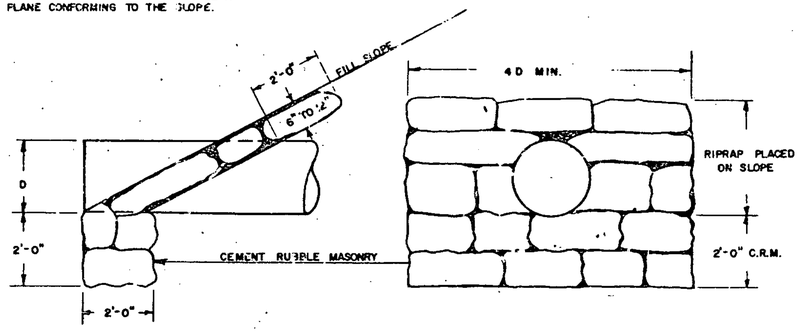
PIPE DIAMETER	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"
C.R.M. QUANTITY	0.8	1.0	1.2	1.4	1.5	1.7	2.0	2.4	2.8	3.3

C.R.M. QUANTITIES ARE DEDUCTED WHEN PIPE DIAMETER 42" OR LARGER
SAME DEDUCTION MADE FOR CONCRETE PIPE AS FOR METAL PIPE.

WHEN CONCRETE CLASS B IS USED, TWO PIECES OF REINFORCING STEEL WILL BE PLACED BELOW THE CULVERT SIMILAR TO THOSE SHOWN ON REINFORCED CONCRETE STRAIGHT HEADWALL.

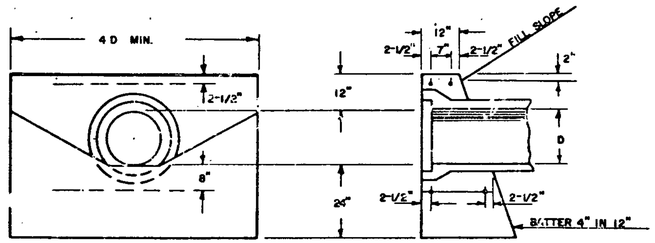
CEMENT RUBBLE MASONRY CRADLE HEADWALL

EXPOSED SURFACE OF RIPRAP TO BE A PLANE CONFORMING TO THE SLOPE.



SIDE VIEW END VIEW

RIPRAP LIGHT TYPE SLOPE HEADWALL WITH CEMENT RUBBLE MASONRY FOOTING



END VIEW SIDE VIEW

QUANTITY SCHEDULE FOR REINFORCED CONCRETE HEADWALL, CLASS B

PIPE DIAMETER	12"	15"	18"	24"	30"	36"	42"	48"	54"	60"
CONCRETE QUANTITY	1.0	1.3	1.8	2.7	3.5	4.9	5.4	8.0	10.0	12.3

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL

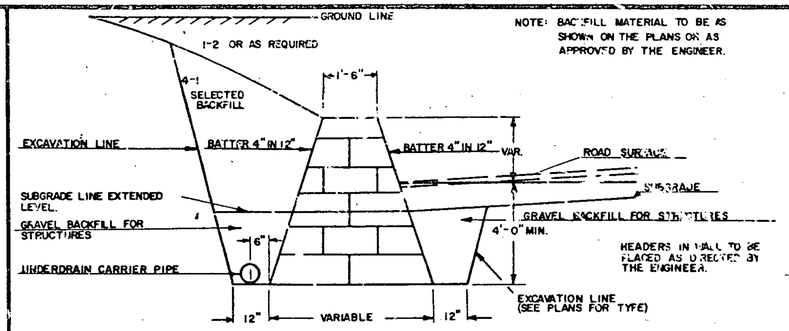
PIPE DIAMETER	12	15"	18"	24"	30"	36"	42"	48"	54"	60"
NUMBER	4	4	4	4	4	4	4	4	4	4
LENGTH OF BARS	3'-0"	3'-0"	3'-0"	3'-0"	4'-0"	4'-0"	5'-0"	5'-0"	6'-0"	6'-0"

ALL REINFORCING STEEL TO BE 5/8" DIAMETER DEFORMED BARS.
CONCRETE QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

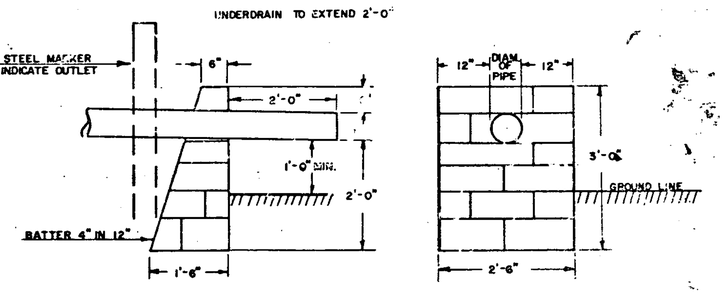
REINFORCED CONCRETE STRAIGHT HEADWALL

GENERAL NOTES – HEADWALLS:

1. THE HEIGHT OF HEADWALLS ON DRIVEWAY PIPES IS TO BE REDUCED TO 6" ABOVE THE TOP OF PIPE.
2. BELL AND SPIGOT PIPE IS TO BE LAID WITH THE BELL UPSTREAM.
3. HEADWALL QUANTITIES, FOR THE SAME TYPE HEADWALLS ON PIPES OF EQUAL DIAMETER, ARE THE SAME FOR BOTH CONCRETE AND METAL PIPE. LENGTH OF HEADWALLS ARE BASED ON INSIDE DIAMETER OF PIPES.
4. THE NECESSITY OF CONSTRUCTING A FLOOR AT THE ENTRANCE TO AN L TYPE HEADWALL SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AND ANY INSTALLATION THEREOF SHALL BE AT HIS DIRECTION.



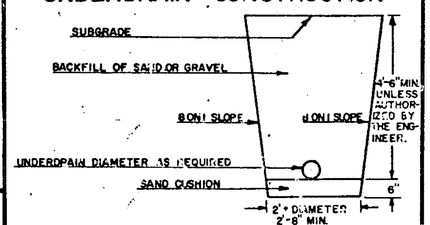
CEMENT RUBBLE MASONRY RETAINING WALL

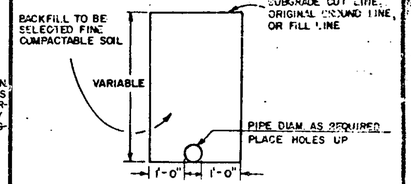


UNDERDRAIN OUTLET TO CLEAR GROUND LINE BY A MINIMUM OF 1'-0" TO HELP PREVENT CLOGGING.

CEMENT RUBBLE MASONRY UNDERDRAIN OUTLET CONSTRUCTION

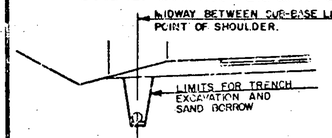
UNDERDRAIN CONSTRUCTION





UNDERDRAIN CARRIER PIPE CONSTRUCTION

UNDERDRAIN LOCATION



UNDERDRAIN TO BE LAID MIDWAY BETWEEN SUB-BASE LINE AND POINT OF SHOULDER OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES – UNDERDRAIN:

1. GRADE FOR UNDERDRAIN PIPE SHALL BE PARALLEL WITH THE GRADE OF THE ROAD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. A FLUSHING BASIN IS TO BE INSTALLED AT INLET WHEN LESS THAN 3% GRADE IS USED OR AS ORDERED BY THE ENGINEER.
3. THE UNDERDRAIN SHALL BE TAKEN TO A PROPER OUTLET AND PROTECTED WITH A HEADWALL OF CEMENT RUBBLE MASONRY IF SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
4. ELBOWS, TEES, AND OTHER JUNCTION UNITS NECESSARY FOR PROPER INSTALLATION OF UNDERDRAIN, AS DIRECTED BY THE ENGINEER, ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR UNDERDRAIN OR CARRIER PIPE.

REVISIONS AND CORRECTIONS

MAR. 8, 1972	CHANGED ANCHOR BOLTS FROM 10" "L" TO 8" CARRIAGE BOLTS
DEC. 15, 1976	NOTE ADDED ON REINFORCING STEEL FOR CRADLE HEADWALLS.

APPROVED:

DATE: Dec. 6, 1971

R. V. Arnold
CHIEF ENGINEER

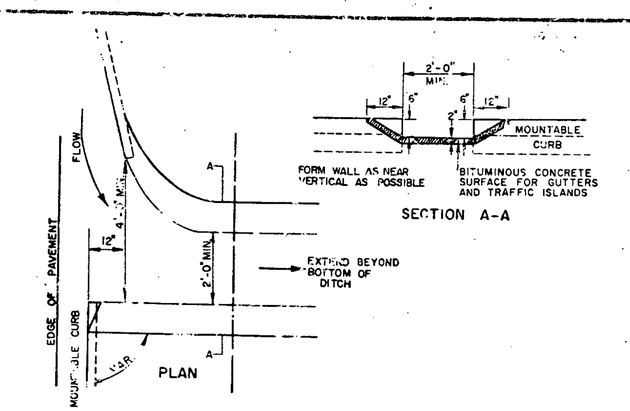
E. H. Stickney
ASST. CHIEF ENGINEER

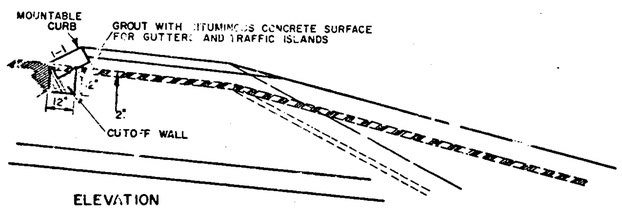
A. M. Lane
HIGHWAY ENGINEER

CEMENT RUBBLE MASONRY HEADWALLS & RETAINING WALL
RIPRAP LIGHT TYPE SLOPE HEADWALL
REINFORCED CONCRETE HEADWALL
UNDERDRAIN & CARRIER PIPE CONSTRUCTION DETAILS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-2





DETAIL OF CURB DRAINS

NOT TO BE USED ON ROADWAY GRADES EXCEEDING 2%

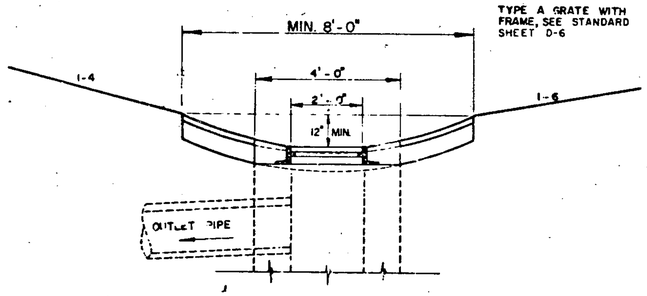
A 6" DEPTH OF COARSE SAND OR GRAVEL SHALL BE USED TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW SUBGRADE AT THE DIRECTION OF THE ENGINEER.

GENERAL NOTES

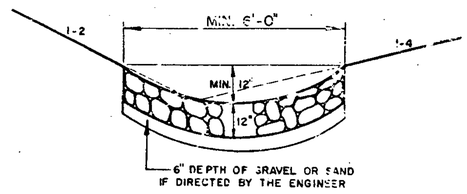
CHANGES IN ALIGNMENT AND GRADE FOR GUTTERS SHOULD BE AS GRADUAL AS THE WIDTH OF RIGHT-OF-WAY AND TERRAIN WILL PERMIT.

CURVED PORTIONS OF TREATED GUTTERS MAY REQUIRE ADDITIONAL PROTECTION ALONG THE OUTSIDE EDGE OF THE GUTTER TO AID IN REDIRECTING THE WATER AND HELP PREVENT EROSION.

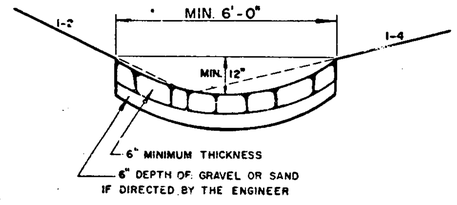
THE USE OF SOD STRIPS ALONG BOTH EDGES OF GUTTERS SHOULD BE CONSIDERED AS A MEANS OF PREVENTING EROSION AND UNDERMINING OF THE GUTTER.



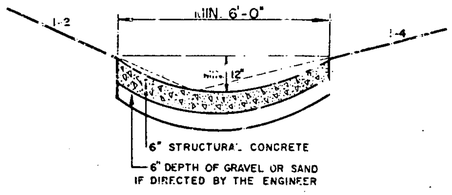
DROP INLET WITH GRATE IN TREATED GUTTER



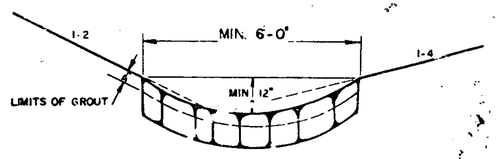
BITUMINOUS GROUTED STONE GUTTER



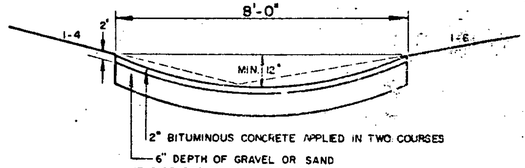
RIPRAP, LIGHT TYPE



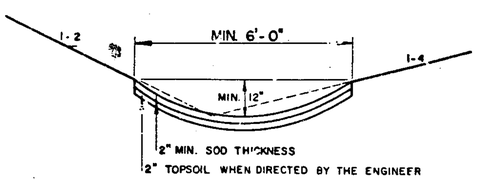
PLAIN CEMENT CONCRETE GUTTER



PLAIN RUBBLE PAVING
GROUTED RUBBLE PAVING

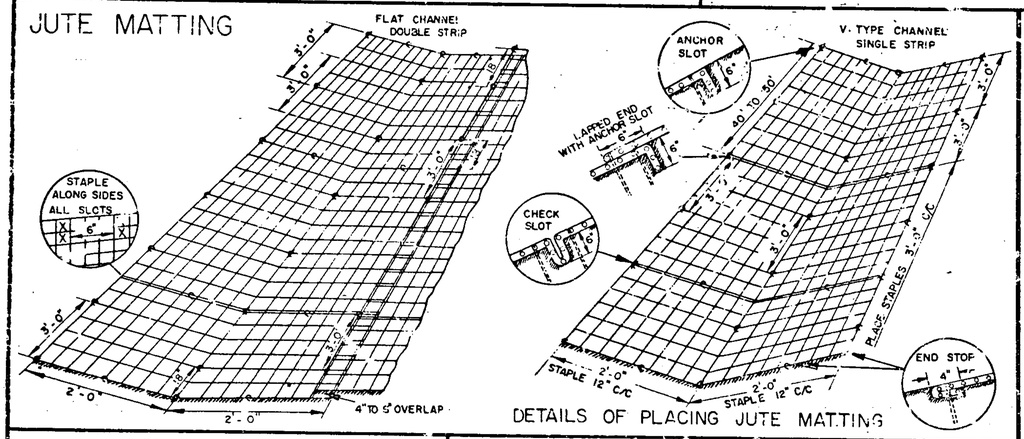


BITUMINOUS CONCRETE SURFACE FOR GUTTERS AND TRAFFIC ISLANDS

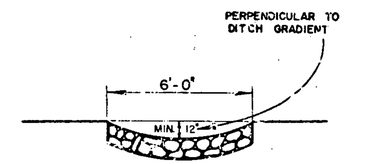


SODDING

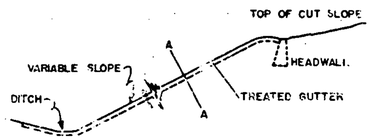
JUTE MATTING



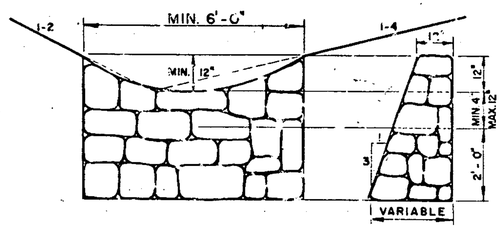
DETAILS OF PLACING JUTE MATTING



SECTION A-A



DETAIL OF TREATED GUTTER ON CUT SLOPE



HEADWALL TO BE CONSTRUCTED AT TOP OF SLOPE AND MAY BE USED WITH ALL TYPES OF GUTTERS.

CONCRETE ALTERNATE, SEE SUB-SECTION 602.11

CEMENT RUBBLE MASONRY GUTTER HEADWALL

REVISIONS & CORRECTIONS

APRIL 27, 1973 - GENERAL NOTES ADDED

APPROVED DATE Dec 6, 1971

R. N. Arnold
CHIEF ENGINEER

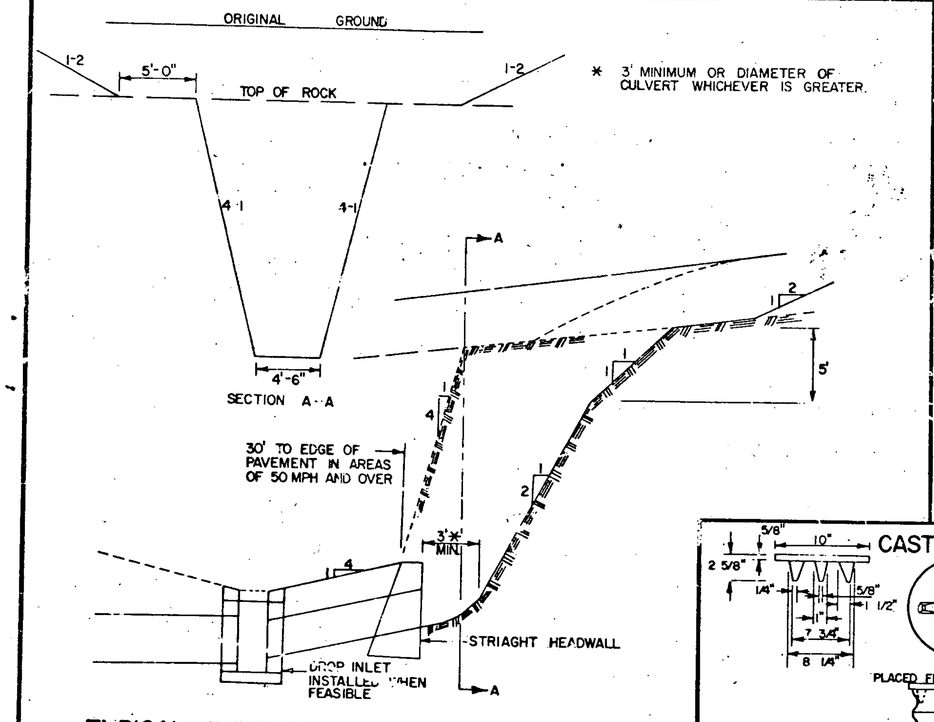
E. H. Stickney
ASST. CHIEF ENGINEER

G. M. Law
HIGHWAY ENGINEER

TREATED GUTTERS

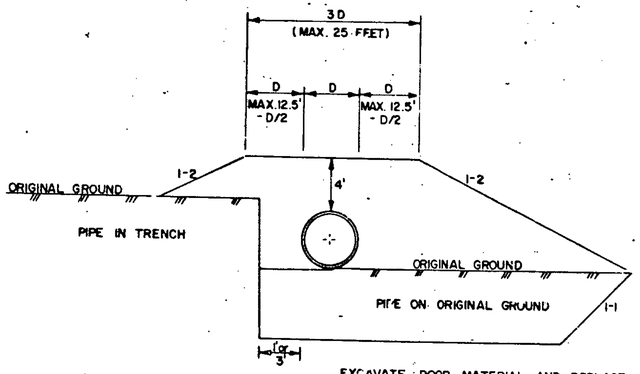
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-3



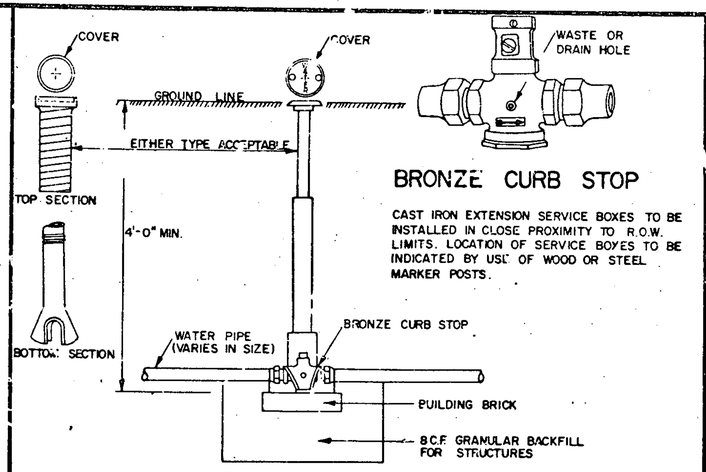
* 3' MINIMUM OR DIAMETER OF CULVERT WHICHEVER IS GREATER.

TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER



EXCAVATE POOR MATERIAL AND REPLACE WITH GRANULAR BACKFILL FOR STRUCTURES, OR SAND BORROW AS DIRECTED BY THE ENGINEER.

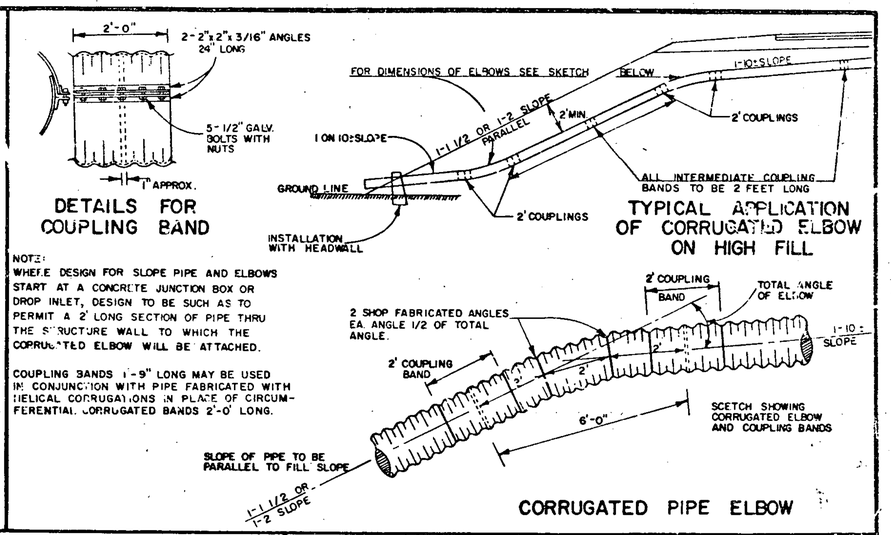
GRANULAR MATERIAL AT CULVERT LOCATIONS



BRONZE CURB STOP

CAST IRON EXTENSION SERVICE BOXES TO BE INSTALLED IN CLOSE PROXIMITY TO R.O.W. LIMITS. LOCATION OF SERVICE BOXES TO BE INDICATED BY USE OF WOOD OR STEEL MARKER POSTS.

EXTENSION SERVICE BOX AND CURB STOP



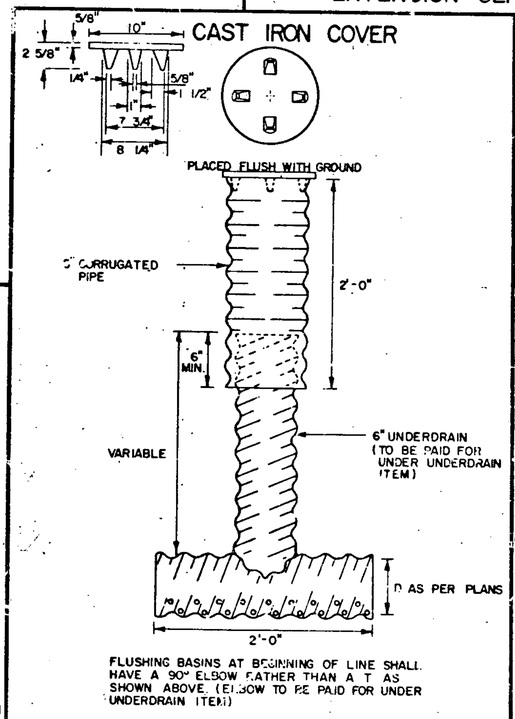
DETAILS FOR COUPLING BAND

TYPICAL APPLICATION OF CORRUGATED ELBOW ON HIGH FILL

NOTE:
WHERE DESIGN FOR SLOPE PIPE AND ELBOWS START AT A CONCRETE JUNCTION BOX OR DROP INLET, DESIGN TO BE SUCH AS TO PERMIT A 2' LONG SECTION OF PIPE THRU THE STRUCTURE WALL TO WHICH THE CORRUGATED ELBOW WILL BE ATTACHED.

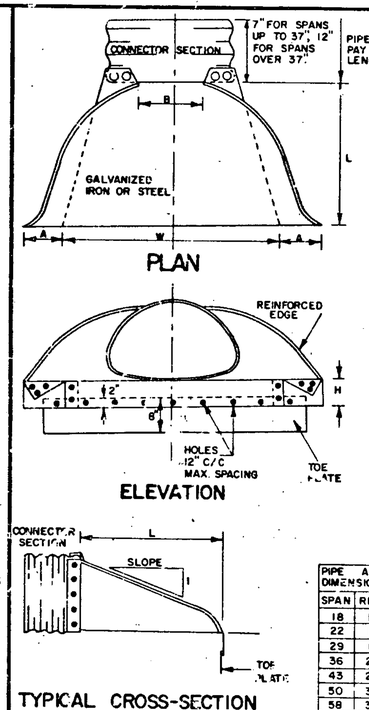
COUPLING BANDS 1'-9" LONG MAY BE USED IN CONJUNCTION WITH PIPE FABRICATED WITH HELICAL CORRUGATIONS IN PLACE OF CIRCUMFERENTIAL CORRUGATED BANDS 2'-0" LONG.

CORRUGATED PIPE ELBOW

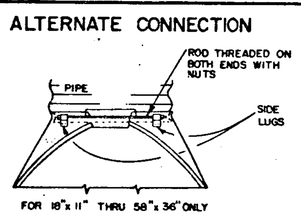


FLUSHING BASINS AT BEGINNING OF LINE SHALL HAVE A 90° ELBOW RATHER THAN A T AS SHOWN ABOVE. (ELBOW TO BE PAID FOR UNDER UNDERDRAIN ITEM)

UNDERDRAIN FLUSHING BASIN



METAL END SECTION FOR C.G.M.P. ARCH



TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" GALV. BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE W=10" FOR PIPE-ARCHES WITH RISE 11" TO 27" INCL. AND W=18" MIN. FOR PIPE-ARCHES WITH RISE OF 31" TO 44" INCL.

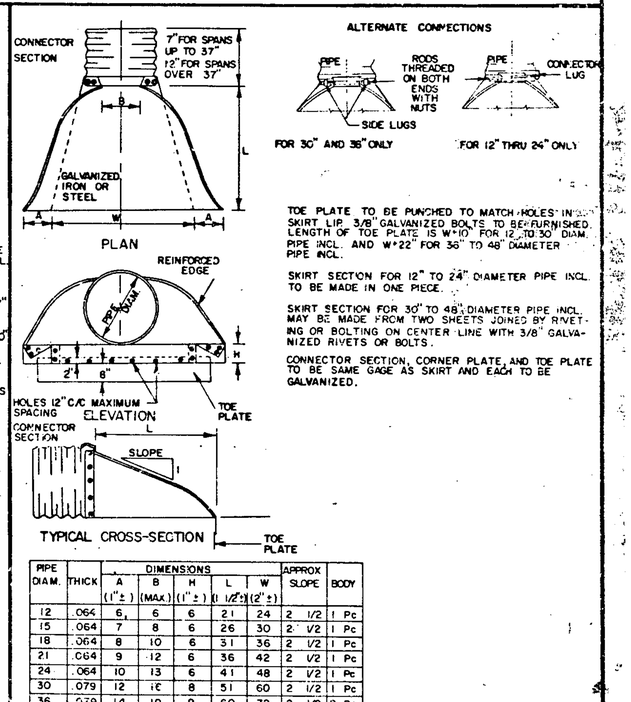
SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 11" TO 27" INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 31" TO 40" INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE WITH 3/8" GALV. BOLTS OR RIVETS.

SKIRT SECTIONS FOR PIPE-ARCHES WITH RISE OF 44 INCHES MAY BE MADE FROM THREE SHEETS JOINED BY RIVETING OR BOLTING AT EQUAL DISTANCES FROM CENTERLINE.

CONNECTOR SECTION, CORNER PLATE, AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

PIPE ARCH DIMENSIONS SPAN	RISE	THICK	DIMENSIONS A (1" ±)	B (MAX.)	H (1" ±)	L (1 1/2")	W (2" ±)	APPROX SLOPE	BODY
18	11	.064	7	9	6	19	30	2 1/2	1 Pc
22	13	.064	7	10	6	23	36	2 1/2	1 Pc
29	18	.064	9	14	6	32	49	2 1/2	1 Pc
36	22	.079	10	16	6	39	60	2 1/2	1 Pc
43	27	.079	12	18	8	46	75	2 1/2	1 Pc
50	31	.109	13	21	9	53	85	2 1/2	2 Pc
58	36	.109	18	26	12	63	90	2 1/2	2 Pc
65	40	.109	18	30	12	70	102	2 1/2	2 Pc
72	44	.109	18	33	12	77	114	2 1/4	3 Pc



TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" GALVANIZED BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W=10" FOR 12" TO 30" DIAM. PIPE INCL. AND W=22" FOR 36" TO 48" DIAMETER PIPE INCL.

SKIRT SECTION FOR 12" TO 24" DIAMETER PIPE INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR 30" TO 48" DIAMETER PIPE INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE WITH 3/8" GALVANIZED RIVETS OR BOLTS.

CONNECTOR SECTION, CORNER PLATE, AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

PIPE DIAM.	THICK	DIMENSIONS A (1" ±)	B (MAX.)	H (1" ±)	L (1 1/2")	W (2" ±)	APPROX SLOPE	BODY
12	.064	6	6	6	21	24	2 1/2	1 Pc
15	.064	7	8	6	26	30	2 1/2	1 Pc
18	.064	8	10	6	31	36	2 1/2	1 Pc
21	.064	9	12	6	36	42	2 1/2	1 Pc
24	.064	10	13	6	41	48	2 1/2	1 Pc
30	.079	12	16	8	51	60	2 1/2	1 Pc
36	.079	14	19	9	60	72	2 1/2	2 Pc
42	.109	16	22	11	69	84	2 1/2	2 Pc
48	.109	18	27	12	78	90	2 1/4	2 Pc

METAL END SECTION FOR C.G.M.P. (ROUND)

REVISIONS AND CORRECTIONS

JULY 17, 1972 HELICAL CORRUGATED COUPLING BAND NOTE ADDED

JULY 24, 1975 GRANULAR MATERIAL AT CULVERT LOCATIONS CORRECTED.

APPROVED:

DATE: Dec 6, 1971

R.H. Arnold
CHIEF ENGINEER

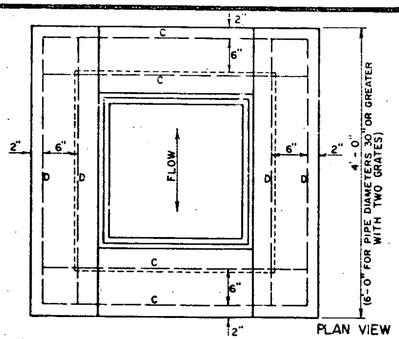
E.H. Stickney
ASST. CHIEF ENGINEER

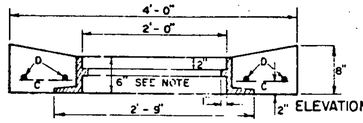
G.M. Lane
HIGHWAY ENGINEER

TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER
EXTENSION SERVICE BOX AND CURB STOP
CORRUGATED PIPE ELBOW
GRANULAR BORROW AT CULVERT LOCATIONS
UNDERDRAIN FLUSHING BASIN
METAL END SECTION FOR CORRUGATED GALVANIZED METAL PIPE
METAL END SECTION FOR CORRUGATED GALVANIZED METAL PIPE ARCH

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-4





NOTE—FRAME SHOWN IS FOR TYPE A GRATE, SEE SHEET D-11. FOR TYPE B GRATE AND FRAME, SEE SHEET D-16 (EXCEPT THE FRAME DEPTH DIMENSION SHALL BE 6").

TOP FOR REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES

STEEL SCHEDULE

4'x4' DROP INLET TYPE A 12", 15", 18", 24"							4'x6' DROP INLET WITH TWO GRATES TYPE B 30", 36"										TYPE C 4'x6' DROP INLET WITH ONE GRATE WITH 4'x6' TOP 30", 36"									
DEPTH	G	LENGTH	H, J	LENGTH	C, D	LENGTH	G	LENGTH	H	LENGTH	J	LENGTH	C	LENGTH	D	LENGTH	DEPTH	G	LENGTH	H	LENGTH	J	LENGTH	C	LENGTH	D	LENGTH	DEPTH
3'-0"	15	2'-3"	22	3'-8"	8	3'-3"											3'-0"											
3'-6"	15	2'-9"	22	3'-8"	8	3'-8"											3'-6"											
4'-0"	15	3'-3"	29	3'-8"	8	3'-8"	17	3'-3"	19	3'-8"	10	5'-8"	4	3'-8"	4	5'-8"	4'-0"	17	3'-8"	19	3'-8"	10	5'-8"	6	3'-8"	4	5'-8"	4'-0"
4'-6"	15	3'-9"	29	3'-8"	8	3'-8"	17	3'-9"	19	3'-8"	10	5'-8"	4	3'-8"	4	5'-8"	4'-6"	17	4'-2"	19	3'-8"	10	5'-8"	6	3'-8"	4	5'-8"	4'-6"
5'-0"	15	4'-3"	35	3'-8"	8	3'-8"	17	4'-3"	23	3'-8"	13	5'-8"	4	3'-8"	4	5'-8"	5'-0"	17	4'-8"	23	3'-8"	13	5'-8"	6	3'-8"	4	5'-8"	5'-0"
5'-6"	15	4'-9"	35	3'-8"	8	3'-8"	17	4'-9"	23	3'-8"	13	5'-8"	4	3'-8"	4	5'-8"	5'-6"	17	5'-2"	23	3'-8"	13	5'-8"	6	3'-8"	4	5'-8"	5'-6"
6'-0"	15	5'-3"	41	3'-8"	8	3'-8"	17	5'-3"	27	3'-8"	15	5'-8"	4	3'-8"	4	5'-8"	6'-0"	17	5'-8"	27	3'-8"	15	5'-8"	6	3'-8"	4	5'-8"	6'-0"
6'-6"	15	5'-9"	41	3'-8"	8	3'-8"	17	5'-9"	31	3'-8"	15	5'-8"	4	3'-8"	4	5'-8"	6'-6"	17	6'-2"	31	3'-8"	15	5'-8"	6	3'-8"	4	5'-8"	6'-6"
7'-0"	15	6'-3"	47	3'-8"	8	3'-8"	17	6'-3"	35	3'-8"	17	5'-8"	4	3'-8"	4	5'-8"	7'-0"	17	6'-8"	35	3'-8"	17	5'-8"	6	3'-8"	4	5'-8"	7'-0"
7'-6"	15	6'-9"	47	3'-8"	8	3'-8"	17	6'-9"	35	3'-8"	17	5'-8"	4	3'-8"	4	5'-8"	7'-6"	17	7'-2"	35	3'-8"	17	5'-8"	6	3'-8"	4	5'-8"	7'-6"
8'-0"	15	7'-3"	53	3'-8"	8	3'-8"	17	7'-3"	39	3'-8"	19	5'-8"	4	3'-8"	4	5'-8"	8'-0"	17	7'-8"	39	3'-8"	19	5'-8"	6	3'-8"	4	5'-8"	8'-0"

STEEL AND CONCRETE QUANTITIES

DEPTH	4'x4' DROP INLET 12"-15"-18"-24" TYPE A CONCRETE C.Y.	STEEL LBS.	4'x6' DROP INLET WITH TWO GRATES 30" TYPE B CONCRETE C.Y.	STEEL LBS.	36" CONCRETE C.Y.	STEEL LBS.	DEPTH	4'x6' DROP INLET WITH ONE GRATE WITH 4'x6' TOP 30" TYPE C CONCRETE C.Y.	STEEL LBS.	36" CONCRETE C.Y.	STEEL LBS.	DEPTH
3'-0"	1.7	150					3'-0"					
3'-6"	1.9	158					3'-6"					
4'-0"	2.1	193	2.7	228			4'-0"	2.8	244			
4'-6"	2.3	200	3.0	237	2.9	237	4'-6"	3.1	252	3.0	252	4'-6"
5'-0"	2.6	231	3.3	279	3.2	279	5'-0"	3.4	294	3.3	294	5'-0"
5'-6"	2.8	239	3.6	288	3.5	288	5'-6"	3.7	303	3.6	303	5'-6"
6'-0"	3.0	270	3.9	324	3.8	324	6'-0"	4.0	339	3.9	339	6'-0"
6'-6"	3.2	278	4.2	348	4.1	348	6'-6"	4.3	363	4.2	363	6'-6"
7'-0"	3.5	308	4.5	384	4.4	384	7'-0"	4.6	399	4.5	399	7'-0"
7'-6"	3.7	316	4.8	393	4.7	393	7'-6"	4.9	408	4.8	408	7'-6"
8'-0"	3.9	347	5.1	429	5.0	429	8'-0"	5.2	444	5.1	444	8'-0"

FOR 2nd 30" PIPE DEDUCT 0.18 C.Y. FOR 2nd 36" PIPE DEDUCT 0.26 C.Y. FOR 2nd 42" PIPE DEDUCT 0.36 C.Y. OR 0.18 FOR 1 PIPE FOR 2nd 48" PIPE DEDUCT 0.47 C.Y. OR 0.24 FOR 1 PIPE

ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS, EVENLY SPACED WITH A MAXIMUM SPACING OF 12" C/C.

ALL STEEL TO HAVE 2 INCH MIN. COVER.

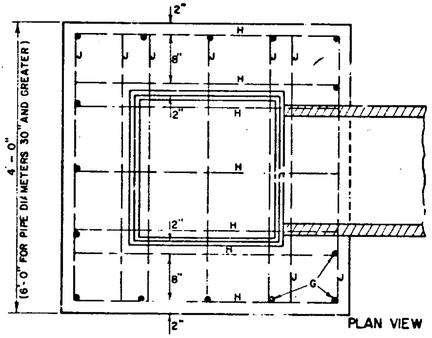
DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

GRATES TO CONFORM TO DROP INLETS, CATCH BASINS, AND MANHOLES, SECTION 604.

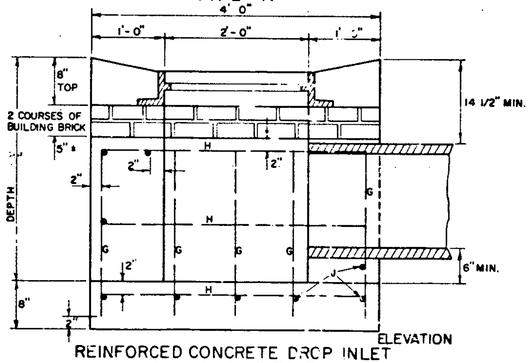
FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED AS JOINT FILLER AND LAYING OF BRICK.

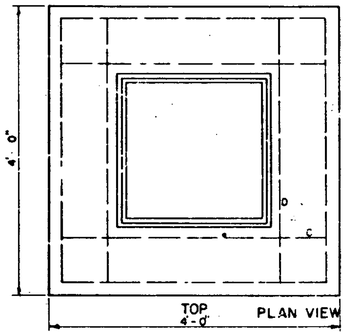
FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE. ABOVE TABLES INDICATE DEDUCTION FOR ONE PIPE.



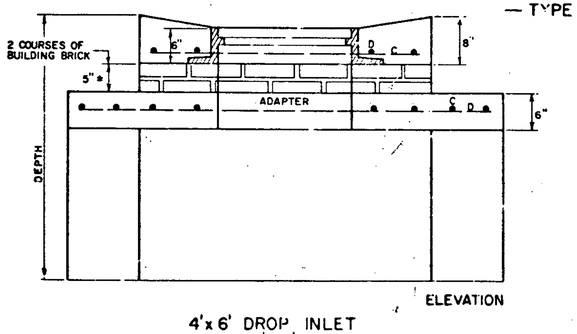
— TYPE A —



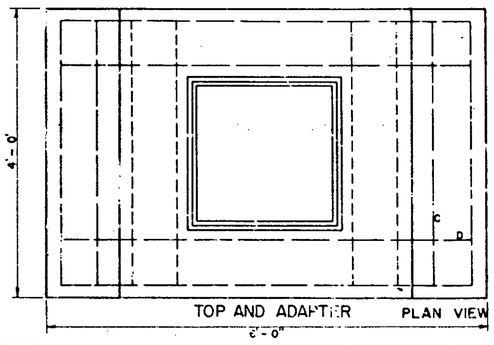
REINFORCED CONCRETE DROP INLET FOR USE IN DITCHES



— TYPE D —



4'x6' DROP INLET WITH 4'x4' TOP TOP WITH ONE CAST IRON GRATE



STEEL SCHEDULE TYPE D

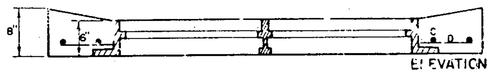
4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP 30", 36"										
G	LENGTH	H	LENGTH	J	LENGTH	C	LENGTH	D	LENGTH	DEPTH
17	3'-7"	23	3'-8"	13	5'-8"	12	3'-8"	4 4	5'-8" 3'-8"	5'-0"
17	4'-1"	23	3'-8"	13	5'-8"	12	3'-8"	4 4	5'-8" 3'-8"	5'-6"
17	4'-7"	27	3'-8"	15	5'-8"	12	3'-8"	4 4	5'-8" 3'-8"	6'-0"
17	5'-1"	31	3'-8"	15	5'-8"	12	3'-8"	4 4	5'-8" 3'-8"	6'-6"
17	5'-7"	35	3'-8"	17	5'-8"	12	3'-8"	4 4	5'-8" 3'-9"	7'-0"
17	6'-1"	35	3'-8"	17	5'-8"	12	3'-8"	4 4	5'-8" 3'-8"	7'-6"
17	6'-7"	39	3'-8"	19	5'-8"	12	3'-8"	4 4	5'-8" 3'-8"	8'-0"

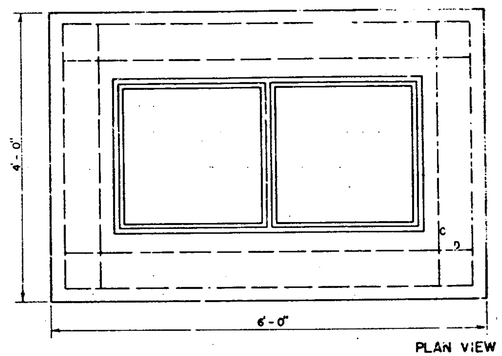
STEEL AND CONCRETE QUANTITIES

4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP TYPE D

DEPTH	30" CONCRETE C.Y.	30" STEEL LBS	36" CONCRETE C.Y.	36" STEEL LBS
5'-0"	3.2	313	3.1	313
5'-6"	3.5	322	3.4	322
6'-0"	3.8	358	3.7	358
6'-6"	4.1	382	4.0	382
7'-0"	4.4	413	4.3	418
7'-6"	4.7	427	4.6	427
8'-0"	5.0	463	4.9	463

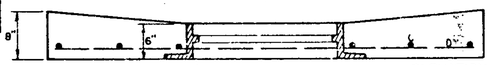
— TYPE B —

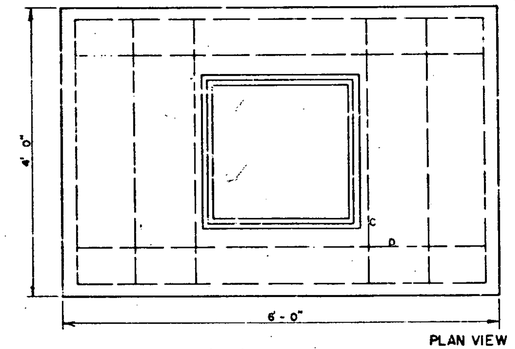




4'x6' DROP INLET TOP WITH TWO CAST IRON GRATES

— TYPE C —





4'x6' DROP INLET TOP WITH ONE CAST IRON GRATE

REVISIONS AND CORRECTIONS
APR. 2, 1973—ORIGINAL D-6 REDRAWN.

APPROVED
April 4, 1973
DATE

R H Arnold es
CHIEF ENGINEER

E. H. Sturtevant Jr
ASST. CHIEF ENGINEER

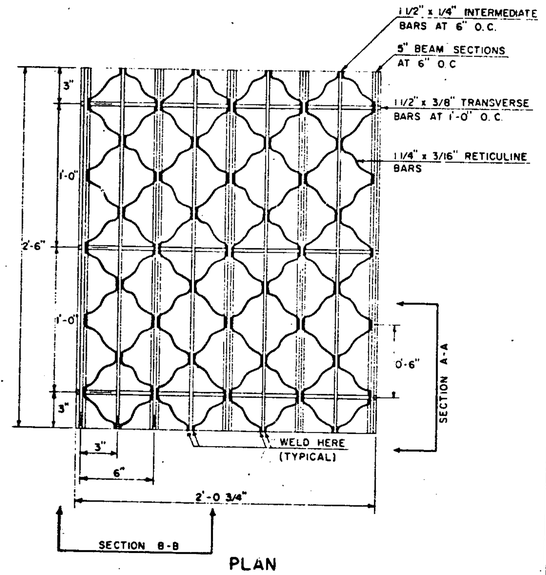
P M Law q
HIGHWAY ENGINEER

REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-6

STEEL GRATE



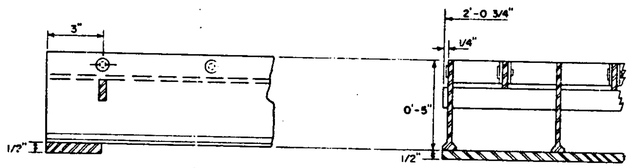
PLAN

GRATE SIZE SINGLE 24 3/4" x 30"
DOUBLE 24 3/4" x 54"

WEIGHT 95 LBS OR MORE

GRATES SHALL BE CAPABLE OF SUPPORTING H-20 (32,000 LB. AXLE LOAD) INCLUDING 30% IMPACT.

UNIT STRESSES (LBS PER SQ. IN.)		18,000	20,000
MAIN BAR PARALLEL TO TRAFFIC	H-20	49"	53"
MAIN BAR PERPENDICULAR TO TRAFFIC	H-20	39"	42"



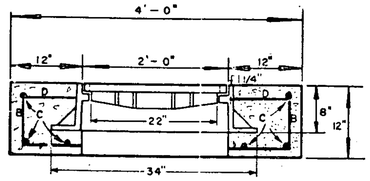
3" x 1/2" x 2'-0 3/4" STEEL BEARING R'S WELDED TO BOTTOM OF GRATING

SECTION A-A

SECTION B-B

CAST IRON COVER WITH FRAME

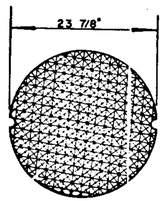
BAR	NO.	LENGTH	
B	4		3'-8"
C	6	3'-8"	STRAIGHT
D	4	3'-8"	STRAIGHT



ELEVATION

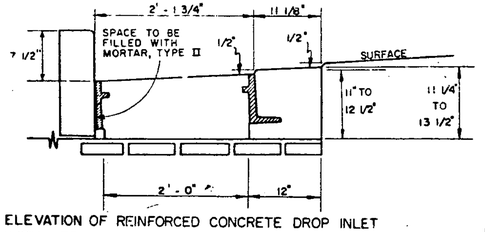
ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS

GENERAL NOTES:
WEIGHT OF FRAME AND COVER = 425 LBS.



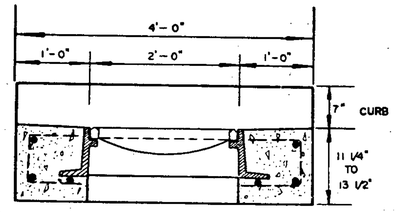
PLAN

CAST IRON GRATE WITH FRAME

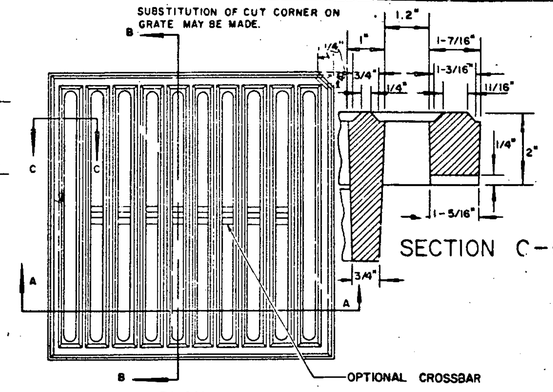


ELEVATION OF REINFORCED CONCRETE DROP INLET WITH VERTICAL GRANITE CURB AND 3 FLANGE CAST IRON FRAME FOR CAST IRON GRATE.

SEE STANDARD D-9 FOR CONCRETE VOLUME, REINFORCING STEEL SCHEDULE AND CURB JOINT DETAIL.

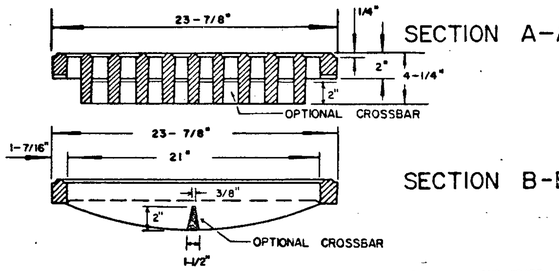


ELEVATION



PLAN

SECTION C-C



SECTION A-A

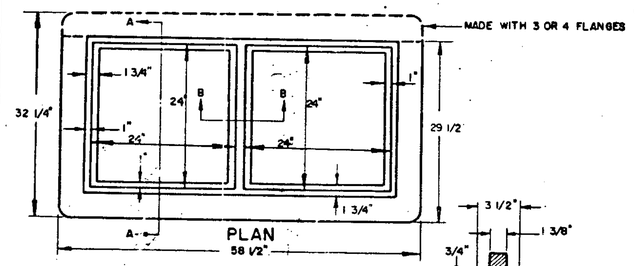
SECTION B-B

WEIGHT OF 3 FLANGED FRAME AND GRATE

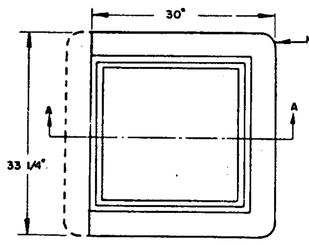
GRATE	220 LBS
FRAME	260 LBS
TOTAL	480 LBS

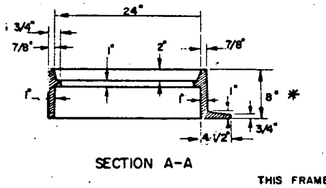
CAST IRON GRATE, TYPE A

USE OF THE TYPE A GRATE IS PROHIBITED WHERE BICYCLE TRAFFIC IS EXPECTED.



RECTANGULAR CAST IRON FRAME FOR TWO 24" SQUARE CAST IRON GRATES





SECTION A-A

SQUARE CAST IRON FRAME FOR CAST IRON GRATE TYPE A

THIS FRAME TO BE PLACED IN DROP INLET TOP BEFORE CONCRETE IS POURED.

4 FLANGES UNLESS OTHERWISE INDICATED. FRAMES TO BE FURNISHED WITH 3 FLANGES WHEN USED IN CONJUNCTION WITH CURB OR AS DIRECTED BY THE ENGINEER.

* NOTE: FRAME DEPTH TO BE "8" WHEN USED IN CONJUNCTION WITH DROP INLET DETAILED ON STANDARD D-6.

REVISIONS AND CORRECTIONS

APRIL 25, 1972 CAST IRON COVER CHANGED FROM SQUARE TO CIRCULAR
SEPT. 4, 1980 OPTIONAL CROSSBAR ADDED TO 'A' GRATE; NOTE ADDED TO 'A' GRATE FRAME DETAIL.
AUG 24, 1981 NOTE ADDED RESTRICTING USE OF TYPE A GRATE.

APPROVED DATE Oct. 6, 1971

R. N. Arnold
CHIEF ENGINEER

E. H. Pitchney
ASST. CHIEF ENGINEER

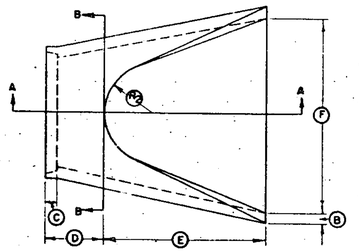
G. M. Lane
HIGHWAY ENGINEER

DRAWN: G. AJA
TRACED: A JA

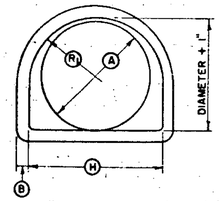
STEEL GRATE
CAST IRON GRATE TYPE A
CAST IRON COVER

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-11

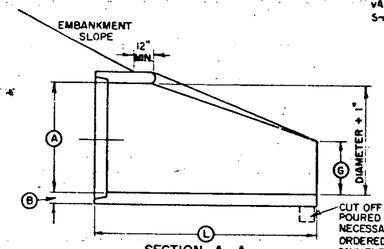


PLAN

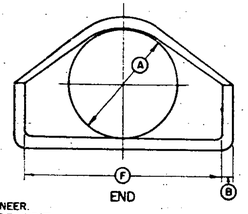


SECTION B-B

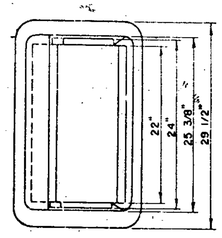
THE USE OF REINFORCED CONCRETE END SECTIONS MAY NO VARIATIONS IN BASIC DIMENSIONS FROM THOSE SHOWN ON THIS SHEET SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER



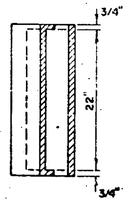
SECTION A-A



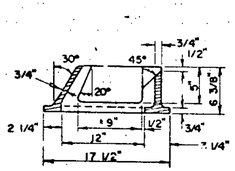
END

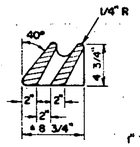


FRAME



GRATE





ALTERNATE GRATE AND FRAME

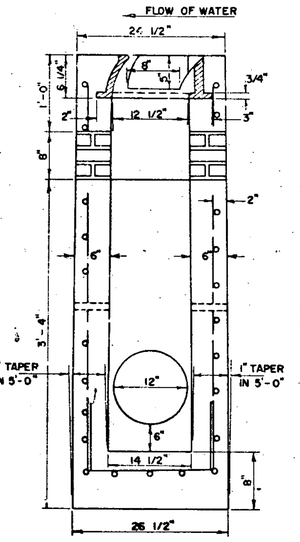
NOTE: JOINTS SHALL BE TONGUE AND GROOVE OR BELL AND SPIGOT AS REQUIRED AND DIMENSIONS SHALL CONFORM TO STANDARD REINFORCED CONCRETE PIPE SPECIFICATIONS.

BASIC DIMENSIONS												
A	B	C	D	E	F	G	H	DIAM. + 1"	SLOPE	R1	R2	RATIO A1/A2*	L
12"	2"	SEE NOTE	48 3/8"	24"	24"	4"	19 15/16"	13"	2.7:1	10 1/8"	9"	1.92	6'-0 3/8"
18"	2 1/2"		46"	27"	36"	9"	29"	19"	2.7:1	15 1/2"	12"	1.88	6'-1"
24"	3"		30"	43 1/2"	48"	9 1/2"	33 3/16"	25"	2.8:1	16 13/16"	14"	1.58	6'-1 1/2"
30"	3 1/2"		19 3/4"	54"	60"	12"	37"	31"	2.8:1	18 1/2"	15"	1.41	6'-1 3/4"
36"	4"		34 3/4"	63"	72"	15"	47 13/16"	37"	2.9:1	24 5/16"	20"	1.50	8'-1 3/4"
42"	4 1/2"		35"	63"	78"	21"	53 7/8"	43"	2.9:1	27 1/2"	22"	1.46	8'-2"
48"	5"		26"	72"	87"	24"	59 1/2"	49"	2.9:1	30"	22"	1.40	8'-2"

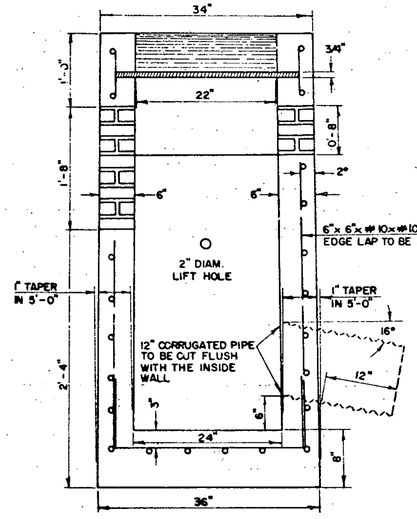
AREA-1=AREA OF NOMINAL DIAMETER
*AREA-2=AREA THRU SECTION B-B

REINFORCED CONCRETE PIPE END SECTION

FURNISHING AND LAYING OF BRICKS SHALL BE INCLUDED IN THE UNIT BID PRICE FOR EACH DROP INLET.



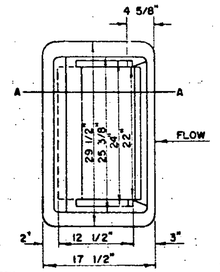
END ELEVATION



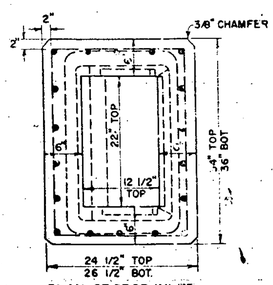
SIDE ELEVATION

ALLOW FOR 1'-6" OF BRICKS ON SIDE OPPOSITE OUTLET PIPE
0'-6" BRICKS ON OTHER 3 SIDES.

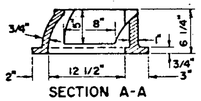
PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE



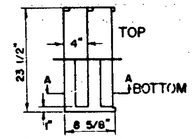
PLAN OF FRAME



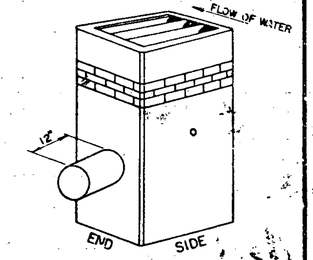
PLAN OF DROP INLET BARREL



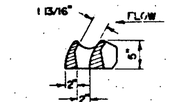
SECTION A-A



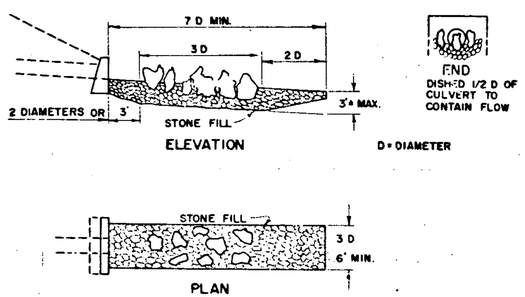
PLAN OF GRATE



ISOMETRIC



SECTION A-A
GRATE



FOR USE ONLY AT LOCATIONS OF VERY HIGH DISCHARGE AND ERODABLE SOIL CONDITIONS

IRREGULAR COBBLES APPROXIMATING THE MAXIMUM SIZE FOR TYPE OF SPECIFIED STONE FILL TO BE PLACED IN GENERAL PATTERN AS SHOWN. NO STONE TO BE CLOSER THAN 2D TO OUTLET OF PIPE. STONES SHOULD NOT BE PLACED TO DAM FLOW, BUT TO INDUCE TURBULENCE AND REDUCE VELOCITY. PLAN MAY BE ADAPTED TO FIELD CONDITIONS PREVAILING AT OUTLET. WHERE FLOW IS TO ULTIMATELY FOLLOW TOE OF SLOPE, DESIGN MAY BE SHORTENED OR WIDENED TO ACT AS A STILLING BASIN, AND DIRECT FLOW INTO DITCH.

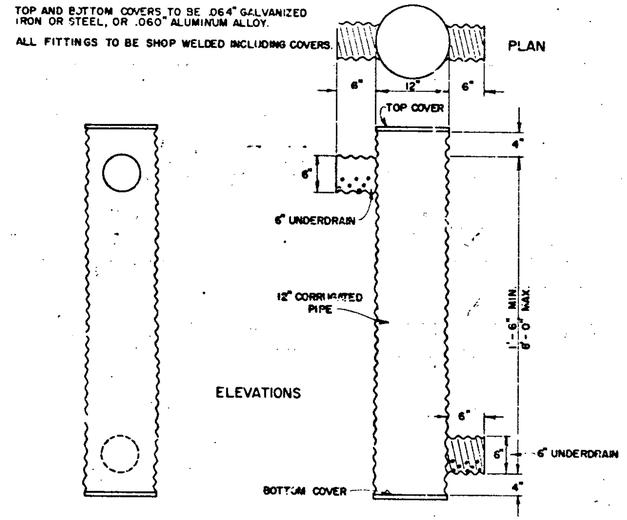
STONES FORMING BREAK SHOULD PROJECT ABOVE AND BELOW SURFACE OF STONE FILL APPROXIMATELY 3/4 THE DIAMETER OF THE PIPE.

STONE FILL TYPE TO BE SPECIFIED ON PLANS.

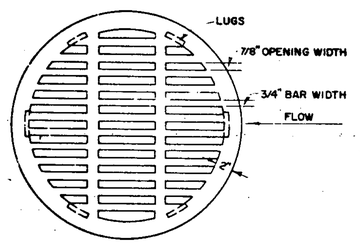
ENERGY DISSIPATOR FOR CULVERTS

TOP AND BOTTOM COVERS TO BE .064" GALVANIZED IRON OR STEEL, OR .060" ALUMINUM ALLOY.

ALL FITTINGS TO BE SHOP WELDED INCLUDING COVERS.

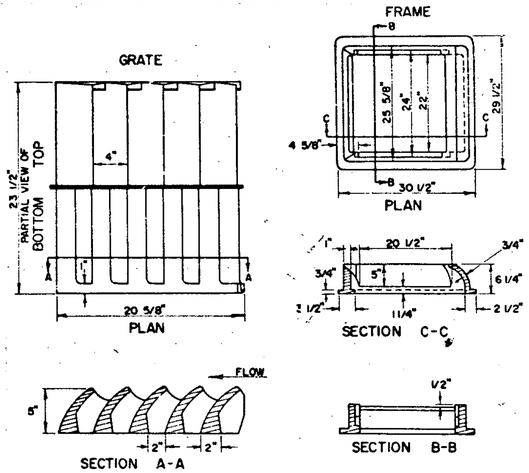


UNDERDRAIN RISER



ELEVATION

CAST IRON GRATE, TYPE C
TO BE USED IN CONJUNCTION WITH 24" CORRUGATED GALVANIZED METAL PIPE



CAST IRON GRATE WITH FRAME, TYPE B

REVISIONS & CORRECTIONS

NOV 14, 1972 - PCP END SECTION DIMENSION VARIANCE NOTE ADDED

APPROVED

DATE Dec. 8, 1971

R. H. Arnold
CHIEF ENGINEER

E. H. Stickney
ASST. CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

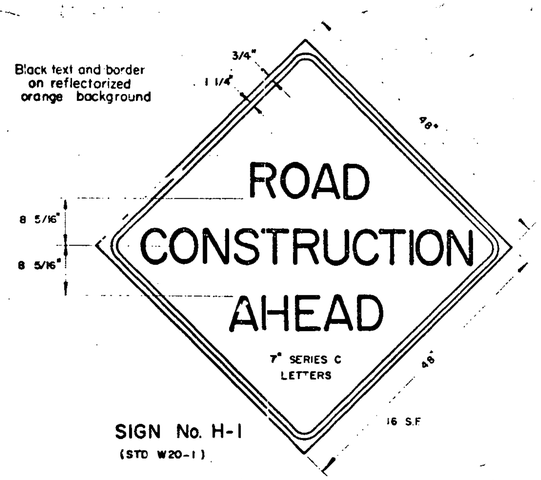
PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE
CAST IRON GRATE, TYPE B
CAST IRON GRATE, TYPE C
UNDERDRAIN RISER
REINFORCED CONCRETE PIPE END SECTION
ENERGY DISSIPATOR FOR CULVERT

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

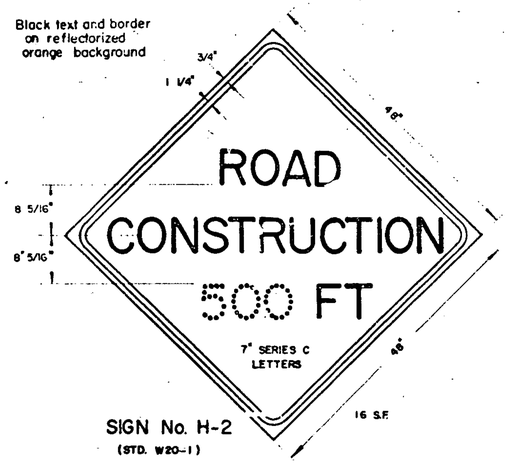
D-16

SIGN H-3 IS TO BE USED WHEN PROJECT LENGTH EXCEEDS 2 MILES, OR AS REQUESTED BY THE RESIDENT ENGINEER. THE TEXT MAY BE AS SHOWN OR MAY READ AS FOLLOWS "CONSTRUCTION AREA NEXT ___ MILES"

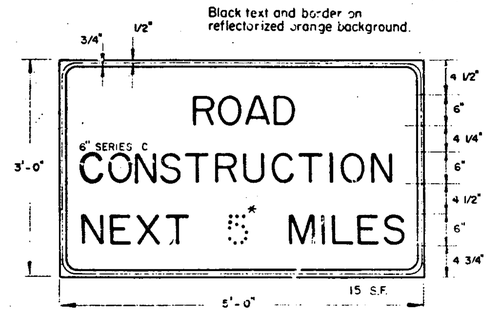
* Show mileage to nearest 1/4 mile



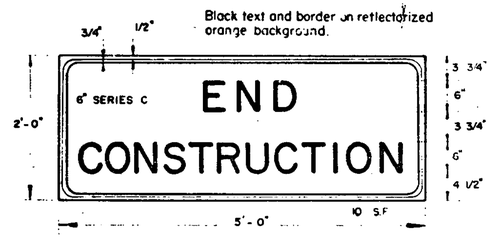
SIGN No. H-1
(STD W20-1)



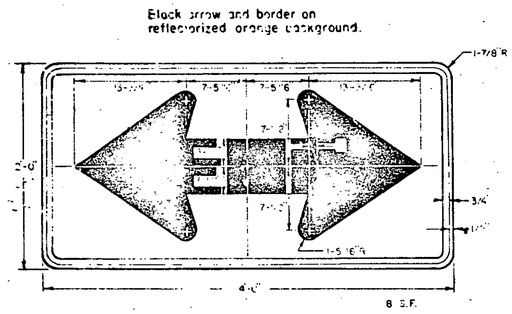
SIGN No. H-2
(STD. W20-1)



SIGN No. H-3 (STD. G20-1)

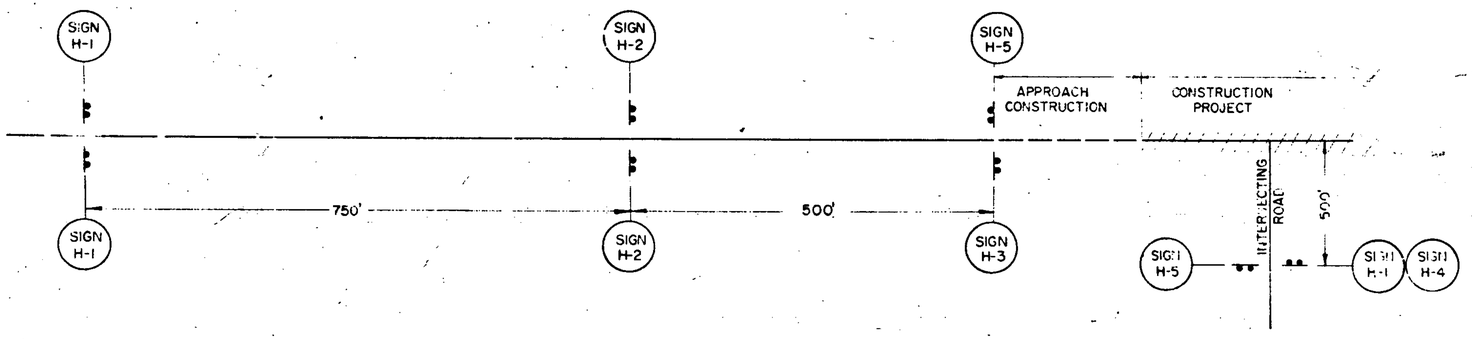


SIGN No. H-5 (STD. G20-2)



SIGN No. H-4 (STD. W1-7)

The road construction approach signs shown on this sheet are intended for use in providing advance warning and information on construction projects over which traffic will be maintained. When additional approach signs or other types of advance signing or control are necessary, the Plans and/or the Specifications for that project will give the details of the signs and devices required.



NOTES

LOCATION

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 highway under construction, and on all 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 will be approved that will deteriorate by exposure to the weather during the required life of the sign.

REFLECTORIZATION

All reflectorized material shall consist of encapsulated lens reflective sheeting.

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 guard rail, curbing or sidewalk. Posts and signs shall be braced or reinforced in back as necessary. The installation of signs shall be subject to approval of the Engineer. In urban areas, the bottom of the sign shall be at least 7 above the sidewalk.

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 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. 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).

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

REVISIONS AND CORRECTIONS

SEPT. 11, 1973 - REVISED PER ORDER OF FHWA, SEPT. 11, 1973
OCT. 19, 1973 - SIGN H-4 REMOVED
MAY 14, 1974 - REFLECTIVE MATERIAL CHANGE
JUNE 7, 1977 - REFLECTIVE MATERIAL NOTE CHANGED.
DEC. 15, 1978 - ILLUMINATION DELETED.
DEC. 17, 1979 - SIGN H-3 REVISED, SIGN H-4 ADDED.
MAR. 4, 1981 - SIGN H-3 TEXT CHANGED, NOTE ADDED.

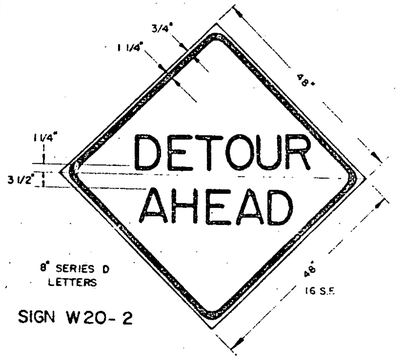
APPROVED
Dec. 14, 1971 DATE
R. H. Arnold, CHIEF ENGINEER
E. W. Stuckney, ASST. CHIEF ENGINEER
G. M. Lane, HIGHWAY ENGINEER

TRAFFIC SIGNS

ROAD CONSTRUCTION APPROACH SIGNS

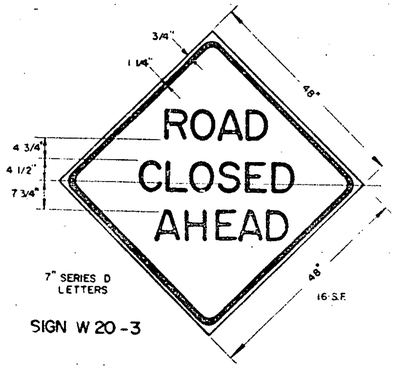
VERMONT AGENCY OF TRANSPORTATION

STANDARD
E-2



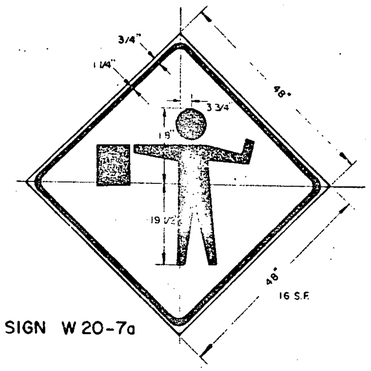
8" SERIES D LETTERS

SIGN W 20-2

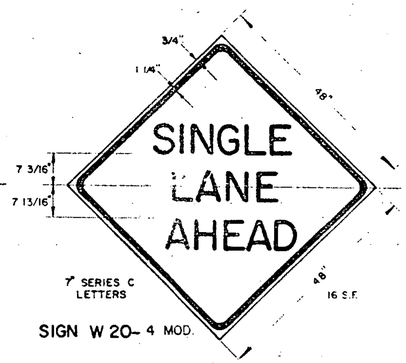


7" SERIES D LETTERS

SIGN W 20-3

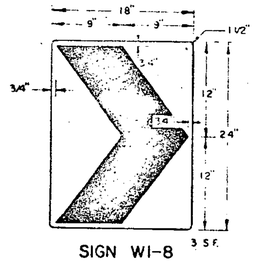


SIGN W 20-7a

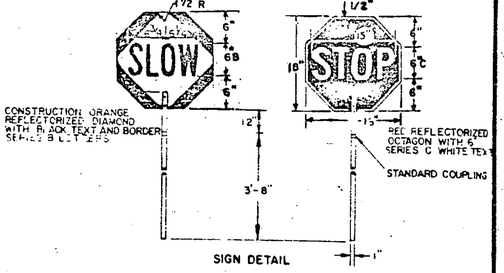


7" SERIES C LETTERS

SIGN W 20-4 MOD.



SIGN W1-8



MATERIALS

The sign materials shall be 0.063 aluminum with colors as indicated on details.

The staff shall be 1" ridged aluminum conduit or tubing with a wall thickness of 1/8 inch.

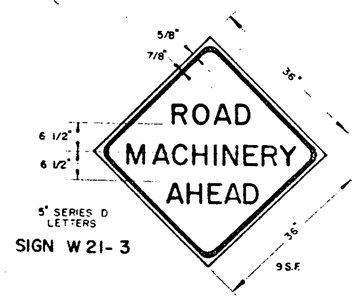
COLORS

The colors 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.

MOUNTING

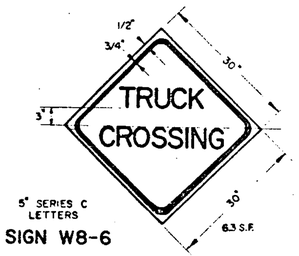
The staff shall be mounted with either 2-1/4" aluminum bolts or 2-1/4" aluminum rivets.

SIGN PADDLE FOR FLAGPERSON



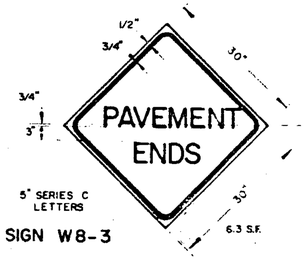
5" SERIES D LETTERS

SIGN W 21-3



5" SERIES C LETTERS

SIGN W8-6



5" SERIES C LETTERS

SIGN W8-3

NOTES

APPLICATION OF STANDARDS

Since it is not possible to prescribe detailed standards of application for all of the situations that may conceivably arise on a construction project, reference must be made to the Manual on Uniform Traffic Control Devices for the principles, procedures and and standards that will be required in connection with on-project construction signs and barricades. The signs here shown represent a sample of those that probably will be most used.

DESIGN

The designs of the signs and barricades shall conform with the details shown on this sheet and with the standards prescribed in the Manual. Deviations will not be permitted.

MATERIALS

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

REFLECTORIZATION AND COLORS

All signs except sign R11-2 and the sign paddle shall have black texts and borders on an encapsolated lens reflective orange background. Sign R11-2 shall have black text and border on an encapsolated lens reflective white background.

INSTALLATION

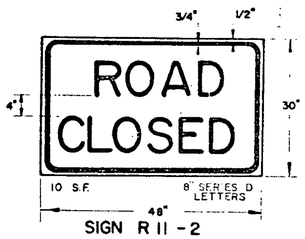
Signs and barricades shall be in place prior to the start of the construction operation to which they apply, and shall be removed promptly when the need no longer exists. Each sign shall be erected in a neat and workmanlike manner on wood or metal posts set securely in the ground, or on portable supports for temporary use, or on barricades when appropriate. As a general rule, roadside signs shall be 5 feet above road level with the nearest edge at least 6 feet outside the shoulder point. The installation of all signs and barricades shall be subject to the approval of the Engineer.

MAINTENANCE

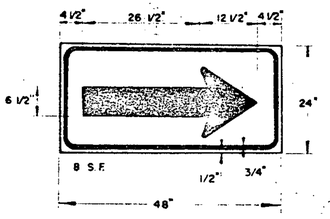
Signs shall be kept in a clean and legible condition at all times with the reflective quality completely unimpaired. Sinns, sign supports, and barricades shall be repaired, cleaned, repainted or replaced whenever necessary.

Weeds, shrubbery, construction materials, equipment, and snow shall not be allowed to obscure any sign or barricade.

The maintenance of all traffic control devices shall be subject to the orders of the Engineer.

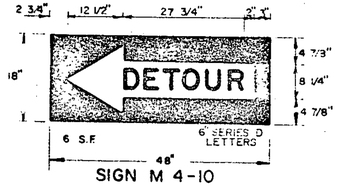


SIGN R 11-2



SIGN W 1-6

ARROW RIGHT OR LEFT AS REQUIRED



SIGN M 4-10

ARROW LEFT OR RIGHT AS REQUIRED.

The on-project construction signs covered by this sheet are intended to be used as the situations apply within normal two-lane highway construction areas, for the protection of the public and workmen and for the guidance of traffic through or around construction operations. When messages other than those shown here are needed, the signs and their applications shall conform with the standards set forth in the Manual on Uniform Traffic Control Devices.

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.

REVISIONS AND CORRECTIONS

DEC. 14, 1973 – BEADS ON PAINT FOR BACKGROUND MATERIAL REMOVED.
MAY 14, 1974 – REFLECTIVE MATERIAL CHANGE.
JUNE 7, 1977 – REFLECTIVE MATERIAL NOTE CHANGED.
JUNE 7, 1977 – SIGNS REFERENCED TO NUMBERS IN M.U.T.C.D.
APR. 20, 1978 – FLAGPERSON SIGN CHANGED TO SYMBOL.
DEC. 15, 1978 – ILLUMINATION DELETED.
FEB. 27, 1980 – SIGN W1-8 AND SIGN PADDLE ADDED. SIGN DETAILS REVISED.
APR. 1, 1980 – SIGN PADDLE SIGN REVISED.

APPROVED

Dec. 14, 1971 — DATE

R. H. Arnold — CHIEF ENGINEER

E. J. Sweeney — ASST. CHIEF ENGINEER

G. M. Lane — HIGHWAY ENGINEER

TRAFFIC SIGNS

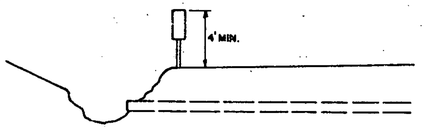
ON-PROJECT CONSTRUCTION SIGNS

VERMONT AGENCY OF TRANSPORTATION

STANDARD

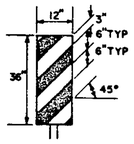
E-6

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



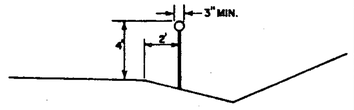
HAZARD MARKER TYPICAL

OBJECTS ADJACENT TO THE ROADWAY SHALL REQUIRE A HAZARD MARKER TO MARK THE OBSTRUCTION. IN SOME CASES THERE MAY NOT BE A PHYSICAL OBJECT INVOLVED BUT OTHER ROADSIDE CONDITONS SUCH AS NARROW SHOULDER DROP-OFFS, GORES, D.I. EXCAVATIONS OR ABRUPT CHANGE IN THE ROADWAY ALIGNMENT MAY MAKE IT UNDESIRABLE FOR A DRIVER TO LEAVE THE ROADWAY. THE INSIDE EDGE OF THE HAZARD MARKER SHALL BE IN LINE WITH THE INNER EDGE OF THE OBSTRUCTION, WHENEVER POSSIBLE.



VERTICAL PANEL

VERTICAL PANELS SHALL HAVE ALTERNATING ORANGE AND WHITE REFLECTORIZED STRIPS (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS). THESE DEVICES MAY BE USED FOR TRAFFIC SEPARATION OR SHOULDER BARRICADING WHERE SPACE IS AT A MINIMUM.



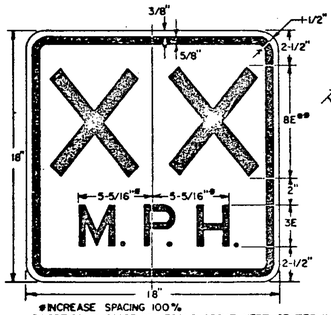
SYMBOL

DELINEATOR TYPICAL

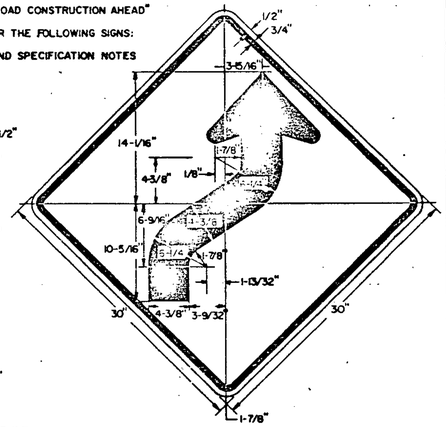
DELINEATORS SHALL BE OF A REFLECTORIZED WHITE COLOR. THEY SHALL HAVE A MINIMUM OF 7 SQUARE INCHES. THEY MAY BE ROUND, SQUARE, OR OBLONG. THEY SHALL BE OF THE FOLLOWING:

1-REFLECTORIZED TAPE WITH METAL BACKING.
2-REFLECTORIZED 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.

SEE STANDARD SHEET E-2 FOR SIGN DETAILS FOR "ROAD CONSTRUCTION AHEAD" AND "END CONSTRUCTION" SIGNS.
SEE STANDARD SHEET E-6 FOR SIGN DETAILS FOR THE FOLLOWING SIGNS: "DETOUR AHEAD", "ROAD CLOSED", "DETOUR" ARROW.
SEE STANDARD SHEET E-6 FOR SIGN MATERIAL AND SPECIFICATION NOTES FOR ALL SIGNS DETAILED ON THIS SHEET.



*INCREASE SPACING 100%
**OPTICALLY SPACE NUMERALS ABOUT VERT. CENTERLINE.



BARRICADES

APPLICATION NOTES

TYPE I BARRICADES ARE TO BE USED ON CONVENTIONAL ROADS OR URBAN STREET AND ARTERIALS TO MARK A SPECIFIC HAZARD TO CHANNELIZE TRAFFIC.

TYPE II BARRICADES ARE TO BE USED ON EXPRESSWAYS AND FREEWAYS, SERVING THE SAME FUNCTIONS AS THE TYPE I BARRICADES.

TYPE III (SEE STANDARD E-7A) SHALL ONLY BE USED WHEN A ROAD SECTION IS CLOSED TO TRAFFIC TO BE ERECTED AT THE POINT OF CLOSURE.

MATERIALS

THE BARRICADES SHOWN ON THIS SHEET NORMALLY WILL BE OF LIGHTWEIGHT MATERIAL. IF WOOD IS USED THE FOLLOWING CONDITIONS SHALL APPLY.

1. WOODEN BARRICADES (TYPES I AND II)
   A. SHALL NOT BE USED TO CHANNELIZE OR DELINEATE WORK AREAS WITHIN THE CLEAR ZONE OF ANY HIGHWAY WHERE OPERATING SPEEDS IN EXCESS OF 20 MILES PER HOUR ARE EXPECTED UNLESS INSTALLED FOR PEDESTRIAN CONTROL BEHIND APPROVED POSITIVE BARRIERS.
   B. MAY BE USED IF OPERATING SPEEDS OF 20 M.P.H. OR LESS ARE EXPECTED.
2. TYPE III WOODEN BARRICADES SHALL NOT BE USED WITHIN THE CLEAR ZONE OF ANY HIGHWAY REGARDLESS OF THE TRAFFIC OPERATING SPEED.

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° IN THE DIRECTION TRAFFIC IS TO PASS.

COLORS

THE BARRICADES PANELS SHOWN ON THIS SHEET SHALL HAVE ALTERNATING REFLECTORIZED WHITE AND ORANGE STRIPES. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS AND APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION. THE BARRICADE COMPONENTS SHALL BE WHITE EXCEPT THAT UNPAINTED METAL OR ALUMINUM MAY BE USED.

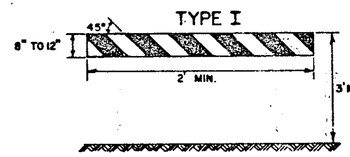
REFLECTORIZATION

THE BARRICADES SHALL BE REFLECTORIZED WITH REFLECTIVE SHEETING.

LOCATION

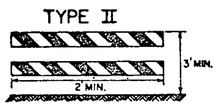
THE BARRICADES SHOWN ON THIS SHEET WILL BE LOCATED BY THE ENGINEER IN THE FIELD OR AS SHOWN ON THE PLANS. THE LOCATION OF THE BARRICADES SHALL FOLLOW THE PROCEDURES SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, OR AS OTHERWISE NOTED.

TYPE I

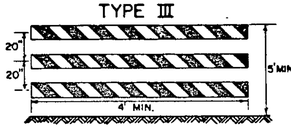


STRIPPING IS SHOWN WITH TRAFFIC PASSING TO THE RIGHT.

TYPE II



TYPE III



BARRICADE	CHARACTERISTICS	
	I	II
WIDTH OF RAIL	8" MIN. 12" MAX.	8" MIN. 12" MAX.
LENGTH OF RAIL	2' MIN.	2' MIN.
WIDTH OF STRIPS*	6"	6"
HEIGHT	3' MIN.	3' MIN.
TYPE OF FRAME	DEMOUNTABLE OR 'A' FRAME	LIGHT "A" FRAME NO STAY BRACE
FLEXIBILITY	ESSENTIALLY MOVEABLE	PORTABLE
ANGLE OF STRIPE	45°	45°
COLOR OF STRIPS	ORANGE AND WHITE	ORANGE AND WHITE

* FOR RAILS LESS THAN 3 FEET LONG, 4" WIDE STRIPS SHALL BE USED.

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.

LIGHTING

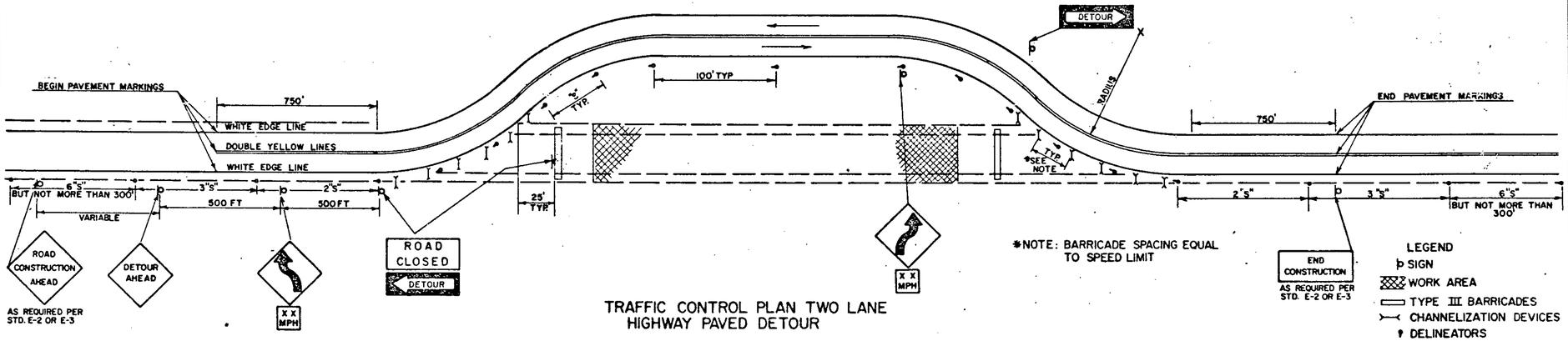
FOR NIGHTTIME USE ADD FLASHING WARNING LIGHTS WHEN BARRICADES ARE USED SINGLY AND STEADY BURN LIGHTS WHEN BARRICADES ARE USED IN A SERIES FOR CHANNELIZATION. THE LIGHTING DEVICES SHALL CONFORM TO THOSE SPECIFIED IN THE MUTCD.

DELINEATOR SPACING

DESIGN SPEED MPH	REQUIRED RADIUS FT	SPACING - "S" FT
25	150	30
30	250	40
40	460	60
50	760	75

NOTES

1. SIGNS & DELINEATION SHOWN FOR ONE DIRECTION OF TRAVEL ONLY.
2. CHANNELIZING DEVICES SHALL CONSIST OF TYPE II BARRICADES WITH STEADY BURN LIGHTS EXCEPT ON THE FIRST AND LAST BARRICADES WHICH SHALL HAVE A FLASHING LIGHT.
3. FLASHING WARNING LIGHTS MAY BE USED TO CALL ATTENTION TO THE EARLY WARNING SIGNS.
4. CONTRACTOR IS RESPONSIBLE FOR PAVEMENT MARKING AND SHALL REMOVE ANY CONFLICTING OR CONFUSING EXISTING MARKINGS.
5. ADDITIONAL SIGNING MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER.
6. UNPAVED DETOURS REQUIRE PAVEMENT MARKINGS FOR TRANSITIONS ON EXISTING PAVEMENT.



TRAFFIC CONTROL PLAN TWO LANE HIGHWAY PAVED DETOUR

*NOTE: BARRICADE SPACING EQUAL TO SPEED LIMIT

LEGEND
- SIGN
- WORK AREA
- TYPE III BARRICADES
- CHANNELIZATION DEVICES
- DELINEATORS

REVISIONS AND CORRECTIONS

FEB. 12, 1982 MATERIALS NOTE CLARIFIED, SIGN ADDITIONS.
FEB. 2, 1983 NOTE # 6 RE: UNPAVED DETOURS ADDED.

APPROVED:

SEPT. 22, 1981
DATE

DIRECTOR OF ENGINEERING AND CONSTRUCTION

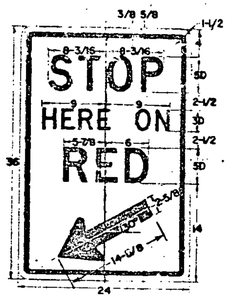
CHIEF OF DESIGN

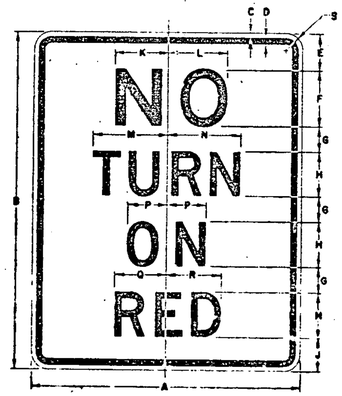
TRANSPORTATION DESIGN ENGINEER

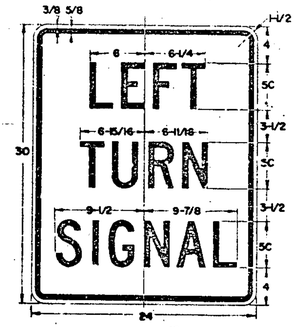
DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS

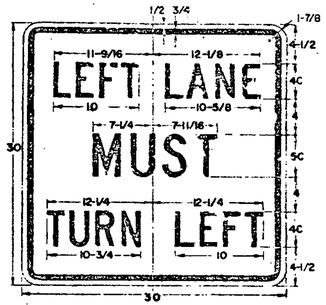
VERMONT AGENCY OF TRANSPORTATION

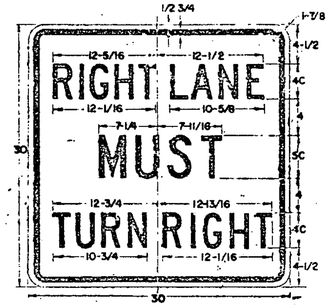
STANDARD
E-7

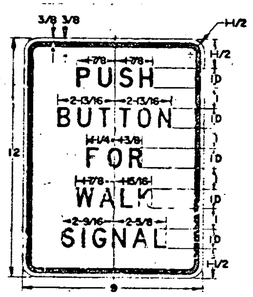












SIGN	DIMENSIONS (INCHES)																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
STD.	24	30	3/8	5/8	3-1/4	5E	2-1/4	4D	3	4-13/16	5-3/16	6-5/8	6-1/2	3-1/2	4-5/8	4-7/8	1-1/2
SPECIAL	36	48	5/8	7/8	6	8E	3-1/2	6D	5-1/2	7-3/4	8-1/4	10	9-3/4	5-1/4	6-7/8	7-3/8	2-1/4

LINE 1 ALTERNATE

COLORS:

THE REGULATORY SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT ON REFLECTORIZED WHITE BACKGROUND. 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 THE REGULATORY SIGNS SHOWN ON THIS SHEET MAY BE ANY OF THE FOLLOWING, OF THE MINIMUM THICKNESS NOTED.

	9"X12"	24"X24" 24"X30" 30"X30"	36"X36"
FLAT SHEET ALUMINUM	0.060"	0.080"	0.100"
HIGH DENSITY OVERLAID PLYWOOD	—	1/2"	5/8"
GALVANIZED FLAT SHEET STEEL	18 GAGE	16 GAGE	14 GAGE

THE REFECTIVE MATERIAL FOR GROUND MOUNTED SIGNS SHALL BE FLAT TOP WHITE REFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND OF THE SIGN. WHEN MOUNTED OVERHEAD, ALL SIGNS SHALL HAVE HIGH INTENSITY ENCAPSULATED LENS REFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND OF THE SIGN.

THE TEXT OF THE SIGNS MAY BE LETTERING FILM, SILK SCREENED OR HAND PAINTED. WHEN HAND PAINTED, POOR WORKMANSHIP SHALL BE CAUSE FOR REJECTION.

TEXT DESIGN:

LETTERS, DIGITS, ARROWS, SPACINGS, AND TEXT DIMENSIONS SHALL CONFORM WITH THE STANDARD ALPHABETS AND DESIGNS PRESCRIBED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES PREPARED BY THE NATIONAL JOINT COMMITTE ON UNIFORM TRAFFIC CONTROL DEVICES.

SPECIFICATIONS

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

REVISIONS AND CORRECTIONS

APPROVED: JULY 29, 1981
DATE

DIRECTOR OF ENGINEERING AND CONSTRUCTION

CHIEF OF DESIGN

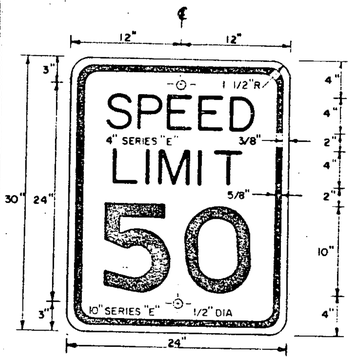
TRANSPORTATION DESIGN ENGINEER

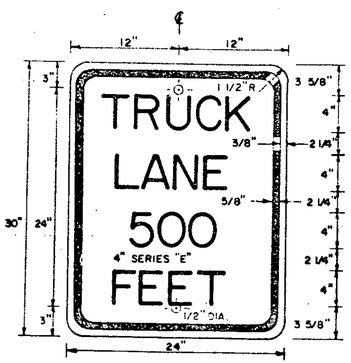
REGULATORY SIGNS

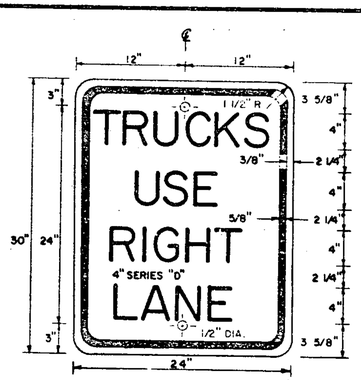
VERMONT AGENCY OF TRANSPORTATION

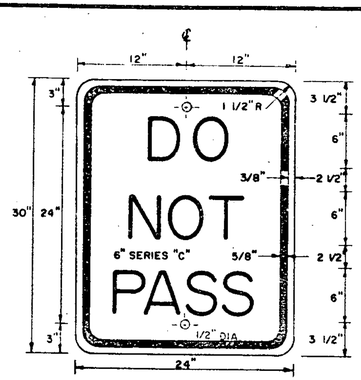
STANDARD

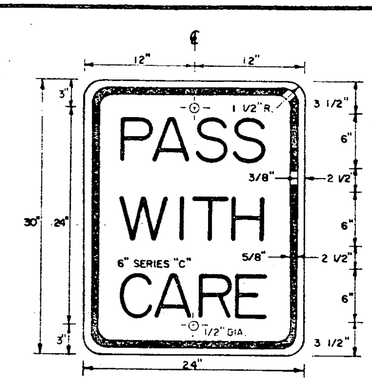
E-15

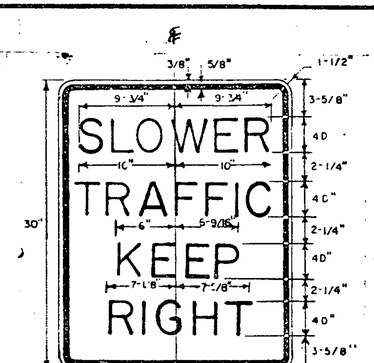


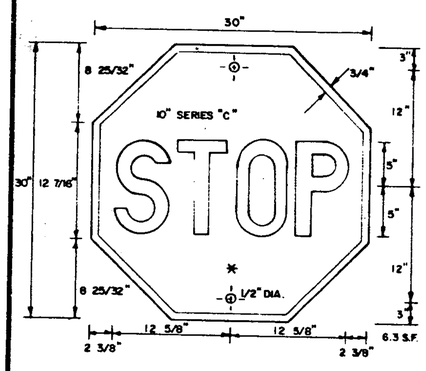


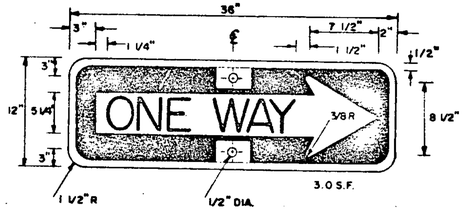


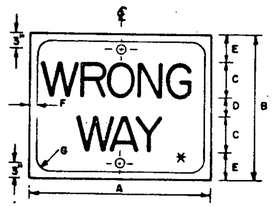




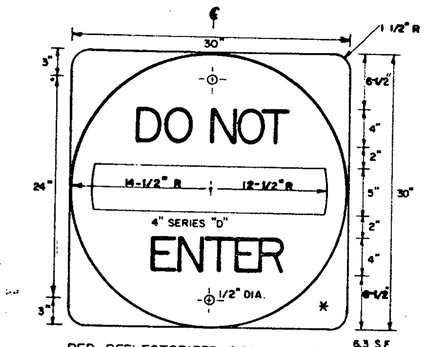




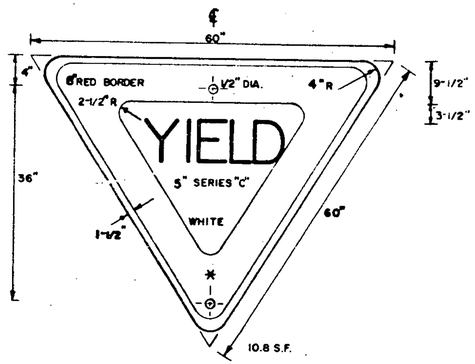




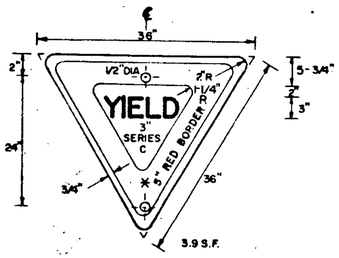
DIMENSIONS							
A	B	C	D	E	F	G
30"	24"	6"C	3"	4 1/2"	5/8"	5/8"
36"	24"	6"D	3 1/2"	4 1/2"	3/4"	3/4"
48"	30"	8"D	4 1/2"	4 3/4"	1"	1"



RED REFLECTORIZED CIRCLE ON A REFLECTORIZED WHITE BACKROUND WITH WHITE STRIPE AND TEXT, REVERSE SCREENED.



RED REFLECTORIZED BORDER ON A REFLECTORIZED WHITE BACKROUND WITH RED PAINTED TEXT, REVERSE SCREENED METHOD.



RED REFLECTORIZED BORDER ON A REFLECTORIZED WHITE BACKROUND WITH RED PAINTED TEXT, REVERSE SCREENED METHOD.

MATERIALS:

The sign base materials used for the regulatory signs shown on this sheet may be any of the following, of the minimum thickness noted:

	24"x30"	30"x30" 36" Δ 36"x12" 36"x24"	48"x30" 60" Δ
FLAT SHEET ALUMINUM	0.008"	0.100"	0.125"
HIGH DENSITY OVERLAID PLYWOOD	1/2"	5/8"	5/8"
GALVANIZED FLAT SHEET STEEL	16gage	14gage	12gage

The reflective material for the black and white signs shall be flat top silver reflective sheeting applied to the entire backround of the sign.

* The reflective material for the red and white signs shall have high intensity encapsulated lens reflective sheeting applied to the entire backround of the sign.

The text of the STOP, DO NOT ENTER, WRONG WAY, and border of YIELD signs shall be reversed screened; the text of the other signs may be lettering film, silk screened or hand painted.

COLORS:

The regulatory signs shown on this sheet, except the STOP, DO NOT ENTER, WRONG WAY, and YIELD signs, shall have black text on reflectorized white or silver backround.

The STOP, DO NOT ENTER, and WRONG WAY signs shall have a reflectorized white or silver text on a reflectorized red backround.

The YIELD sign shall have a red text on a reflectorized white backround with a red border reversed screened.

The red, white, and black shall conform with the standard colors adopted by the American Association of State Highway Officials and approved by the Department of Transportation, Federal Highway Administration.

TEXT DESIGN:

Letters, digits, arrows, spacings, and text dimensions shall conform with the standard alphabets and designs prescribed in the Manual on Uniform Traffic Control Devices prepared by the National Joint Committe on Uniform Traffic Control Devices.

SPECIFICATIONS:

Regulatory signs shall meet the standard state specifications for traffic signs.

REVISIONS AND CORRECTIONS

Jan. 8, 1974 Revised to include encapsulated lens reflective sheeting.

Added SLOWER TRAFFIC sign and deleted KEEP RIGHT sign.

FEB 23 1984 Revised yield signs

APPROVED: DATE: Jan. 4, 1972

R. H. Conold
CHIEF ENGINEER

E. W. Stickney
ASST. CHIEF ENGINEER

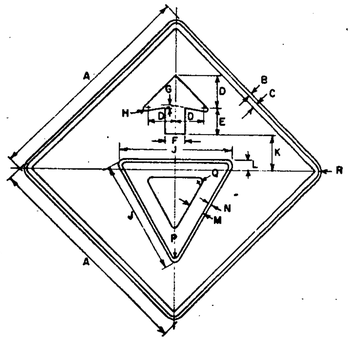
G. M. Lane
HIGHWAY ENGINEER

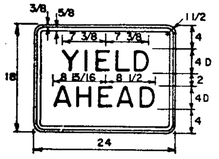
REGULATORY SIGNS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

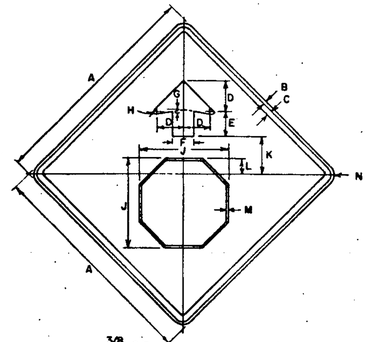
E-17

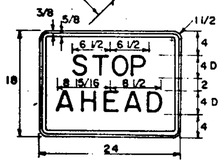
D 8



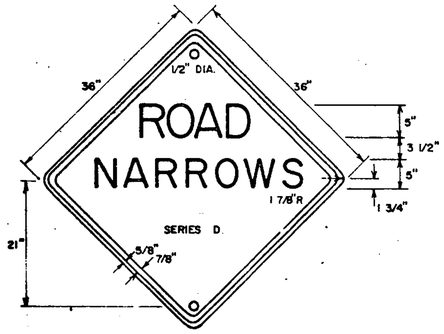


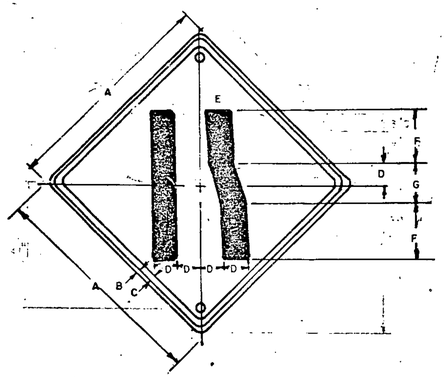
SIGN	DIMENSIONS															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
MIN.	30	1/2	3/4	5	3 3/4	3 1/4	5/8	5/16	18 3/4	6 1/4	1 1/4	2 1/2	3/8	5/16	1/2	1 7/8
STD.	36	5/8	7/8	6	4 1/2	3 3/4	3/4	3/8	22 1/2	7 1/2	1 1/2	3	1/2	1 1/8	5/8	2 1/4
SPECIAL	48	3/4	1 1/4	8	6	5	1	1/2	30	10	2	4	5/8	1 1/2	7/8	3



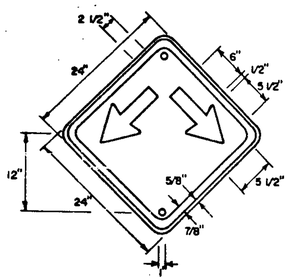


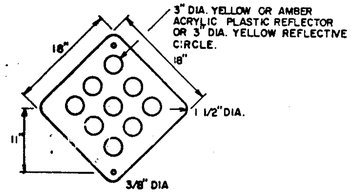
SIGN	DIMENSIONS												
	A	B	C	D	E	F	G	H	J	K	L	M	N
MIN.	30	1/2	3/4	5	3 3/4	3 1/4	5/8	5/16	12 1/2	6 1/4	1 1/4	3/8	1 7/8
STD.	36	5/8	7/8	6	4 1/2	3 3/4	3/4	3/8	15	7 1/2	1 1/2	1/2	2 1/4
SPECIAL	48	3/4	1 1/4	8	6	5	1	1/2	20	10	2	5/8	3



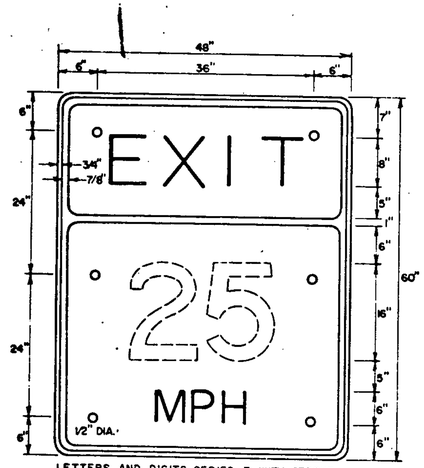


SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
MIN.	30	1/2	3/4	3-3/8	13/16	8-7/16	6-3/4	1-7/8
STD B EXPWY	36	5/8	7/8	4	1	10	8	2-1/4
FWY.	48	3/4	1-1/4	5-5/16	1-3/8	13.15/16	10-5/8	3





HAZARD MARKER:
HAZARD MARKERS SHALL BE OF 0.060 FLAT SHEET ALUMINUM OR 18 GAGE GALVANIZED FLAT SHEET STEEL, WITH A YELLOW BAKED ENAMEL FINISH AND NINE 3" DIA. CIRCLES EVENLY SPACED WITH MATERIALS AS NOTED ABOVE.



LETTERS AND DIGITS SERIES E WITH STROKE WIDTH 0.2" PER INCH OF HEIGHT.

MATERIALS

THE SIGN BASE MATERIALS USED FOR THE WARNING SIGNS ON THIS SHEET MAY BE ANY OF THE FOLLOWING, OF THE THICKNESS NOTED (IN INCHES).

	18 x 18	30 x 30	36 x 36	48 x 60
FLAT SHEET ALUMINUM	0.060	0.080	0.100	0.100
HIGH DENSITY OVERLAID PLYWOOD	1/2	1/2	5/8	5/8
GALVANIZED FLAT SHEET STEEL	18 GA.	16 GA.	14 GA.	16 GA.

THE REFLECTIVE MATERIAL SHALL BE OF REFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND OF THESE SIGNS, EXCEPT THE HAZARD MARKER WHICH SHALL HAVE A BAKED ENAMEL BACKGROUND. THE TEXT AND BORDERS MAY BE SCREENED, LETTERING FILM, OR HAND PAINTED.

COLORS

THE WARNING SIGNS SHOWN ON THIS SHEET, EXCEPT THE HAZARD MARKER, YIELD AHEAD AND STOP AHEAD SHALL HAVE A BLACK TEXT AND BORDER OR A REFLECTORIZED YELLOW BACKGROUND. THE HAZARD MARKER SHALL HAVE A NON-REFLECTORIZED YELLOW BACKGROUND WITH YELLOW ACRYLIC PLASTIC REFLECTOR OR REFLECTIVE SHEETING CIRCLES. THE REFLECTIVE SHEETING FOR THESE CIRCLES SHALL HAVE A MINIMUM BRIGHTNESS VALUE OF 95 AT -4° ANGLE OF INCIDENCE AND 0.2° DIVERGENCE ANGLE; AND 7.5 AT 40° ANGLE OF INCIDENCE AND 0.5° DIVERGENCE ANGLE, EXPRESSED AS AVERAGE CANDLE POWER PER FOOT-CANDLE, PER SQUARE FOOT OF MATERIAL. THE YIELD AHEAD AND STOP AHEAD SIGNS SHALL HAVE A BLACK BORDER AND ARROW WITH A RED REVERSED SCREENED SYMBOL ON A WHITE BACKGROUND. THE MAIN BACKGROUND IS REFLECTORIZED YELLOW. THE YELLOW SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE UNITED STATES DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

TEXT DESIGN

LETTERS, DIGITS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE STANDARD ALPHABETS AND DESIGNS PRESCRIBED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

SPECIFICATIONS

WARNING SIGNS SHALL MEET STANDARD SPECIFICATIONS FOR TRAFFIC SIGNS.

THE YIELD AHEAD AND STOP AHEAD SIGNS SHALL HAVE AN ENCAPSULATED LENS REFLECTIVE MATERIAL BACKGROUND ALL OTHERS ON THIS SHEET SHALL BE ENGINEER GRADE.

REVISIONS AND CORRECTIONS

SEPT. 29, 1977 - REVISION DUE TO SYMBOL SIGNS.
MAY 18, 1978 - ENCAPSULATED LENS NOTE ADDED.
DEC 20, 1982 LANEMERGE SIGN REMOVED SYMBOL SIGN ADDED

APPROVED

Feb. 4, 1972
DATE

R.H. Arnold
CHIEF ENGINEER

E.H. Stickney
ASST. CHIEF ENGINEER

G.M. Lane
HIGHWAY ENGINEER

WARNING SIGNS

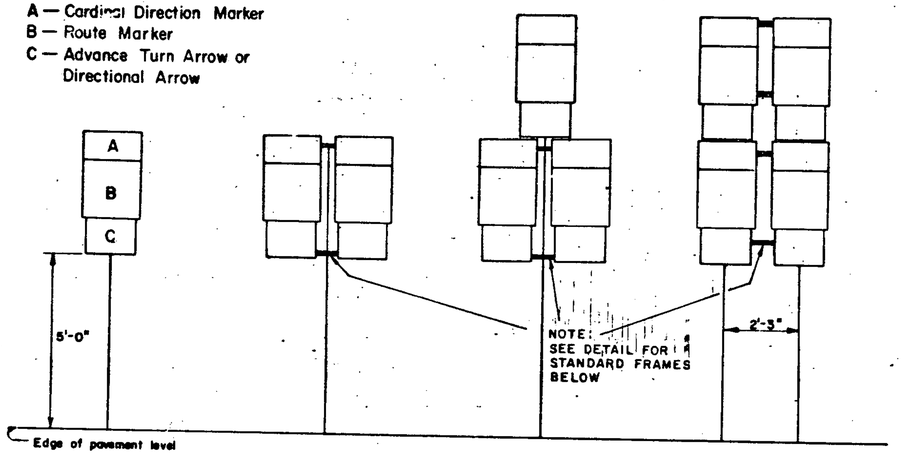
VERMONT AGENCY OF TRANSPORTATION

STANDARD

E-19

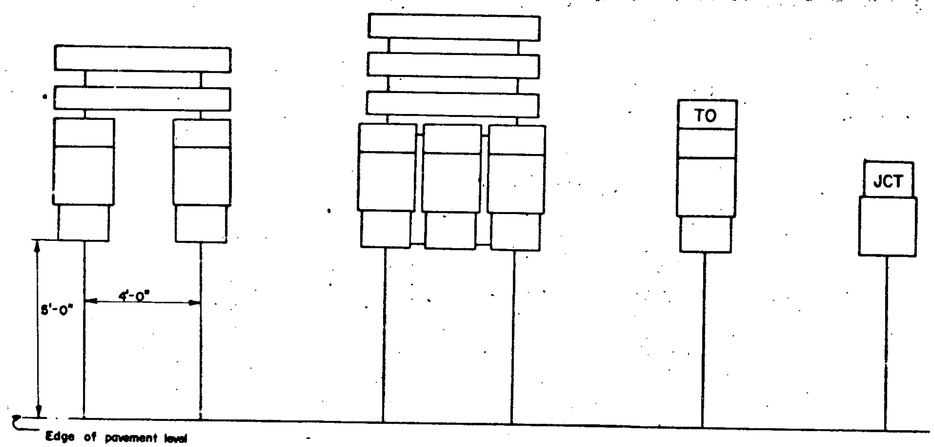
STANDARD ARRANGEMENT OF ROUTE TURN AND DIRECTIONAL ASSEMBLIES

A — Cardinal Direction Marker
B — Route Marker
C — Advance Turn Arrow or Directional Arrow



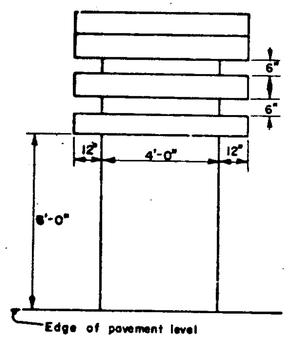
In business and residential districts, or where parking is likely to occur, the height shall be 7 ft.

COMBINATION DIRECTIONAL AND DESTINATION ASSEMBLIES



TRAILBLAZER ASSEMBLY

JUNCTION ASSEMBLY



DESTINATION ASSEMBLY

GENERAL NOTES:

MATERIALS;

The sign base material for standard destination signs shall be high density overlaid plywood 5/8 inch thick or flat sheet aluminum 0.125 inch thick.

The reflective material shall be green reflective sheeting applied to the entire backround of the sign. The text shall be cut-out reflectorized white or silver letters.

COLORS;

Destination signs shall have a reflectorized white or silver text on a reflectorized green backround.

LETTERING;

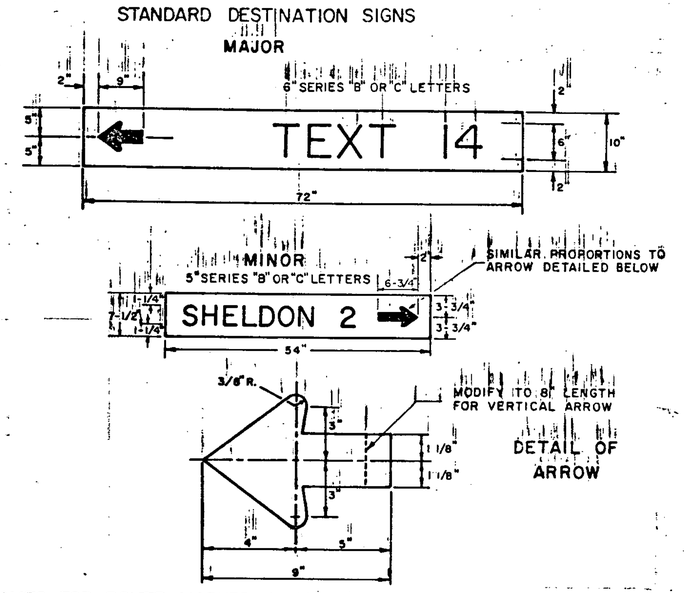
Letters and digits shall conform with the standard alphabets for highway signs approved by the National Joint Committee on Uniform Traffic Control Devices.

SPECIFICATIONS;

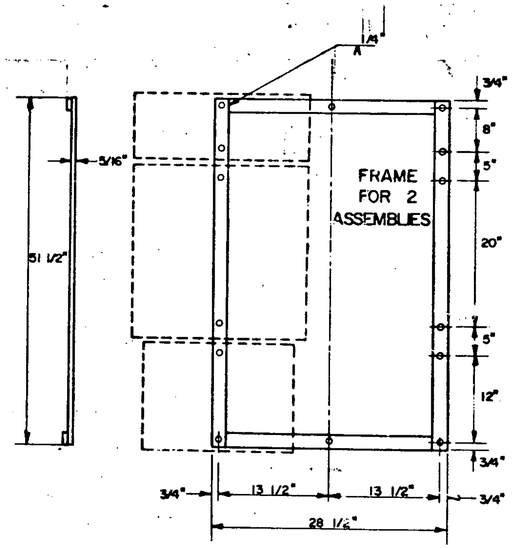
Destination signs shall meet the state specifications for "Traffic Signs."

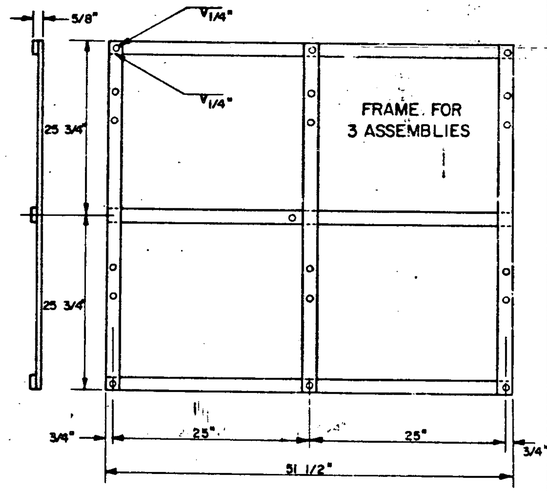
For designs of Route Markers and auxiliary markers, see Standard Sheets E-11, E-12, and E-13.

STANDARD DESTINATION SIGNS



STANDARD FRAMES FOR ROUTE MARKER ASSEMBLIES





Standard frames shall be 5/16" x 1 1/2" wrought iron welded. All holes shall be 7/16" diameter. For other sign combinations than above, the frame dimensions and hole spacing shall be modified as necessary. The frame shall be painted with one coat of primer and a second coat of good grade black paint.

In business and residential districts, or where parking is likely to occur, the height shall be 7 ft.

REVISIONS AND CORRECTIONS
12/1/82
ADDED 2 FRAME ASSEMBLY TO 2 POST ASSEMBLY
ADDED MINOR DESTINATION SIGN, MOUNTING HEIGHT REVISED
2/10/83
SIGN HEIGHT CHANGED TO 7 FT

APPROVED:
DATE: Dec. 29, 1971
R.H. Crandall
CHIEF ENGINEER
E.H. Stickney
ASST. CHIEF ENGINEER
G.M. Lane
HIGHWAY ENGINEER

GUIDE SIGNS

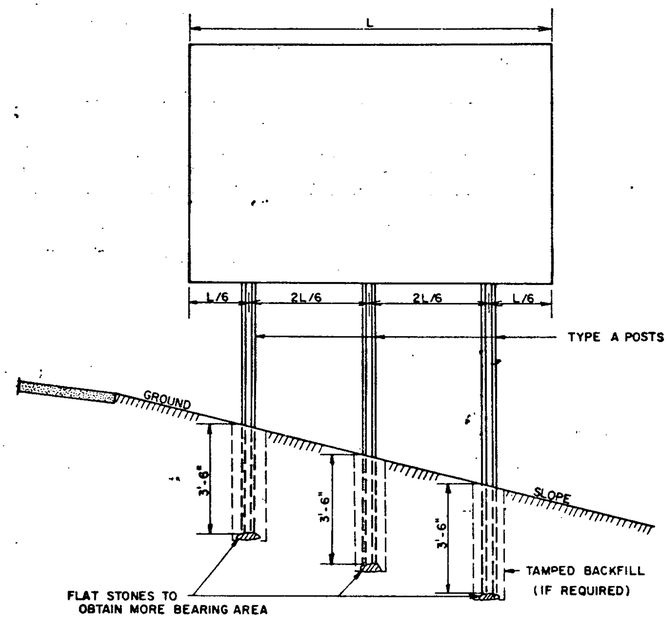
VERMONT AGENCY OF TRANSPORTATION

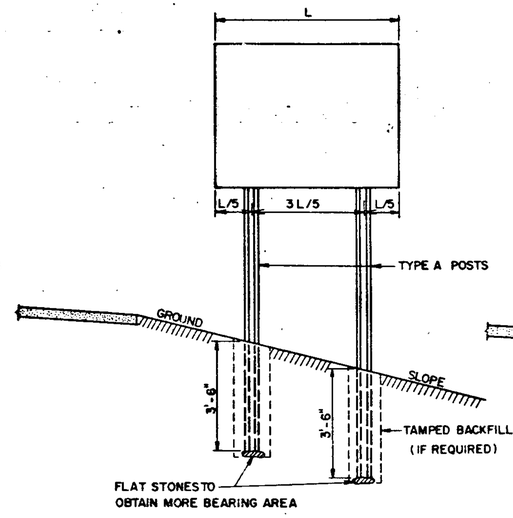
STANDARD
E-23

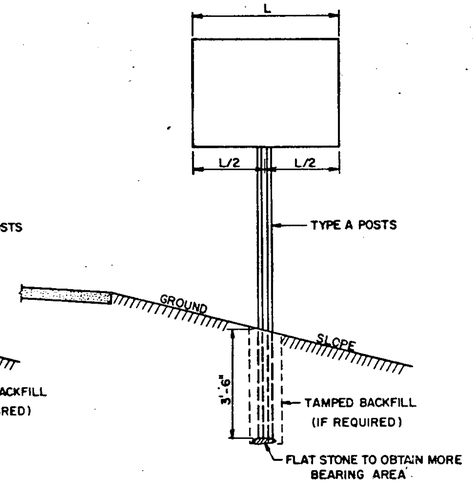
GENERAL NOTES

ALL MATERIAL SHALL BE AS SPECIFIED UNDER SECTION 675 - 675 - TRAFFIC SIGNS

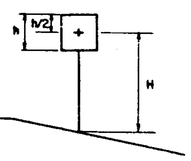
CONSTRUCTION METHODS - POSTS MAY BE DRIVEN OR SET IN A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. IF SET IN A DUG HOLE, THE EXCAVATION AND BACKFILL WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED AS BEING INCLUDED IN UNIT PRICES FOR OTHER ITEMS IN THE CONTRACT. THE DUG HOLE INSTALLATION SHALL BE USED IN AREAS OF POOR SOIL CONDITIONS OR AS DIRECTED BY THE ENGINEER.







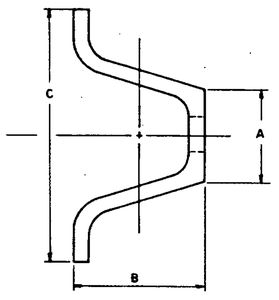
IN AREAS WHERE LEDGE ROCK IS ENCOUNTERED STEEL POSTS WILL BE SET AND GROUTED 12" DEEP IN THE LEDGE.

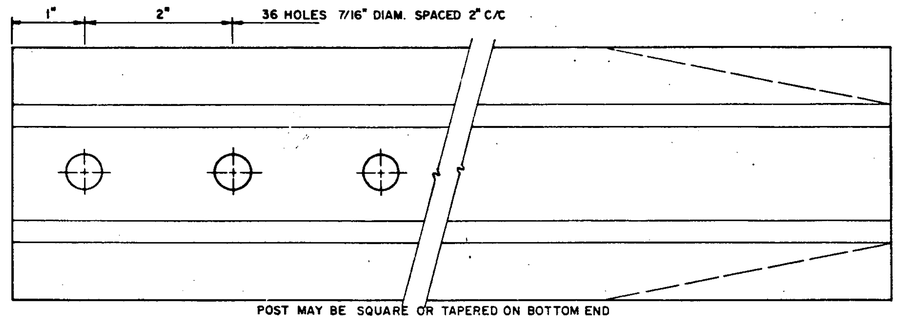


POST SELECTION CHART		
SIGN AREA $(FT^2) \times H(FT) \leq Sv$ (SELECTION VALUE)		
POST SIZE	Sv	DESIGN CRITERIA
2 LB/FT. 2 1/2 LB/FT. 3 LB/FT.	62 77 107	WIND SPEED = 60 MPH (10-YEAR MEAN RECURRENCE INTERVAL) WIND PRESSURE = 12 PSF STEEL MIN YIELD Fy = 50,000 PSI ALLOWABLE STRESS = (1.4) 0.55Fy

POST SIZE POUNDS PER LINEAR FOOT	DIMENSIONS A	B	C	PLASTIC SECTION MODULUS, Z
2	1 9/32"	1 31/64"	3 1/16"	0.26 $IN.^3$
2 1/2	1 9/32"	1 35/64"	3 1/16"	0.40 $IN.^3$
3	1 5/16"	1 7/8"	3 1/2"	0.53 $IN.^3$

SIMILAR DIMENSIONS ARE ACCEPTABLE, HOWEVER PLASTIC SECTION MODULUS VALUES MUST NOT BE EXCEEDED.





REVISIONS AND CORRECTIONS
FEB. 8, 1978 - HEIGHT OF SIGNS ADDED.
DEC 15, 1978 - RAIL STEEL DELETED
JAN. 8, 1981 - ADDED POST SIZE & SELECTION CHARTS; REVISED NOTES & DIMENSIONS

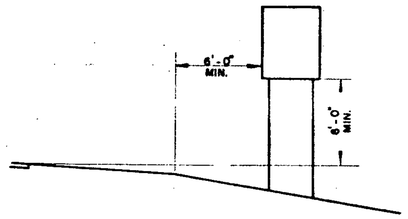
APPROVED
Nov 24, 1976 DATE
E. W. Stickney CHIEF ENGINEER
R O Munn ASST. CHIEF ENGINEER
Loren L Jones HIGHWAY ENGINEER

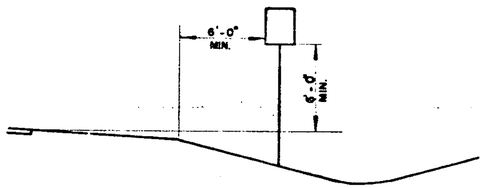
YIELDING TYPE FLANGED CHANNEL STEEL SIGN SUPPORTS

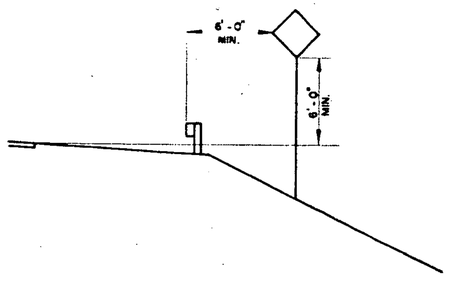
VERMONT AGENCY OF TRANSPORTATION

STANDARD
E 24 - A

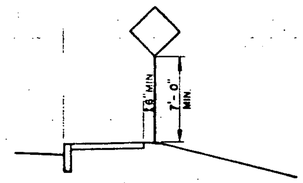
RURAL

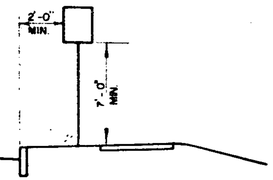


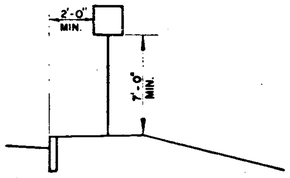




URBAN



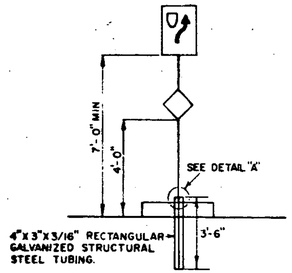


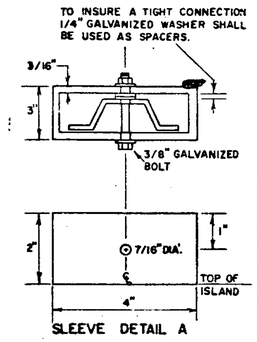


NOTES 1) IN BOTH RURAL AND URBAN LOCATIONS, IF A SECONDARY SIGN IS MOUNTED BELOW ANOTHER SIGN, THE MINIMUM CLEARANCE MAY BE REDUCED BY ONE FOOT.

2.) IN RURAL AREAS WITH NO SHOULDER, THE MINIMUM LATERAL CLEARANCE SHOULD BE 12' FROM EDGE OF THE TRAVELED WAY.

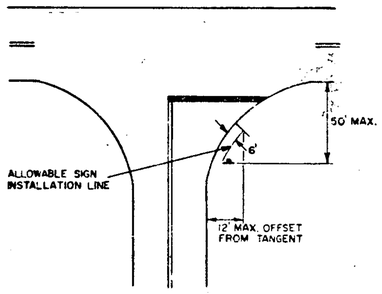
WARNING SIGNS
ON ISLAND IN THE LINE OF TRAFFIC





SLEEVE DETAIL A

STOP OR YIELD SIGNS
AT WIDE THROAT INTERSECTIONS



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 SHOULDER, THE MINIMUM LATERAL CLEARANCE SHOULD BE 12' FROM EDGE OF THE TRAVELED WAY.

REVISIONS AND CORRECTIONS

JAN. 23, 1978 - DIMENSION FROM SHOULDER TO SIGN CHANGED PER FHWA.

AUG. 25, 1981 - ADDED STOP AND ISLAND DETAILS, REVISED CURB OFFSET

APPROVED Dec. 29, 1971

R.W. Carrolel CHIEF ENGINEER

E.W. Stickney ASST. CHIEF ENGINEER

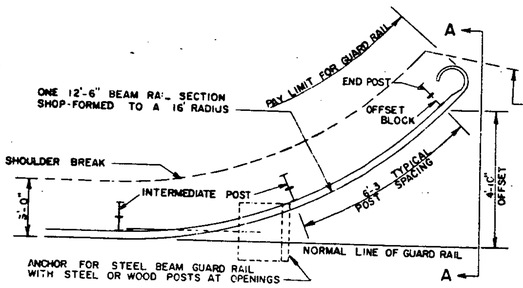
G.M. Lane HIGHWAY ENGINEER

STANDARD SIGN PLACEMENT
CONVENTIONAL ROAD

VERMONT AGENCY OF TRANSPORTATION

STANDARD

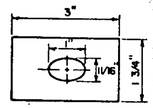
E-29



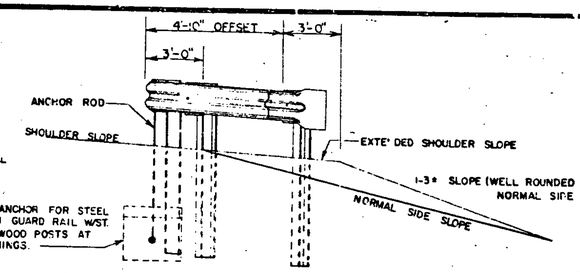
APPROACH END DETAIL

(NOT APPROVED FOR USE WHERE V > 40 MPH)

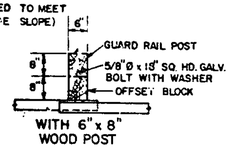
DIRECTION OF TRAFFIC



POST WASHER 'A'

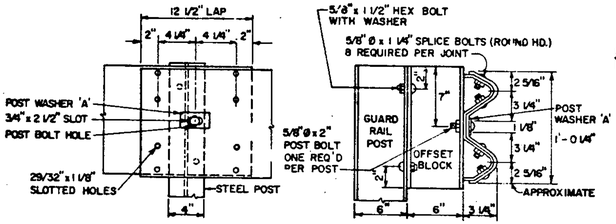


SECTION A-A

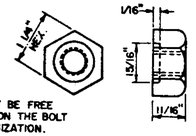


WITH 6" x 8" WOOD POST

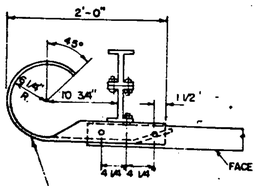
ELEVATION OF GUARD RAIL SPLICE AT POST



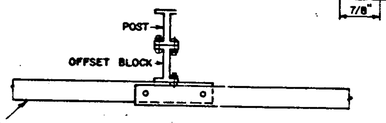
CROSS SECTION THROUGH GUARD RAIL SPLICE



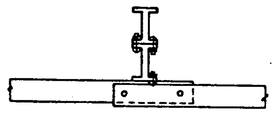
THE NUT MUST BE FREE RUNNING FIT ON THE BOLT AFTER GALVANIZATION.

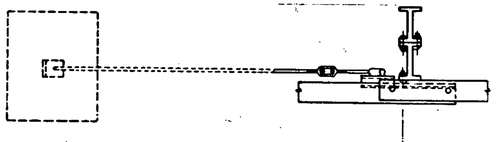


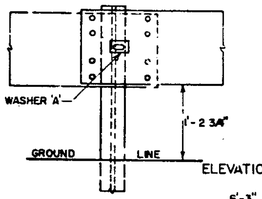
TERMINAL SECTION



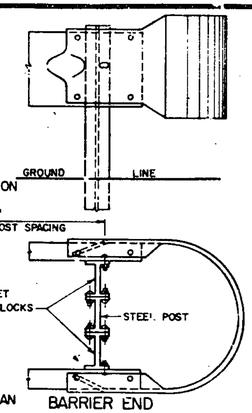
PLAN







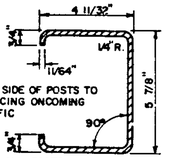
MEDIAN DIVIDER



ELEVATION

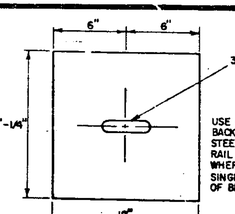
PLAN

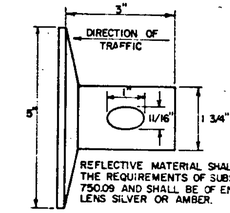
BARRIER END



ALL POSTS IN A GIVEN RUN OF BARRIER TO BE UNIFORM

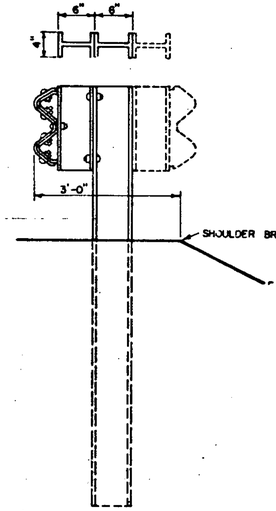
ALTERNATE POST

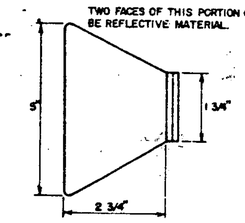




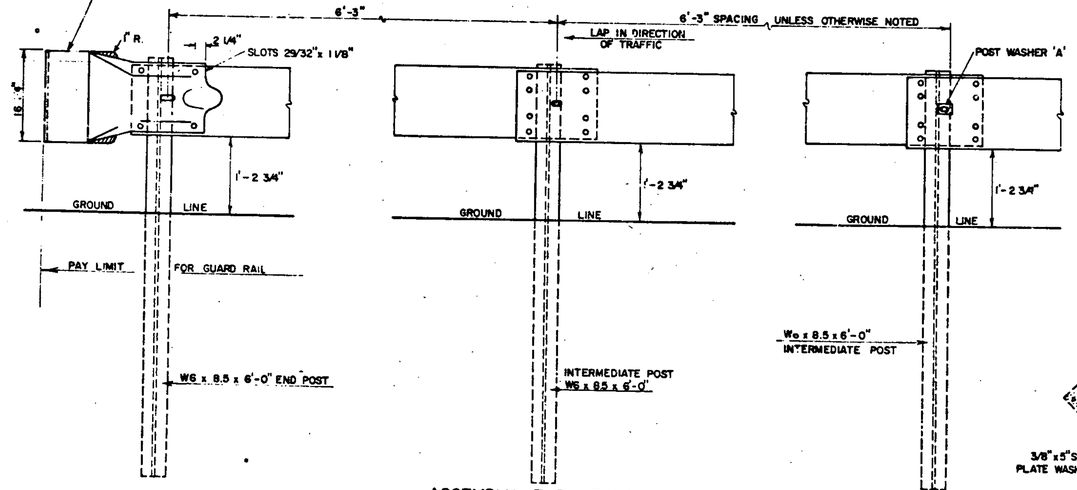
REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER.

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 A.S.T.M. B-209 ALLOY 5052-H-32.



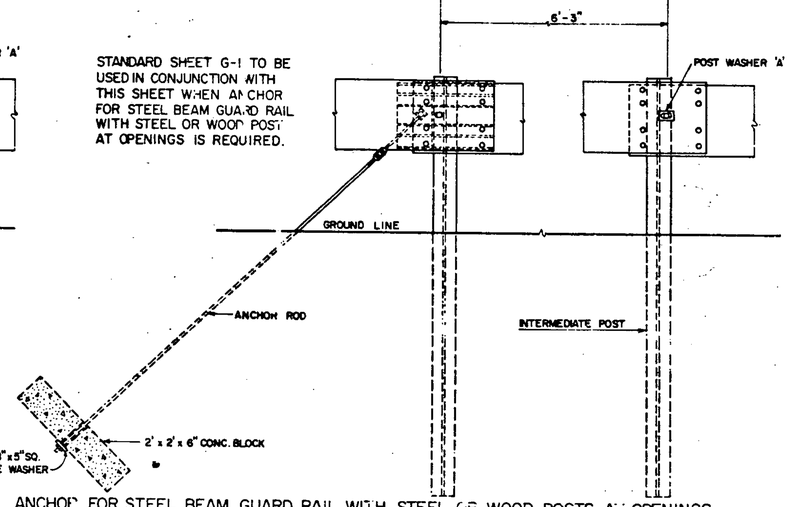


SIDE ELEVATION OF POST FOR SHOULDER OR MEDIAN INSTALLATION



ASSEMBLY ELEVATION

STANDARD SHEET G-1 TO BE USED IN CONJUNCTION WITH THIS SHEET WHEN ANCHOR FOR STEEL BEAM GUARD RAIL WITH STEEL OR WOOD POST AT OPENINGS IS REQUIRED.



ANCHOR FOR STEEL BEAM GUARD RAIL WITH STEEL OR WOOD POSTS, AT OPENINGS

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.

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

REVISIONS & CORRECTIONS

SEPT. 10, 1976 – MINIMUM LENGTH & ADVANCE OF NEED NOTES REMOVED.
MAR. 2, 1977 – ROUND WOOD POSTS REMOVED.
SEPT. 12, 1977 – REFERENCE TO ROUND WOOD POSTS REMOVED.
MAY 29, 1979 NOTE ON REFLECTIVE MATERIAL CHANGED
APRIL 28, 1980 – APPROACH END DETAILS REDRAWN
DEC. 16, 1980 – INCREASED SHOULDER WIDENING FOR GUARD RAIL.

APPROVED: May 6, 1976
DATE

E H Stickney by ROM
CHIEF ENGINEER

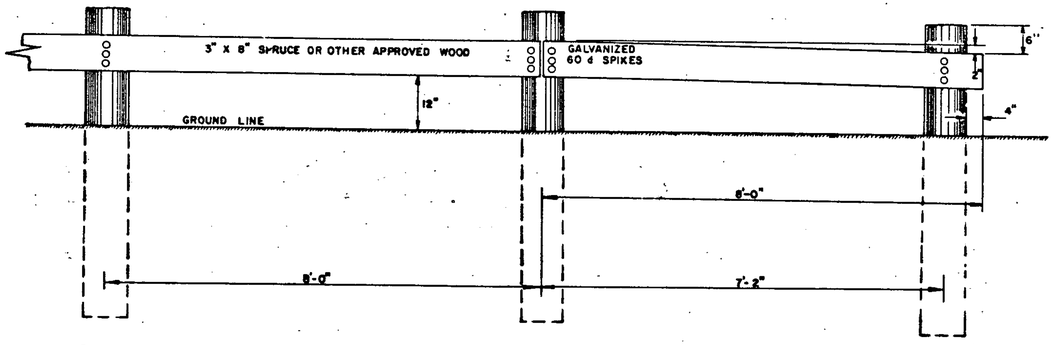
RO Munn
ASST. CHIEF ENGINEER

Louis C Jones
HIGHWAY ENGINEER

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

VERMONT AGENCY OF TRANSPORTATION

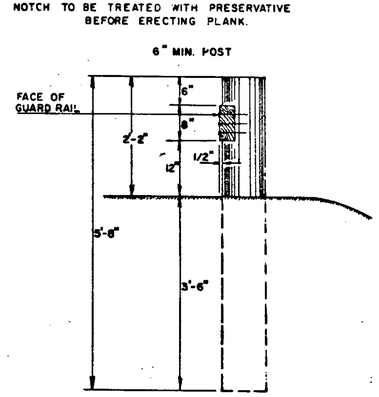
STANDARD
G-1d



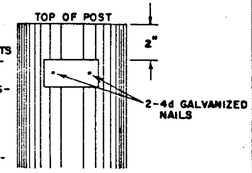
PLANK SIXTEEN FEET IN LENGTH TO BE USED WHEREVER POSSIBLE.
POSTS SIX (6) INCHES SQUARE MAY BE USED IN PLACE OF ROUND POSTS.
FIRST AND LAST POSTS OF EACH SECTION TO BE SET BACK TWELVE INCHES FROM THE GENERAL LINE OF POSTS, WHEN FOUR OR MORE POSTS ARE REQUIRED.
REFLECTIVE MATERIAL TO BE PLACED AS DIRECTED BY THE ENGINEER.
ALL WOOD MEMBERS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

GUARD RAIL, PLANK WITH WOOD POSTS
TO BE USED AS A BARRICADE OFF THE HIGHWAY

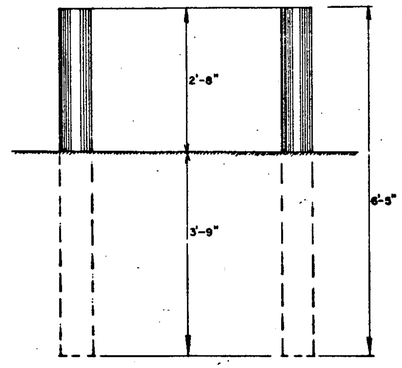
NOTCH TO BE TREATED WITH PRESERVATIVE BEFORE ERECTING PLANK.



3" X 1 1/2" REFLECTIVE ALUMINUM STRIP TO BE PLACED ON EVERY OTHER WOOD POST IN A LINE OF POSTS AND CLEARLY VISIBLE TO APPROACHING TRAFFIC.
STRIPS TO BE ATTACHED TO THE DESIGNATED GUARD RAIL POSTS ON BOTH SIDES OF THE ROAD AND VISIBLE TO TRAFFIC IN BOTH DIRECTIONS.
REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER.



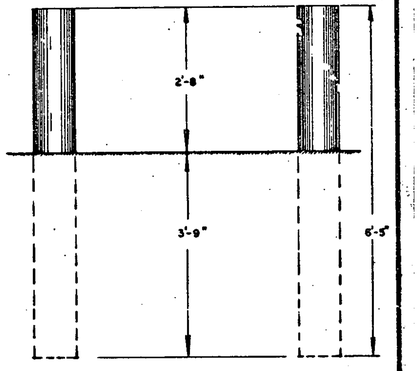
DELINEATION OF WOOD GUARD RAIL AND GUIDE POSTS



MARKER POSTS ARE TO BE 4" TO 5 1/2" IN DIAMETER AND ARE TO BE PLACED AS DIRECTED BY THE ENGINEER.

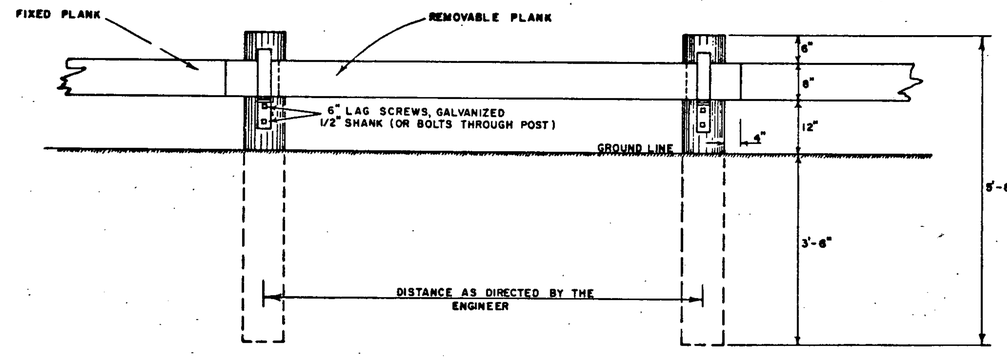
POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

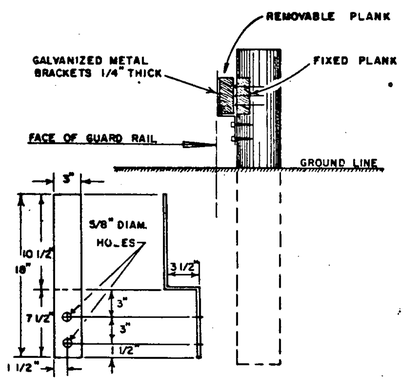
WOOD MARKER POSTS



REFLECTIVE MATERIAL TO BE PLACED AS DIRECTED BY THE ENGINEER.
POSTS ARE TO BE 4" TO 5 1/2" IN DIAMETER AND ARE TO BE PLACED AS DIRECTED BY THE ENGINEER.
POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

WOOD GUIDE POSTS

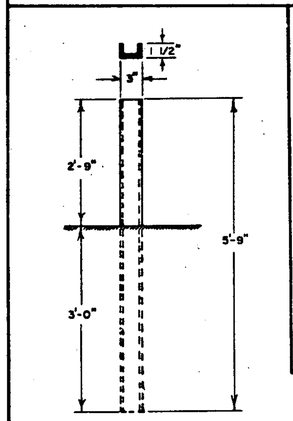




BRACKET DETAIL

GALVANIZED METAL BRACKETS ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR GUARD RAIL, PLANK WITH WOOD POSTS.

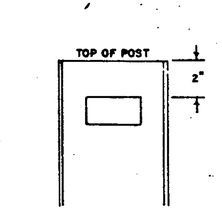
ENTRANCE THROUGH GUARD RAIL, PLANK WITH WOOD POSTS



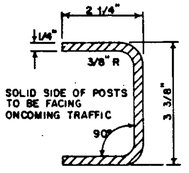
ALL STEEL MARKER POSTS TO BE GALVANIZED.
STEEL MARKER POSTS TO BE PLACED AS DIRECTED BY THE ENGINEER.

POSTS ARE TO BE AMERICAN STANDARD CHANNEL 5'-9" X 3" (4.1 LBS PER FT.)

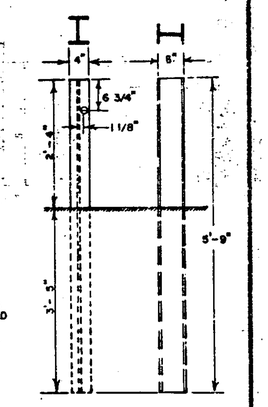
STEEL MARKER POSTS



3" X 1 1/2" REFLECTIVE STRIP TO BE APPLIED TO EVERY OTHER POST IN A LINE OF POSTS AND CLEARLY VISIBLE TO APPROACHING TRAFFIC.
STRIPS TO BE APPLIED TO THE DESIGNATED POSTS ON BOTH SIDES OF THE ROAD AND VISIBLE TO TRAFFIC IN BOTH DIRECTIONS.
REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER.



ALTERNATE POST



ALL STEEL GUIDE POSTS TO BE GALVANIZED.
REFLECTIVE MATERIAL TO BE PLACED AS DIRECTED BY THE ENGINEER.
POSTS ARE TO BE 5'-9" x 6" x 4" (6.5 LBS PER FT.)

ALL POSTS IN A GIVEN RUN OF BARRIER TO BE UNIFORM.

STEEL GUIDE POSTS

REVISIONS AND CORRECTIONS

MAY 23, 1974	ALTERNATE POST ADDED
MAY 29, 1979	NOTE ON REFLECTIVE MATERIAL CHANGED
JULY 23, 1980	CHANGED DIAMETER OF WOOD MARKER POST AND WOOD GUIDE POST
MAY 25, 1982	REMOVED ALTERNATE POST DETAIL.

APPROVED DATE Dec. 8, 1971

R.H. Arnold
CHIEF ENGINEER

E.H. Stickney
ASST. CHIEF ENGINEER

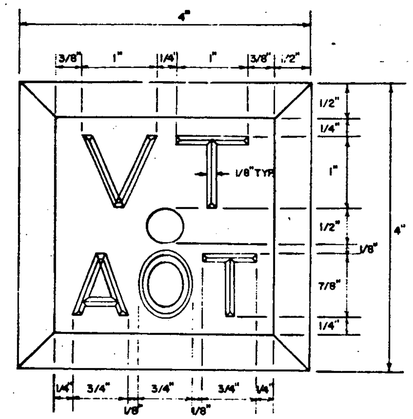
G.M. Lane
HIGHWAY ENGINEER

GUARD RAIL, PLANK WITH WOOD POSTS
WOOD GUIDE POSTS
STEEL GUIDE POSTS
WOOD MARKER POSTS
STEEL MARKER POSTS

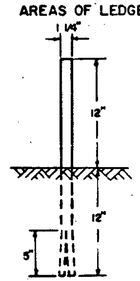
VERMONT AGENCY OF TRANSPORTATION

STANDARD G-4

BRUNING 44-131 40592



LETTERING DETAIL
(ALL LETTERS TO BE COUNTERSUNK 1/8")
SCALE: FULL SIZE

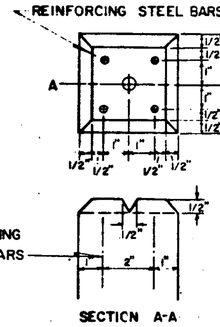


1 1/4" STEEL ROD 2'-0" LONG TO BE USED IN AREAS OF LEDGE.

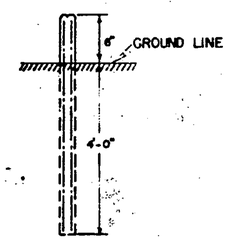
2" HOLE TO BE DRILLED IN LEDGE.

SPACE AROUND HOLE TO BE FILLED WITH MORTAR, TYPE I.

ROD TO BE SPLIT WITH IRON WEDGE.



SECTION A-A



BOUNDARY MARKERS TO BE CONSTRUCTED OF CONCRETE CLASS A.
4 REINFORCING STEEL BARS ARE No. 3 DEFORMED BARS 4'-4" LONG.
BOUNDS ARE TO BE SET WITH 6" ABOVE GROUND, OR AS DIRECTED BY THE ENGINEER.
IN AREAS WHERE MOWING OPERATIONS ARE REQUIRED, BOUNDS SHALL BE SET FLUSH WITH THE GROUND.

BOUNDARY MARKERS

REVISIONS AND CORRECTIONS

APPROVED: _____ DATE

_____ DIR. OF ENGINEERING AND CONSTRUCTION

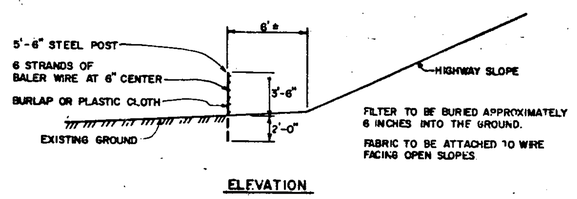
_____ CHIEF OF DESIGN

_____ TRANSPORTATION DESIGN ENGINEER

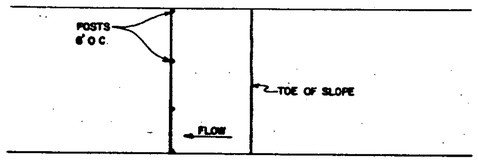
BOUNDARY MARKERS

VERMONT AGENCY OF TRANSPORTATION

STANDARD J-1

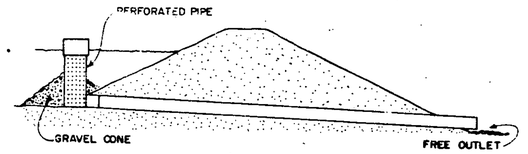


ELEVATION

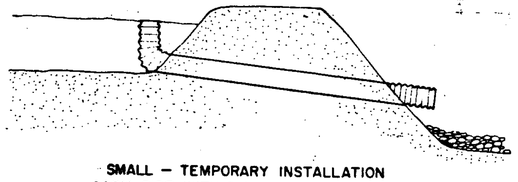


PLAN

SILT FENCE

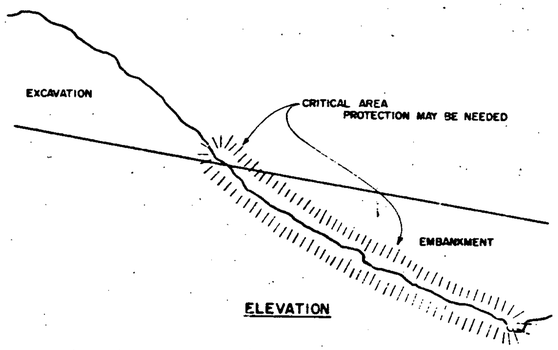


LARGE – PERMANENT INSTALLATION
PIPE RISER – STONE CUTLET

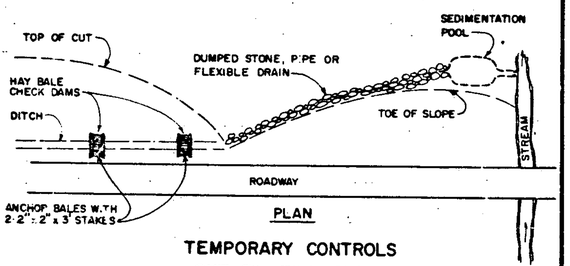


SMALL – TEMPORARY INSTALLATION
ACCM PIPE WITH RISER – STONE OUTLET

SEDIMENT DAMS

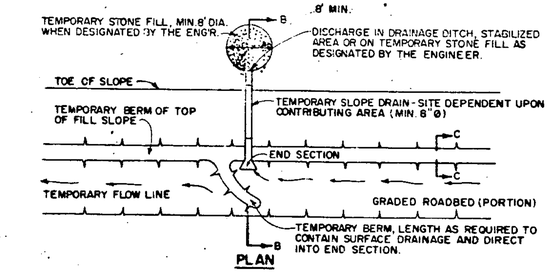


ELEVATION

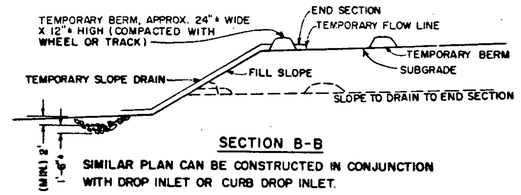


PLAN

TEMPORARY CONTROLS CUT TO FILL SLOPE

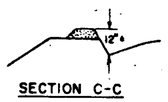


PLAN



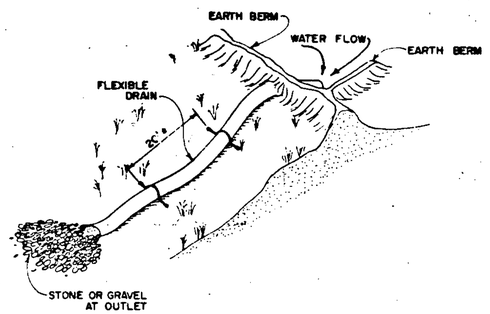
SECTION B-B

SIMILAR PLAN CAN BE CONSTRUCTED IN CONJUNCTION WITH DROP INLET OR CURB DROP INLET.

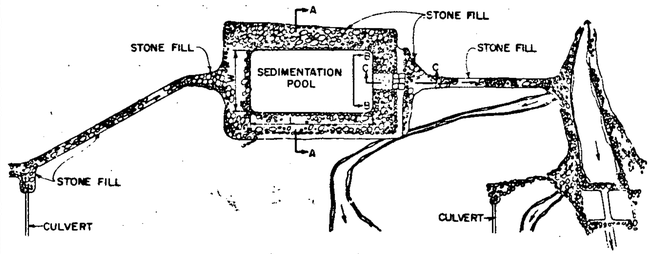


SECTION C-C

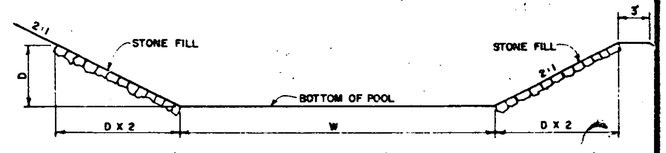
TEMPORARY BERMS AND SLOPE DRAINS FOR FILL SLOPES



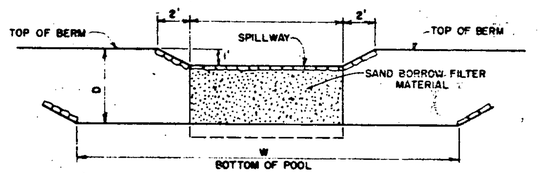
TEMPORARY FLEXIBLE SLOPE DRAIN



SEDIMENTATION POOL

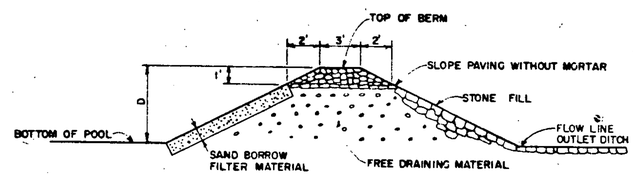


SECTION A-A



DETAILS OF SPILLWAY TO BE DETERMINED BY HYDRAULIC SECTION

SECTION B-B



SECTION C-C

CORRECTIONS & REVISIONS

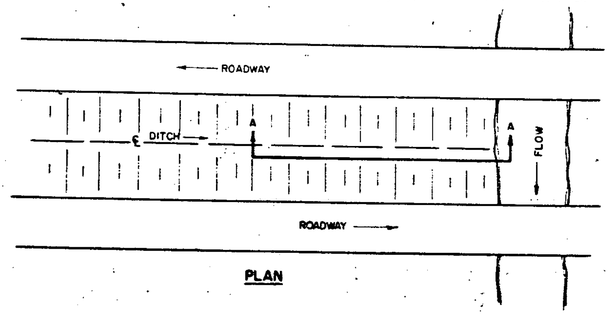
JUNE 14, 1973 – SEDIMENT TRAPS REMOVED FROM TEMPORARY BERMS AND SLOPE DRAINS FOR FILL SLOPES
FEB. 26, 1976 – SILT FENCE ADDED.
DEC. 7, 1976 – HAY BALE ANCHOR NOTE ADDED.

APPROVED: July 5, 1972
DATE
R. H. Arnold
CHIEF ENGINEER
E. H. Stickney
ASST. CHIEF ENGINEER
G. M. Lane
HIGHWAY ENGINEER

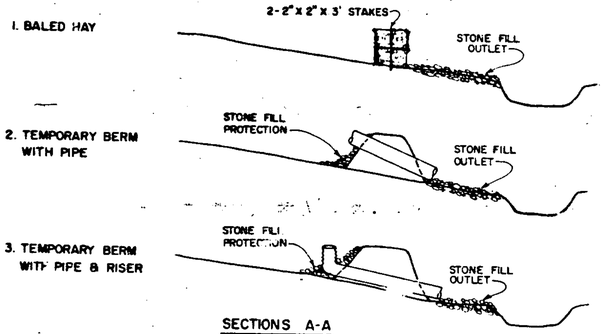
TEMPORARY EROSION CONTROL DETAILS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

T-1

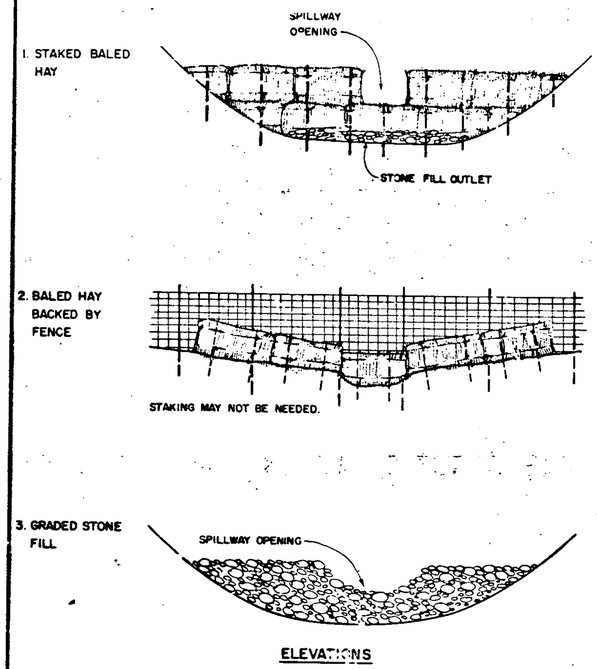


PLAN



SECTIONS A-A

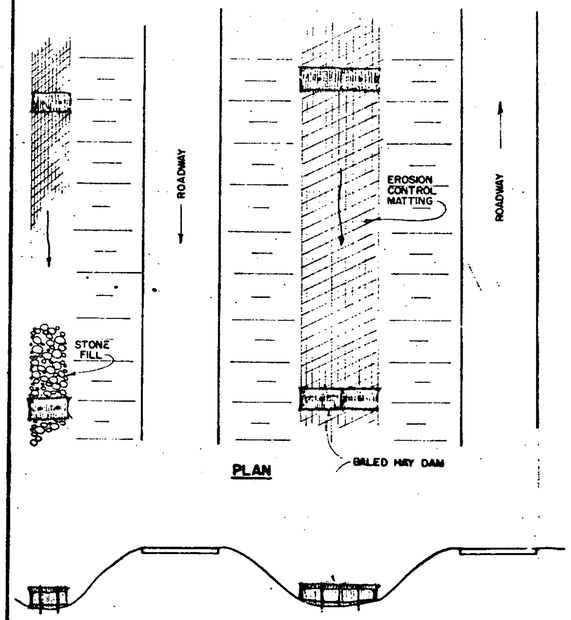
PROTECTION AT STREAM CROSSING
MEDIAN AND SIDE DITCHES



ELEVATIONS

TYPES OF TEMPORARY DAMS

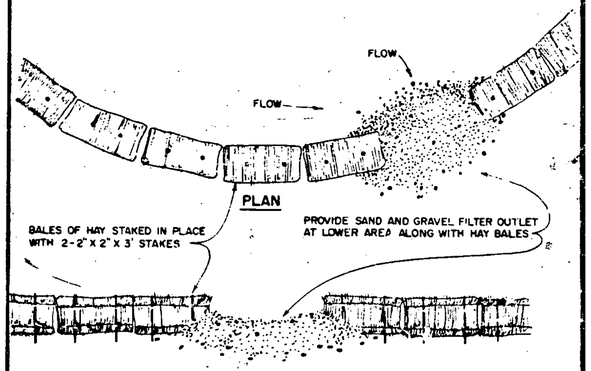
DAM SHOULD EXTEND FAR ENOUGH UP DITCH SIDE SLOPES TO EFFECTIVELY POND THE RUNOFF AND PREVENT EROSION AND WASHOUT.



PLAN

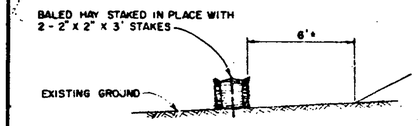
ELEVATION

BALED HAY DAMS USED IN DITCHES

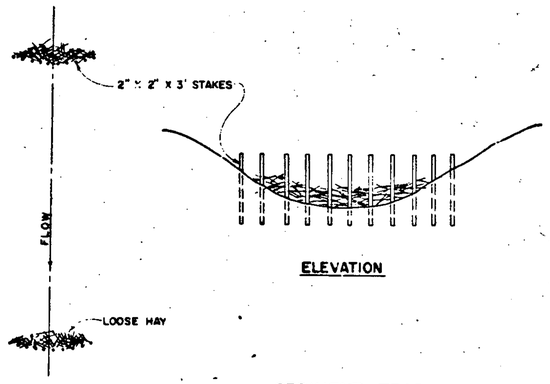


ELEVATION

BALED HAY DAMS ALONG TOE OF SLOPE



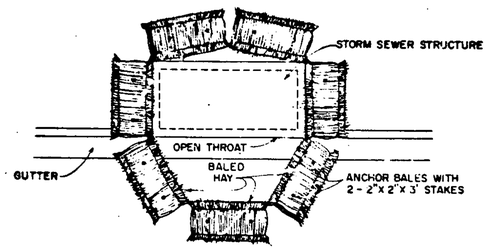
ELEVATION



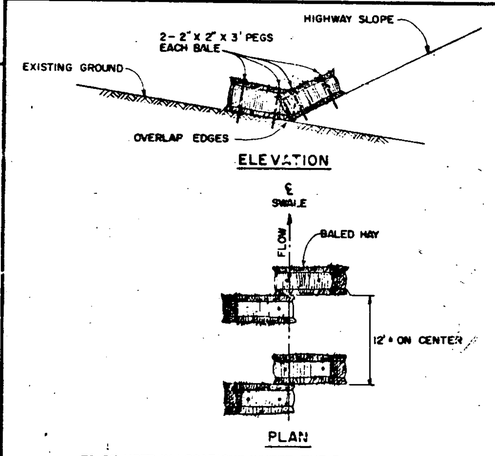
ELEVATION

PLAN

SEDIMENT TRAP
LOOSE HAY BACKED BY STAKES



INLET PROTECTION
TEMPORARY BARRIER - HAY BALES

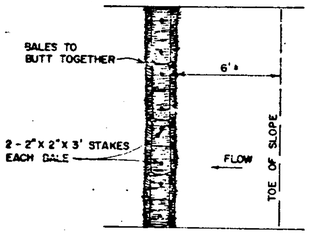


ELEVATION

PLAN

TO BE USED IN LOCATIONS WHERE THE EXISTING GROUND SLOPES IN TOWARD THE EMBANKMENT.
BALES WILL BE ALLOWED TO ROT IN PLACE.

BALED HAY EROSION CHECKS



PLAN

TO BE USED WHERE THE EXISTING GROUND SLOPES AWAY FROM THE HIGHWAY EMBANKMENT.

BALED HAY EROSION CHECKS

CORRECTIONS & REVISIONS

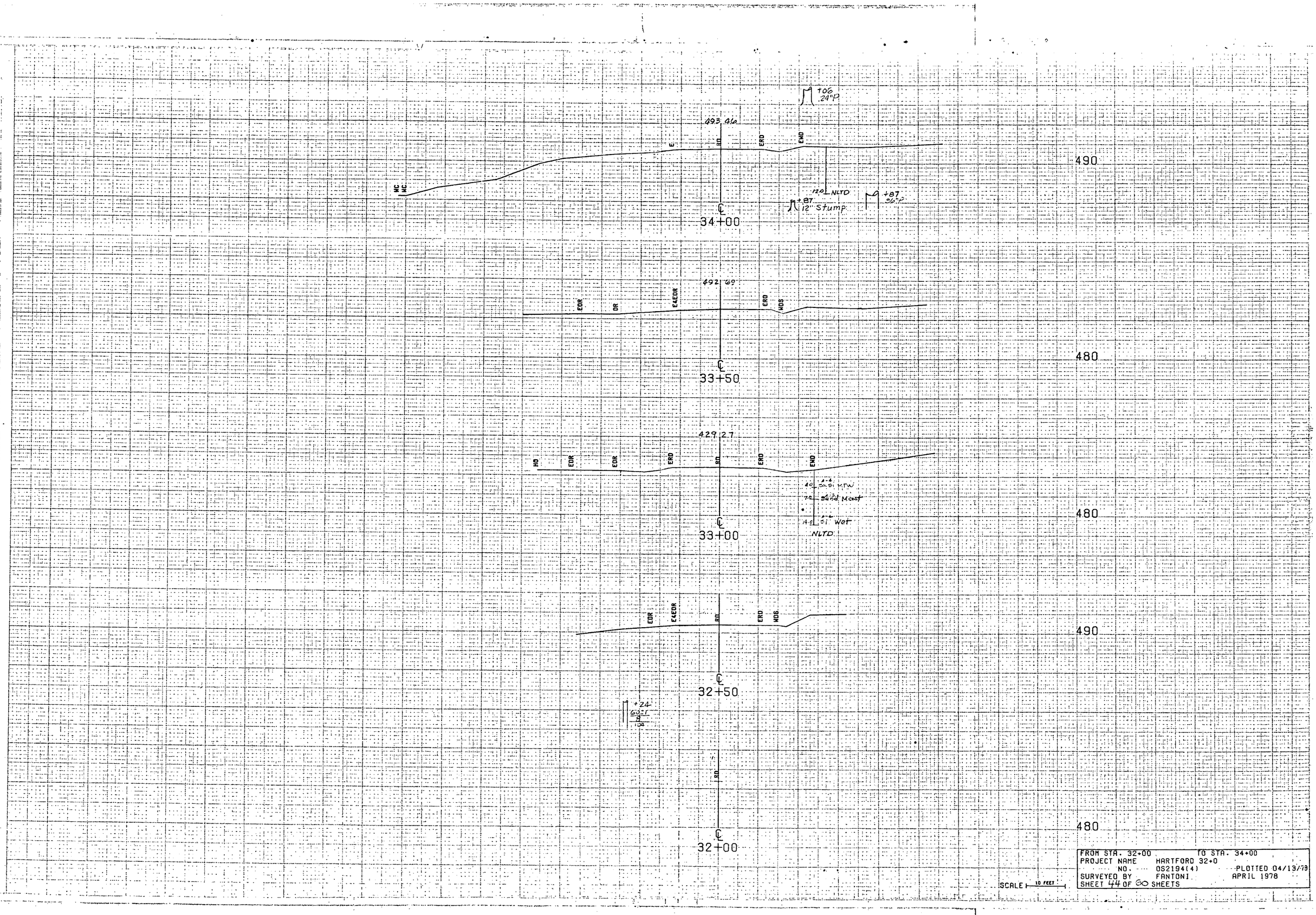
APPROVED: July 5, 1972
DATE
R.H. Conrad
CHIEF ENGINEER
ASST. CHIEF ENGINEER
G. W. Lane
HIGHWAY ENGINEER

TEMPORARY EROSION CONTROL DETAILS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

T - 2

D - 3


493.46
WC
WC
℄
34+00
TOS
24"P
120 LNLTD
+87
12" Stump
+87
36"P
490
492.69
EDR
OR
E&EDR
ERD
WDS
℄
33+50
480
429.27
HD
EDR
EDR
END
RD
ERD
END
40 Sa. Si. MTN
70 Sand Moist
140 Si. Wet
NLTD
℄
33+00
480
EDR
E&EDR
RD
ERD
WDS.
490
+24
60°-1'
℄
32+50
RD
℄
32+00
480
SCALE 10 FEET
FROM STA. 32+00 TO STA. 34+00
PROJECT NAME HARTFORD 32+0
NO. OS2194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 44 OF 60 SHEETS

35+72 Lt
Begin Special Ditch
W/Stone Fill Type I
(Item 203.15)

35+70 Lt
Begin New 6"x20' Underdrain

35+50 Lt
Construct Approach (TH #201)
Remove Existing Drive Culvert

35+10 Lt - 35+72 Lt
New 18"x64' ACCGMP .064

35+50 Rt
Construct Approach
(TH #224)

35+32 Askew 38°20'Rt
18" ACCGMP Remove
New 30"x124' ACCGMP .079
New 30" MES For ACCGMP .079
Stone Fill Type II @ Inlet & Outlet

35+00
Begin Approach Construction
Match To Existing Grade

36+00
Begin Project HES-SOS 2194(4)
Construct Satisfactory Approach

34+50

TH #201

TH #224

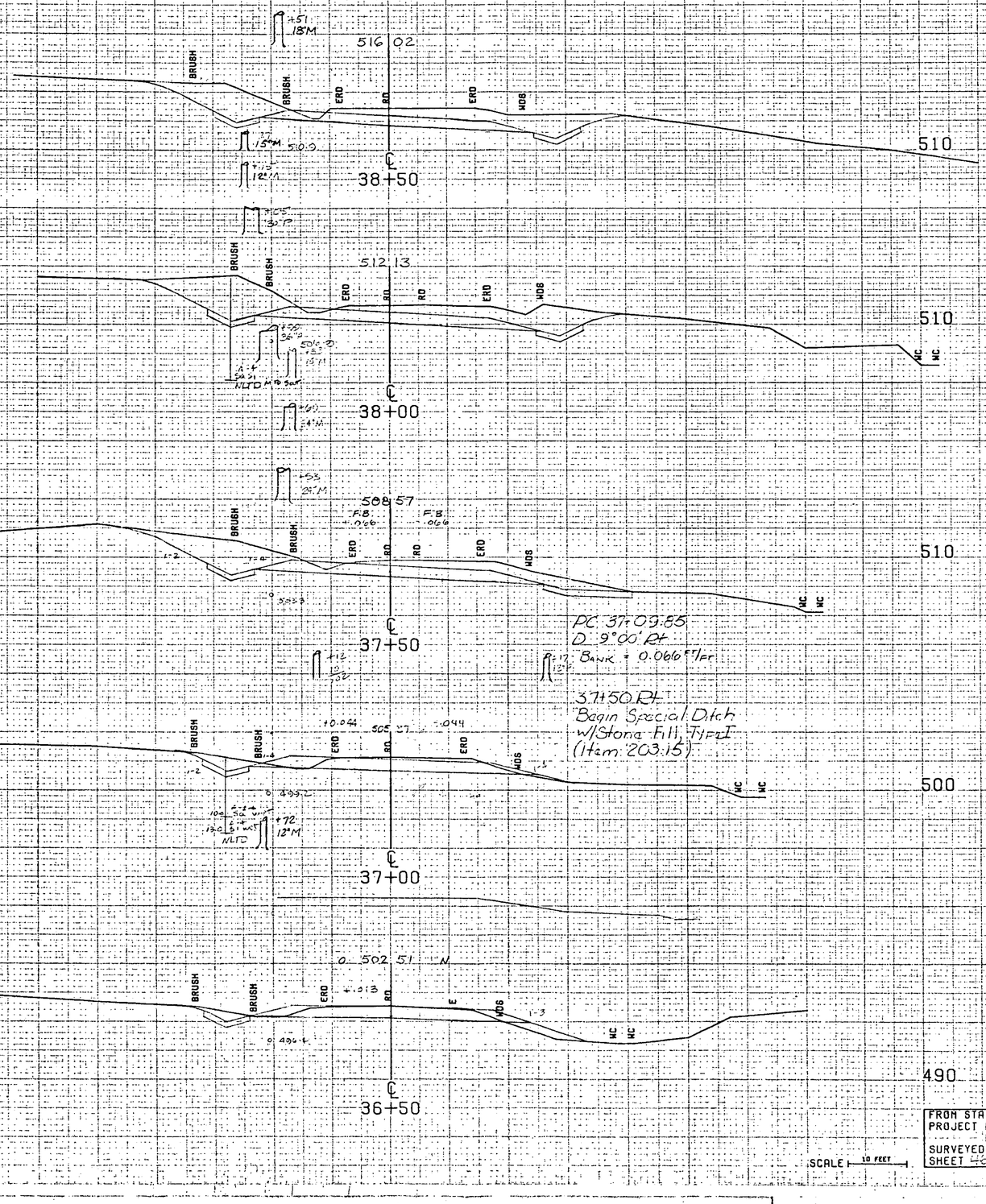
TH #49

Begin Approach Detail
Scale 1" = 20'

Section A-A @ 35+50 (29' Lt)

FROM STA. 34+50 TO STA. 36+00
PROJECT NAME HARTFORD 32+0
NO. 0S2194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 45 OF 60 SHEETS

SCALE 10 FEET



FROM STA. 36+50 TO STA. 38+50
PROJECT NAME HARTFORD 32+0
NO. 052194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 46 OF 60 SHEETS

SCALE 10 FEET

40+75 Lt
Begin Special Ditch
W/ Stone Fill, Type I
(Item 203.15)

40+75 Rt
Begin Rock Fill
(Encountered On Project)

40+41 Lt
(Interpolated Section)

40+15 Lt
Construct Drive (16' Wide)

40+03 Rt ~ 40+41 Lt
New 18" MES for ACCGMP.064
Construct Inlet & Outlet ditches w/ Stone Fill, Type I

39+80 Lt
End New 6"x42" Underdrain W/New Flushing Basin

39+80 Lt
End Special Ditch
W/ Stone Fill, Type I

39+90 Rt
End Special Ditch w/ Stone Fill, Type I
(Excavation to be Paid as Item 203.15)

39+40 Rt
Begin Treated Timber Curb

39+30 Rt
Begin Guard Rail Standard Steel Beam
W/ Wood Posts, Type II

39+00 Rt ~ 39+42 Rt
New 12" / 42" ACCGMP.064 or CMACP.060
1 - 30° Elbow

FROM STA. 39+00	TO STA. 41+00
PROJECT NAME	HARTFORD 32+0
NO.	DS2194(4)
SURVEYED BY	FANTONI
SHEET 47 OF 60 SHEETS	
	PLOTTED 04/13/78
	APRIL 1978

SCALE 10 FEET

43+35 ~ 43+75
Scarifying Existing Pavement

PC 43+42.47
D = 6°00' Lt
FB = .052 Ft/Ft

56.58
-0.010
RD
END
1½
W/L
43+17 Rt
Begin Guard Rail, Standard Steel Beam
W/ Wood Posts, Type II
+16' R
43+17 Rt ~ 43+36 Rt
2 - 12.5' PANELS
WRAPPED AROUND
DRIVE RADIUS
550
+17
℄ 43+25
+24
24" M
43+08 Rt
Construct Drive (18' Wide)
New 24" ø Asphalt C.M.P. 064
Remove Existing 15" ACCGMP
562.42
43
WDS
-0.503
+0.503
E
RD
END
DR
115
TLDB
556.0
560
42+80 Rt ~ 42+99 Rt
2 - 12.5' PANELS
WRAPPED AROUND
DRIVE RADIUS
16' R
42+10 Lt
Begin New 6"ø 350' Underdrain
+95
24" M
42+99 Rt
End Guard Rail, Standard Steel Beam
W/ Wood Posts, Type II
+50
℄ 43+00
+86
30" P
42+50 Rt ~ 42+10 Lt
New 6"ø 66' Underdrain w/ Carrier Pipe
+62
30" M
556.11
-0.018
-0.018
42+80 Rt
End Treated Timber Curb
1-1½
550
+35
18" P
℄ 42+50
+25
24" P
+24
18" P
499.93
+0.042
-0.042
1-1½
Rock Fill
42+50
540
℄ 42+00
PT 41185.59
D = 9°00' Rt
+22
18" M
FB 544.20 FB
1-4
1-1½
540
℄ 41+50

PC 43+42.47
FB .052 Ft/Ft
Lt. Side
44+0
43+0
42+0
41+0
PT 41185.59
FB .052 Ft/Ft
FB Diameter
Lt. Side
Rt. Side

9'-0
9'-0
Rock Fill
45+0 (53 Rt)
42+50

FROM STA. 41+50	TO STA. 43+25
PROJECT NAME	HARTFORD 32+0
NO.	052194(4) PLOTTED 04/13/78
SURVEYED BY	FANTONI APRIL 1978
SHEET 46 OF 60 SHEETS	

SCALE 10 FEET

PT 45+18.02
Δ-6°00'24"
Batk -0.052 FT/FT

45+36 PT
END GUARD RAIL; STANDARD STEEL BEAM W/WOOD POSTS, TYPE II

100' L of 36' RT
PAY LIMIT FOR GUARD RAIL STANDARD STEEL BEAM W/WOOD POSTS, TYPE II
16' R

43+64 Lt
Begin Special Ditch W/Stone Fill, Type I (Item 203.15)
43+60 LF

End Special Ditch W/Stone Fill, Type I (Item 203.15)

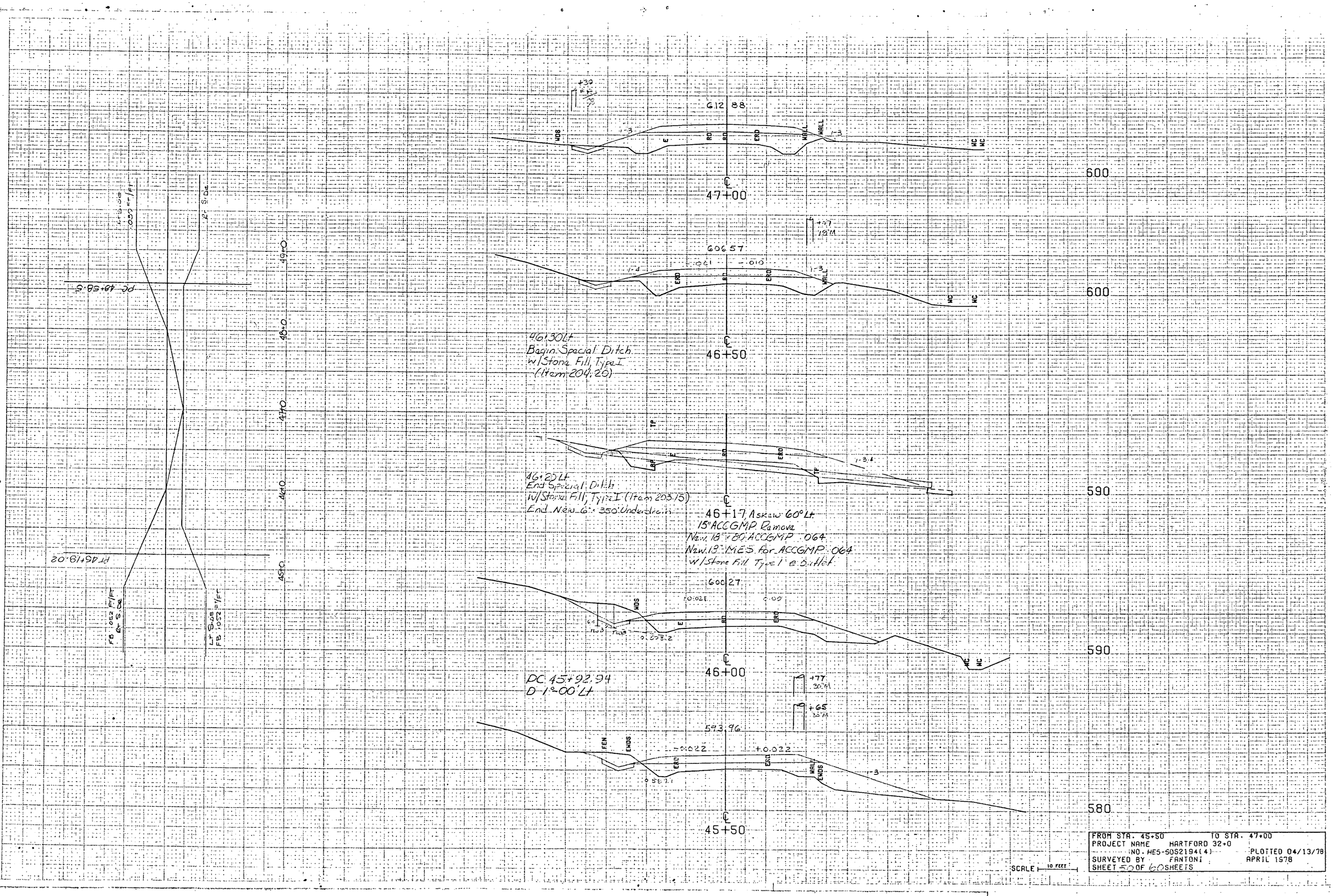
43+66 (Interpolated)

43+75 Rt
End Rock Fill

43+27 Rt - 43+65 Lt
New 18"x66' ACCG/MP .064
W/12' Coupling Bands & Galv Joints
New 18" MES for ACCG/MP .064

FROM STA. 43+50	TO STA. 45+00
PROJECT NAME	HARTFORD 32+0
NO.	OS2194(4) PLOTTED 04/13/78
SURVEYED BY	FANTONI APRIL 1978
SHEET 49 OF 60 SHEETS	

SCALE 10 FEET



SCALE 10 FEET

FROM STA. 45+50 TO STA. 47+00
PROJECT NAME HARTFORD 32+0
NO. HES-505219 4(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 50 OF 60 SHEETS

630.67

WALL E RD E

620

℄ 49+00

+0.030 634.53 -0.030

WALL E RD E

620

℄ 48+75

PC 48+54.5
D-76°-39'44"

631.79
+0.024 -0.023

WALL E RD RD ERO DCH

620

48+25 Lt
End Special Ditch
W/Stone Fill, Type I
(Item 204.20)

℄ 48+50

625.41
0.000 -0.025

E RD RD E WALL

610

℄ 48+00

PT 47+71.27
0.1° Lt

619.19
-0.023

ERO RD RD ERO WALL

610

℄ 47+50

46+75 ~ 49+15
Scarifying Existing Pavement

SCALE 10 FEET

FROM STA. 47+50 TO STA. 49+00
PROJECT NAME HARTFORD 32+0
NO. WES-SOS2194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 51 OF 60 SHEETS

630

50+00

639.62

ERD RD RD RD ERD

630

49+75

PT 49+61.4
D 76.3944

639.63

ERD TP ERD ERD TP

630

49+59
Askew 73°Lt
15" RCP Pipe

639.22

EDR E&EDR RD CRD

1:3

630

49+50 Rt ~ 49+62 Lt
Construct Drive (14' Wide)

49+50
49+50 Rt ~ 49+62 Lt
New 18" 90° CMP MP-064
New RCDI w/ C.I. Grate Type B

638.24

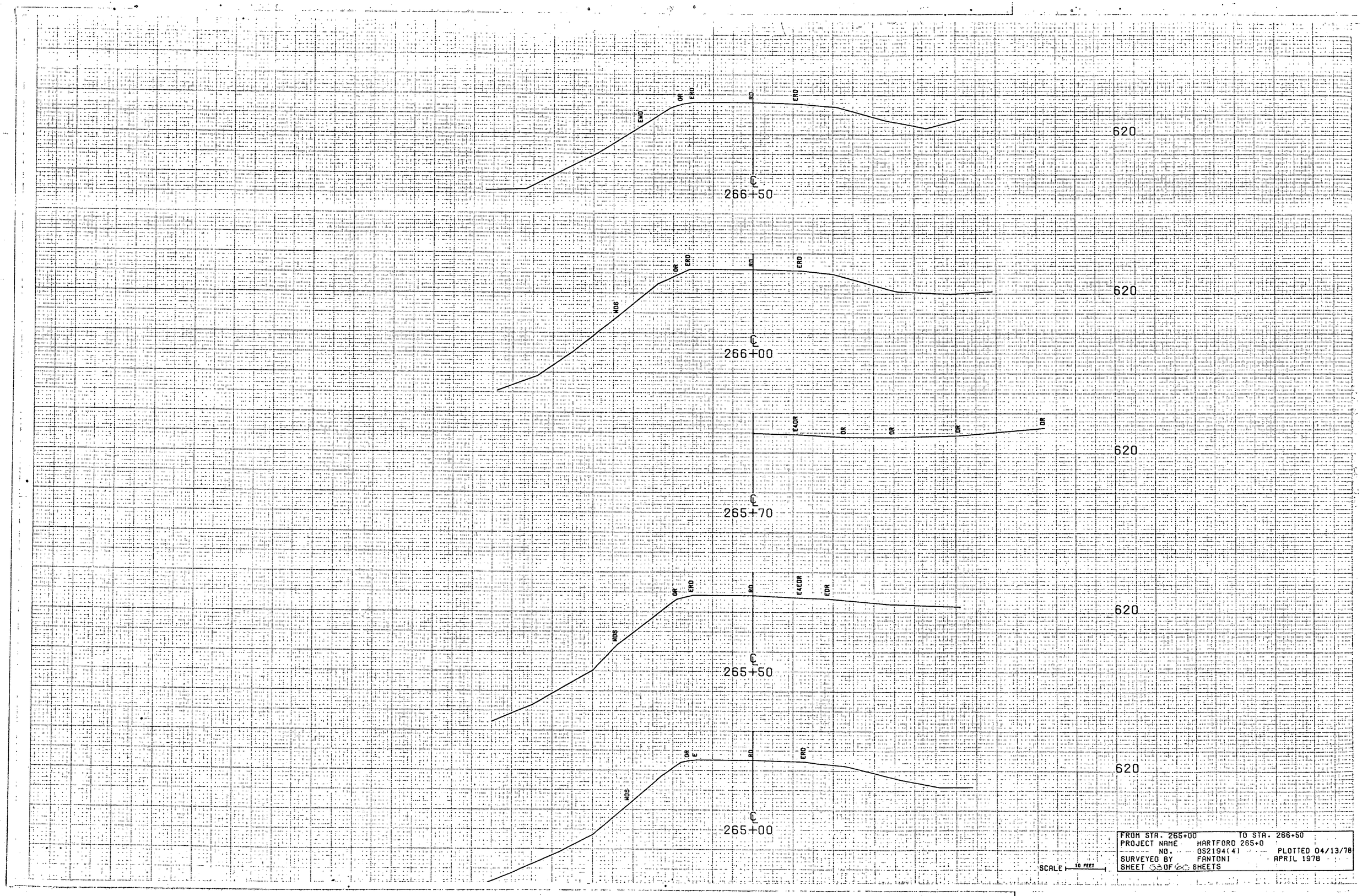
WALL ERD RD ERD ERD

630

49+25

SCALE 10 FEET

FROM STA. 49+25 TO STA. 50+00
PROJECT NAME HARTFORD 32+0
NO. HES-SOS2194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 52 OF 60 SHEETS

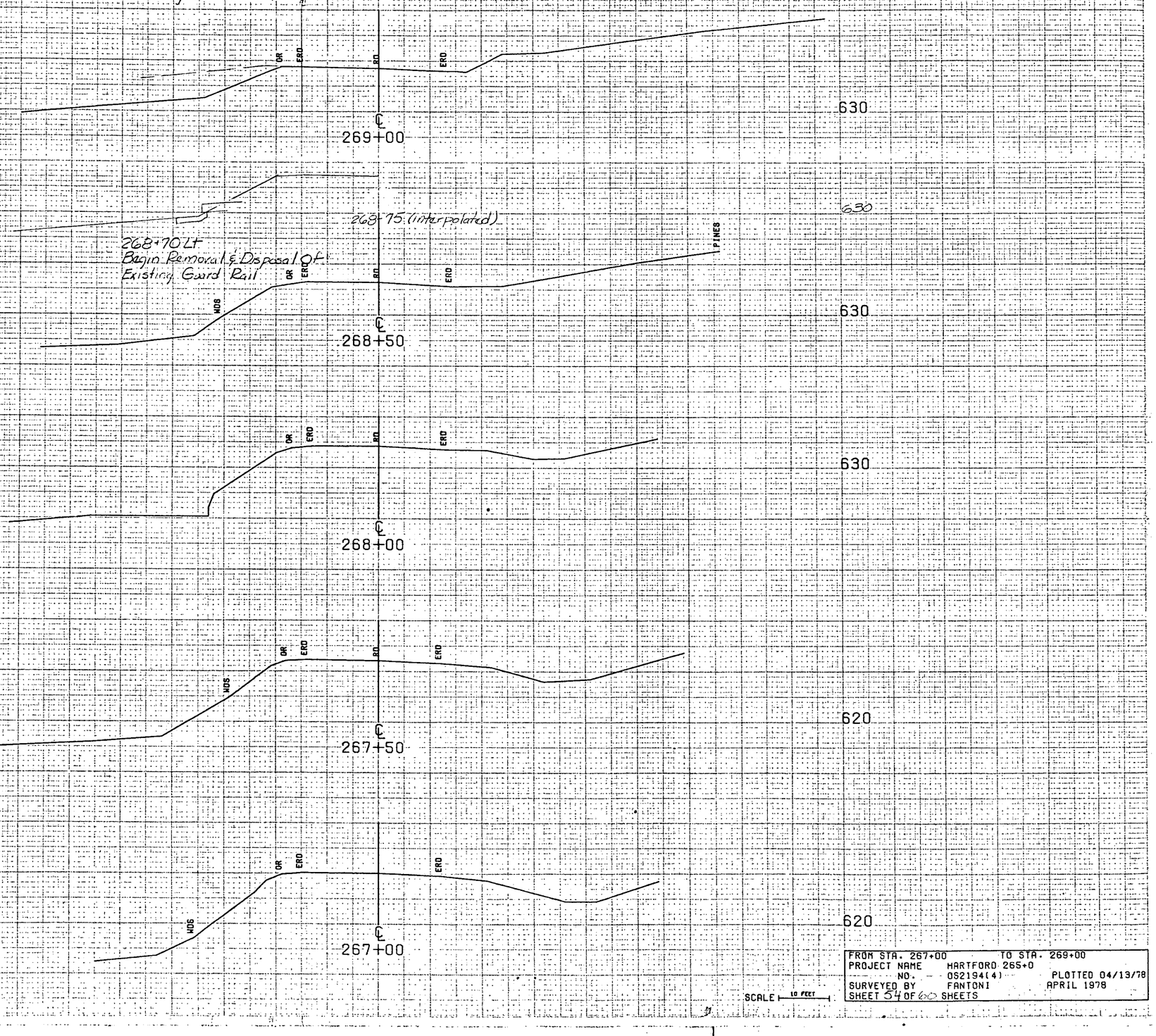

EXD
GR
ERD
RD
ERD
620
℄
266+50
MDS
GR
ERD
RD
ERD
620
℄
266+00
EXDR
DR
DR
DR
DR
620
℄
265+70
MDS
GR
ERD
RD
EXEDR
EDR
620
℄
265+50
MDS
GR
E
RD
ERD
620
℄
265+00
SCALE 10 FEET
FROM STA. 265+00 TO STA. 266+50
PROJECT NAME HARTFORD 265+0
NO. 052194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 530F 60 SHEETS

268+75 Lt ~ 269+12 Rt
New 18" x 60' ACCGMP.064
New RCDI w/ SI Grate Type B
w/ Stone Fill Type 1

269+07 Lt
End Removal & Disposal of
Existing Guard Rail

268+70 Lt
Begin Removal & Disposal of
Existing Guard Rail

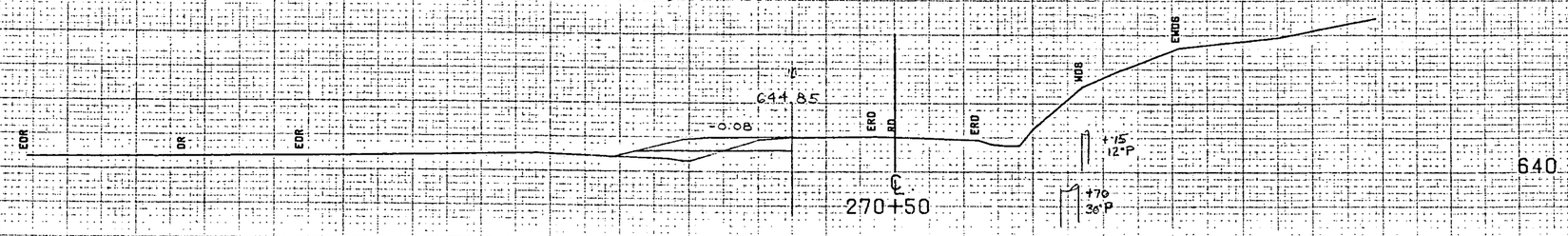
268+75 (Interpolated)

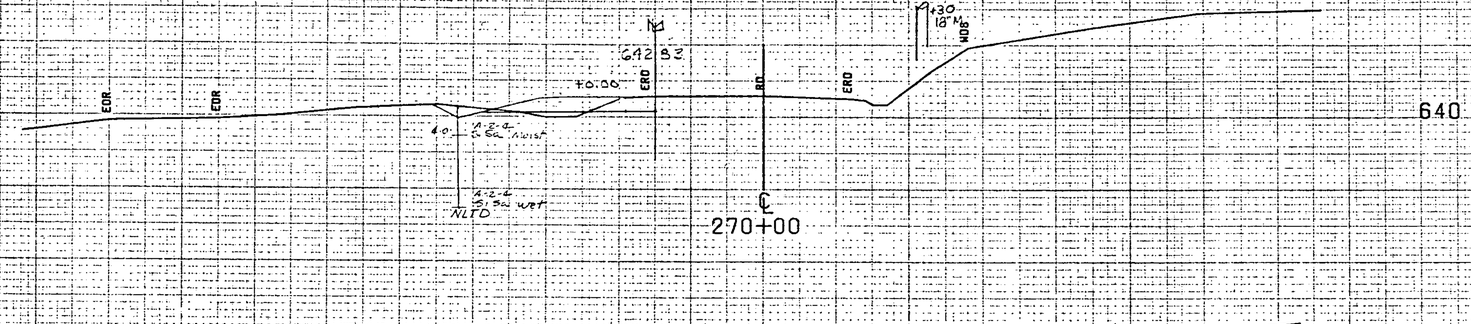


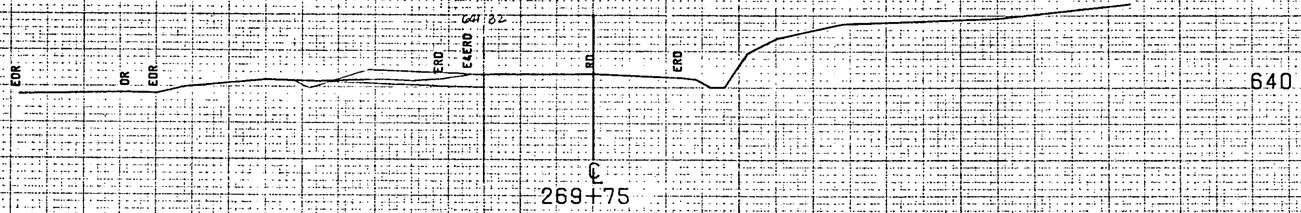
SCALE 10 FEET

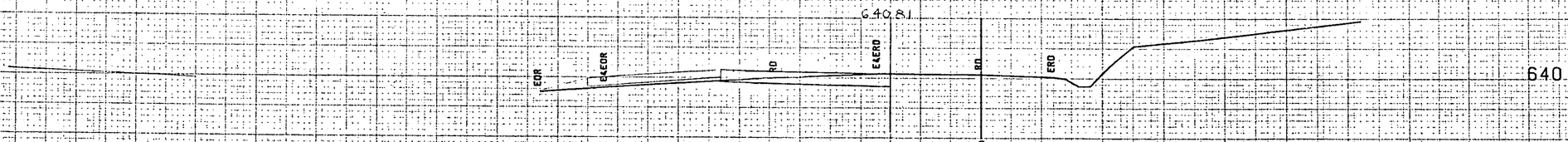
FROM STA. 267+00	TO STA. 269+00	
PROJECT NAME	HARTFORD 265+0	
NO.	OS2194(4)	PLOTTED 04/13/78
SURVEYED BY	FANTONI	APRIL 1978
SHEET 54 OF 60 SHEETS		

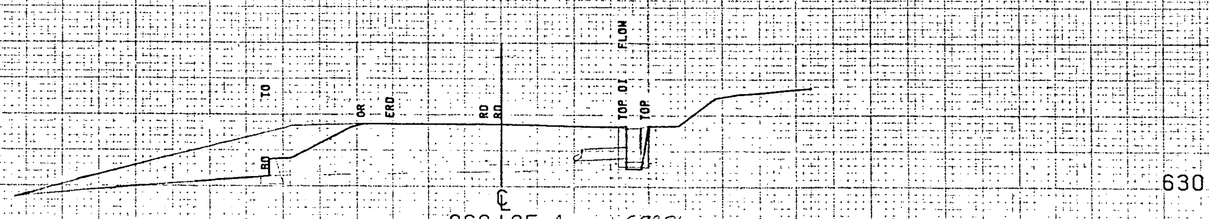
270+75 LT
BEGIN EROSION MATTING.











SCALE 10 FEET

FROM STA. 269+05	TO STA. 270+50
PROJECT NAME	HARTFORD 26S-0
NO.	0S2194(4)
SURVEYED BY	FANTONI
SHEET 55 OF 60 SHEETS	

PLOTTED 04/13/78
APRIL 1978

650

650

640

640

640

272+50

272+00

271+80

271+50

271+00

272+25 Lt
End Erosion Matting

271+87 Lt
Begin Erosion Mattins

271+65 Lt
Construct Drive
New 15"x52 Drive Pipe Option

271+36 Lt
End Erosion Matting

271+42.5
End Decel. Lane
Begin Taper

650.80

650.91

650.11

648.88

646.86

-0.042

-0.033

-0.030

-0.026

-0.017

+72
14" P

+15
8" M

+10
15" M

+81
15" M

+34
12" Oak

+12
36" P

+86
12" M

WALL
EOR
FN
WDS
ERD
RD
CMPF
DR
ENDD
ENDS
HD
SILL

Bankard Transition

FROM STA. 271+00 TO STA. 272+50
PROJECT NAME HARTFORD 265+0
NO. OS2194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 5a OF 60 SHEETS

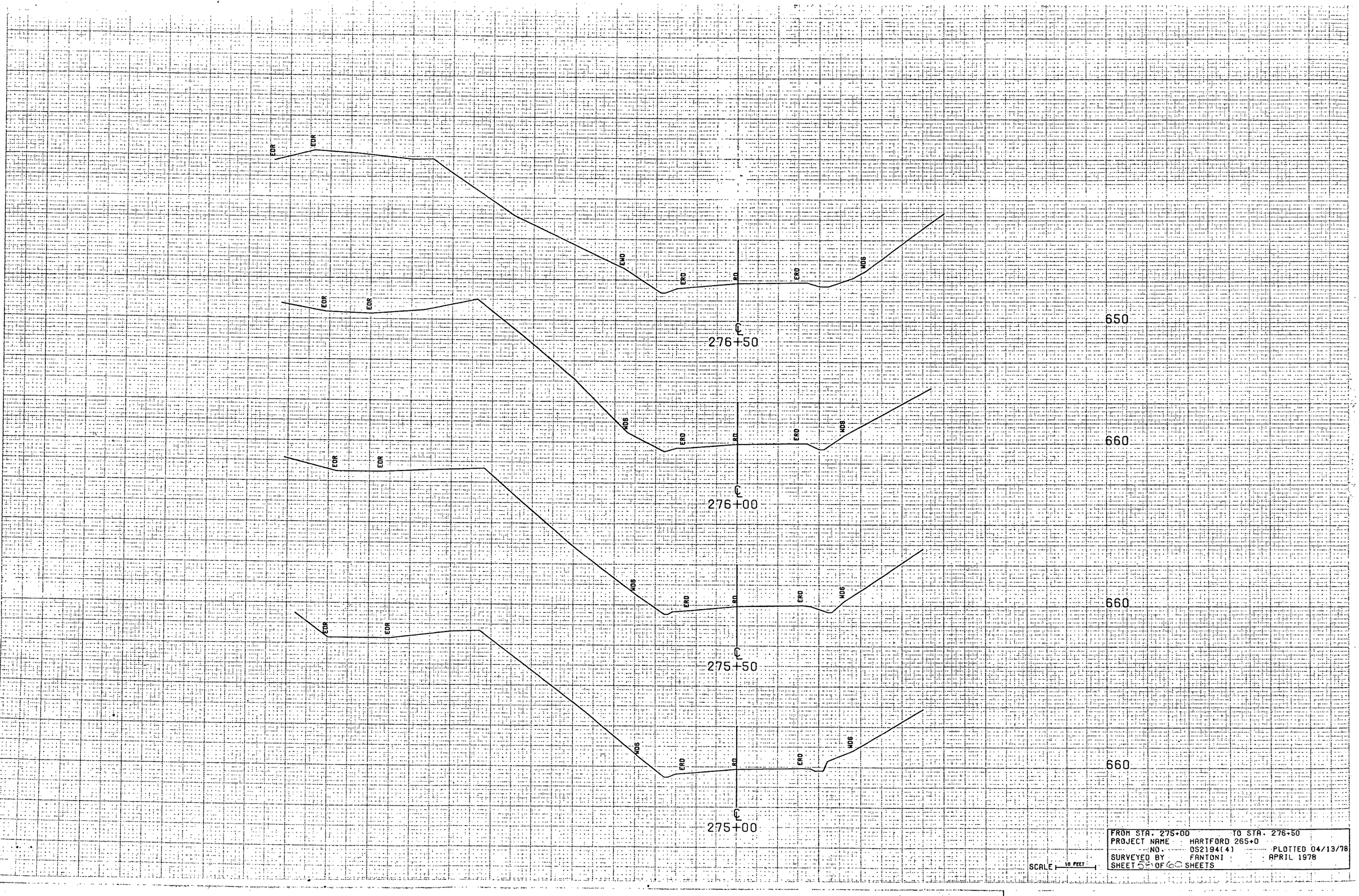
SCALE 10 FEET

EOR
EOR
WALL
EOR
WDS
ERO
RD
ERO
+46
15"P
650
274+50
WDS
ERO
RD
ERO
660
+19
6"P
WALL
EOR
EOR
WDS
ERO
RD
ERO
+74
6"P
274+00
273+72.5
END DECEL. LANE TAPER
WALL
EOR
EOR
FN
WDS
ERO
RD
ERO
WDS
FN
655.73
650
273+50
WALL
EOR
EOR
FN
WDS
ERO
RD
ERO
WDS
FN
654.41
650
273+00

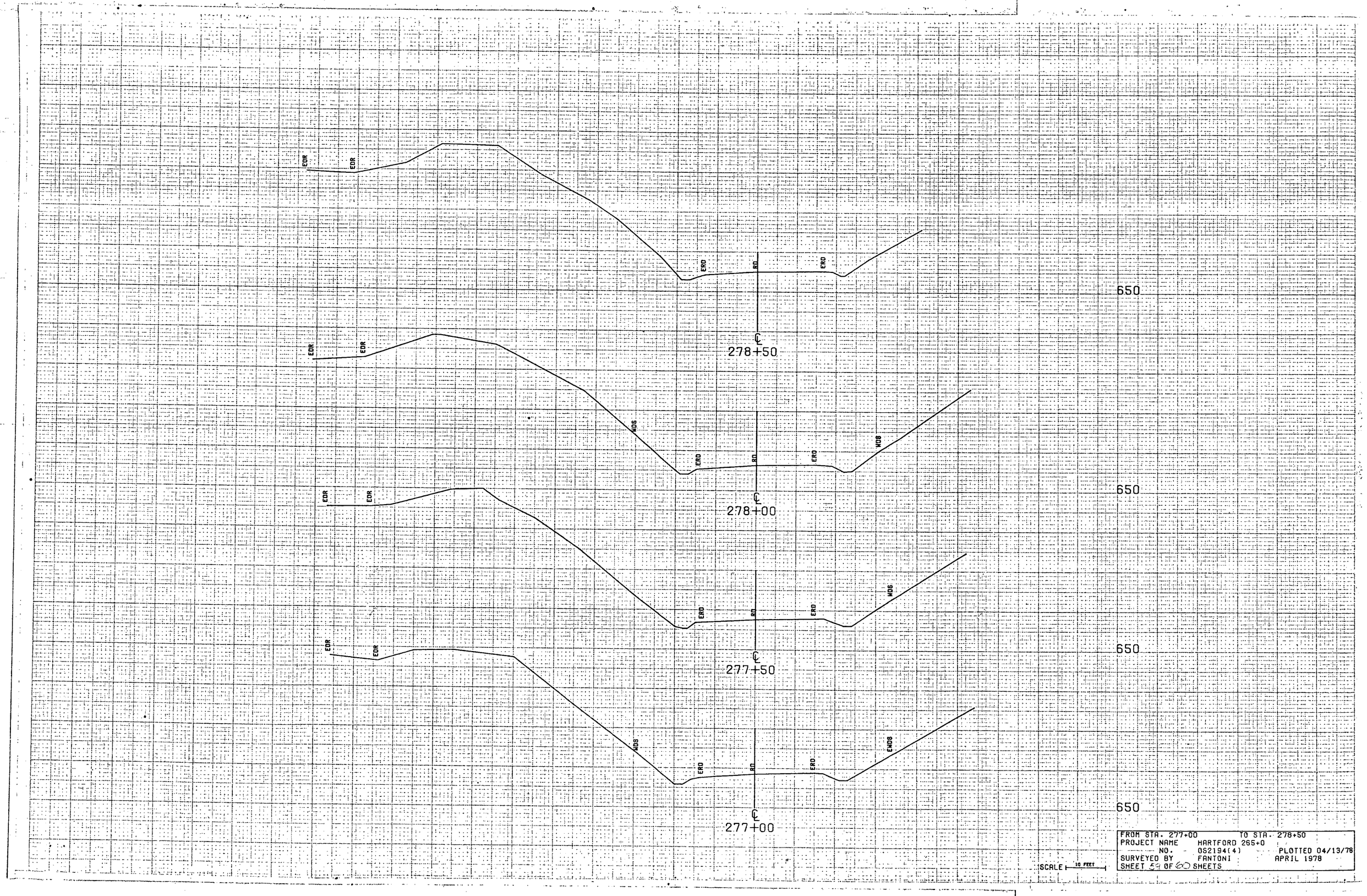
FROM STA. 273+00	TO STA. 274+50
PROJECT NAME	HARTFORD 265+0
NO.	0S2194(4)
SURVEYED BY	FANTONI
SHEET 57 OF 60 SHEETS	

PLOTTED 04/13/78
APRIL 1978

SCALE 50 FEET



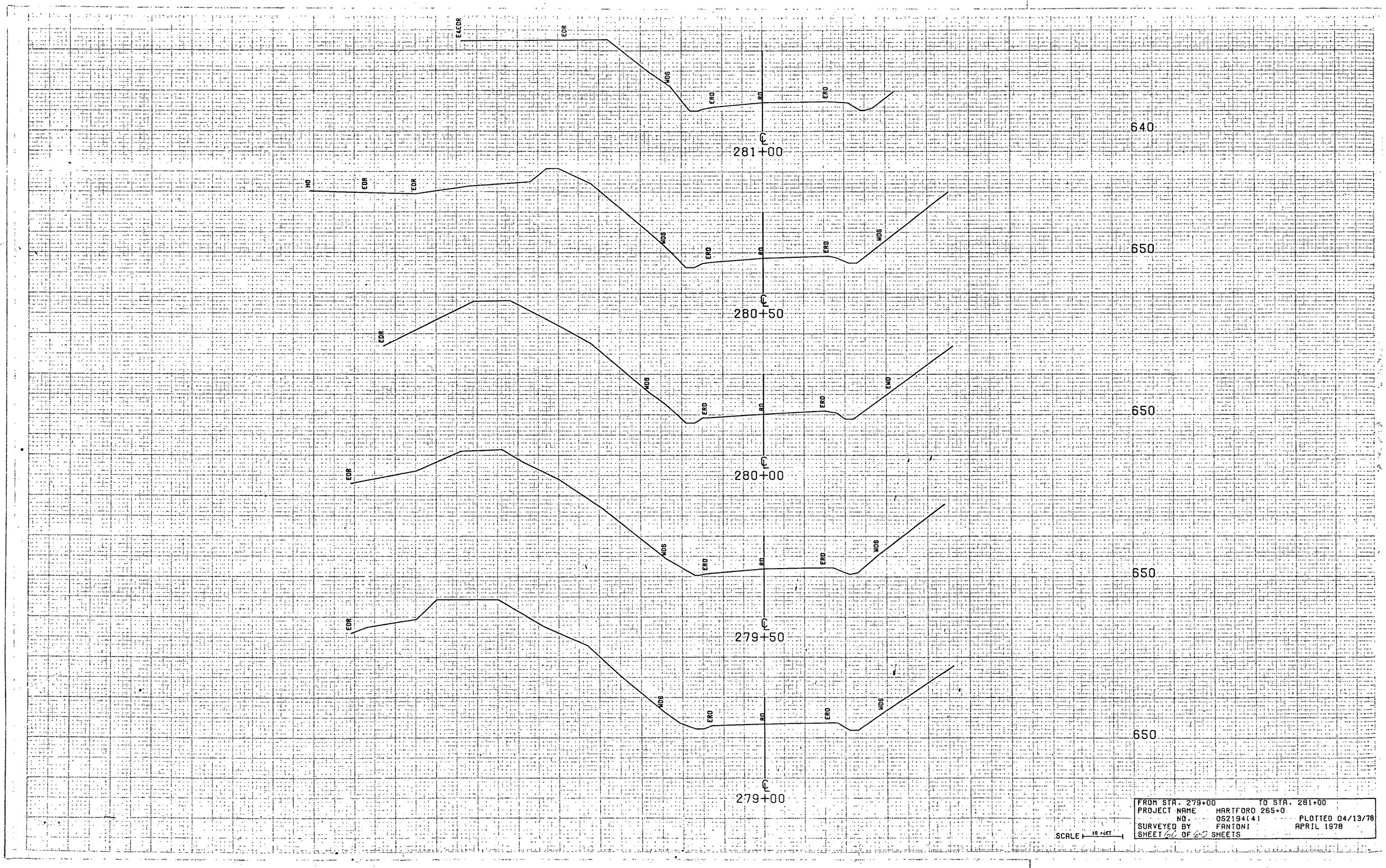
FROM STA. 275+00 TO STA. 276+50
PROJECT NAME HARTFORD 265+0
NO. OS2194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 58 OF 60 SHEETS



FROM STA. 277+00	TO STA. 278+50
PROJECT NAME	HARTFORD 265+0
NO.	052194(4)
SURVEYED BY	FANTONI
SHEET 59 OF 60 SHEETS	

PLOTTED 04/13/78
APRIL 1978

SCALE 10 FEET


EXEDR
EDR
WDS
ERD
RD
ERD
640
281+00
HD
EDR
EDR
WDS
ERD
RD
ERD
WDS
650
280+50
EDR
WDS
ERD
RD
ERD
END
650
280+00
EDR
WDS
ERD
RD
ERD
WDS
650
279+50
EDR
WDS
ERD
RD
ERD
WDS
650
279+00
FROM STA. 279+00 TO STA. 281+00
PROJECT NAME HARTFORD 265+0
NO. 052194(4) PLOTTED 04/13/78
SURVEYED BY FANTONI APRIL 1978
SHEET 61 OF 60 SHEETS
SCALE 10 FEET