

INDEX OF SHEETS

- 1 TITLE SHEET
- 2 PROJECT NOTES
- 3-4 TYPICAL SECTIONS & DETAILS SHEETS
- 5 QUANTITY SHEET
- 6 LAYOUT
- 7 CULVERT PROFILE
- 8 EPSC NARRATIVE
- 9 EPSC EXISTING CONDITIONS SITE PLAN
- 10 EPSC CONSTRUCTION SITE PLAN
- 11 EPSC FINAL CONDITIONS SITE PLAN
- 12-14 EPSC DETAIL SHEETS
- 15 CROSS SECTIONS

VAOT STANDARDS FOR CONSTRUCTION

D-16	DRAINAGE DETAILS INCLUDING DROP INLETS, IRON GRATE TYPE B&C, CONC END SECTIONS, ETC.	06-01-1994
D-34	REINFORCED CONCRETE CRADLE HEADWALL	03-12-2007
E-100	CONSTRUCTION APPROACH SIGNS	01-02-2004
E-100A	SIDE ROAD CONSTRUCTION - APPROACH SIGNS	01-02-2004
E-101	CONSTRUCTION SIGN DETAILS	05-30-2003
E-102	CONSTRUCTION SIGN DETAILS	06-30-2003
E-102A	CONSTRUCTION SIGN DETAILS	05-01-2004
E-103	MAINLINE TRAFFIC CONTROL DIVIDED HIGHWAY ONE LANE CLOSED	03-01-2004
E-106	TRAFFIC CONTROL- MISCELLANEOUS DETAILS	03-01-2004
E-107	DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS	06-30-2003
E-107A	BREAKAWAY BARRICADE DETAILS	06-08-2009
E-III	MINOR MAINTENANCE OPERATIONS	03-11-1997
E-120	STANDARD SIGN PLACEMENT - EXPRESSWAY & FREEWAY	08-08-1995
E-121	STANDARD SIGN PLACEMENT - CONVENTIONAL ROAD	08-08-1995

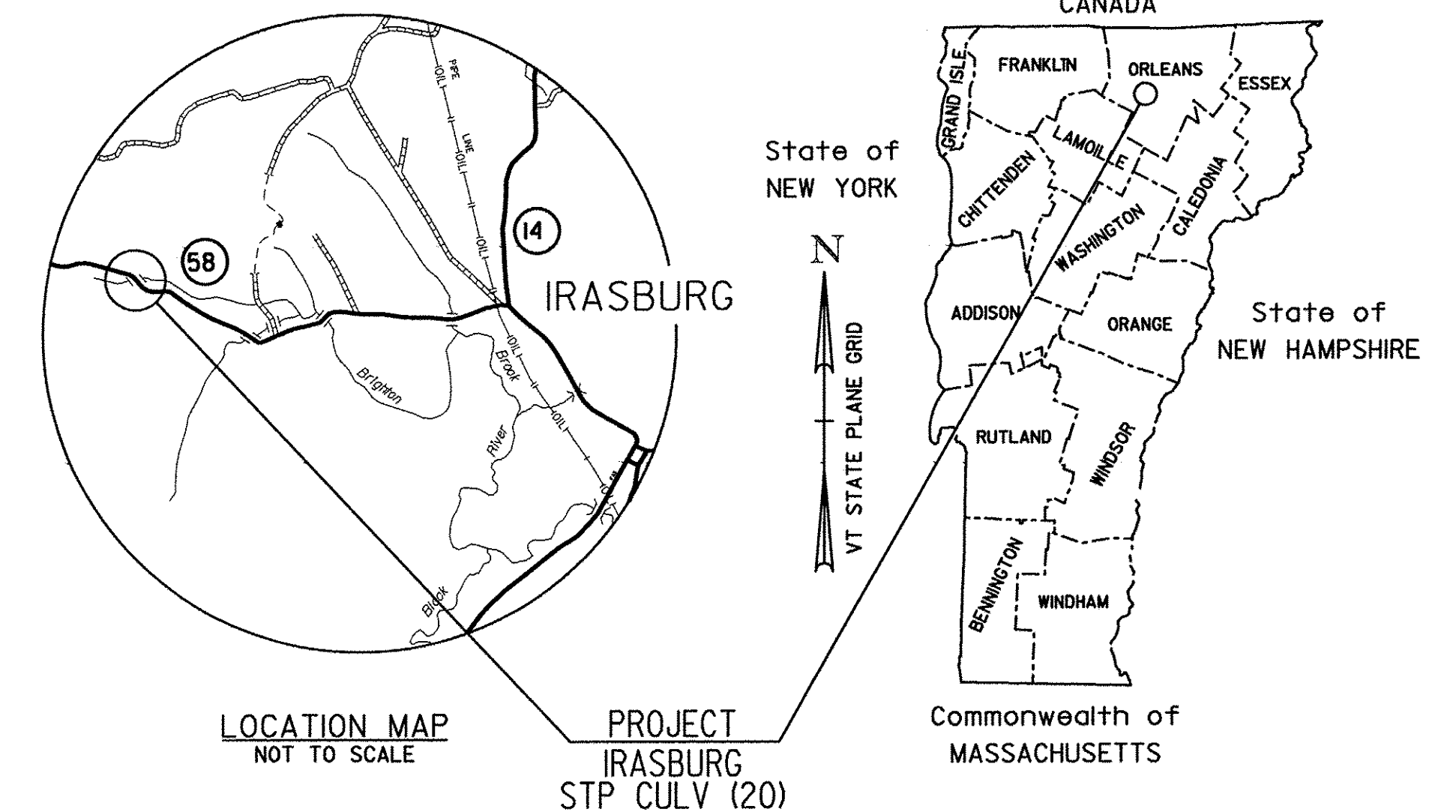
TRAFFIC DATA

2008 AADT: 1200

STATE OF VERMONT
AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
CULVERT REHABILITATION PROJECT
TOWN OF IRASBURG
COUNTY OF ORLEANS
VERMONT ROUTE 58 (MAJOR COLLECTOR)



PROJECT LOCATION: WORK TO BE PERFORMED AT THIS LOCATION, ON VERMONT ROUTE 58, 2.2 MILES WEST OF JUNCTION WITH VERMONT ROUTE 14.

PROJECT DESCRIPTION: THIS PROJECT CONSISTS OF INSTALLATION OF PIPE LINER, INSTALLATION OF HEADWALLS, CHANNEL AND EMBANKMENT STABILIZATION.

RECORD PLANS

CONTRACTOR: J.P. SICARD, INC. - BARTON, VT

RESIDENT ENGINEER: SETH HISMAN

CONSTRUCTION BEGAN: MAY 26, 2011

CONSTRUCTION COMPLETE: AUGUST 26, 2012

RECORD PLANS BY: SETH HISMAN

I HEREBY CERTIFY THAT ALL THE CONSTRUCTION REQUIRED BY THIS SET OF DRAWINGS HAS BEEN ACCOMPLISHED AS INDICATED HEREIN.

BY *Seth Hisman* RESIDENT ENGINEER

DATE 3/13/13

NOTE: Any further information concerning final quantities, amounts or other details relative to this project may be found at Central Files in the electronic archives.

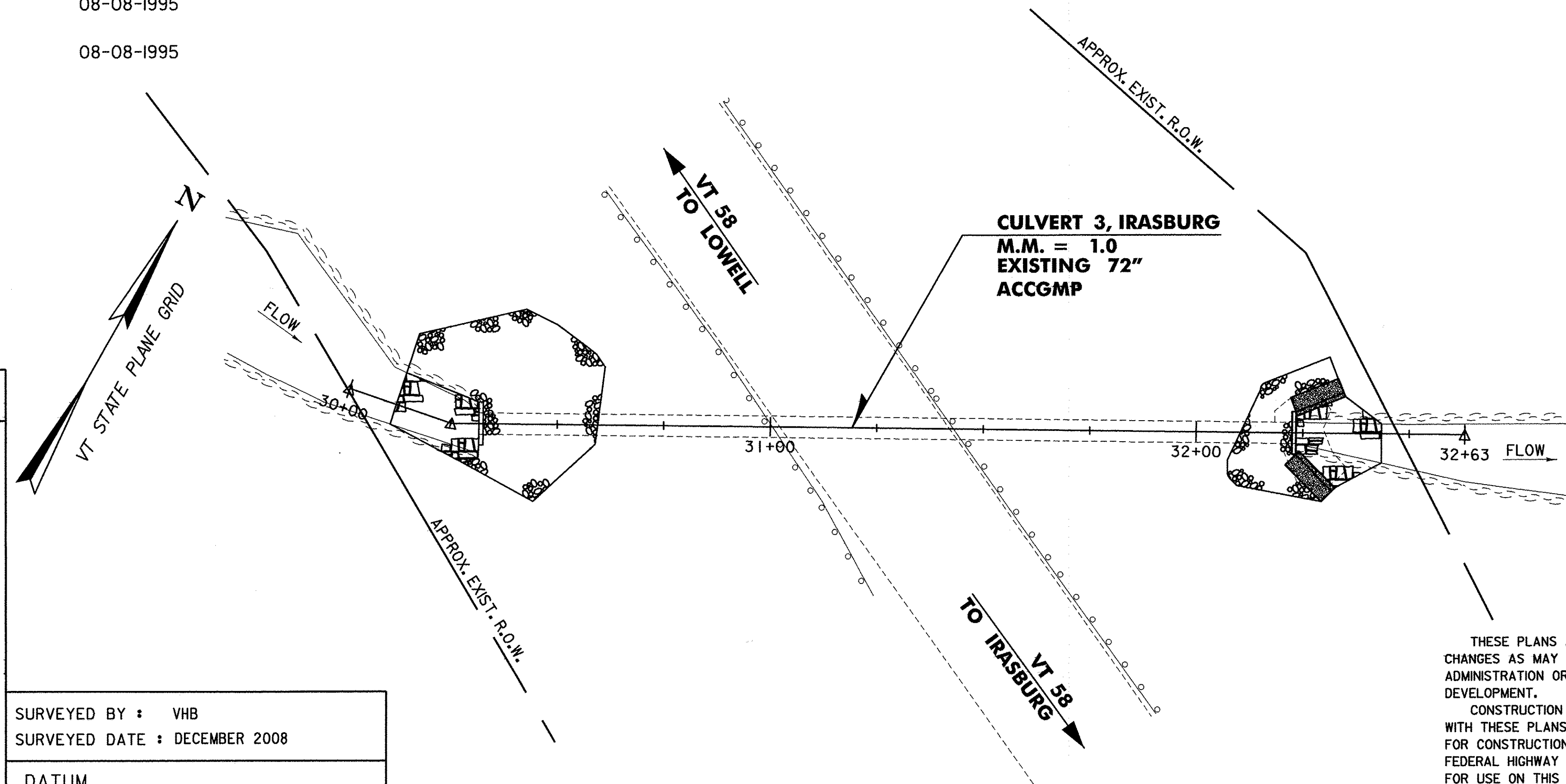
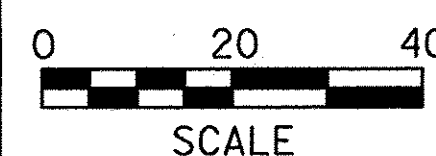
QUALITY ASSURANCE PROGRAM: LEVEL 2

CONVENTIONAL SYMBOLS

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	

SURVEYED BY : VHB
SURVEYED DATE : DECEMBER 2008

DATUM
VERTICAL ASSUMED
HORIZONTAL ASSUMED



FINAL PLANS
JULY 27, 2010



THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2006, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JUNE 15, 2006 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

DIRECTOR OF PROGRAM DEVELOPMENT

APPROVED *Paul J. Sargent* DATE 9-17-10

PROJECT MANAGER : MARK SARGENT

PROJECT NAME : IRASBURG
PROJECT NUMBER : STP CULV (20)

SHEET 1 OF 15 SHEETS

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TRAFFIC DATA

2008 AADT: 1200

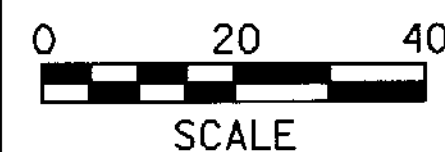
QUALITY ASSURANCE PROGRAM: LEVEL 2

CONVENTIONAL SYMBOLS

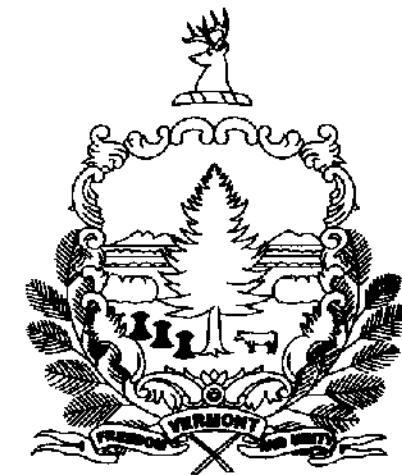
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SLOPE RIGHTS	
TOP OF CUT	
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SURVEYED BY : VHB
SURVEYED DATE : DECEMBER 2008

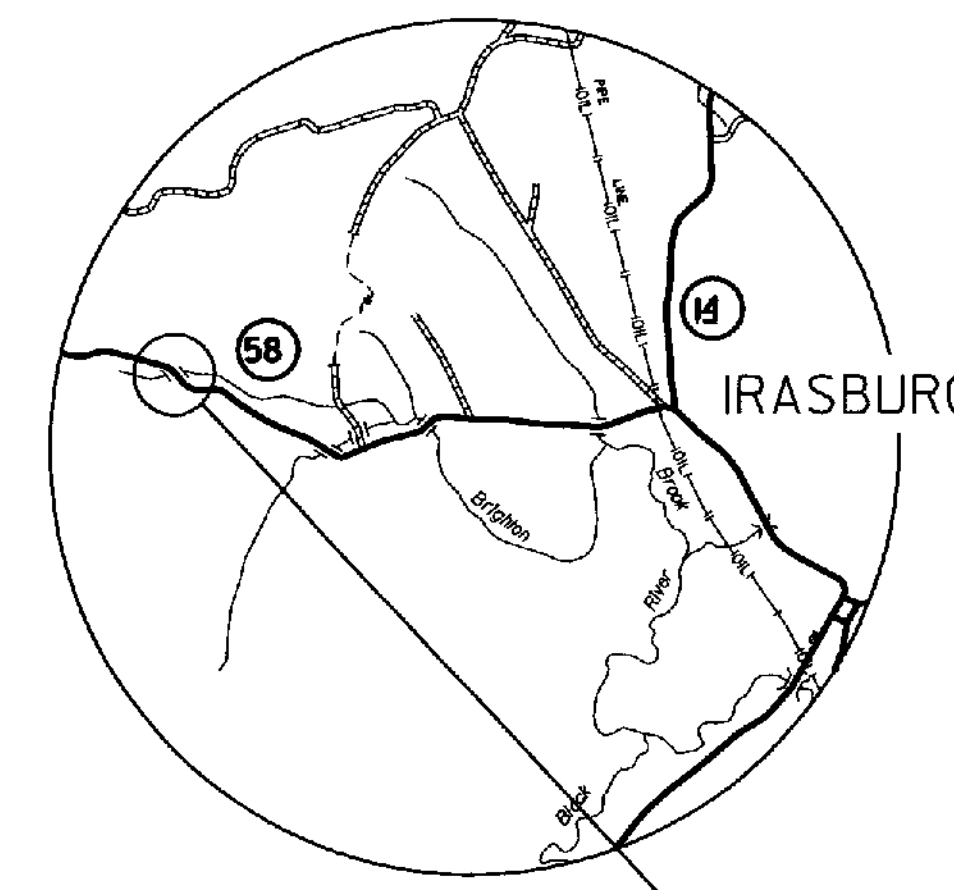
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HORIZONTAL ASSUMED



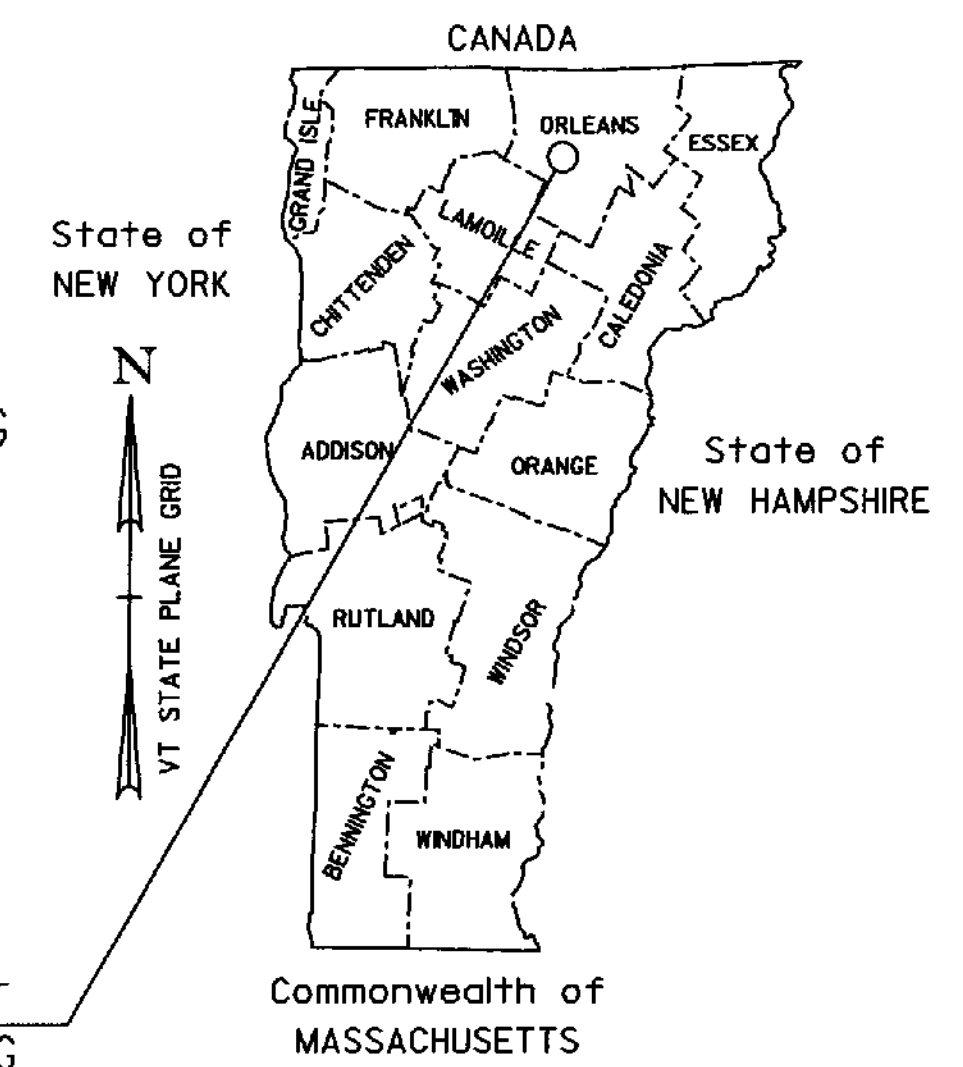
STATE OF VERMONT
AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
CULVERT REHABILITATION PROJECT
TOWN OF IRASBURG
COUNTY OF ORLEANS
VERMONT ROUTE 58 (MAJOR COLLECTOR)



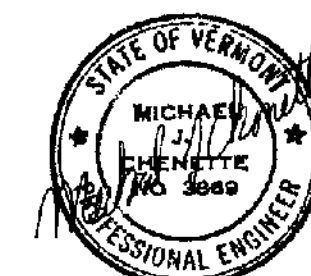
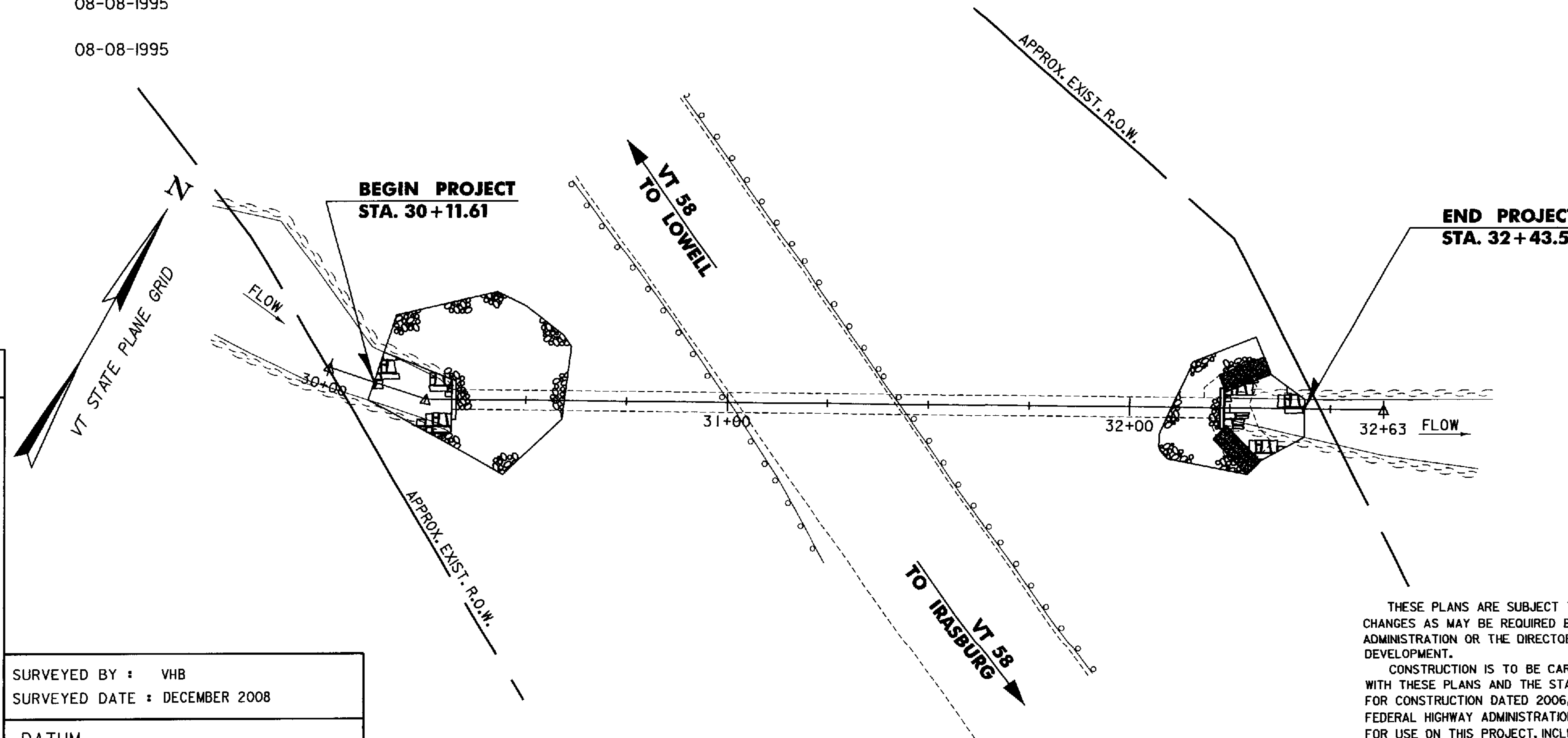
LOCATION MAP
NOT TO SCALE



PROJECT
IRASBURG
STP CULV (20)

PROJECT LOCATION: WORK TO BE PERFORMED AT THIS LOCATION, ON VERMONT ROUTE 58, 2.2 MILES WEST OF JUNCTION WITH VERMONT ROUTE 14.

PROJECT DESCRIPTION: THIS PROJECT CONSISTS OF INSTALLATION OF PIPE LINER, INSTALLATION OF HEADWALLS, CHANNEL AND EMBANKMENT STABILIZATION.



Stantec
Stantec Consulting Services Inc
55 Green Mountain Drive
South Burlington VT U.S.A. 05403
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2006, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JUNE 15, 2006 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

DIRECTOR OF PROGRAM DEVELOPMENT	
APPROVED	DATE 11-18-10
PROJECT MANAGER : MARK SARGENT	
PROJECT NAME : IRASBURG	
PROJECT NUMBER : STP CULV (20)	
SHEET 1 OF 15 SHEETS	

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO STATE OF VERMONT AGENCY OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2006, AND ITS LATEST REVISIONS, AND THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION, DATED 2002, AND ITS LATEST REVISIONS.
2. ALL WORK AND ANY ASSOCIATED ACTIVITY ON THIS PROJECT SHALL BE PERFORMED WITHIN THE EXISTING RIGHT-OF-WAY LIMITS SHOWN ON THE PLANS.
3. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL, AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.
4. IT IS EXPECTED THAT CULVERT LINING, HEADWALLS AND STONE FILL WILL BE THE EXTENT OF THE WORK. DURING THE COURSE OF CONSTRUCTION IF THE CONTRACTOR SEES AN AREA OF CONCERN, SUCH AS VOIDS AROUND THE EXISTING CULVERT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. THE ENGINEER WILL MAKE A DETERMINATION AS TO THE NEED FOR FURTHER EXPLORATION. IF FURTHER EXPLORATION IS NEEDED TEST BORINGS SHALL BE CONDUCTED IN THE AREA OF CONCERN. TEST BORINGS SHALL EXTEND 5 FEET BELOW THE INVERT OF THE CULVERT. THIS WORK SHALL BE PAID FOR UNDER ITEM 900.640, "SPECIAL PROVISION (TEST BORINGS)".

PIPE REHABILITATION NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ACCESS TO THE CULVERT REHABILITATION SITE. ALL RESULTING DISTURBED EARTH SHALL BE STABILIZED AND RESTORED UPON COMPLETION OF CONSTRUCTION. PAYMENT SHALL BE MADE UNDER CONTRACT ITEM 900.645, "SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT)".
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARATION OF THE EXISTING PIPE TO THE SATISFACTION OF THE ENGINEER. IT IS ANTICIPATED THAT IT WILL BE NECESSARY FOR THE CONTRACTOR TO REMOVE SEDIMENT, LARGE STONES, AND/OR DEBRIS FROM INSIDE THE EXISTING CULVERT, AND TO FILL AND REPAIR LARGE HOLES IN THE EXISTING CULVERT PRIOR TO INSTALLING THE NEW LINER. PAYMENT FOR THIS WORK WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 900.640, "SPECIAL PROVISION (ALUMINUM PIPE LINER)".
3. THE CONTRACTOR SHALL FILL ANY VOIDS UNDER THE CULVERT FROM WITHIN THE CULVERT BEFORE INSTALLING THE LINER. PAYMENT FOR THIS WORK WILL BE MADE UNDER ITEM 541.31, "CONCRETE, CLASS D".
4. THE EXISTING MASONRY CONCRETE CRADLE HEADWALLS AT THE CULVERT INLET AND OUTLET SHALL BE REMOVED. NEW CONCRETE CRADLE HEADWALLS SHALL BE CONSTRUCTED. PAYMENT FOR REMOVAL OF EXISTING CRADLE WALLS WILL BE MADE UNDER ITEM 529.25, "REMOVAL OF CONCRETE OR MASONRY".
5. NEW CONCRETE HEADWALLS SHALL BE CONSTRUCTED IN THE DRY. CONTROL OF WATER WILL BE PAID FOR UNDER ITEM 900.645, "SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)".

CONCRETE NOTES

1. CONCRETE PAYMENT AND CLASSIFICATION WILL BE AS FOLLOWS:
HEADWALL:
ITEM 501.34, CONCRETE, HIGH PERFORMANCE CLASS B
FILLING VOIDS BELOW PIPE FLOW LINE:
ITEM 541.31, CONCRETE CLASS D
FILLING VOIDS ABOVE PIPE FLOW LINE:
ITEM 900.608, SPECIAL PROVISION (CONTROLLED DENSITY (FLOWABLE) FILL)
2. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1 INCH BY 1 INCH, UNLESS OTHERWISE NOTED.
3. JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
4. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES. PAYMENT WILL BE MADE UNDER ITEM 514.10, "WATER REPELLENT, SILANE".

REINFORCING STEEL NOTES

1. ALL REINFORCING STEEL SHALL BE GRADE 60.
2. MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
ALONG BACK FACES OF WALLS AGAINST EARTH: 2"
ELSEWHERE UNLESS OTHERWISE INDICATED: 3"
3. REINFORCEMENT STEEL PLACEMENT TOLERANCES SHALL BE:
SPACING = +/- 1 - INCH
CLEARANCE = +/- 1/4- INCH

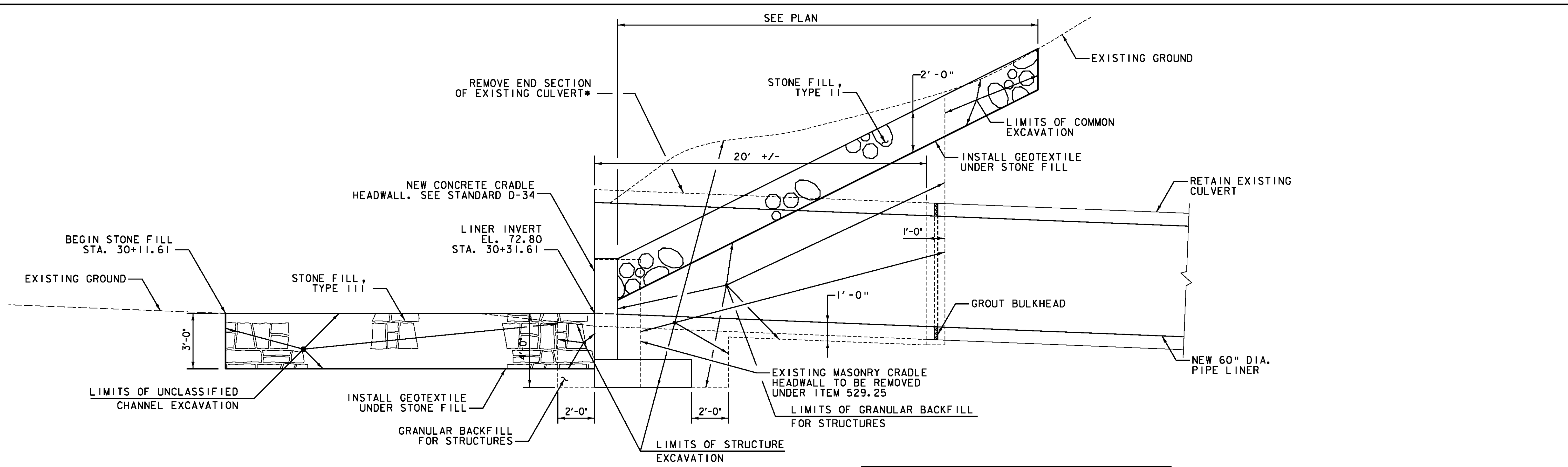
TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL MEASURES FOR THIS PROJECT SHALL BE INSTALLED IN ACCORDANCE WITH TYPICAL APPLICATIONS TA-5, TA-33, TA-34, TA-42 AND TA-44 OF THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE VTRANS STANDARD DRAWINGS, AS NEEDED. CONFLICTS BETWEEN THE MUTCD AND THE VTRANS STANDARD DRAWINGS WILL DEFER TO THE MUTCD.
2. TWO WEEKS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A SPECIFIC TRAFFIC CONTROL PLAN TO THE ROADWAY, TRAFFIC AND SAFETY ENGINEER FOR APPROVAL PER SUBSECTION 105.03. PAYMENT FOR THIS WORK WILL BE INCLUDED IN THE UNIT BID PRICE FOR CONTRACT 641.10, "TRAFFIC CONTROL".
3. LARGE CONSTRUCTION VEHICLES MAY BE REQUIRED TO BACK DOWN THE TEMPORARY ACCESS ROADS. THESE VEHICLES WILL LIKELY NOT HAVE ADEQUATE SPACE AT THE INTERSECTION OF THE ACCESS ROADS AND THE MAIN ROAD TO PERFORM THE NECESSARY TURNING MOVEMENTS. AT THE OPTION OF THE CONTRACTOR, TEMPORARY CLOSURE OF ONE LANE WILL BE ALLOWED FOR ACCESS TO THE PROJECT SITE. THIS WORK WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL".
4. TEMPORARY LANE AND/OR SHOULDER CLOSURES WILL BE ALLOWED DURING WORKING HOURS ONLY.
5. TEMPORARY BARRIER, IF USED, SHALL MEET THE REQUIREMENTS OF SECTION 621. BARRIER ENDS FACING ONCOMING TRAFFIC SHOULD BE TAPERED BEYOND THE CLEAR ZONE. IF NECESSARY, PAYMENT FOR FURNISHING, INSTALLING, RESETTING, AND REMOVING ANY TEMPORARY TRAFFIC BARRIER WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL".
6. ENERGY ABSORPTION ATTENUATORS, IF USED, SHALL MEET THE REQUIREMENTS OF SECTION 621. PAYMENT FOR INSTALLING AND REMOVING ANY ENERGY ABSORPTION ATTENUATORS WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL". A BACKUP ATTENUATOR SHALL BE PROVIDED ON SITE IN ACCORDANCE WITH THE SPECIFICATIONS.
7. SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES SHALL BE CLEANED WEEKLY AND THIS WORK SHALL BE INCLUDED IN THE BID PRICE FOR ITEM 641.10, "TRAFFIC CONTROL".

PROJECT NAME: IRASBURG
PROJECT NUMBER: STP CULV(20)

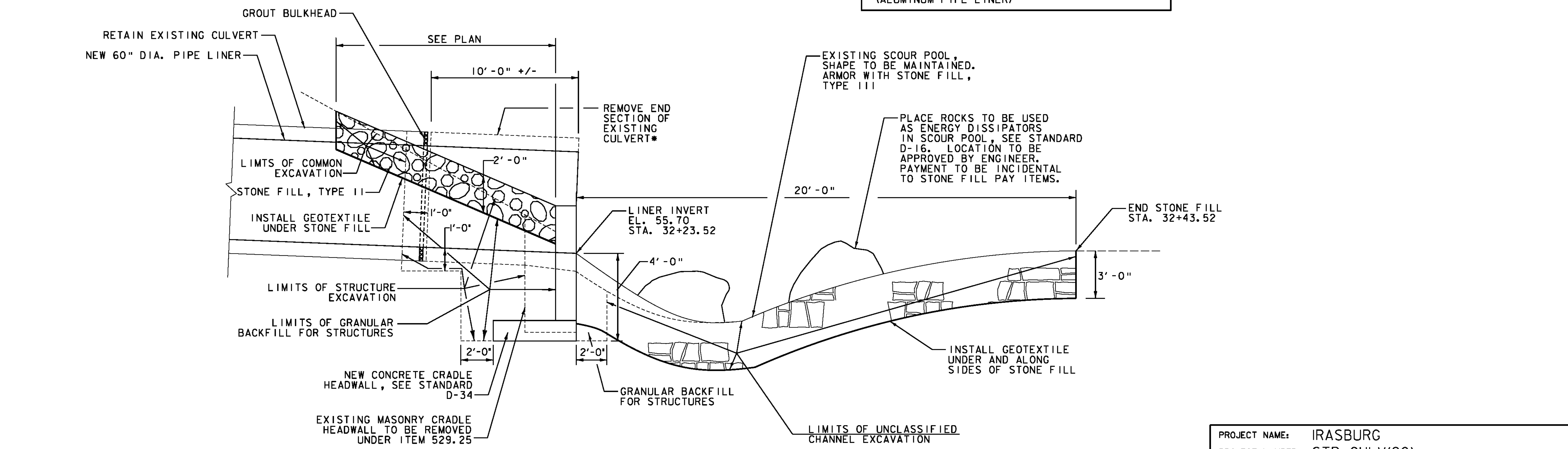
FILE NAME: ...drawing\z08cl94notes.dgn PLOT DATE: 10/28/2010
PROJECT LEADER: G. BOGUE DRAWN BY: J. SOTER
DESIGNED BY: M. CHENETTE CHECKED BY: T. KNIGHT
PROJECT NOTES SHEET 2 OF 15





CULVERT INLET DETAIL
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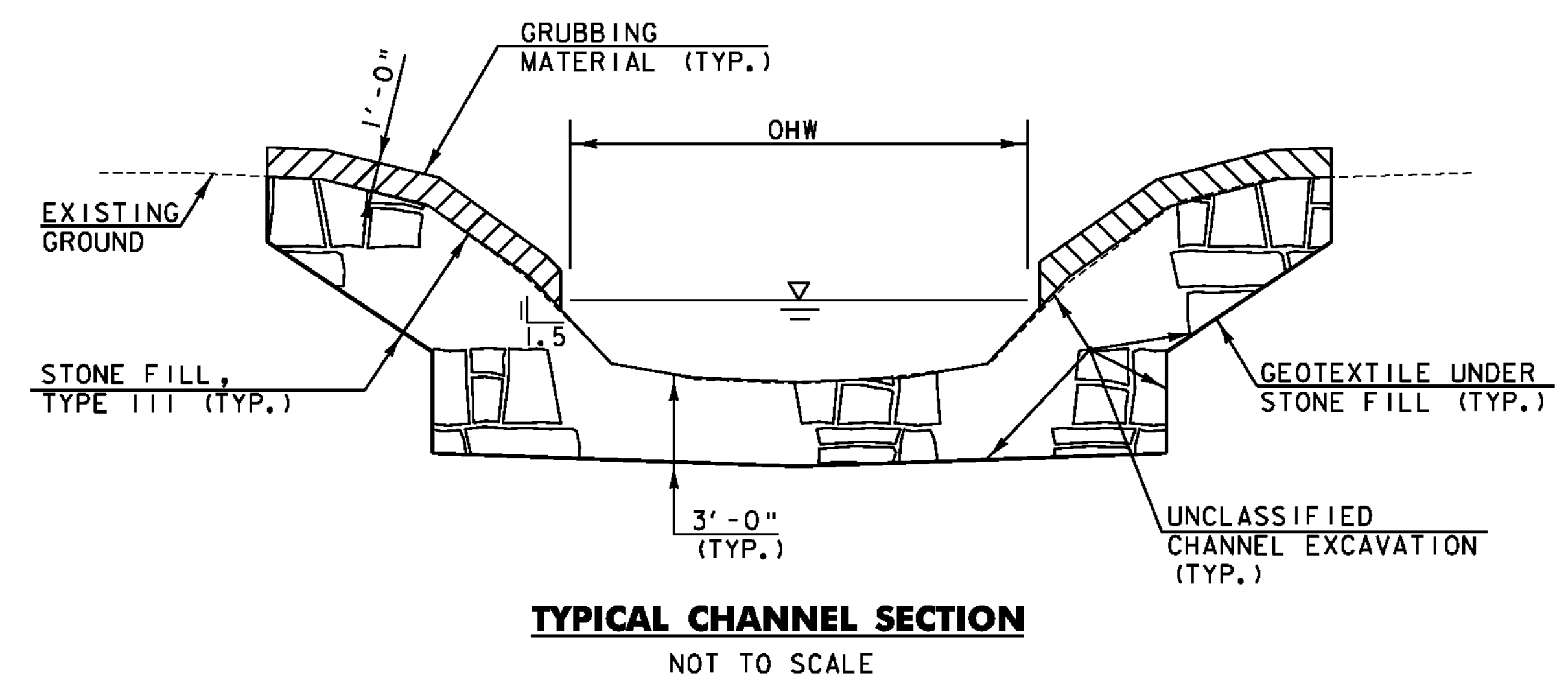
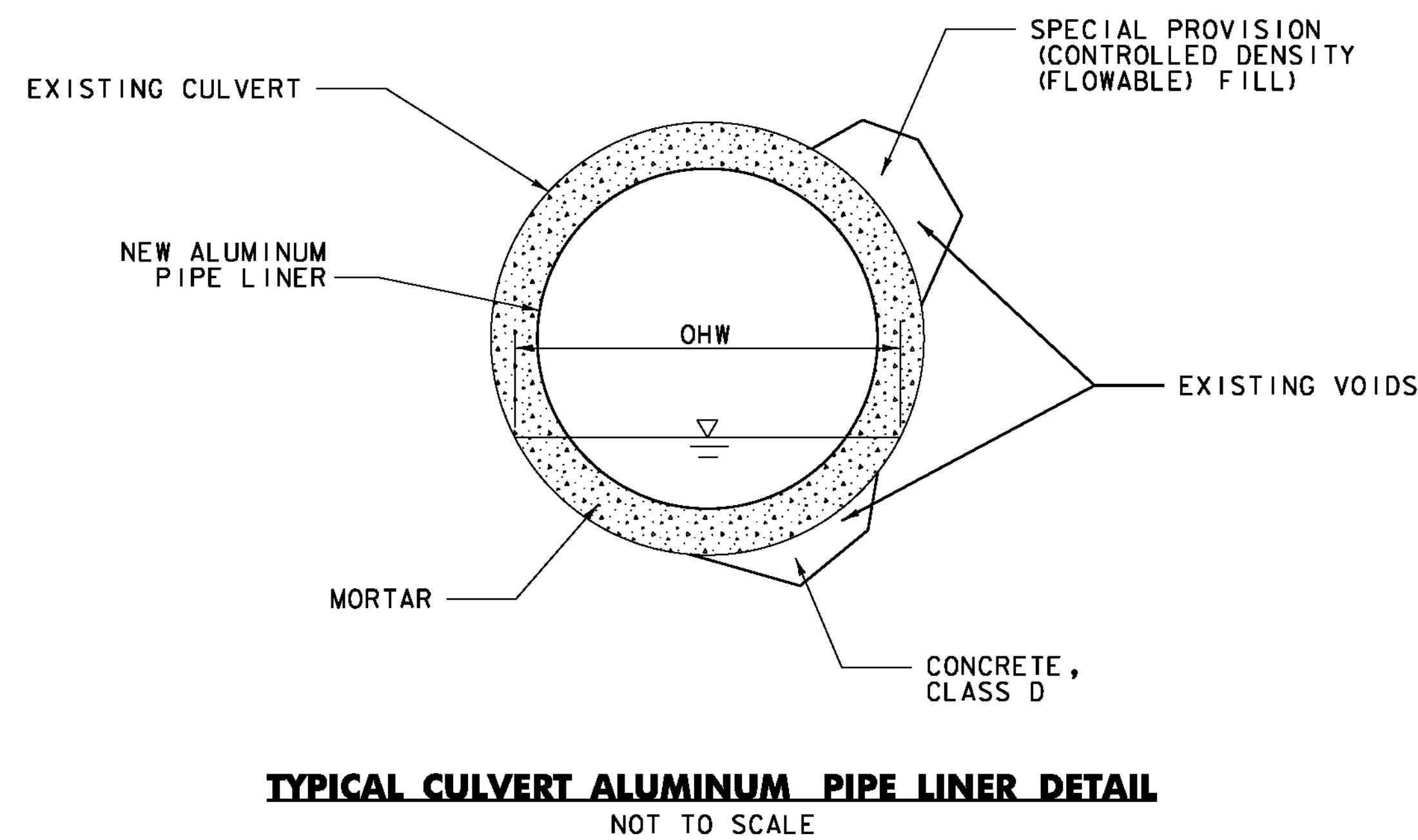
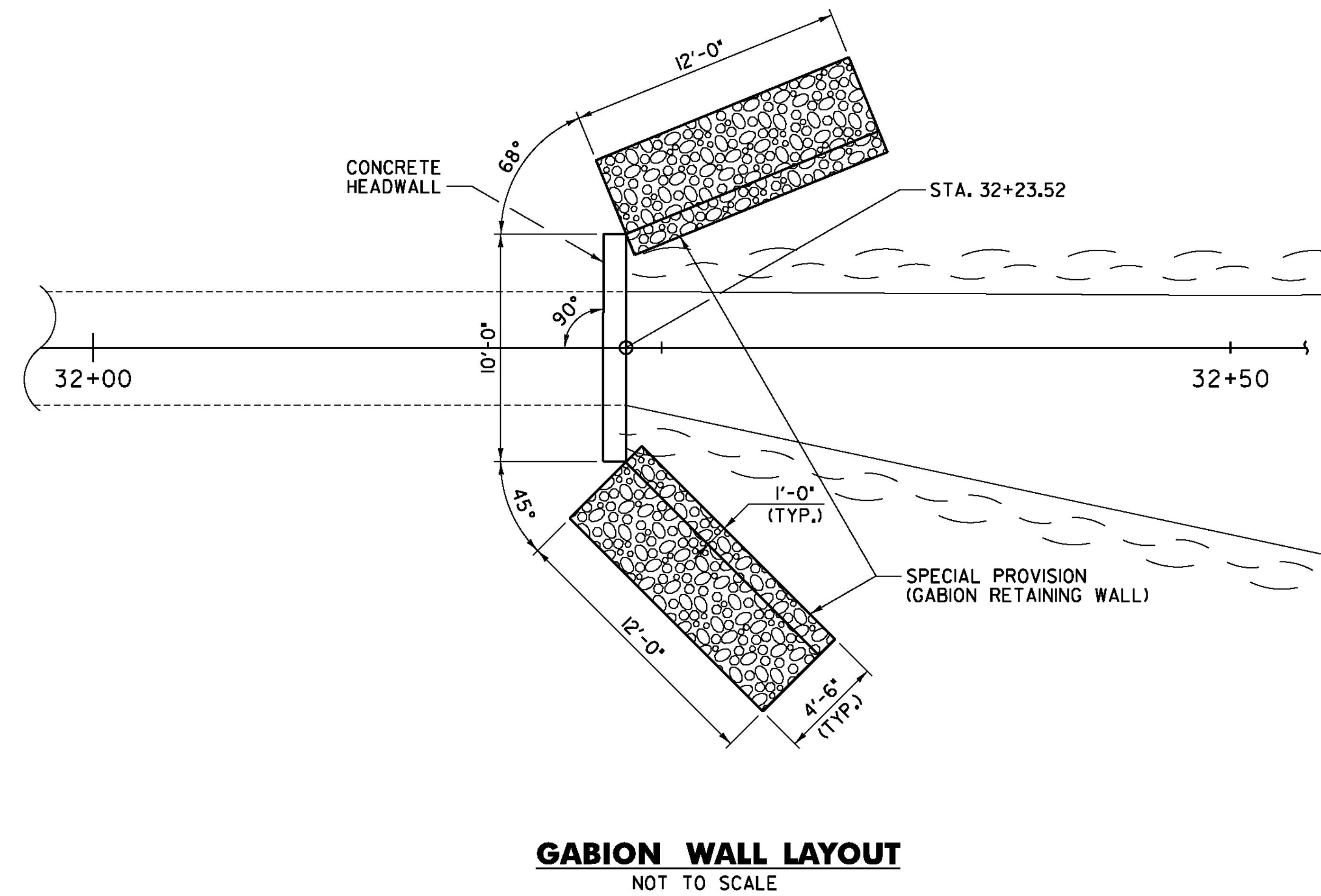
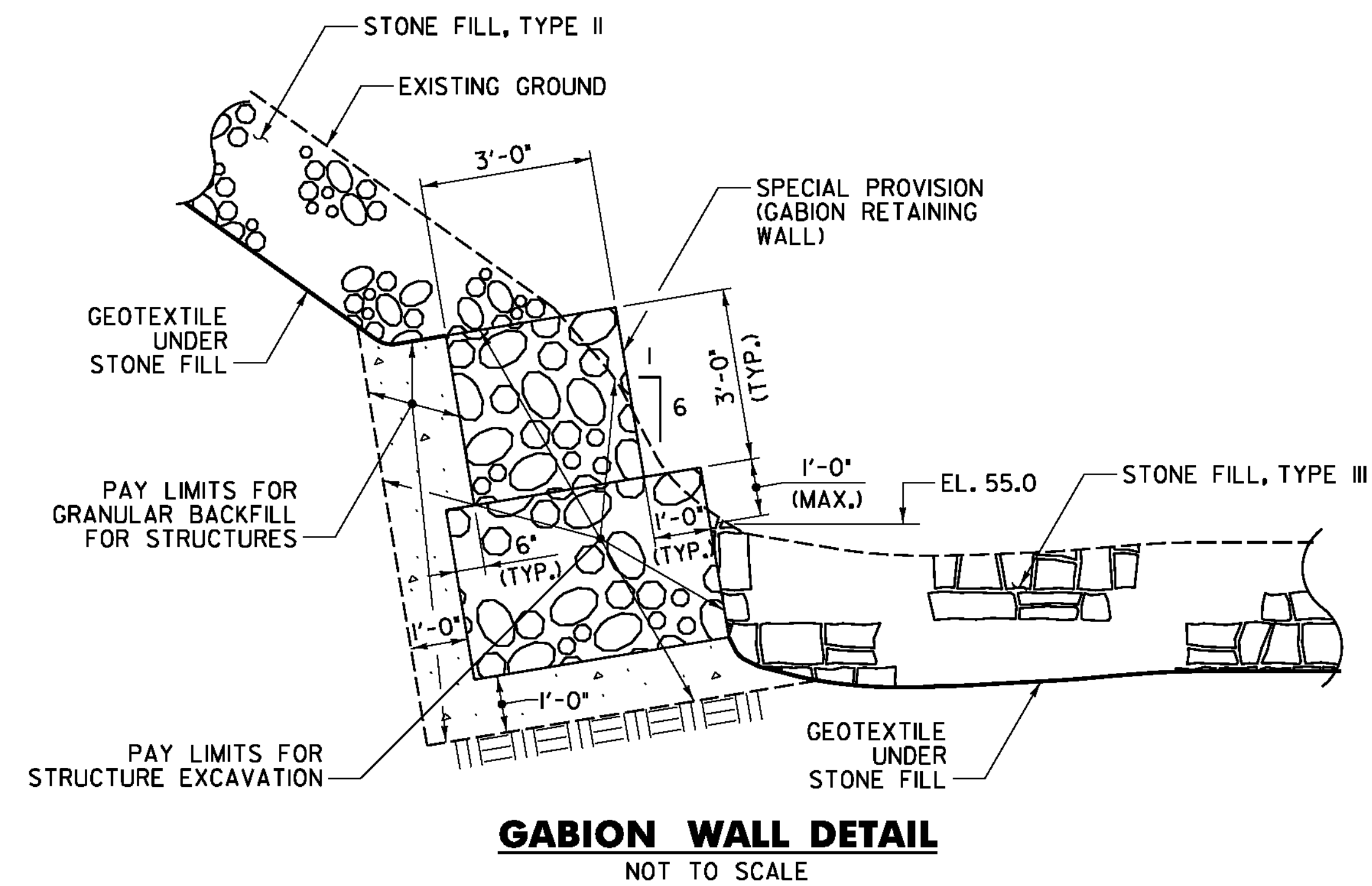
*REMOVAL OF EXISTING CULVERT END SECTIONS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 900.640 SPECIAL PROVISION (ALUMINUM PIPE LINER)



CULVERT OUTLET DETAIL
NOT TO SCALE

PROJECT NAME:	IRASBURG	PLOT DATE:	11/16/2010
PROJECT NUMBER:	STP CULV(20)	DRAWN BY:	J. SOTER
FILE NAME:	...z08c194typ sec det1s.dgn	DESIGNED BY:	M. CHENETTE
PROJECT LEADER:	G. BOGUE	CHECKED BY:	T. KNIGHT
TYPICAL SECTIONS & DETAILS SHEET 1		SHEET 3 OF 15	





PROJECT NAME:	IRASBURG
PROJECT NUMBER:	STP CULV(20)
FILE NAME: ...z08c194typ sec det1s.dgn	PLOT DATE: 10/28/2010
PROJECT LEADER: G. BOGUE	DRAWN BY: J. SOTER
DESIGNED BY: M. CHENETTE	CHECKED BY: T. KNIGHT
TYPICAL SECTIONS & DETAILS SHEET 2	
SHEET 4 OF 15	

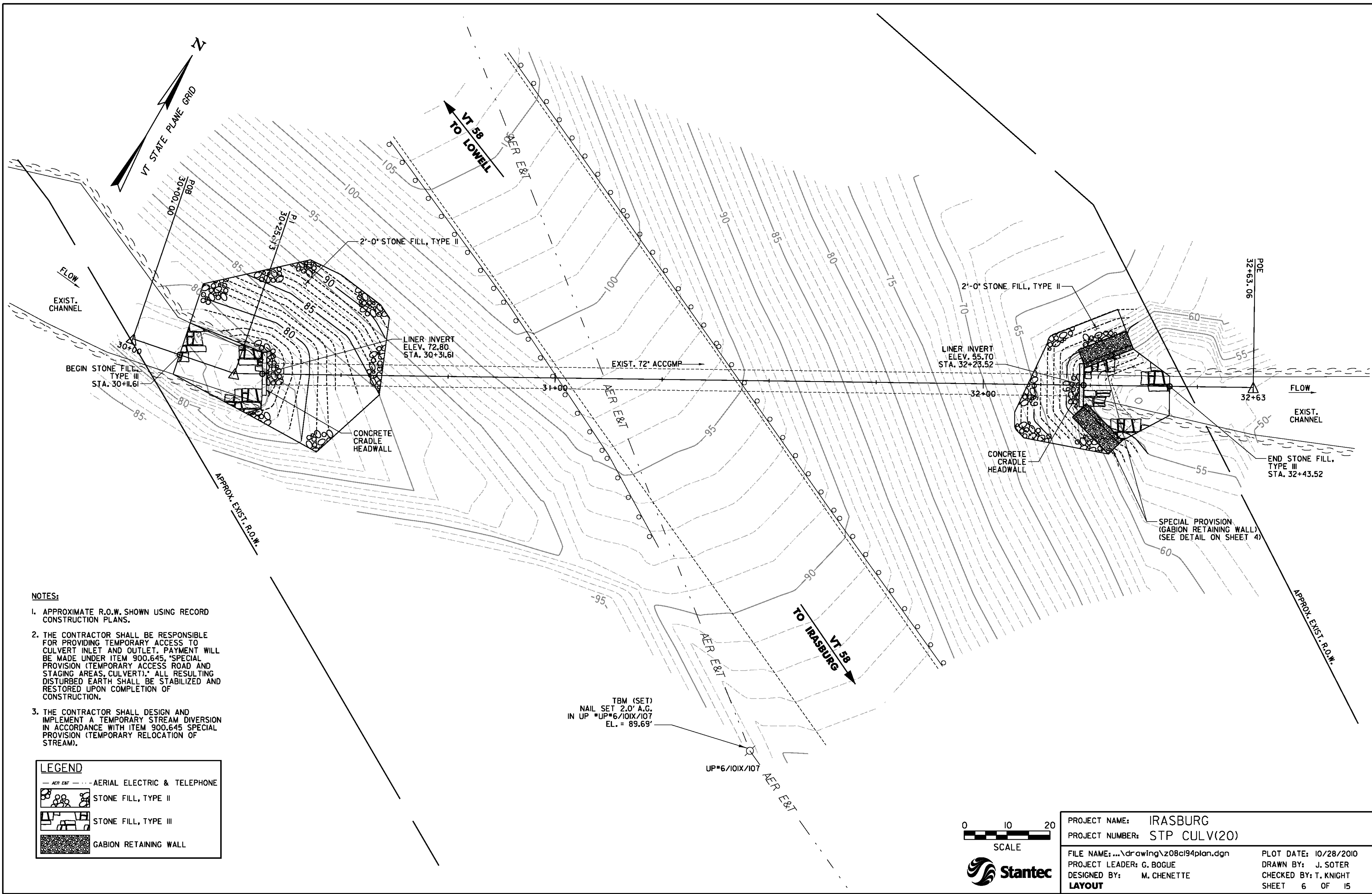


QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
							ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
									1		1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
									110		110		CY	COMMON EXCAVATION	203.15				
									75		75		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				
									1		1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22				
									130		130		CY	STRUCTURE EXCAVATION	204.25				
									80		80		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				
									7		7		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34				
									1145		1145		LB	REINFORCING STEEL	507.15				
									1		1		GAL	WATER REPELLENT, SILANE	514.10				
									7		7		CY	REMOVAL OF CONCRETE OR MASONRY	529.25				
									5		5		CY	CONCRETE, CLASS D	541.31				
			16								16		HR	POWER BROOM RENTAL, TYPE II	608.31				
									150		150		CY	STONE FILL, TYPE II	613.11				
									75		75		CY	STONE FILL, TYPE III	613.12				
									80		80		HR	FLAGGERS	630.15				
										1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16				
									1		1		LS	MOBILIZATION/DEMobilIZATION	635.11				
			1								1		LS	TRAFFIC CONTROL	641.10				
									300		300		SY	GEOTEXTILE UNDER STONE FILL	649.31				
							120				120		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
							30				30		LB	SEED	651.15				
							250				250		LB	FERTILIZER	651.18				
							1				1		TON	AGRICULTURAL LIMESTONE	651.20				
							1				1		TON	HAY MULCH	651.25				
							70				70		CY	TOPSOIL	651.35				
							225				225		SY	GRUBBING MATERIAL	651.40				
							1				1		LS	EPSC PLAN	652.10				
							80				80		HR	MONITORING EPSC PLAN	652.20				
							1				1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30				
							300				300		SY	TEMPORARY EROSION MATTING	653.20				
							1200				1200		SY	PERMANENT EROSION MATTING	653.21				
							6				6		CY	TEMPORARY STONE CHECK DAM, TYPE I	653.25				
							40				40		CY	VEHICLE TRACKING PAD	653.35				
							1				1		EACH	FILTER BAG	653.45				
							675				675		LF	PROJECT DEMARCATION FENCE	653.55				
									5		5		CY	SPECIAL PROVISION (CONTROLLED DENSITY (FLOWABLE) FILL)	900.608				
									20		20		CY	SPECIAL PROVISION (GABION RETAINING WALL)	900.608				
									192		192		LF	SPECIAL PROVISION (ALUMINUM PIPE LINER)(60")EXISTING 72" PIPE)	900.640				
									80		80		LF	SPECIAL PROVISION (TEST BORINGS)	900.640				
									1		1		LS	SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT)	900.645				
									1		1		LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)	900.645				

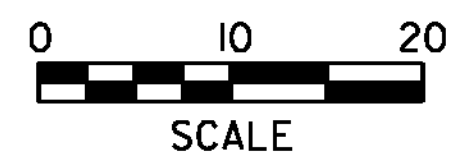
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 FILE NAME: ...drawing\z08cl94qty.dgn PLOT DATE: 10/28/2010
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QUANTITY SHEET SHEET 5 OF 15



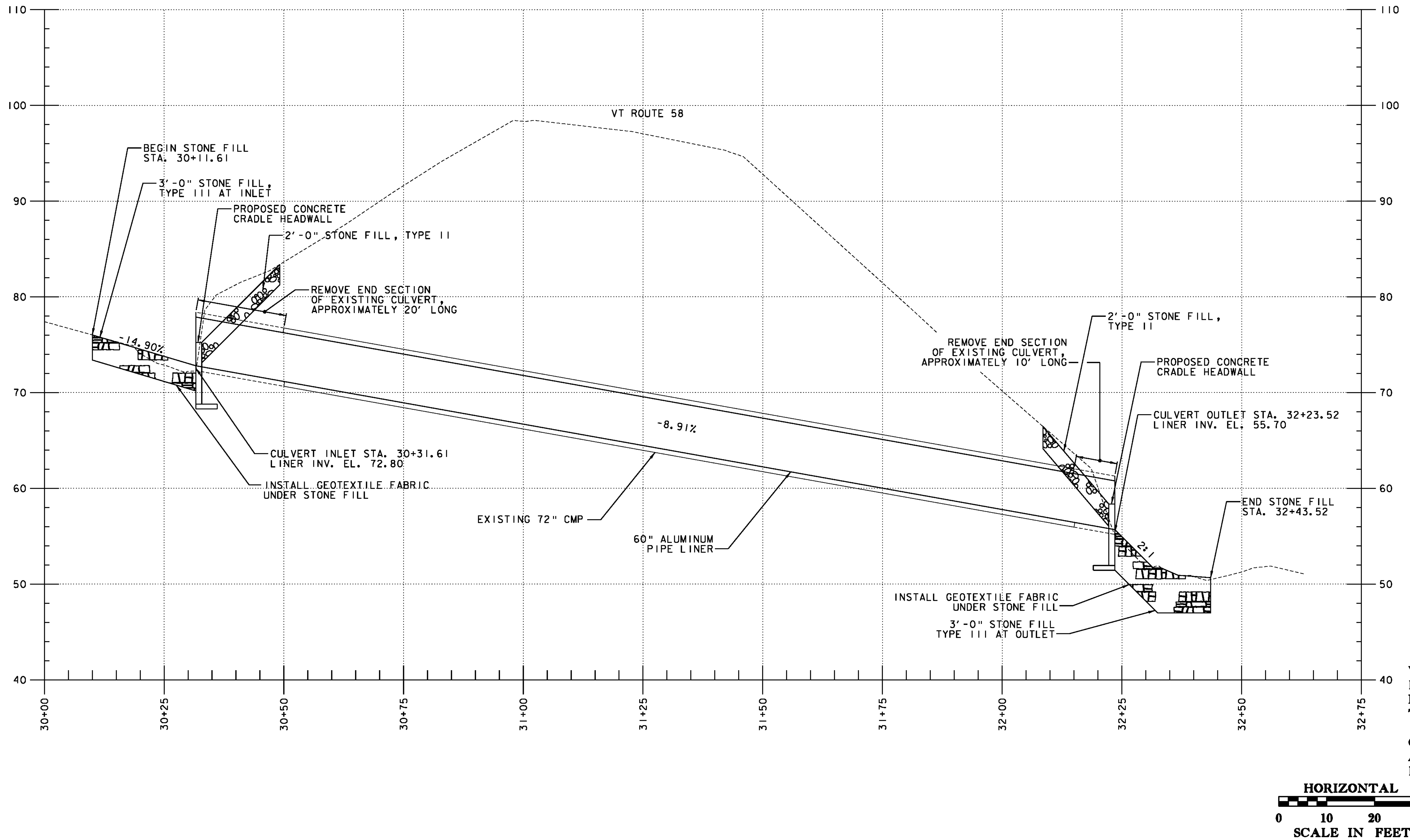


- NOTES:**
1. APPROXIMATE R.O.W. SHOWN USING RECORD CONSTRUCTION PLANS.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ACCESS TO CULVERT INLET AND OUTLET. PAYMENT WILL BE MADE UNDER ITEM 900.645, "SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT)." ALL RESULTING DISTURBED EARTH SHALL BE STABILIZED AND RESTORED UPON COMPLETION OF CONSTRUCTION.
 3. THE CONTRACTOR SHALL DESIGN AND IMPLEMENT A TEMPORARY STREAM DIVERSION IN ACCORDANCE WITH ITEM 900.645 SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM).

LEGEND	
	AERIAL ELECTRIC & TELEPHONE
	STONE FILL, TYPE II
	STONE FILL, TYPE III
	GABION RETAINING WALL



PROJECT NAME: IRASBURG	PLOT DATE: 10/28/2010
PROJECT NUMBER: STP CULV(20)	DRAWN BY: J. SOTER
FILE NAME: ...drawing\208cl94plan.dgn	CHECKED BY: T. KNIGHT
PROJECT LEADER: G. BOGUE	SHEET 6 OF 15
DESIGNED BY: M. CHENETTE	
LAYOUT	



PROJECT NAME: IRASBURG
 PROJECT NUMBER: STP CULV(20)
 FILE NAME: ...drawing\208cl94prof3.dgn PLOT DATE: 10/28/2010
 PROJECT LEADER: G. BOGUE DRAWN BY: J. SOTER
 DESIGNED BY: M. CHENETTE CHECKED BY: T. KNIGHT
CULVERT PROFILE SHEET 7 OF 15



EROSION CONTROL NARRATIVE

1.1 PROJECT DESCRIPTION

THE IRASBURG VERMONT ROUTE 58 CULVERT REHABILITATION PROJECT INCLUDES WORK TO BE PERFORMED AT MILE MARKER 1.05 ON VERMONT ROUTE 58 IN THE TOWN OF IRASBURG, COUNTY OF ORLEANS.

THE PROJECT SHALL CONSIST OF INSTALLATION OF A SPIRAL RIB PIPE LINER, INSTALLATION OF CONCRETE HEADWALLS AND WINGWALLS, CHANNEL STABILIZATION, AND EMBANKMENT STABILIZATION. TOPSOIL, SEED, MULCH, OR STONE FILL SHALL BE APPLIED TO ALL DISTURBED AREAS.

THE PROJECT SHALL REHABILITATE AN EXISTING CORRUGATED GALVANIZED METAL PLATE PIPE THAT IS IN POOR CONDITION. FAILURE OF THE EXISTING HEADWALLS HAS RESULTED IN SEVERE EROSION OF THE BANKS SURROUNDING THE CULVERT OUTLET. DISTURBED EARTH ASSOCIATED WITH THIS WORK IS A RESULT OF ACCESS AND STAGING REQUIREMENTS, EXCAVATION FOR INSTALLATION OF NEW HEADWALLS AND WINGWALLS, AND STONE FILL INSTALLATION FOR INLET AND OUTLET PROTECTION AND SLOPE STABILIZATION. THE TOTAL AREA OF DISTURBANCE IS 0.31 ACRES, INCLUDING BOTH ON-SITE AND CONTIGUOUS WASTE, BORROW, STAGING, AND HAUL ROADS.

1.2 SITE INVENTORY AND ANALYSIS

1.2.1 BODIES OF WATER & ON-SITE/OFFSITE DRAINAGE CHARACTERISTICS

THE PROPERTY SURROUNDING THE PROJECT SITE IS HEAVILY FORESTED WITH STEEP SLOPES AND IS A RURAL AREA. THERE ARE ROADWAY DITCHES THAT OUTLET INTO THE PROJECT AREA. THE PROJECT SITE COULD RECEIVE RUNOFF FROM THE SURROUNDING SLOPES, ROADWAY DITCHES AND THE ROADWAY OVERTOP THE CULVERT.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

THE WATER SOURCE ON THE PROJECT SITE IS AN UNNAMED TRIBUTARY TO BRIGHTON BROOK. THE TRIBUTARY AREA AT THE CULVERT CROSSING IS 0.49 SQUARE MILES.

1.2.3 TOPOGRAPHY, EXISTING ROADS, BUILDINGS, UTILITIES

THE TOPOGRAPHY OF THE PROJECT AREA IS MOUNTAINOUS TERRAIN THAT IS MOSTLY WOODED WITH OPEN AREAS FOR THE SURROUNDING ROADWAYS. VT ROUTE 58 IS WITHIN THE PROJECT SITE. THERE IS A RESIDENCE ON THE NORTH WEST SIDE OF THE PROJECT SITE WITH A PAVED DRIVEWAY AND A HOUSE UP THE SLOPE. THERE ARE OVERHEAD UTILITIES THAT SHOULD NOT BE IMPACTED BY THE PROJECT.

1.2.4 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF RELATIVELY SMALL HARDWOOD TREES AND UNDERGROWTH. THE IMPACT WILL BE LIMITED TO THAT WHICH IS RELATED TO THE EXCAVATION REQUIRED FOR THE INSTALLATION OF HEADWALLS AND WINGWALLS, STONE FILL, TEMPORARY HAUL ROADS. UPON COMPLETION, THE CHANNEL AND ANY DISTURBED AREAS WITH SLOPES GREATER THAN 2:1 WILL BE ARMORED WITH STONE FILL TYPE II OR III AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2.5 SOILS

SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE NATIONAL RESOURCES CONSERVATION SERVICE FOR THE COUNTY OF ORLEANS, VERMONT.

THE SOIL ON THE PROJECT SITE IS DIXFIELD SANDY LOAM, 35 TO 60 PERCENT SLOPES, VERY STONY. THIS TYPE OF SOIL IS USUALLY FOUND IN MOUNTAINS AND HILLS. K FACTOR = 0.24. THE SOIL IS CONSIDERED MODERATELY ERODIBLE.

1.2.6 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: NO
PRIME AGRICULTURAL LAND: NO
THREATENED AND ENDANGERED SPECIES: NO
WATER RESOURCE: UNNAMED TRIBUTARY TO BRIGHTON BROOK
WETLANDS: NO

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF CONSTRUCTION GENERAL PERMIT 3-9020 BASED ON THE PROJECT IMPACT AREA. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ONE OR MORE ACRES OF EARTH DISTURBANCE OR SHOULD THE PROJECT BECOME PART OF A LARGER PLAN OF DEVELOPMENT, THEN THE SELECTED CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL PERMITTING WITH VANR VIA FILING OF THE APPROPRIATE NOTICE OF INTENT UNDER THE CONSTRUCTION GENERAL PERMIT PROCESS.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE WORK OUTLINED IN THIS NARRATIVE CONSISTS OF APPLYING MEASURES THROUGHOUT THE LIFE OF THE PROJECT MINIMIZING SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION CONTROLS.

PREVENTING INITIAL SOIL EROSION IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

(REFER TO THE "LOW RISK SITE HANDBOOK FOR EROSION PREVENTION AND SEDIMENT CONTROL" AND APPROPRIATE DETAIL SHEETS FOR EACH PRACTICE REQUIRED ON THE PROJECT TO INCLUDE BUT NOT LIMITED TO THE FOLLOWING.)

1.4.1 MARK SITE BOUNDARIES

PROJECT DEMARCATION FENCING, DENOTED -PDF- ON THE PLANS, IS USED TO DELINEATE THE LIMITS THE CONTRACTOR CAN ACCESS WITH CONSTRUCTION EQUIPMENT. THIS MEASURE LIMITS THE AREA THAT CAN BE DISTURBED AND EXPOSED TO EROSION.

1.4.2 LIMIT DISTURBANCE AREA

EMPLOY TEMPORARY STABILIZATION PRACTICES IN INCREMENTAL STAGES (PHASING) AS CONSTRUCTION PROCEEDS. ADDITIONAL MEASURES MAY BE NEEDED DUE TO THE PHASING OF THE PROJECT AND AS DIRECTED BY THE ENGINEER.

1.4.3 STABILIZE CONSTRUCTION EXIT

STABILIZED CONSTRUCTION ENTRANCE SHALL BE UTILIZED AS NECESSARY.

1.4.4 INSTALL SILT FENCE

SILT FENCE SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK AS SHOWN ON THE PLANS OR AS NECESSARY.

1.4.5 DIVERT UPLAND RUNOFF

NOT APPLICABLE.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK DAMS SHALL BE UTILIZED AS NECESSARY.

1.4.7 CONSTRUCT PERMANENT CONTROLS

TYPE II,III STONE FOR SLOPE LINING AND CHANNEL PROTECTION
SEED AND MULCH
DRAINAGE INLETS AND PIPING
SOIL RETENTION WALLS

STREAM BANK VEGETATION WILL BE INTRODUCED IN THE GRUBBING MATERIAL THAT IS TO BE PLACED OVER THE STREAM BANK STONE FILL.

1.4.8 STABILIZE EXPOSED SOILS

SEED AND MULCH
EROSION MATTING

TRACKING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, WILL BE UTILIZED ON A REGULAR BASIS. SLOPES SHALL BE STABILIZED WITHIN 48 HOURS OF FORECASTED RAIN. SEEDING, MULCHING AND BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3. THESE SLOPES SHALL BE STABILIZED WITHIN 48 HOURS OF REACHING INTERMITTENT PHASES OF CONSTRUCTION.

1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER (SEE LOW RISK HANDBOOK)

1.4.10 STABILIZE SOIL AT FINAL GRADE

SEED AND MULCH
EROSION MATTING

SEEDING, MULCHING AND BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3. THESE SLOPES SHALL BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

1.4.11 DE-WATERING ACTIVITIES

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

SEDIMENT CONTAINMENT BAGS (FILTER BAGS) FOR HEADWALL WORK SHALL BE USED AS NECESSARY AND AS DIRECTED BY THE ENGINEER. SEE SHEET 14 FOR DETAIL.

1.4.12 INSPECT YOUR SITE

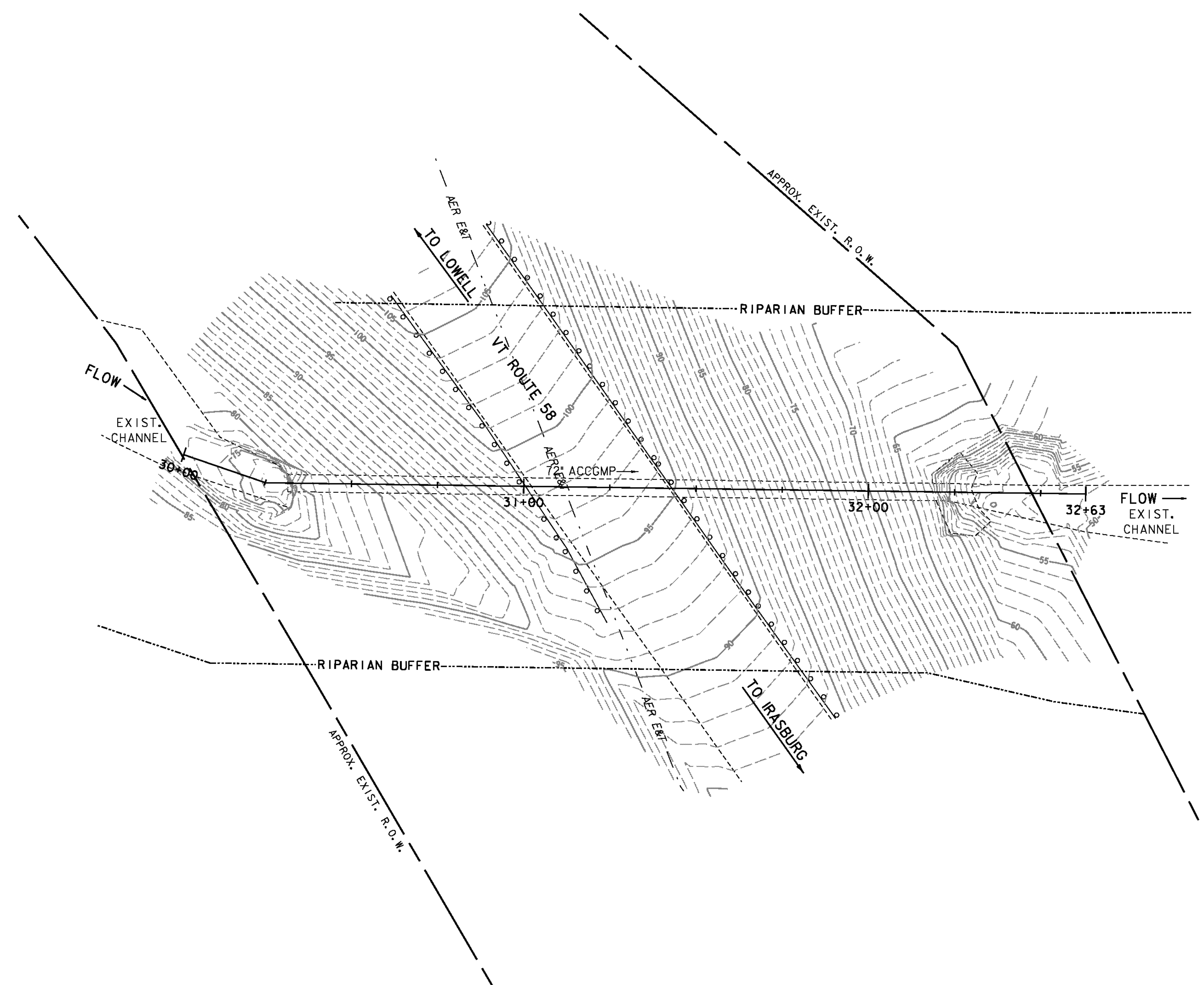
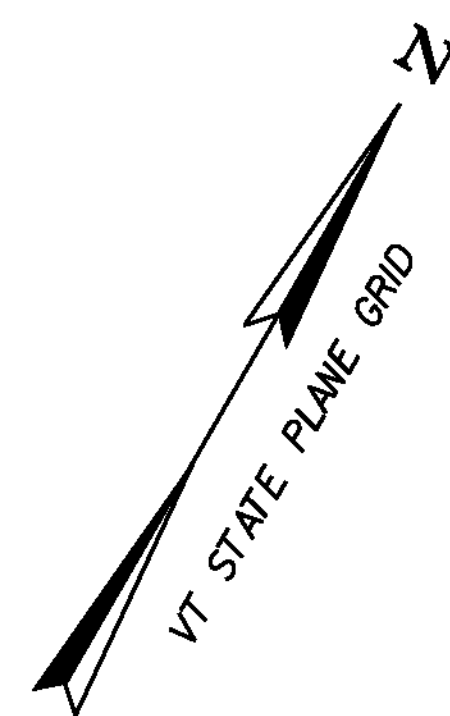
INSPECT SITE BASED ON PERMIT AUTHORIZATION OR SPECIAL PROVISION REQUIREMENTS.

EPSC NARRATIVE

PROJECT NAME: IRASBURG
PROJECT NUMBER: STP CULV(20)

FILE NAME: ...drawing\z08cl94eronarr.dgn PLOT DATE: 11/16/2010
PROJECT LEADER: G. BOGUE DRAWN BY: J. SOTER
DESIGNED BY: M. CHENETTE CHECKED BY: T. KNIGHT
EPSC NARRATIVE SHEET 8 OF 15



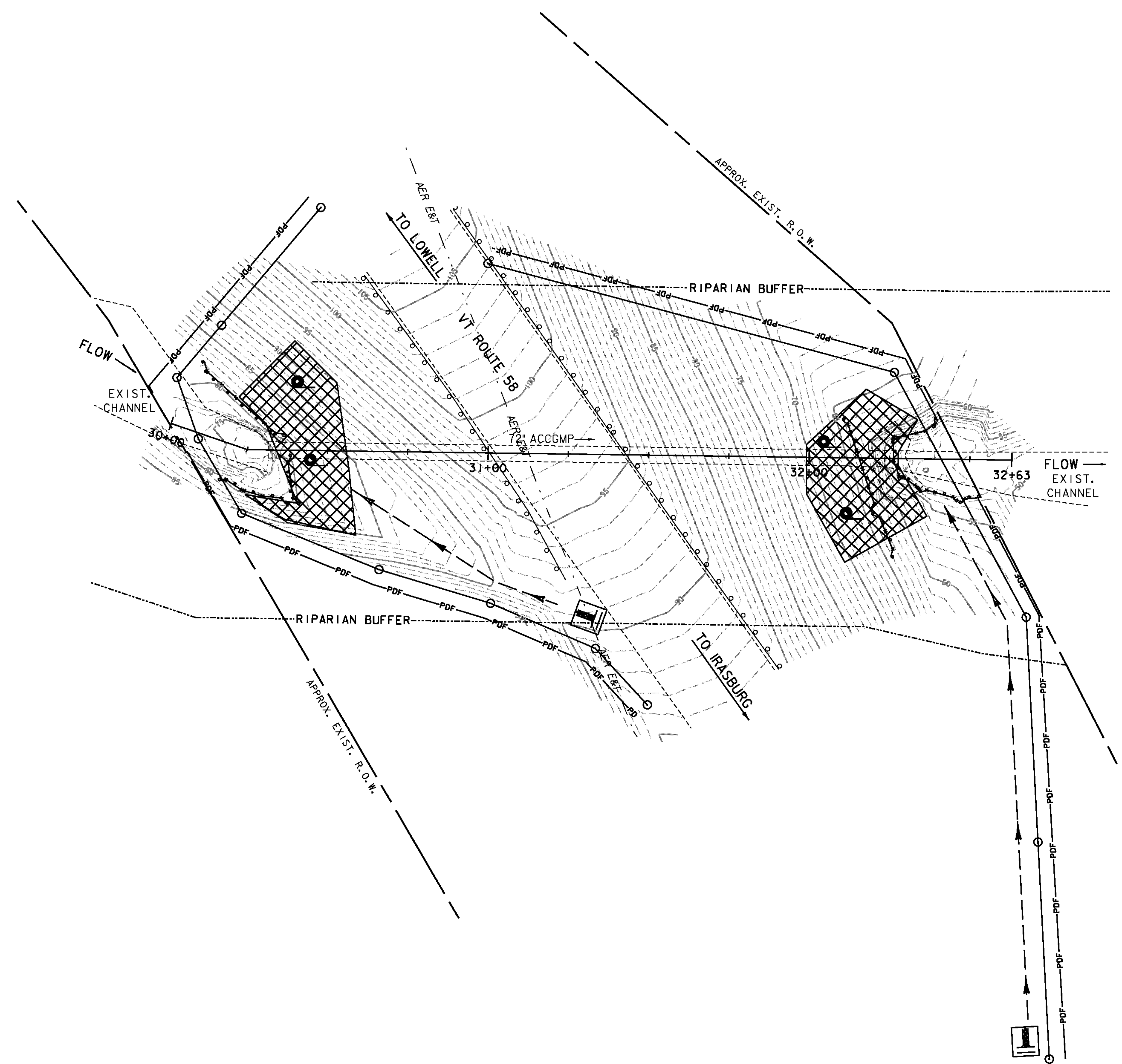
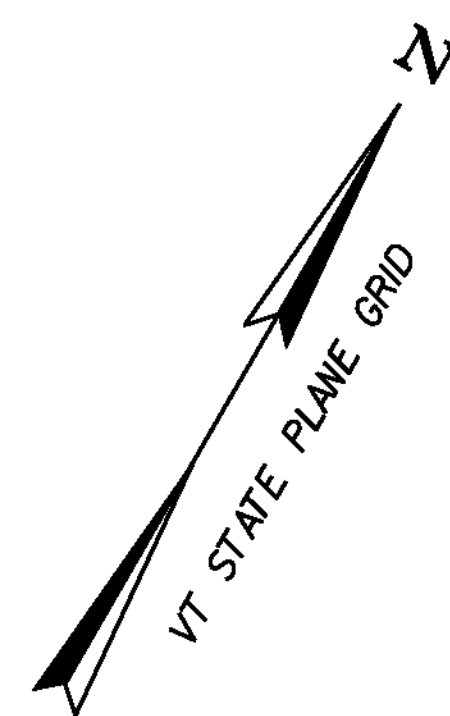


SOIL CLASSIFICATION
 DIXFIELD SANDY LOAM
 35-60% SLOPES
 "K FACTOR" .24
 CLASSIFIED MODERATELY ERODIBLE

LEGEND
 - - - - - AER. EBT - AERIAL ELECTRIC & TELEPHONE
 - - - - - RIPARIAN BUFFER ZONE



EPSC EXISTING CONDITIONS SITE PLAN	
PROJECT NAME: IRASBURG	PLOT DATE: 10/28/2010
PROJECT NUMBER: STP CULV(20)	DRAWN BY: J. SOTER
FILE NAME: ...drawing\z08cl94ero.dgn	CHECKED BY: T. KNIGHT
PROJECT LEADER: G. BOGUE	
DESIGNED BY: M. CHENETTE	
EPSC EXISTING CONDITIONS SITE PLAN	SHEET 9 OF 15

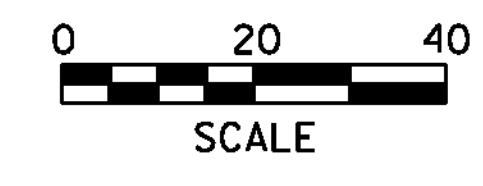


NOTES

1. THESE PLANS SHOW A CONCEPTUAL EROSION CONTROL PLAN. THE CONTRACTOR MUST SUBMIT A TEMPORARY EROSION CONTROL PLAN FOR APPROVAL.
2. TEMPORARY EROSION CONTROL MEASURES ARE CONCEPTUALLY SHOWN. THE CONTRACTOR MAY RELOCATE TEMPORARY MEASURES TO IMPROVE EROSION CONTROL WITH APPROVAL OF THE RESIDENT ENGINEER AND ON SITE COORDINATOR. SILT FENCE SHALL NOT BE INSTALLED ACROSS CONTOURS.
3. THE CONTRACTOR SHALL USE OTHER TEMPORARY EROSION CONTROL MEASURES AS NECESSITATED BY THE SEQUENCE OF CONSTRUCTION OR AS DIRECTED BY THE RESIDENT ENGINEER OR ON SITE COORDINATOR.
4. REFER TO EPSC DETAIL SHEETS FOR ADDITIONAL DETAILS.
5. IN AREAS UNDER STONE FILL, GEOTEXTILE MAY BE SUITABLE FOR TEMPORARY SLOPE STABILIZATION.
6. DISTURBED AREAS REQUIRING REVEGETATION SHALL RECEIVE A MINIMUM TOPSOIL DEPTH OF 2 INCHES OR AS DIRECTED BY THE ENGINEER.

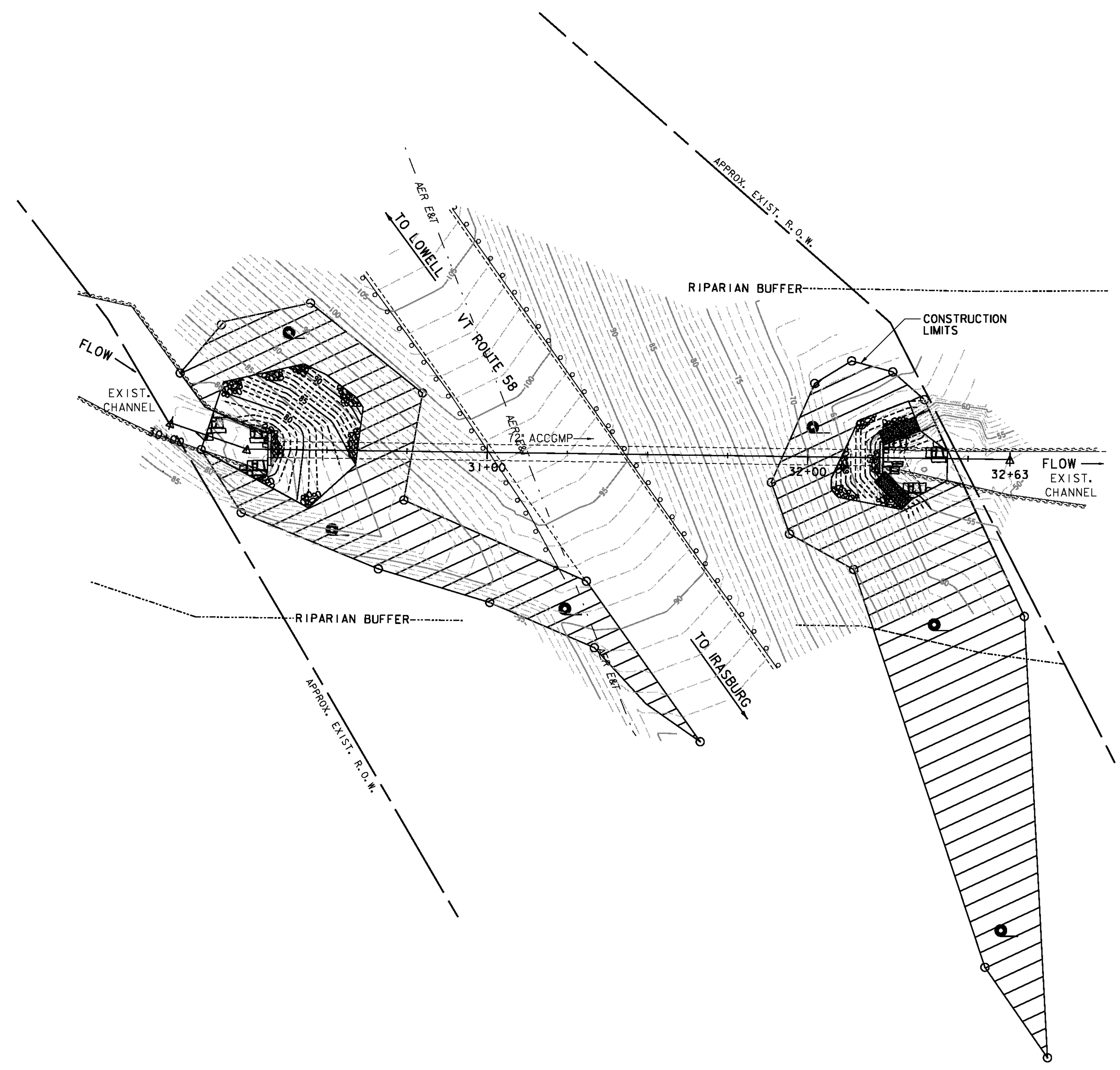
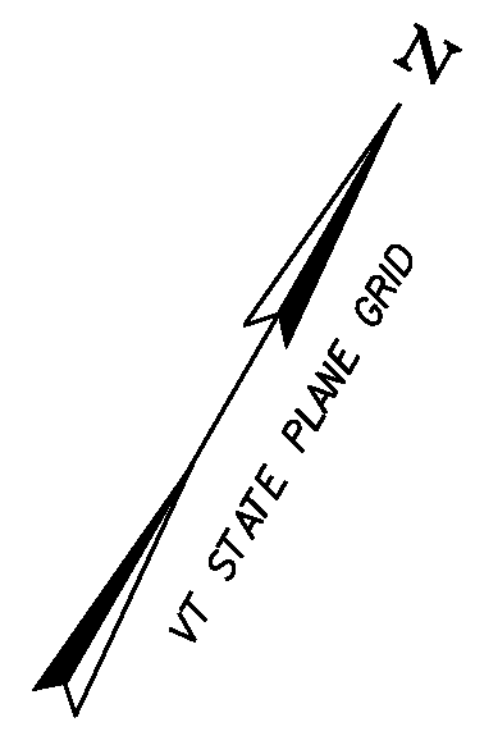
LEGEND

- AER E&T — AERIAL ELECTRIC & TELEPHONE
- SILT FENCE, WOVEN WIRE REINFORCED
- LIMITS OF SOIL DISTURBANCE
- ▨ TEMPORARY EROSION MATTING (SEE NOTE 5)
- PDF— PROJECT DEMARCATION FENCE
- RIPARIAN BUFFER ZONE
- ▲— ASSUMED CONSTRUCTION ACCESS ROUTE
- ▭ STABILIZED CONSTRUCTION ENTRANCE

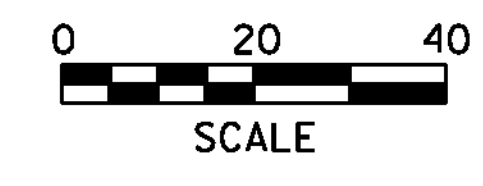


EPSC CONSTRUCTION SITE PLAN

PROJECT NAME:	IRASBURG
PROJECT NUMBER:	STP CULV(20)
FILE NAME: ...drawing\z08cl94ero.dgn	PLOT DATE: 11/16/2010
PROJECT LEADER: G. BOGUE	DRAWN BY: J. SOTER
DESIGNED BY: M. CHENETTE	CHECKED BY: T. KNIGHT
EPSC CONSTRUCTION SITE PLAN	SHEET 10 OF 15

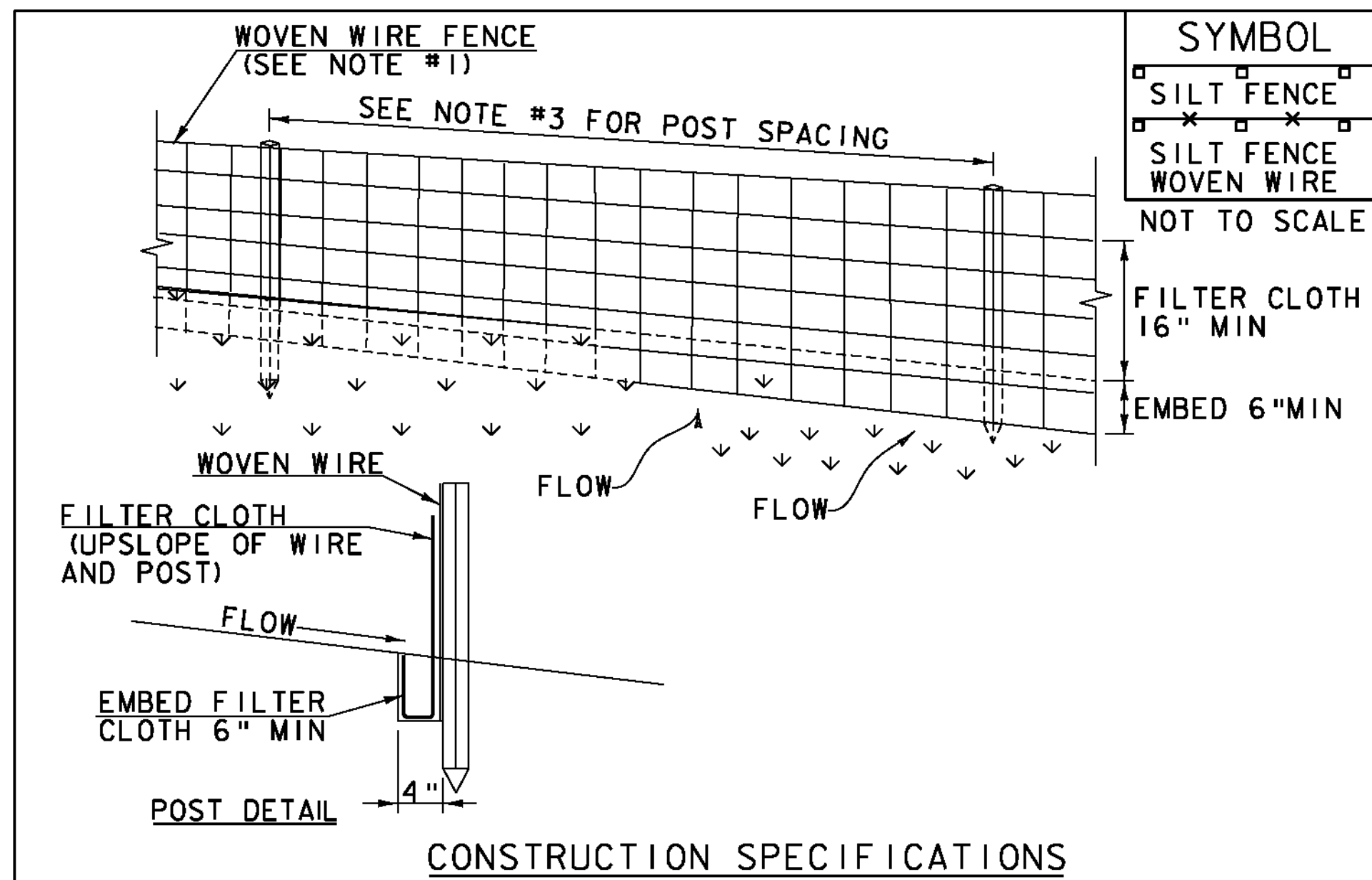


LEGEND	
— AER EXT —	AERIAL ELECTRIC & TELEPHONE
○ ○ ○	LIMITS OF SOIL DISTURBANCE
	PERMANENT EROSION MATTING, DISTURBED AREAS REQUIRING RE-VEGETATION
	GABION RETAINING WALL
	2'-0" STONE FILL, TYPE II WITH GRUBBING MATERIAL
	3'-0" STONE FILL, TYPE III
-----	RIPARIAN BUFFER ZONE



EPSC FINAL CONDITIONS SITE PLAN

PROJECT NAME:	IRASBURG	FILE NAME:	...drawing\z08cl94ero.dgn	PLOT DATE:	10/28/2010
PROJECT NUMBER:	STP CULV(20)	PROJECT LEADER:	G. BOGUE	DRAWN BY:	J. SOTER
		DESIGNED BY:	M. CHENETTE	CHECKED BY:	T. KNIGHT
			EPSC FINAL CONDITIONS SITE PLAN		SHEET 11 OF 15



- CONSTRUCTION SPECIFICATIONS**
- WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
 - FILTER CLOTH SHALL BE EITHER FILTER X, MIRAF1100X, STABILINKA T140N OR APPROVED EQUIVALENT.
 - POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
 - WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
 - WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
 - MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

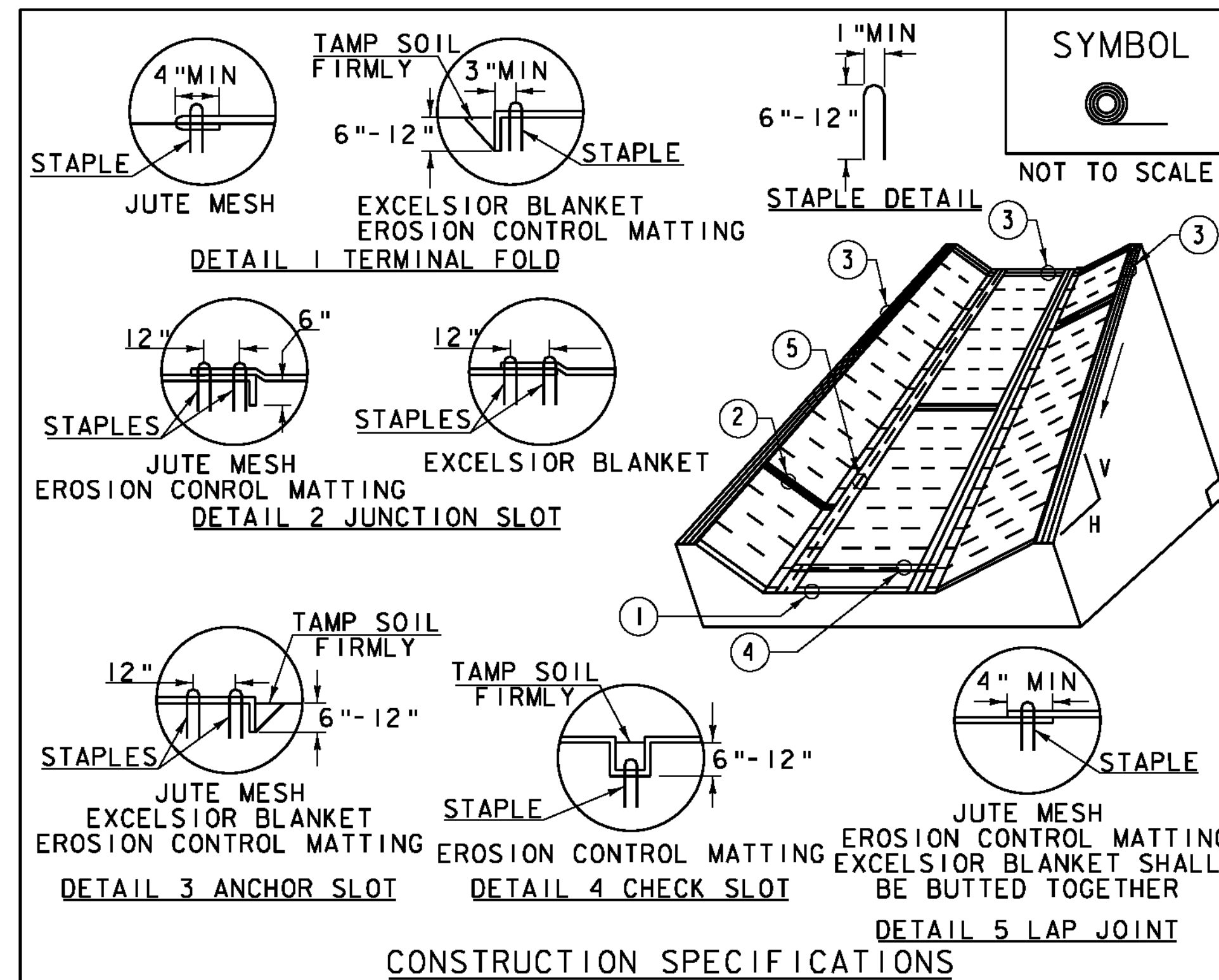
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.51) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).

REVISIONS	
MARCH 21, 2008	WHF
DECEMBER 11, 2008	WHF
JANUARY 13, 2009	WHF



- CONSTRUCTION SPECIFICATIONS**
- EROSION MATTING, CHECK SLOTS, SHALL BE SPACED IN DITCH CHANNEL SO THAT ONE OCCURS WITHIN EACH 50' ON SLOPES OF MORE THAN 4% AND LESS THAN 6%. ON SLOPES OF 6% OR MORE, THEY SHALL BE SPACED SO THAT ONE OCCURS WITHIN EACH 25'.
 - APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
 - STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' ROLL OF MATERIAL.
 - DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
 - ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

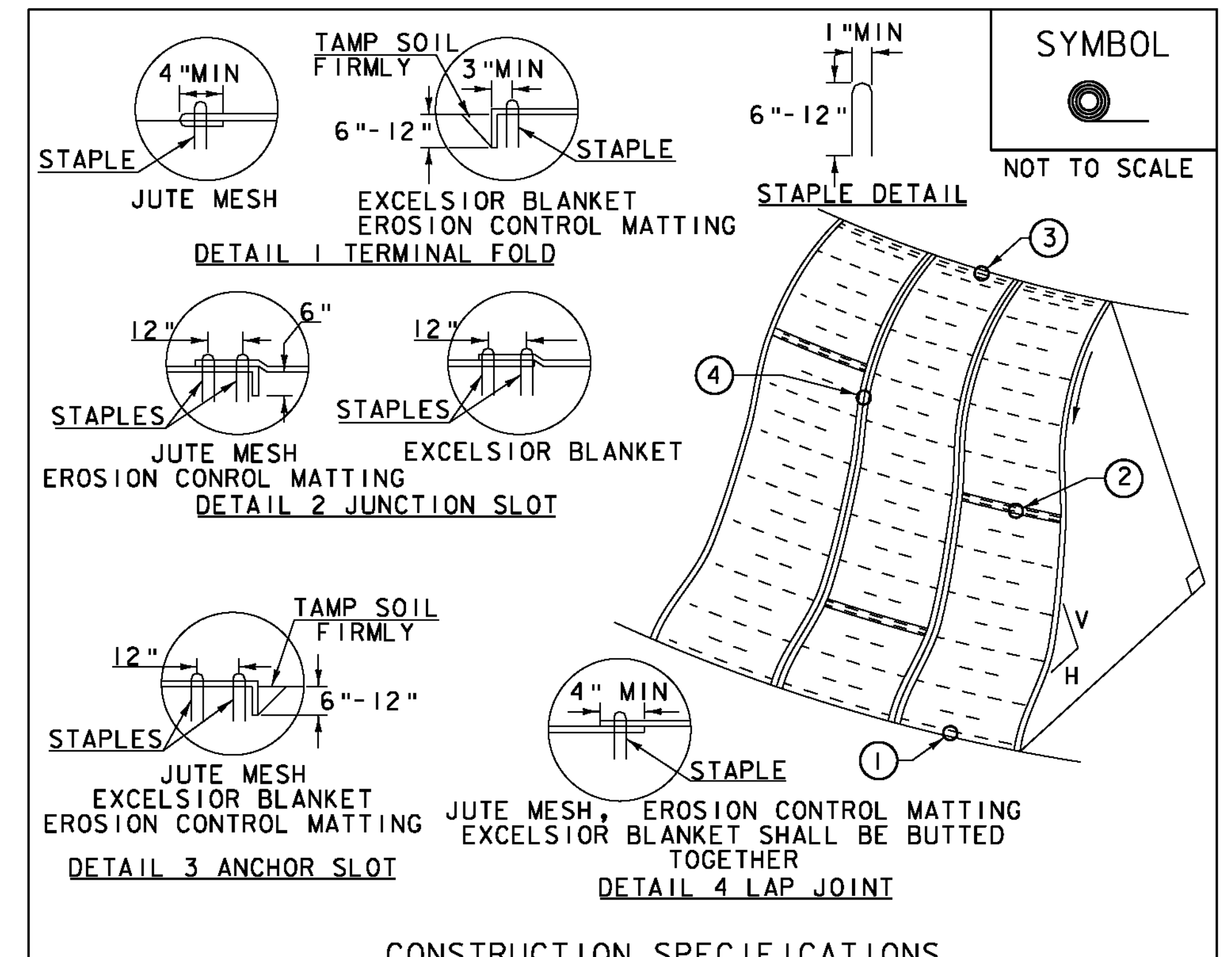
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VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) DITCH

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

REVISIONS	
MARCH 8, 2007	JMF
APRIL 16, 2007	WHF
JANUARY 13, 2009	WHF



- CONSTRUCTION SPECIFICATIONS**
- APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
 - APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
 - STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' ROLL OF MATERIAL.
 - DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
 - ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

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VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

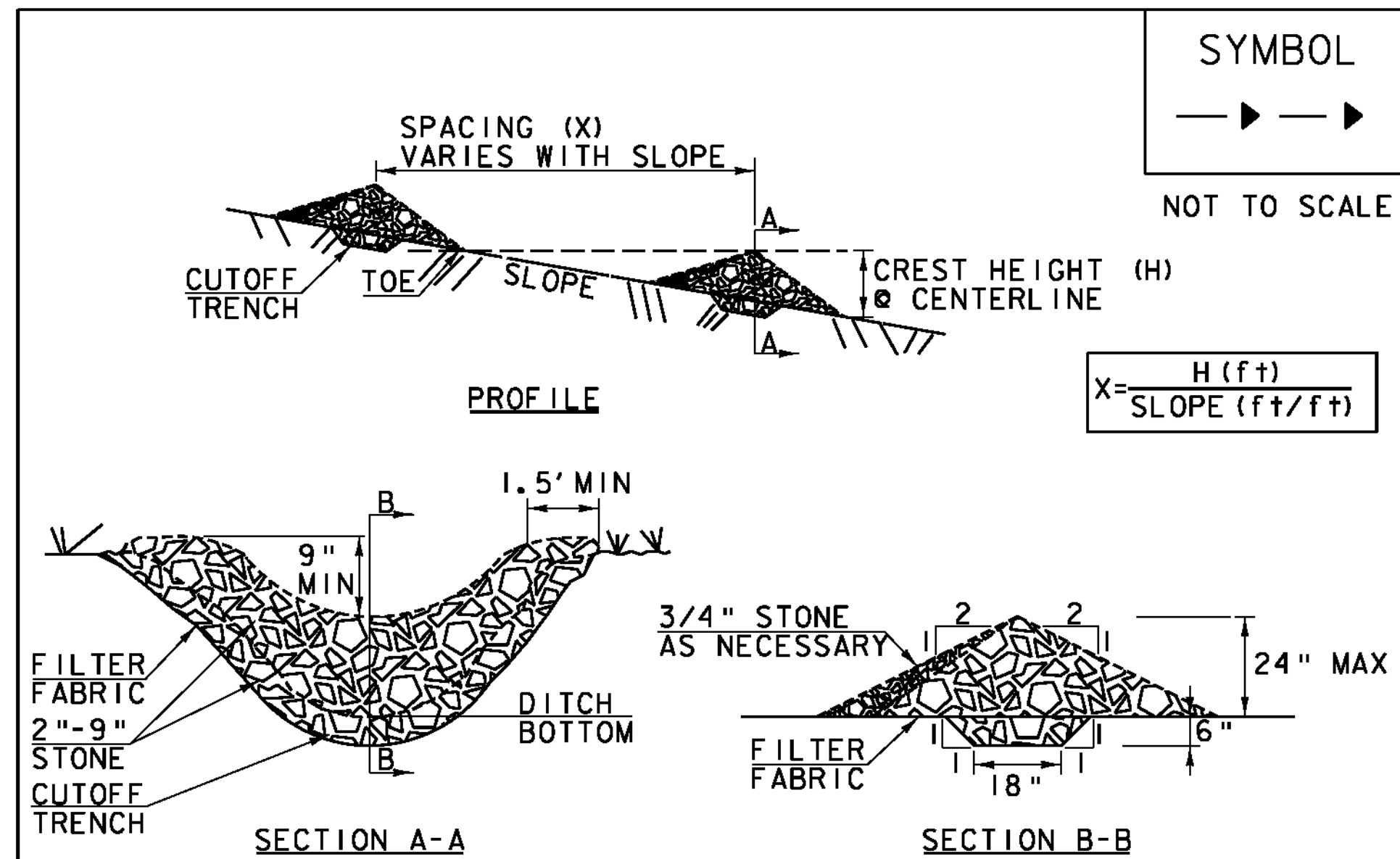
NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF

EPSC DETAIL SHEET 1

PROJECT NAME:	IRASBURG
PROJECT NUMBER:	STP CULV(20)
FILE NAME:	...drawing\208cl94epsc detis.dgn
PLOT DATE:	10/28/2010
PROJECT LEADER:	G. BOGUE
DESIGNED BY:	M. CHENETTE
EPSC DETAIL SHEET 1	
DRAWN BY:	J. SOTER
CHECKED BY:	T. KNIGHT
SHEET	12 OF 15





SYMBOL

NOT TO SCALE

$$X = \frac{H (ft)}{\text{SLOPE } (ft/ft)}$$

CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
3. 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
4. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
7. MAXIMUM DRAINAGE AREA 2 ACRES.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CHECK DAM

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR TEMPORARY STONE CHECK DAM, TYPE I (PAY ITEM 653.25)

REVISIONS	
MARCH 21, 2008	WHF
JANUARY 8, 2009	WHF

VAOT RURAL AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
37.5%	22.5	45	CREeping RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
42.5%	34	68	CREeping RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

GENERAL GUIDANCE			
FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10-20-10	19-19-19	PELLETIZED	LIQUID
500 LBS/AC		2 TONS/AC	4.4 GAL/AC

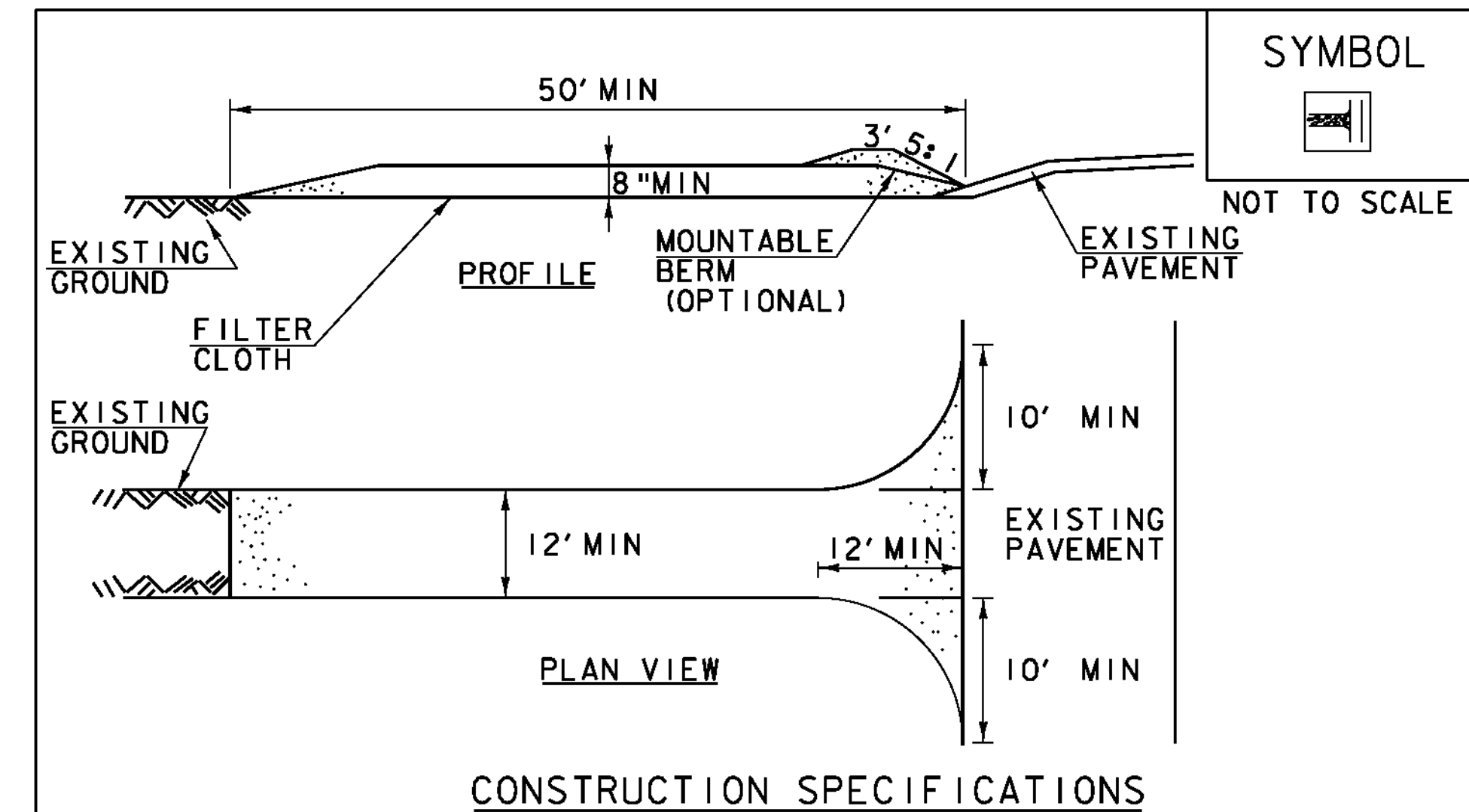
CONSTRUCTION GUIDANCE

1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
7. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
8. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MAUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

REVISIONS	
JUNE 23, 2009	WHF
JANUARY 15, 2010	WHF



SYMBOL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STABILIZED CONSTRUCTION ENTRANCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.

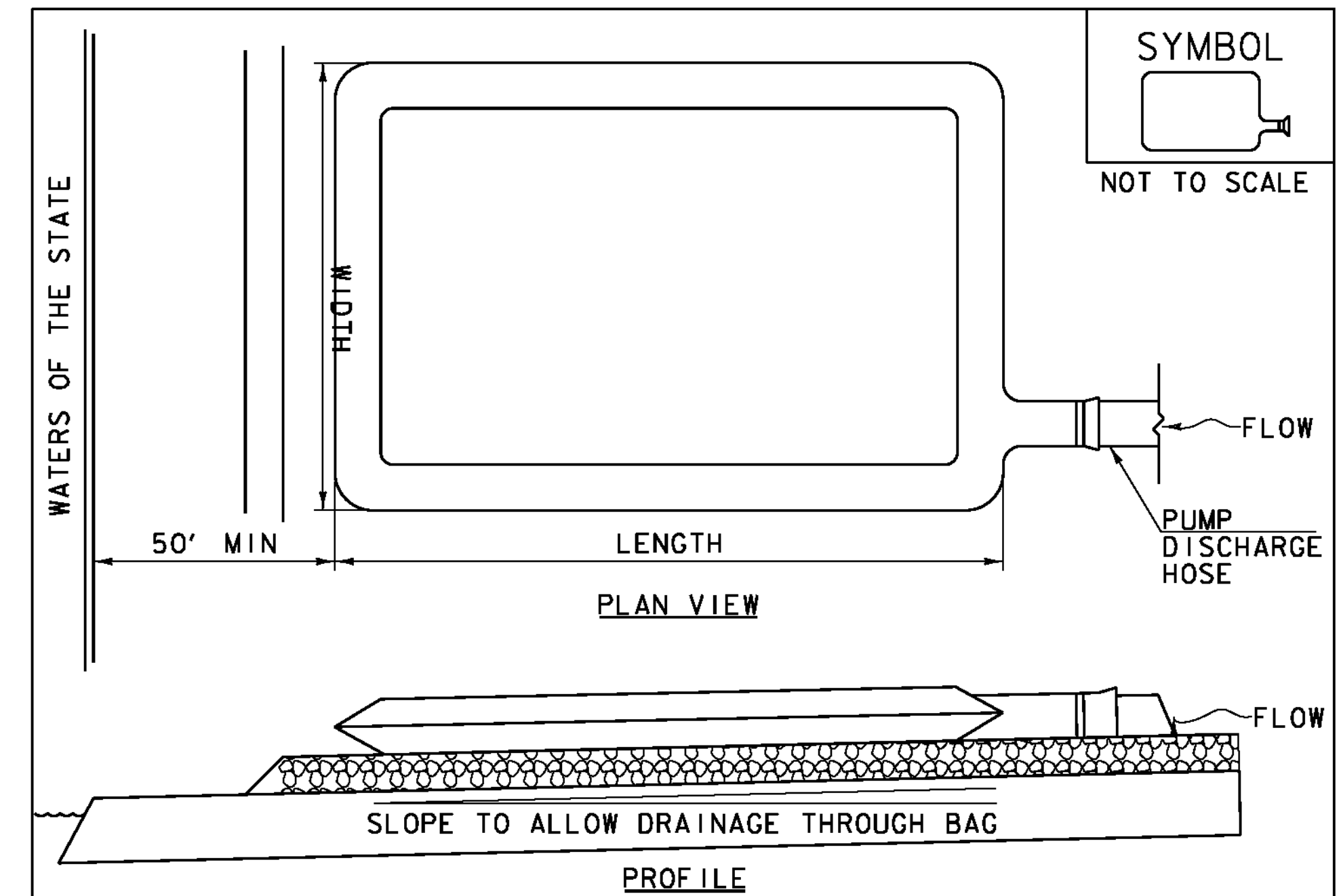
REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

EPSC DETAIL SHEET 2

PROJECT NAME: IRASBURG
PROJECT NUMBER: STP CULV(20)

FILE NAME: ...drawing\208cl94epsc detis.dgn PLOT DATE: 10/28/2010
PROJECT LEADER: G. BOGUE DRAWN BY: J. SOTER
DESIGNED BY: M. CHENETTE CHECKED BY: T. KNIGHT
EPSC DETAIL SHEET 2 SHEET 13 OF 15





CONSTRUCTION SPECIFICATIONS

1. THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
2. FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
3. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION EFFICIENCY.
4. FILTER BAGS SHALL BE LOCATED A MINIMUM OF 50' FROM WATERS OF THE STATE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. THE NECK OF THE FILTER BAG SHALL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE.
6. A FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE.
7. FILTER BAG SHALL BE DISPOSED OF AS APPROVED IN THE EPSC PLAN OR AS DIRECTED BY THE ENGINEER.

	FILTER BAG
--	------------

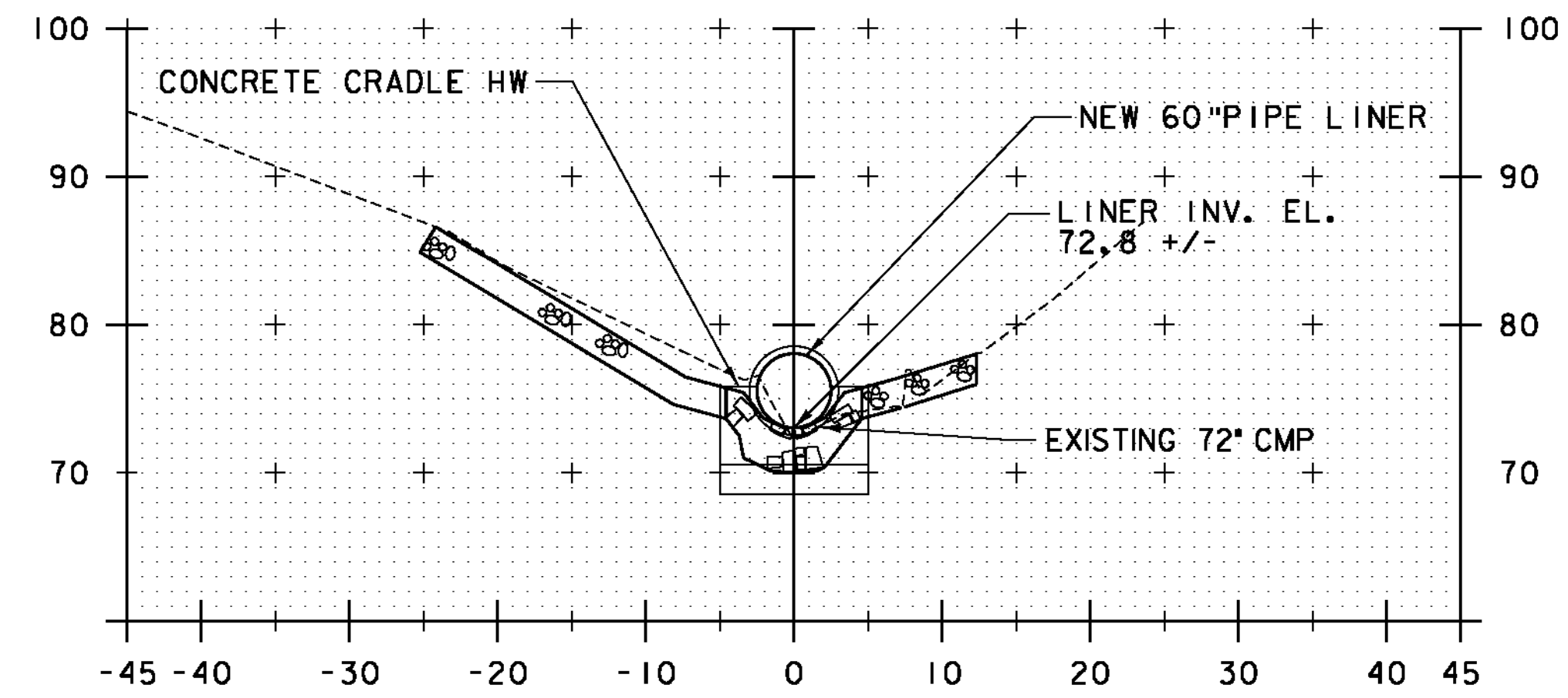
NOTES:
 REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
 THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR FILTER BAG (PAY ITEM 653.45) AND AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

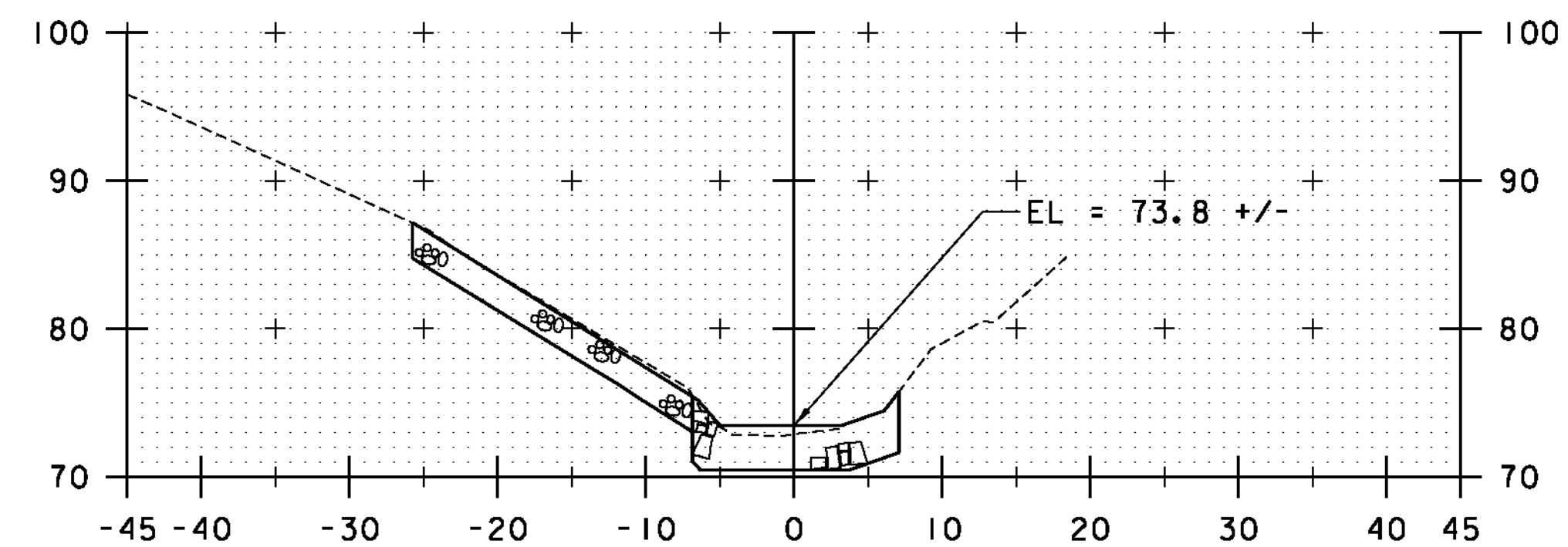
EPSC DETAIL SHEET 3

PROJECT NAME: IRASBURG	
PROJECT NUMBER: STP CULV(20)	
FILE NAME: ...drawing\208cl94epsc detis.dgn	PLOT DATE: 10/28/2010
PROJECT LEADER: G. BOGUE	DRAWN BY: J. SOTER
DESIGNED BY: M. CHENETTE	CHECKED BY: T. KNIGHT
EPSC DETAIL SHEET 3	SHEET 14 OF 15

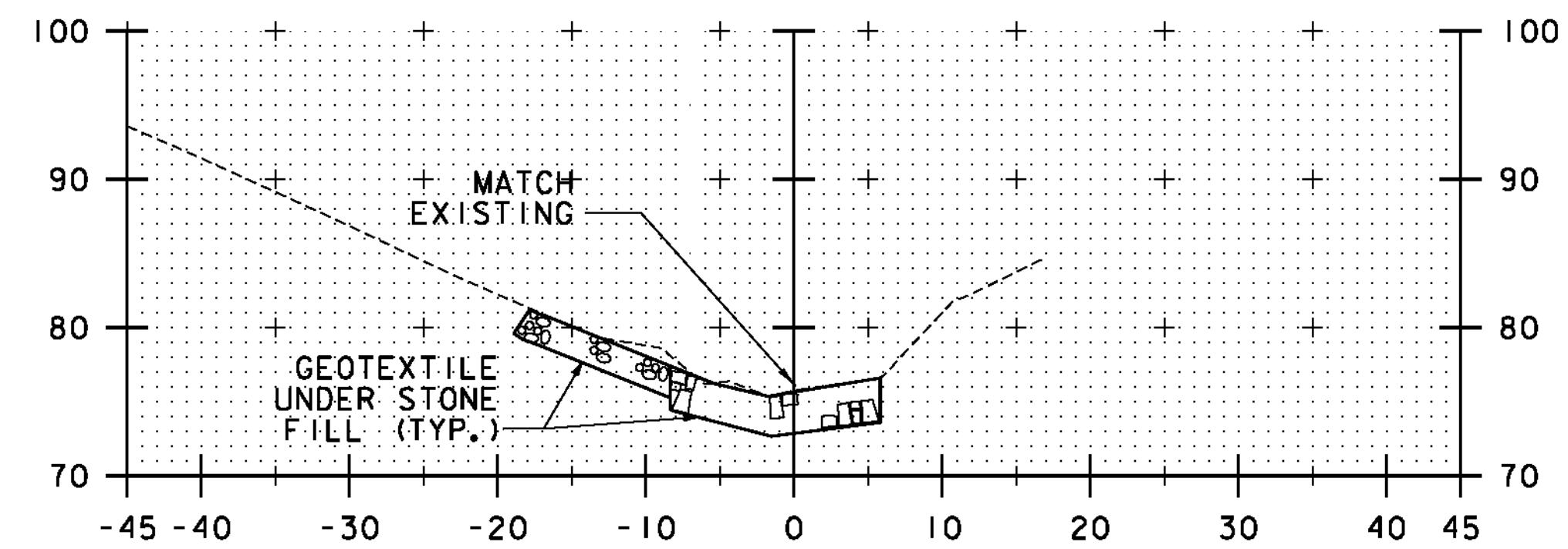




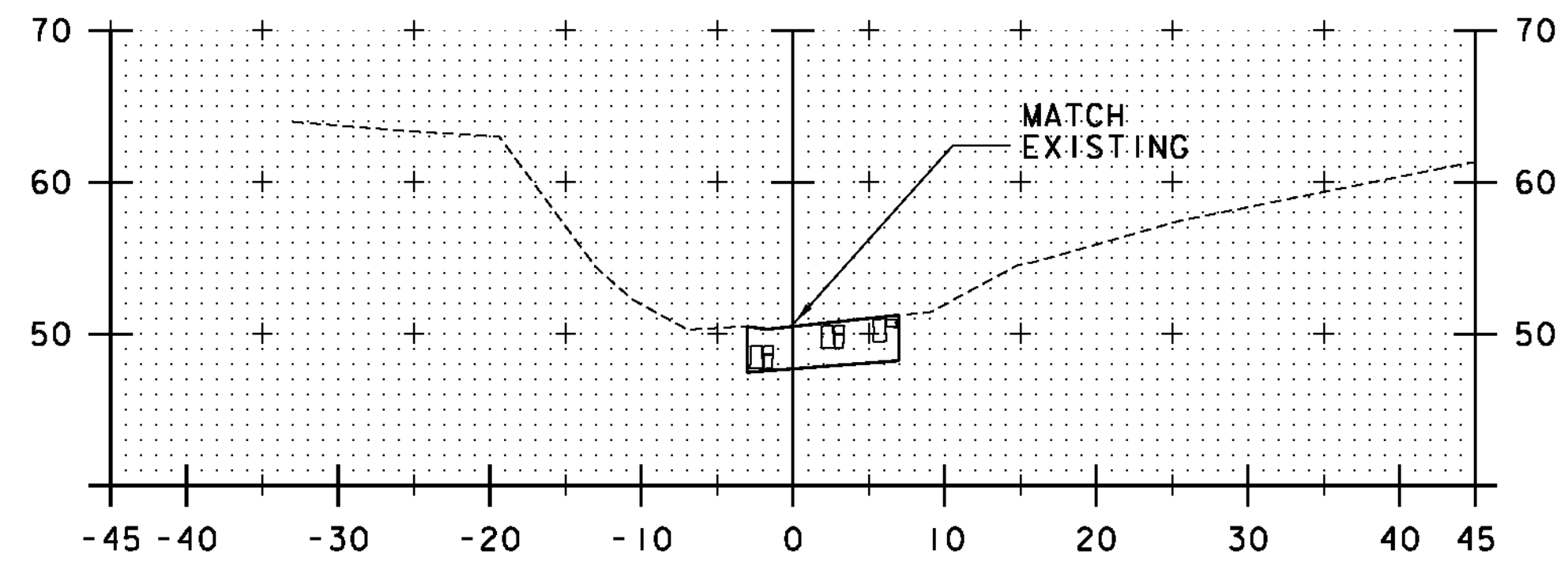
30+31.61



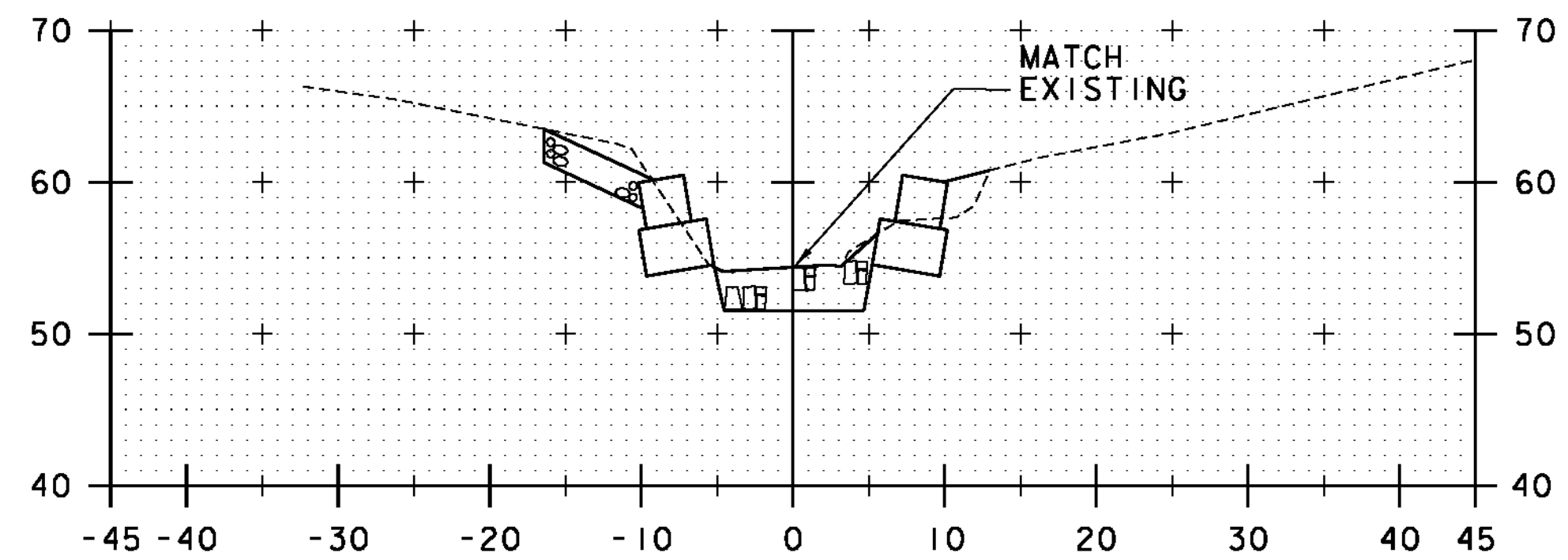
30+25



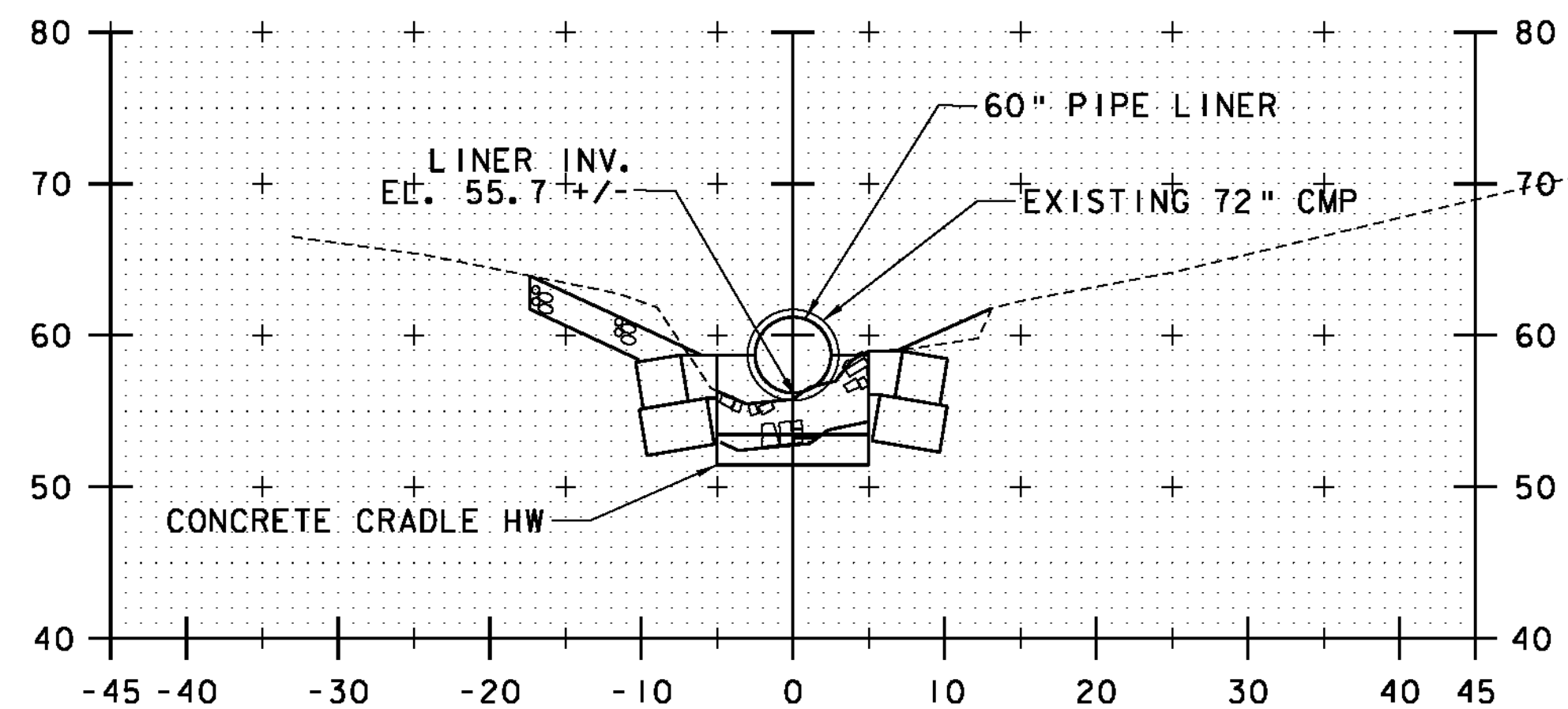
30+11.61



32+43.52

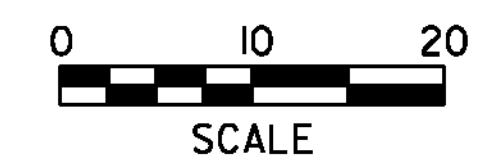


32+25



32+23.52

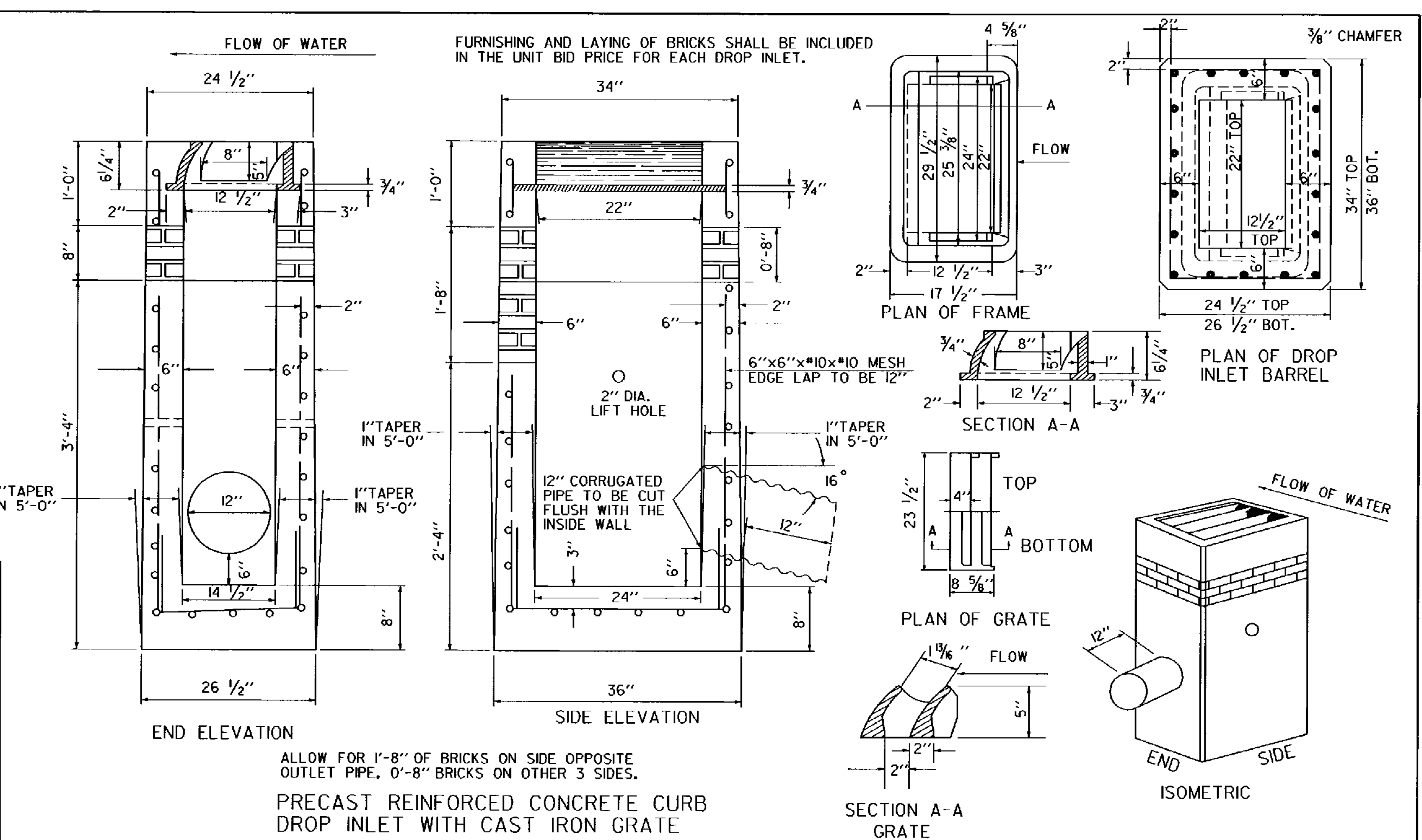
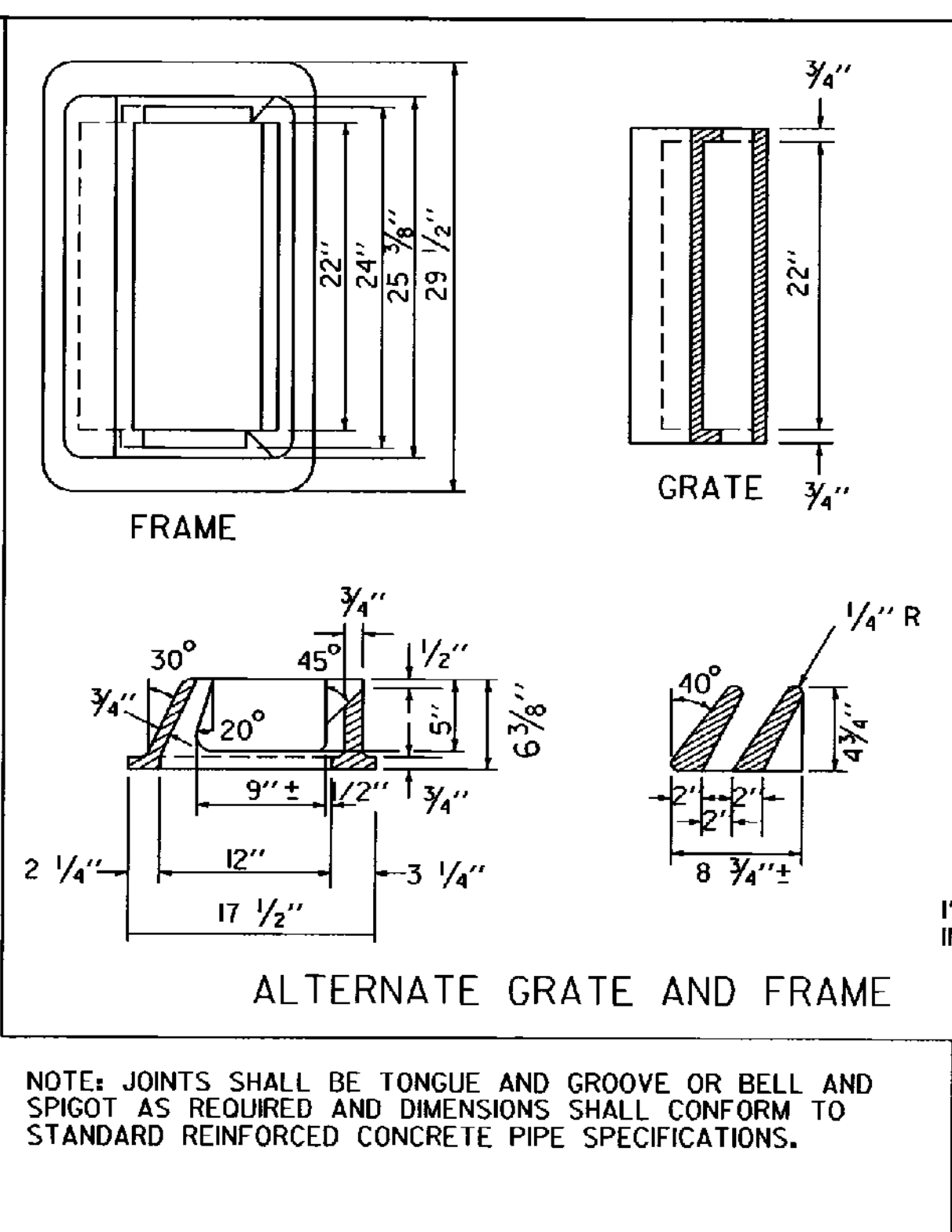
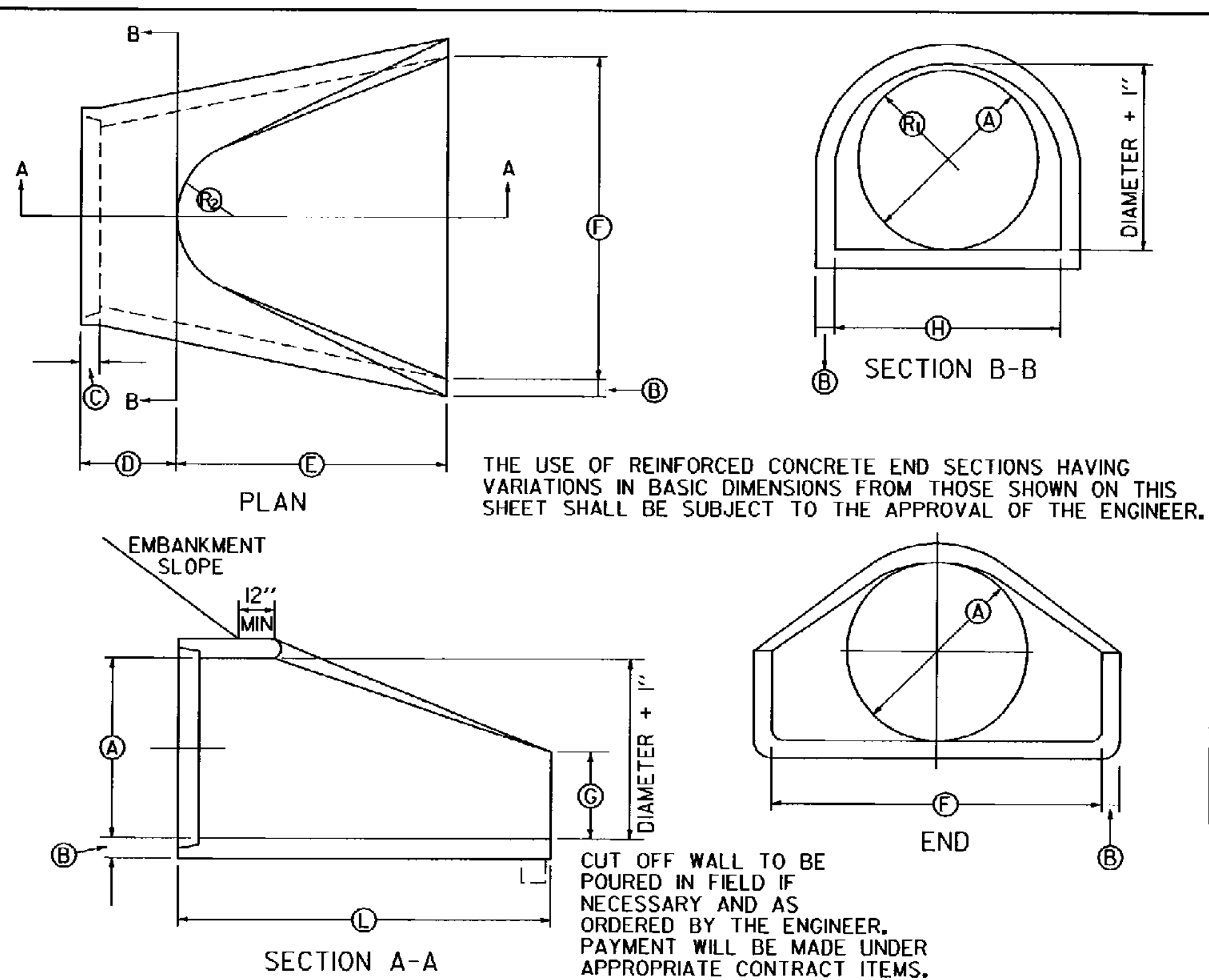
LEGEND	
	3'-0" STONE FILL, TYPE III
	2'-0" STONE FILL, TYPE II



STA. 30+11.61 TO STA. 32+43.52

PROJECT NAME: IRASBURG	PLOT DATE: 10/28/2010
PROJECT NUMBER: STP CULV(20)	DRAWN BY: J. SOTER
FILE NAME: ...drawing\z08cl94xs.dgn	DESIGNED BY: M. CHENETTE
PROJECT LEADER: G. BOGUE	CHECKED BY: T. KNIGHT
CROSS SECTIONS	
SHEET 15 OF 15	



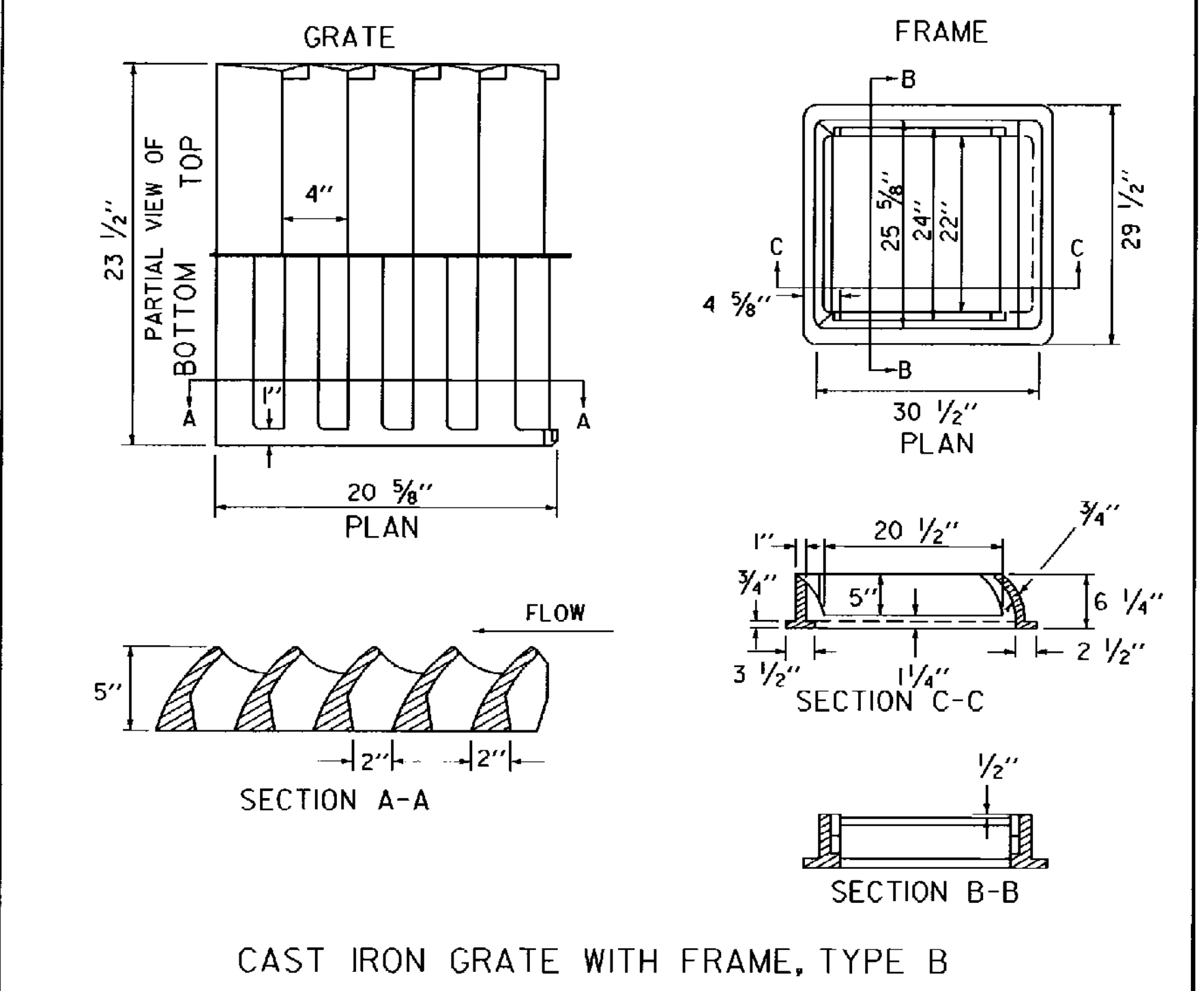
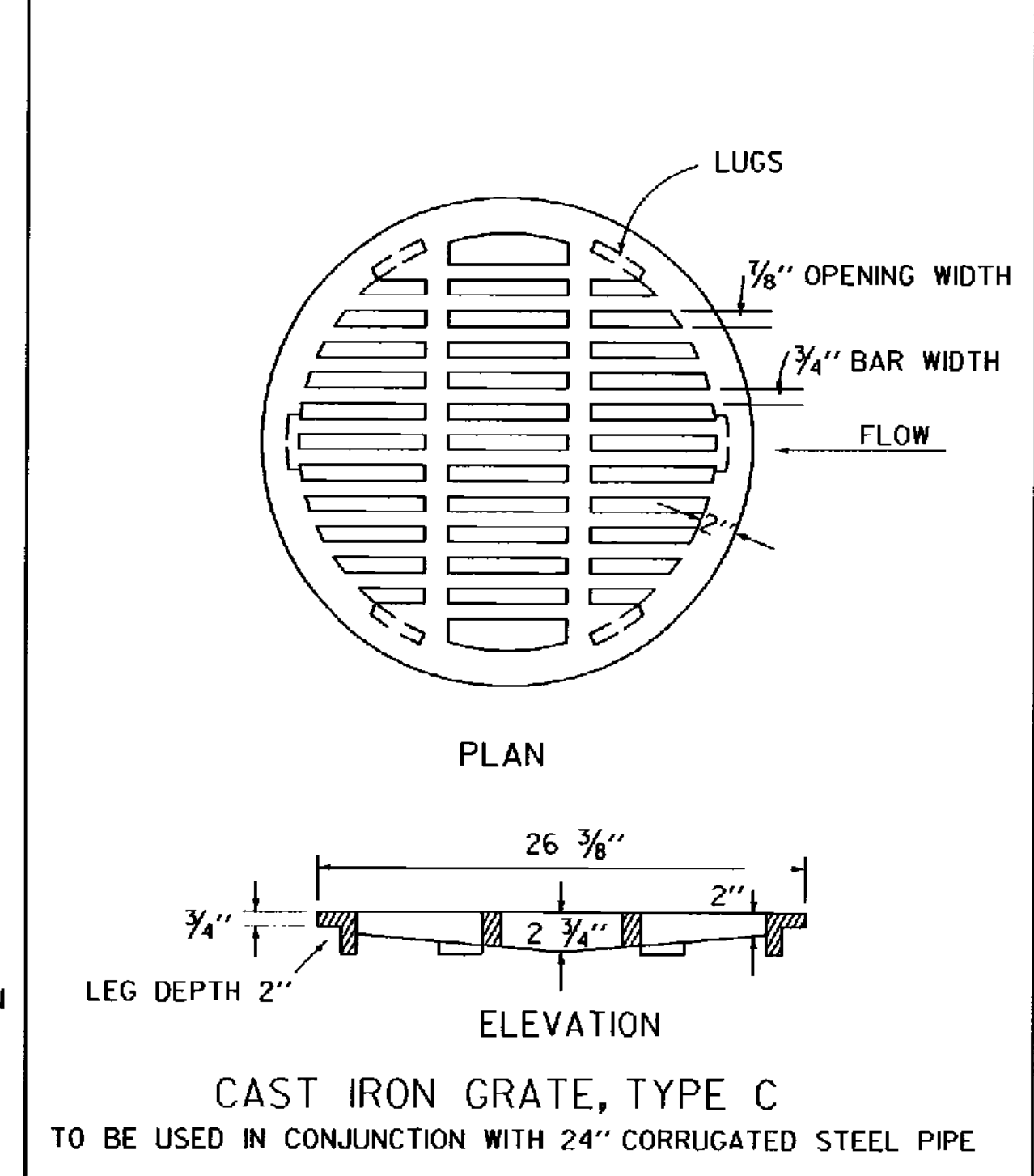
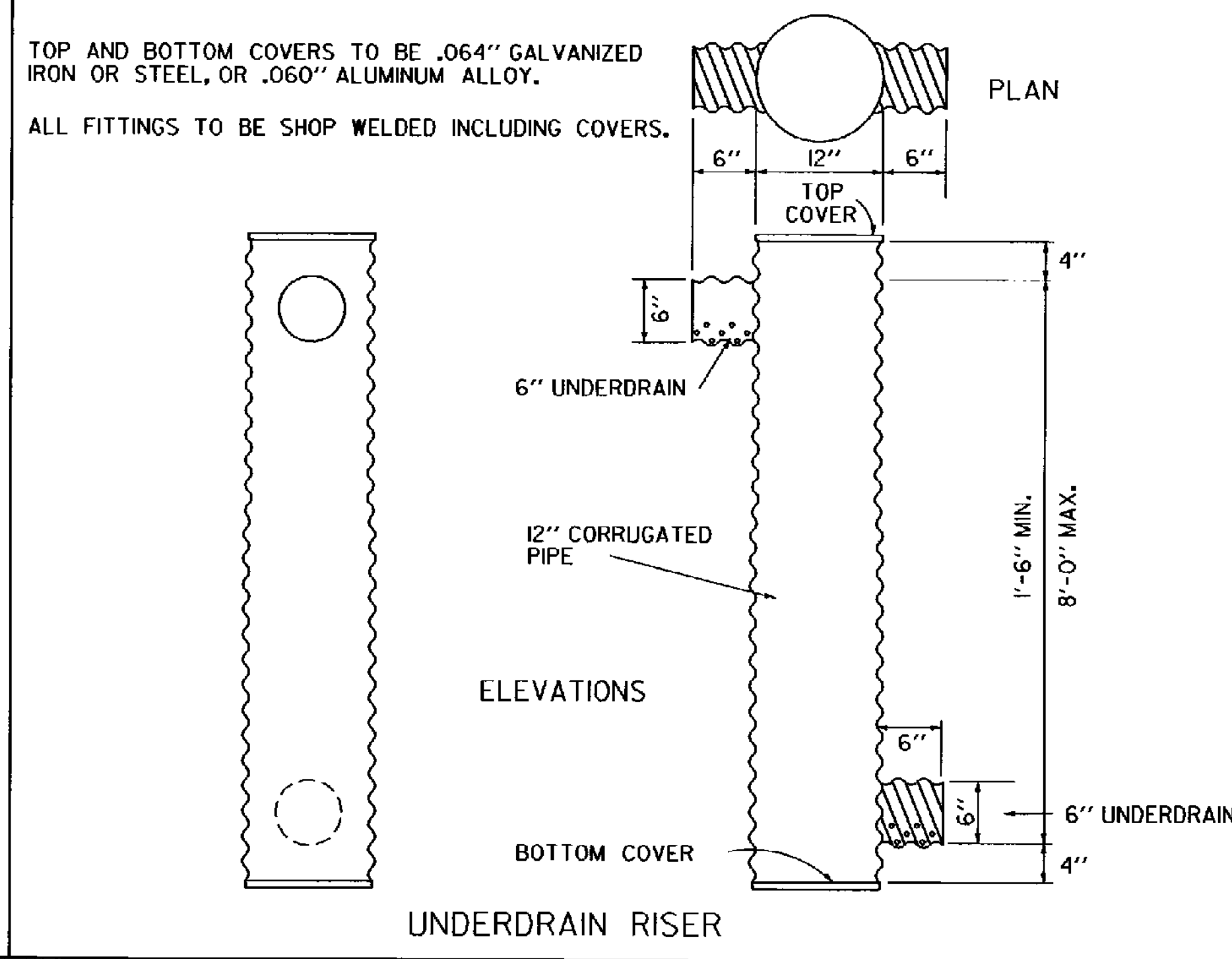
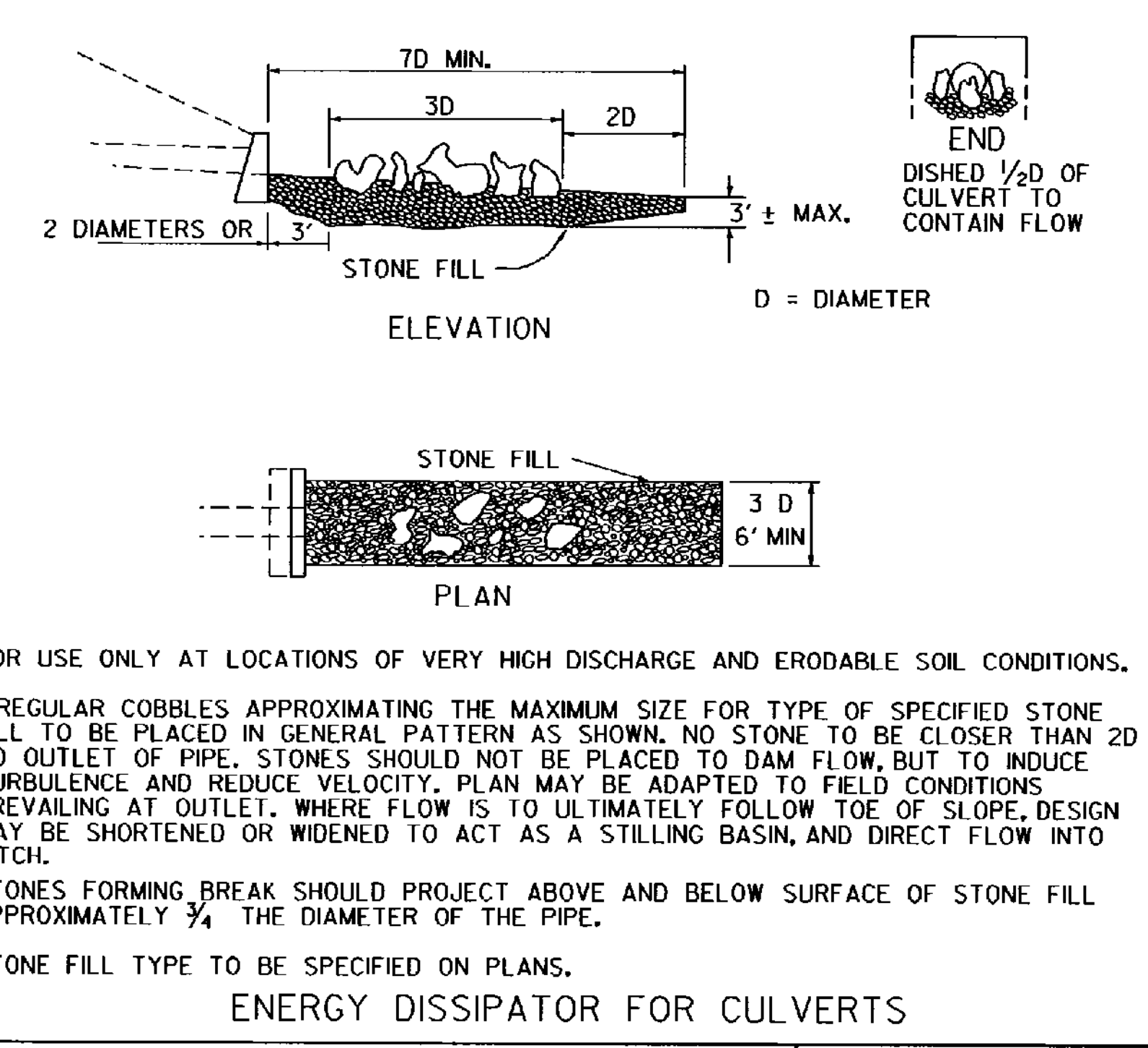


BASIC DIMENSIONS

A	B	C	D	E	F	G	H	DIAM+1"	SLOPE	R ₁	R ₂	RATIO #	L
12"	2"	SEE NOTE	48 3/8"	24"	24"	4"	19 5/8"	13"	2.7 : 1	10 1/8"	9"	1.92	6'-0 3/4"
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 3/8"	25"	2.8 : 1	16 5/8"	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 1/8"	37"	2.9 : 1	24 3/8"	20"	1.50	8'-1 3/4"
42"	4 1/2"		35"	63"	78"	21"	53 1/8"	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"

REINFORCED CONCRETE PIPE END SECTION

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



REVISIONS AND CORRECTIONS

DEC. 8, 1971 - ORIGINAL APPROVAL

NOV. 14, 1972 - RCP END SECTION DIMENSION VARIANCE NOTE ADDED

OCT. 30, 1985 - REVISED TO CONFORM WITH 1986 SPECIFICATIONS

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

APPROVED

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

Stanley B. MacCallum, P.E.
 DIRECTOR OF ENGINEERING

John M. Murphy, P.E.
 DESIGN ENGINEER 1

PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE

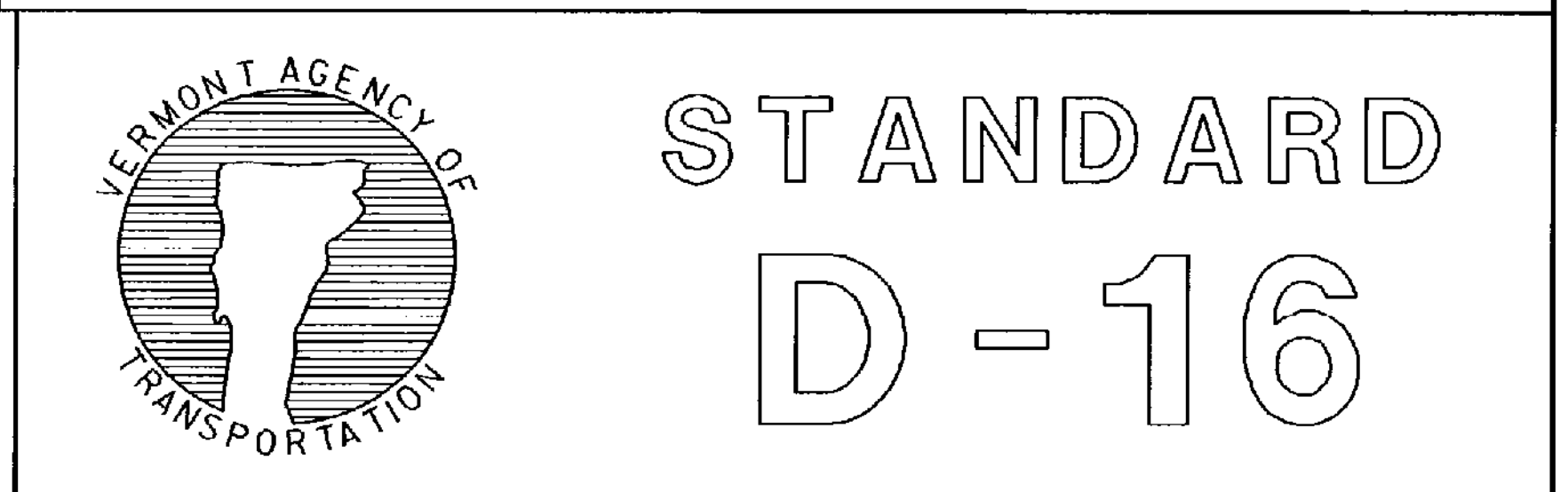
CAST IRON GRATE, TYPE B

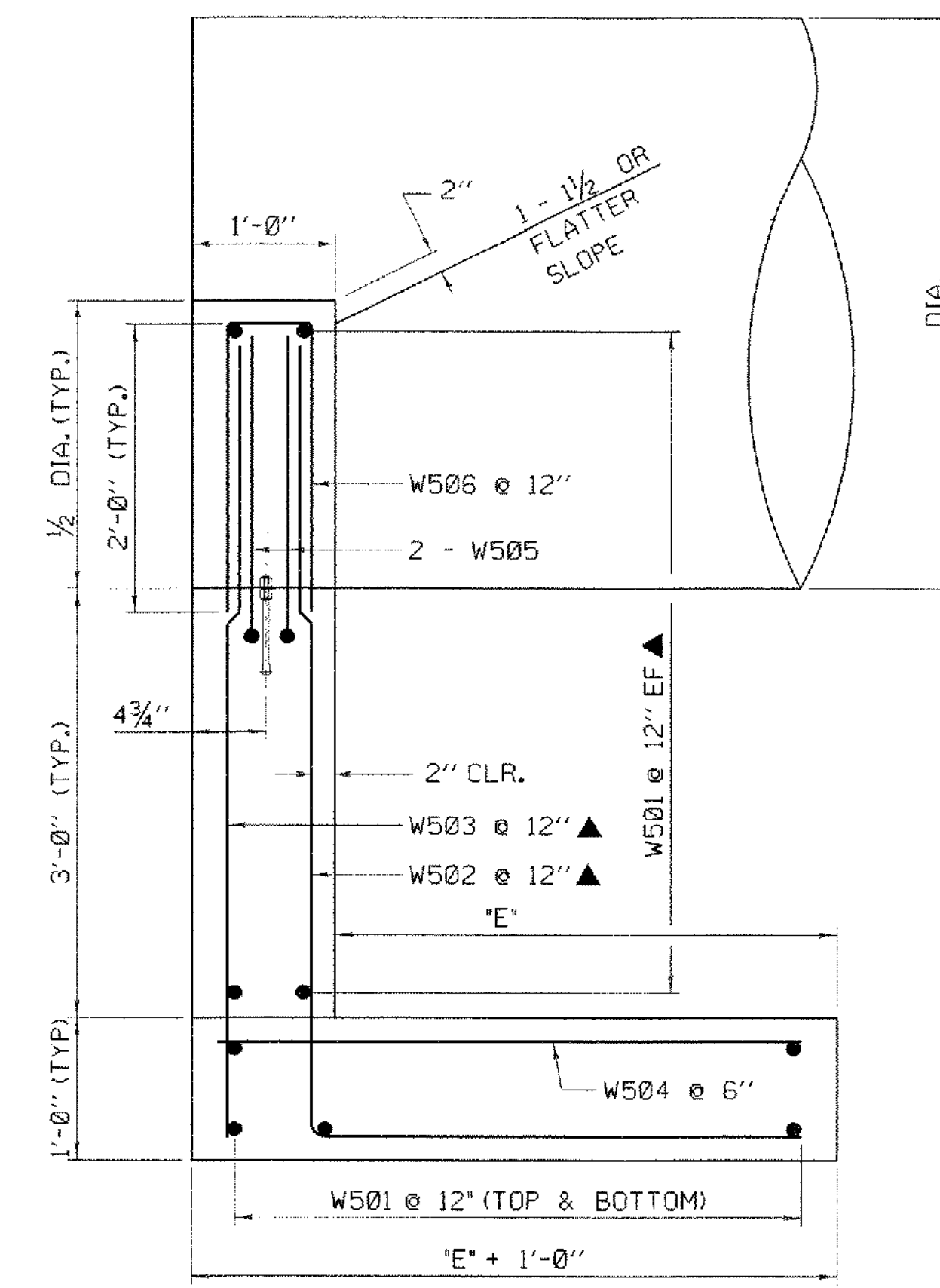
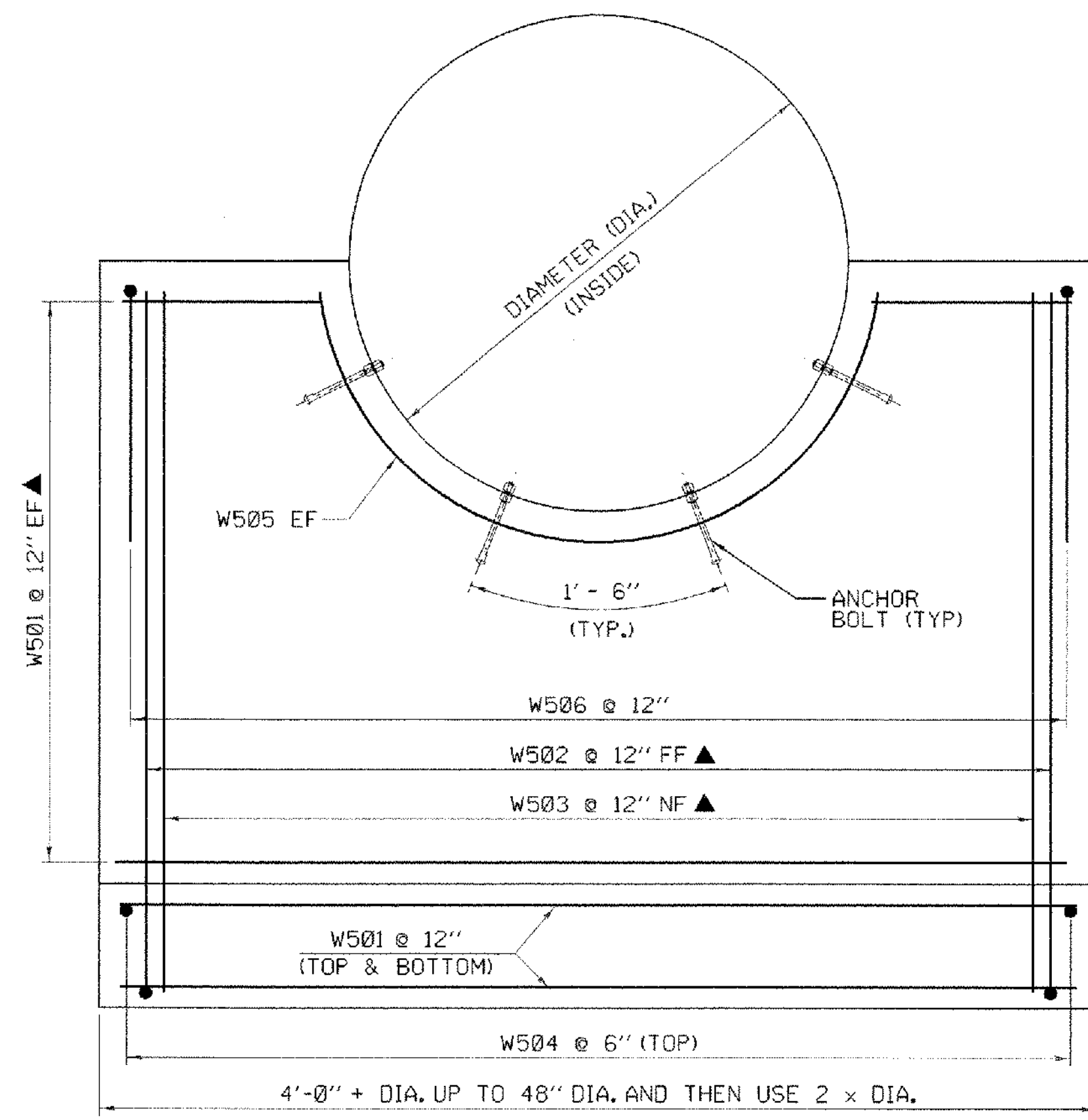
CAST IRON GRATE, TYPE C

UNDERDRAIN RISER

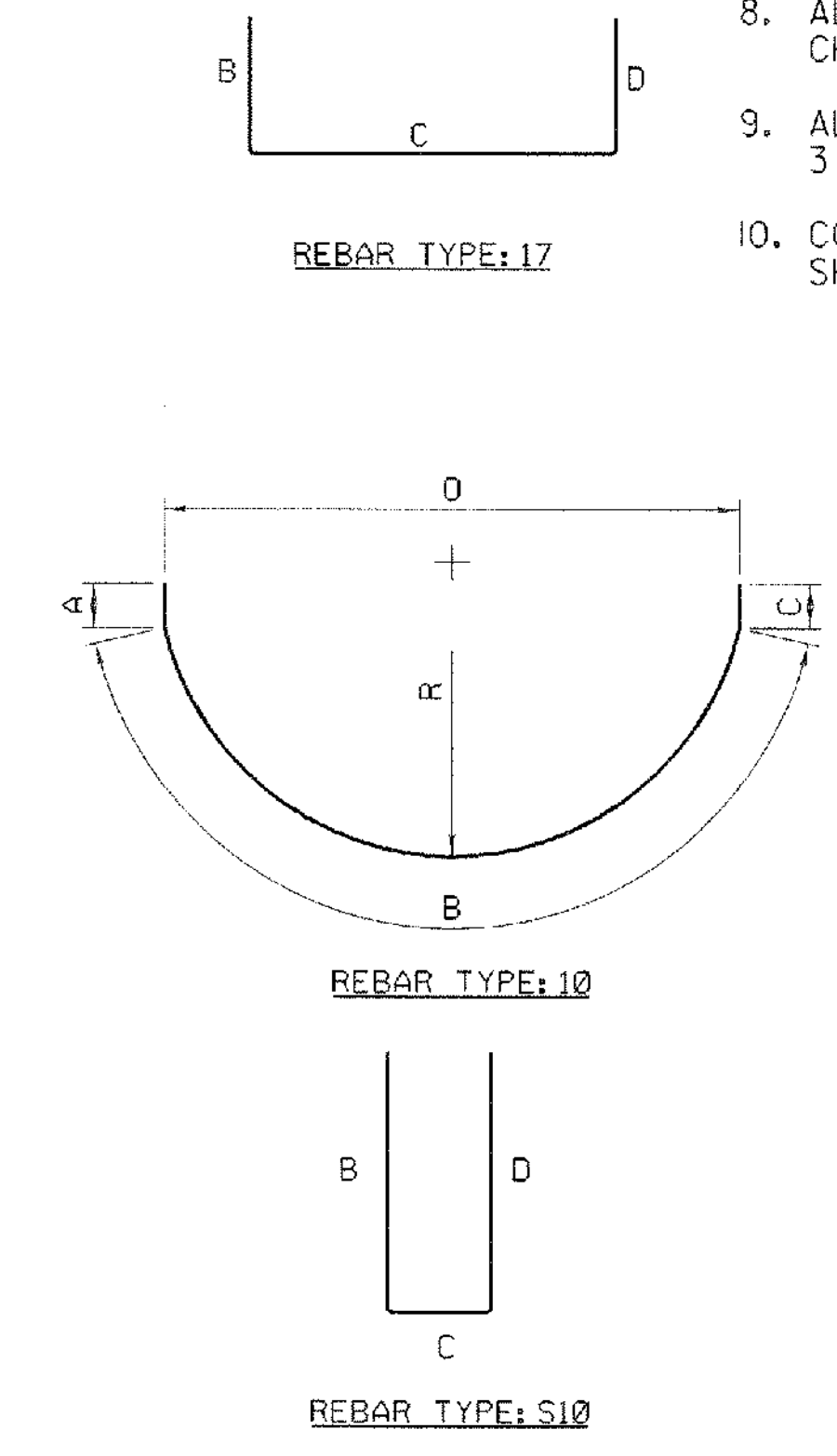
REINFORCED CONCRETE PIPE END SECTION

ENERGY DISSIPATOR FOR CULVERT





REBAR NOTES:
 NF = NEAR FACE
 FF = FAR FACE
 EF = EACH FACE
 ▲ = CUT TO FIT IN FIELD

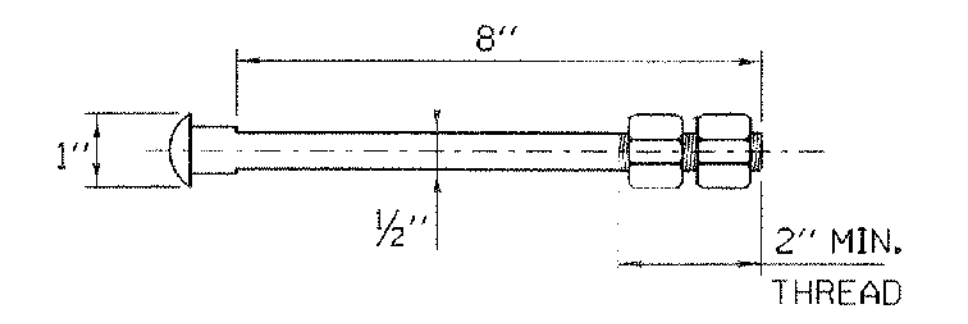


DESIGN CRITERIA

1. ASSUMED ALLOWABLE LOAD FOR SPREAD FOOTINGS
 - ON SOIL: 4 KSF
 - ON LEDGE: 10 KSF
2. REINFORCING STEEL GRADE: 60 KSI
3. CONCRETE CLASS B: 3500 PSI
4. SOIL UNIT WEIGHT: 140 PSF
5. ASSUMED FOOTING FRICTION COEFFICIENT: 0.55
6. SOIL FRICTION ANGLE: 33.67°
7. DEDUCT VOLUME OF PIPE.
8. ALL EXPOSED EDGES WILL BE CHAMFERED ONE INCH.
9. ALL REBAR CLEARANCES SHALL BE 3 INCHES UNLESS OTHERWISE NOTED.
10. CONSTRUCTION JOINT SURFACE SHALL BE ROUGH.

ANCHOR BOLT NOTES

1. ANCHOR BOLTS ARE REQUIRED ON NON-CONCRETE CULVERTS AND ARE TO BE INCLUDED IN THE COST OF THE PIPE.
2. ANCHOR BOLTS SHALL BE 1/2" DIA. x 8" WITH TWO 3/4" HEXAGONAL NUTS. MATERIALS SHALL MEET THE REQUIREMENTS OF ASTM A307. 3/16" HOLES IN PIPE TO BE DRILLED OR PUNCHED PRIOR TO COATING OF PIPE, OR FIELD DRILLED AND COATED WHEN REQUIRED DUE TO A FIELD CHANGE.



GALVANIZED ANCHOR BOLT

PIPE DIAMETER	72"	66"	60"	54"	48"	42"	36"	30"	24"	18"
DIMENSION "E"	42"	42"	42"	36"	36"	36"	30"	30"	30"	30"
CONCRETE QUANTITY (CY)	4.14	3.74	3.34	2.79	2.43	2.25	1.94	1.77	1.61	1.44
LENGTH OF BARS	665'	604'	544'	455'	402'	363'	305'	271'	254'	222'
WEIGHT OF BARS (LB)	694	630	567	475	420	379	318	283	265	232
CARRIAGE BOLTS (No.)	8	7	7	6	6	5	5	4	4	3

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 54"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	22	5	8'-6"	W501	STR.						
2	10	5	8'-8"	W502	17		5'-9"	2'-11"			
3	10	5	5'-9"	W503	STR.						
4	18	5	3'-6"	W504	STR.						
5	2	5	7'-5"	W505	10		7'-5"			5'-0"	2'-6"
6	10	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 60"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	24	5	9'-6"	W501	STR.						
2	11	5	9'-5"	W502	17		6'-0"	3'-5"			
3	11	5	6'-0"	W503	STR.						
4	20	5	4'-0"	W504	STR.						
5	2	5	8'-2"	W505	10		8'-2"			5'-6"	2'-9"
6	11	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 66"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	24	5	10'-6"	W501	STR.						
2	12	5	9'-8"	W502	17		6'-3"	3'-5"			
3	12	5	6'-3"	W503	STR.						
4	22	5	4'-0"	W504	STR.						
5	2	5	8'-11"	W505	10		8'-11"			6'-0"	3'-0"
6	12	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 72"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	24	5	11'-6"	W501	STR.						
2	13	5	9'-11"	W502	17		6'-6"	3'-5"			
3	13	5	6'-6"	W503	STR.						
4	24	5	4'-0"	W504	STR.						
5	2	5	9'-9"	W505	10		9'-9"			6'-6"	3'-3"
6	13	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 18"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	18	5	5'-0"	W501	STR.						
2	6	5	6'-8"	W502	17		4'-3"	2'-5"			
3	6	5	4'-3"	W503	STR.						
4	11	5	3'-0"	W504	STR.						
5	2	5	2'-8"	W505	10		2'-8"			2'-0"	1'-0"
6	6	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 30"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	18	5	6'-0"	W501	STR.						
2	7	5	7'-2"	W502	17		4'-9"	2'-5"			
3	7	5	4'-9"	W503	STR.						
4	13	5	3'-0"	W504	STR.						
5	2	5	4'-3"	W505	10		4'-3"			3'-0"	1'-6"
6	7	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 42"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	22	5	7'-0"	W501	STR.						
2	8	5	8'-2"	W502	17		5'-3"	2'-11"			
3	8	5	5'-3"	W503	STR.						
4	15	5	3'-6"	W504	STR.						
5	2	5	5'-10"	W505	10		5'-10"			4'-0"	2'-0"
6	8	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 24"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	18	5	5'-6"	W501	STR.						
2	7	5	6'-11"	W502	17		4'-6"	2'-5"			
3	7	5	4'-6"	W503	STR.						
4	12	5	3'-0"	W504	STR.						
5	2	5	3'-5"	W505	10		3'-5"			2'-6"	1'-3"
6	7	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 36"

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	18	5	6'-6"	W501	STR.						
2	8	5	7'-5"	W502	17		5'-0"	2'-5"			
3	8	5	5'-0"	W503	STR.						
4	14	5	3'-0"	W504	STR.						
5	2	5	5'-0"	W505	10		5'-0"			3'-6"	1'-9"
6	8	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL DIA. 48"

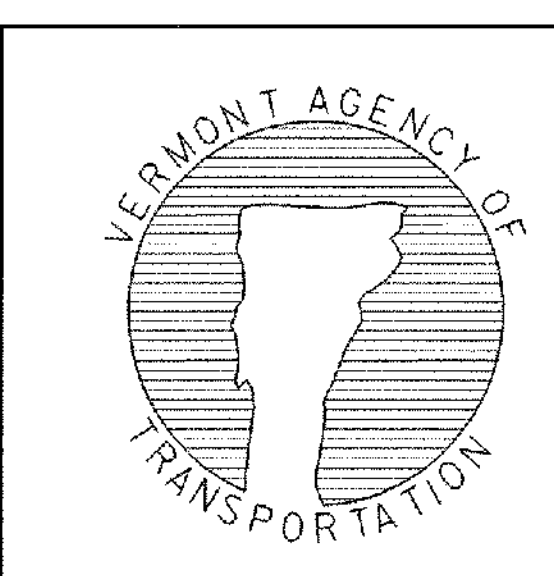
ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	22	5	7'-6"	W501	STR.						
2	9	5	8'-5"	W502	17		5'-6"	2'-11"			
3	9	5	5'-6"	W503	STR.						
4	16	5	3'-6"	W504	STR.						
5	2	5	6'-7"	W505	10		6'-7"			4'-6"	2'-3"
6	9	5	4'-7"	W506	S10		2'-0"	0'-7"	2'-0"		

NOT TO SCALE

REVISIONS AND CORRECTIONS
 MAR. 12, 2007 - ORIGINAL APPROVAL DATE

APPROVED
Kim A. Marsha
 ROADWAY, TRAFFIC & SAFETY ENGINEER
Richard Johnson
 DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
 FEDERAL HIGHWAY ADMINISTRATION

REINFORCED CONCRETE CRADLE HEADWALL



STANDARD D-34

NOTES CONT.

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, INSTALLING, MAINTAINING AND REMOVING ALL CONSTRUCTION APPROACH SIGNS WILL BE CONSIDERED INCIDENTAL WORK PERTAINING TO THE PROJECT AS A WHOLE AND SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR VARIOUS ITEMS INVOLVED IN THE CONTRACT. DURING ALL PHASES OF CONSTRUCTION THE REQUIREMENTS SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE MET.

SIGN COVERS

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

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

SIGN POSTS

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

WOODEN POSTS ARE ACCEPTABLE FOR USE WITH CONSTRUCTION SIGNS. THESE POSTS SHALL HAVE A UNIFORM CROSS-SECTION AND SHALL BE MADE FROM GRADE 2, AIR-DRIED SOUTHERN YELLOW PINE OR ANOTHER EQUIVALENT SOFTWOOD. AN ACCEPTABLE EQUIVALENT SOFTWOOD SHALL HAVE AN EXTREME FIBER IN BENDING "Fb" DESIGN VALUE NOT TO EXCEED 1400 PSI AND HORIZONTAL SHEAR "Fv" DESIGN VALUE NOT TO EXCEED 90 PSI SPECIFICATION; "DESIGN VALUES FOR WOOD CONSTRUCTION" AND RELATED SUPPLEMENT, LATEST EDITION.

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

- 1. 4" X 4" (ACTUAL DIMENSIONS ARE S4S 3.5" X 3.5")
- A) ACCEPTABLE FOR SINGLE OR DUAL POSTS INSTALLATION WITH NO MODIFICATIONS.

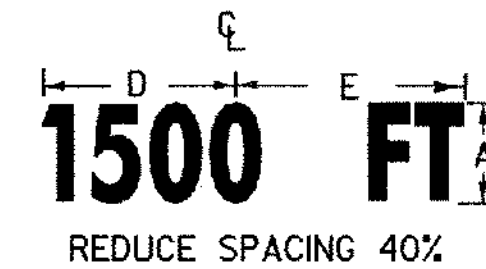
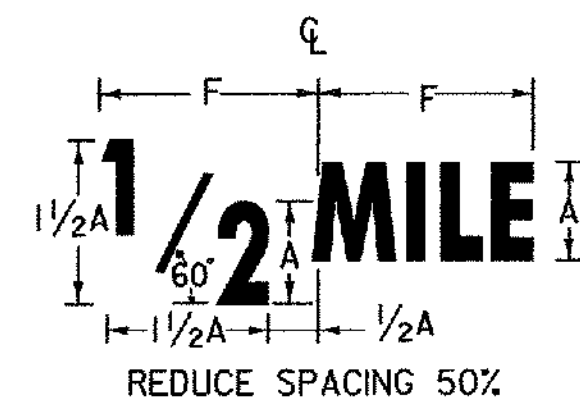
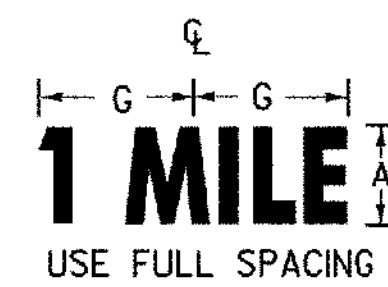
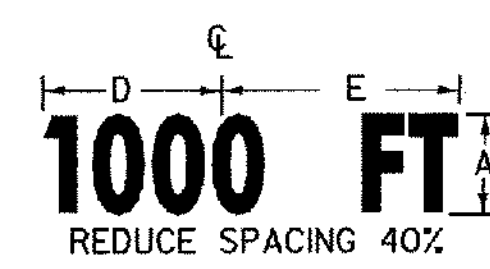
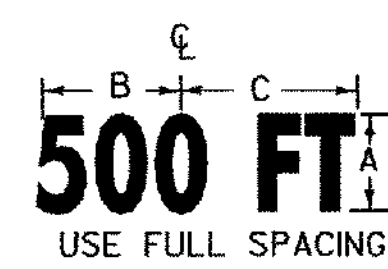
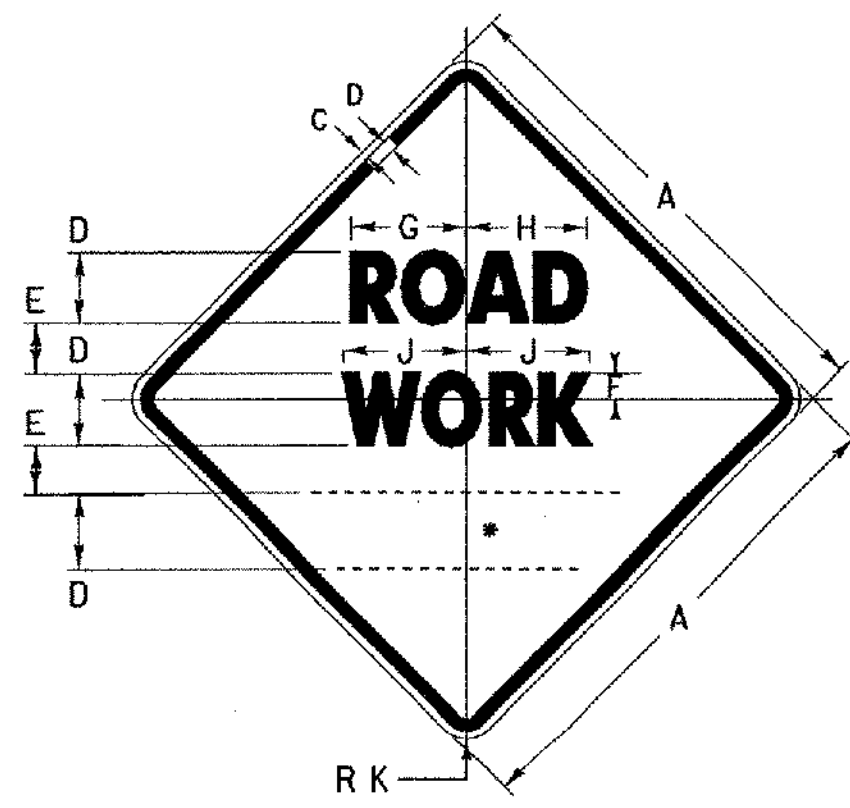
ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS, OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS GOVERN:

- A) THE SIGN WIDTH (HORIZONTAL DIMENSIONS FOR DIAMOND SHAPED SIGNS) EXCEEDS 3 1/2 FEET.
- B) THE EXPOSED SIGN AREA OF ANY SINGLE SIGN OR ASSEMBLY EXCEEDS 7 SQ. FEET.
- C) THE Sv OF A SINGLE POST IS 64.

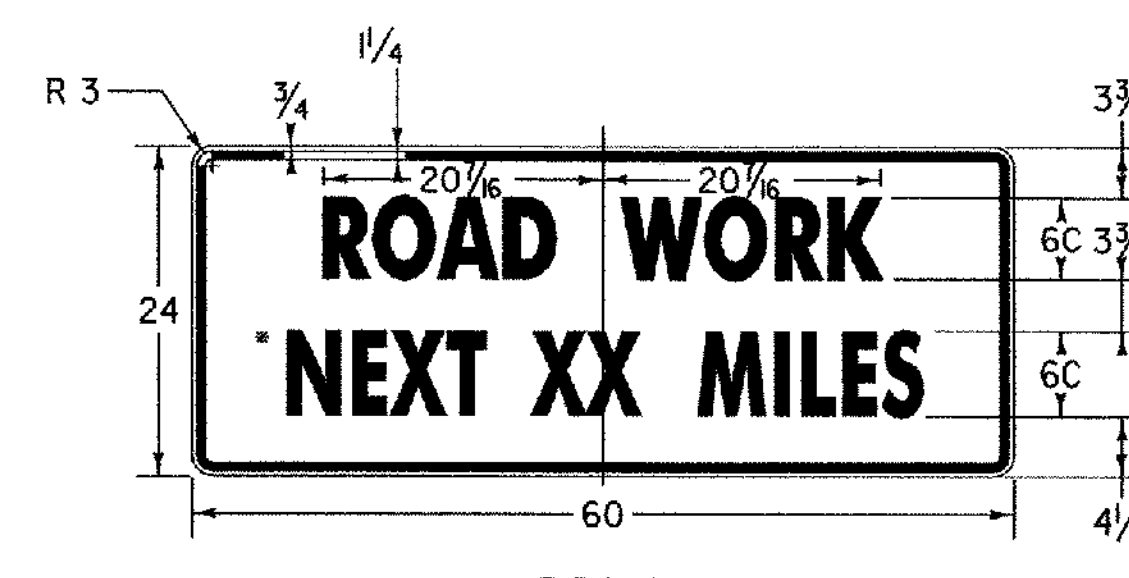
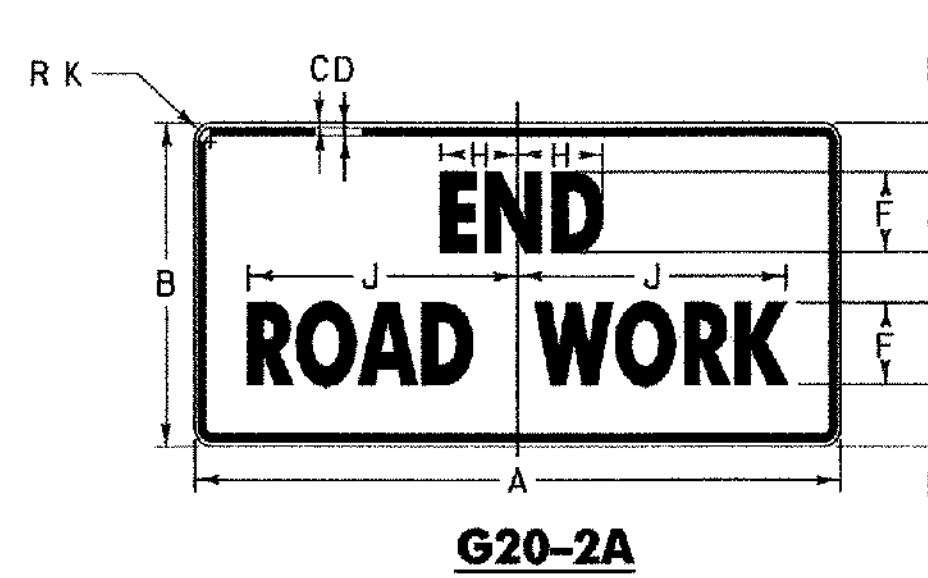
OTHER STDS. E-100A, E-101, E-102 REQUIRED:



STANDARD E-100



DISTANCE DETAILS



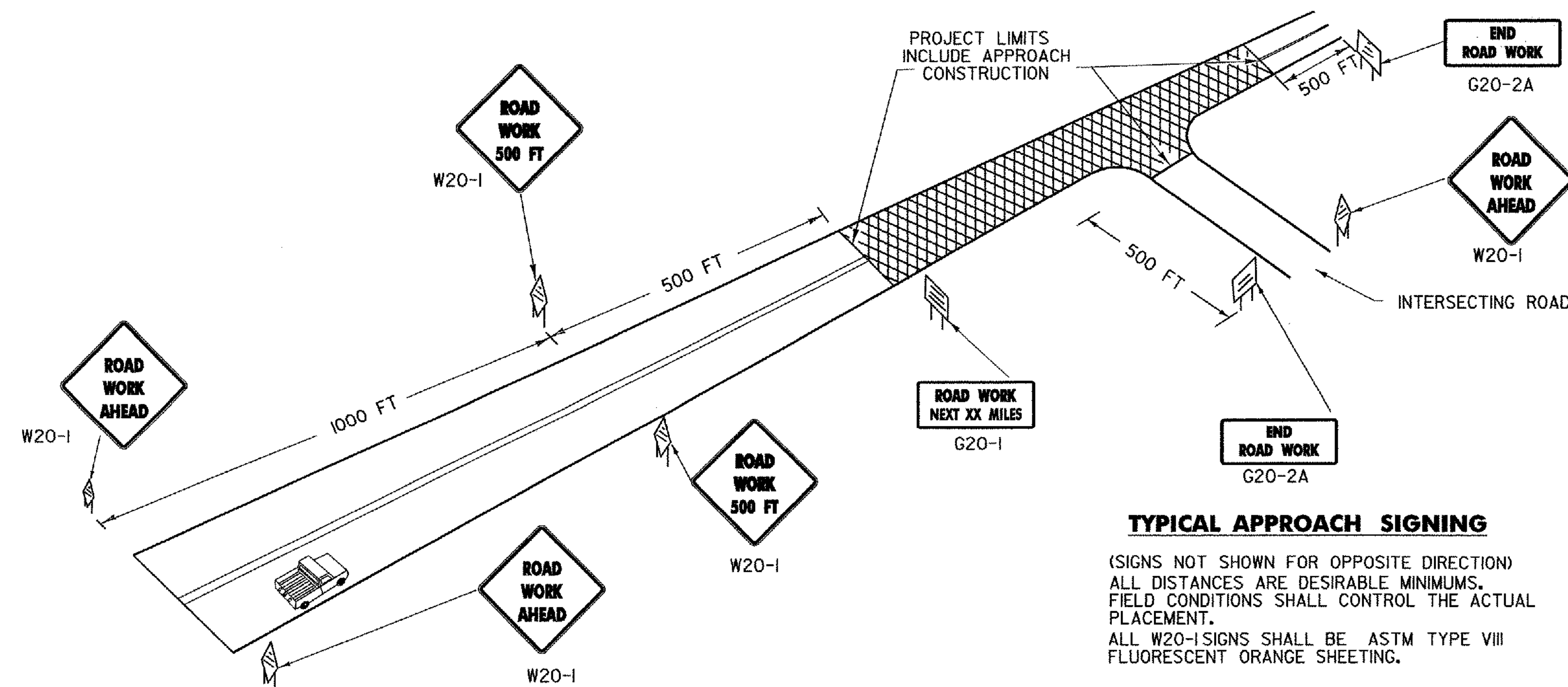
THIS SIGN TO BE USED WHEN PROJECT LENGTH EXCEEDS 2 MILES OR AS REQUESTED BY THE RESIDENT ENGINEER. SHOW MILEAGE TO NEAREST 1/4 MILE USING FRACTIONS, NOT DECIMALS. HAND LETTERING OF MILEAGE WILL NOT BE ALLOWED.

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	18	5/8	7/8	3 3/4	4C	2 1/2	4	12 5/8	2 1/4
STD.	48	24	3/4	1 1/4	4 1/8	6C	3 3/4	5 7/8	22	3

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	5/8	7/8	5D	3 1/2	3 3/4	8 3/8	8 7/8	9	2 1/4
STD.	48	3/4	1 1/4	7D	4 3/4	4 1/2	11 1/8	12 1/8	12 5/8	3

DIMENSIONS (INCHES)							
A	B	C	D	E	F	G	H
5D	10 3/8	10 3/8	11 5/8	11 1/4	11 1/4	9 1/2	10 7/8
7D	14 1/4	15 1/8	14 1/8	15 3/4	15 3/4	13 1/8	15 1/2

(ALL DIMENSIONS SHOWN IN INCHES)



TYPICAL APPROACH SIGNING

(SIGNS NOT SHOWN FOR OPPOSITE DIRECTION)
ALL DISTANCES ARE DESIRABLE MINIMUMS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
ALL W20-1 SIGNS SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING.

NOTES

THE 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. FOR ON-PROJECT CONSTRUCTION SIGNS, REFER TO APPROPRIATE STANDARD SHEETS.

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 SHALL BE MADE TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" FOR THE PRINCIPLES, PROCEDURES, AND STANDARDS THAT WILL BE REQUIRED IN CONNECTION WITH ADVANCED WARNING AND ON-PROJECT CONSTRUCTION SIGNS AND BARRICADES. THE SIGNS SHOWN IN E-101 AND E-102 REPRESENT A SAMPLE OF THOSE MORE COMMONLY USED.

LOCATION

THE SIGNS SHALL BE LOCATED AS DETAILED ON THIS SHEET OR AS OTHERWISE SHOWN ON THE PLANS. THEY SHALL APPEAR AT EACH END OF THE HIGHWAY UNDER CONSTRUCTION AND ON ALL INTERSECTING PUBLIC HIGHWAYS. THE ENGINEER SHALL DETERMINE THE EXACT LOCATIONS.

DESIGN

LETTERS, DIGITS, ARROWS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD HIGHWAY SIGNS BOOK" AND DESIGNS PRESCRIBED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) ADOPTED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA).

MATERIALS

THE SIGN BASE MATERIAL USED FOR THE SIGNS ON THIS SHEET MAY BE ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED.
FLAT SHEET ALUMINUM 0.125 INCHES
HIGH DENSITY OVERLAYED PLYWOOD 5/8 INCHES

REFLECTORIZATION

ALL LEAD SIGNS (W20-1) ON THIS SHEET SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING. ALL OTHER SIGNS ON THIS SHEET SHALL BE ASTM TYPE III RETROREFLECTORIZED SHEETING.

COLORS

THE COLORS SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA. COLORS SHOWN ON THIS SHEET CONSIST OF BLACK TEXT AND BORDER ON A RETROREFLECTORIZED ASTM TYPE III OR TYPE VIII ORANGE BACKGROUND.

INSTALLATION

THE SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY, OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER ON POSTS SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST 7 FEET ABOVE THE EDGE OF PAVEMENT, AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST 6 FEET OUTSIDE THE SHOULDER POINT, 4 FEET OUTSIDE GUARD RAIL, OR 2 FEET OUTSIDE CURBING, OR SIDEWALK. 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 FEET ABOVE THE SIDEWALK. SIGNS MAY BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.

REVISIONS AND CORRECTIONS

- MAY 26, 1989 - DATE OF ORIGINAL ISSUE
- OCT 21, 1992 - REVISED WOOD POST REQUIREMENTS, ADDED SIGN DETAILS, & REVISED TITLE BLOCK
- AUG. 08, 1995 - MINOR NOTE REVISIONS
- JAN. 06, 1997 - MINOR NOTE AND DIMENSION REVISIONS
- JAN. 2, 2004 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VIII

APPROVED

[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
TRAFFIC OPERATIONS ENGINEER
[Signature]
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION APPROACH SIGNS

NOTES CONT.

MATERIALS

THE SIGN BASE MATERIAL USED FOR THE SIGNS ON THIS SHEET MAY BE ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED.
 FLAT SHEET ALUMINUM 0.125 INCHES
 HIGH DENSITY OVERLAYED PLYWOOD 5/8 INCHES

REFLECTORIZATION

ALL LEAD SIGNS (W20-1, VC-839) ON THIS SHEET SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING. ALL OTHER SIGNS ON THIS SHEET SHALL BE ASTM TYPE III RETROREFLECTORIZED SHEETING.

COLORS

THE COLORS SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA. COLORS SHOWN ON THIS SHEET CONSIST OF BLACK TEXT AND BORDER ON A RETROREFLECTORIZED ASTM TYPE III OR TYPE VIII ORANGE BACKGROUND.

INSTALLATION

THE SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY, OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER ON POSTS SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST 7 FEET ABOVE THE EDGE OF PAVEMENT, AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST 6 FEET OUTSIDE THE SHOULDER POINT, 4 FEET OUTSIDE GUARD RAIL, OR 2 FEET OUTSIDE CURBING, OR SIDEWALK. 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 FEET ABOVE THE SIDEWALK. SIGNS MAY BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.

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, INSTALLING, MAINTAINING AND REMOVING ALL CONSTRUCTION APPROACH SIGNS WILL BE CONSIDERED INCIDENTAL WORK PERTAINING TO THE PROJECT AS A WHOLE AND SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR VARIOUS ITEMS INVOLVED IN THE CONTRACT. DURING ALL PHASES OF CONSTRUCTION THE REQUIREMENTS SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE MET.

SIGN COVERS

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

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

SIGN POSTS

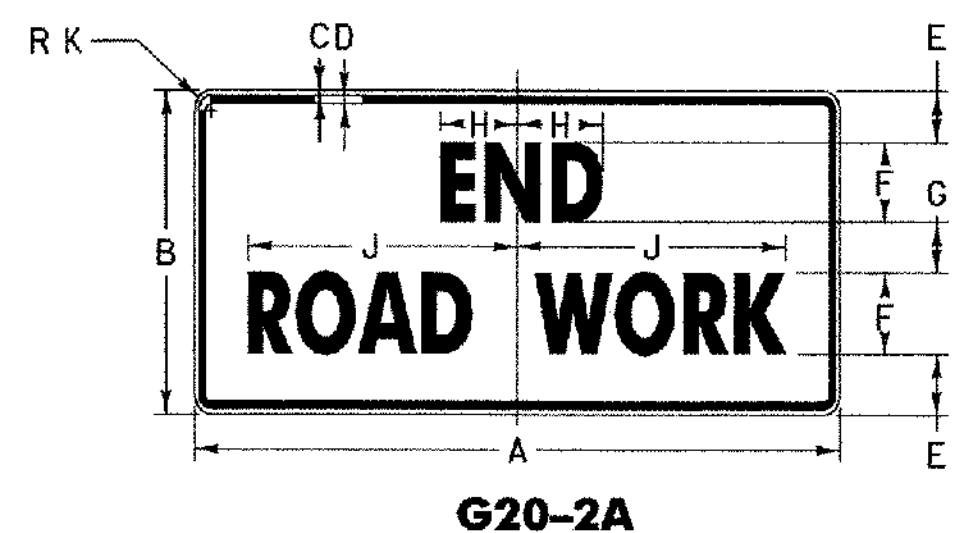
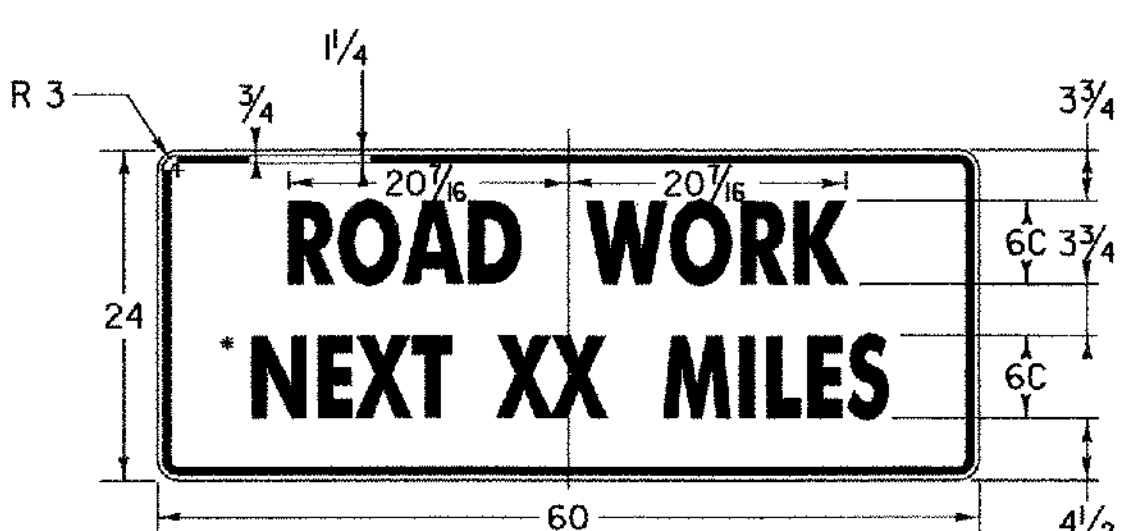
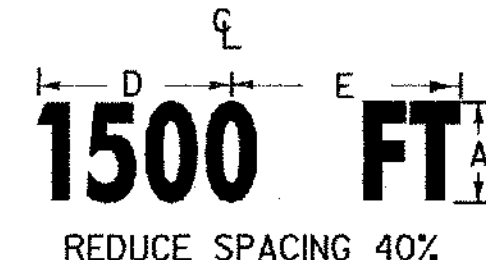
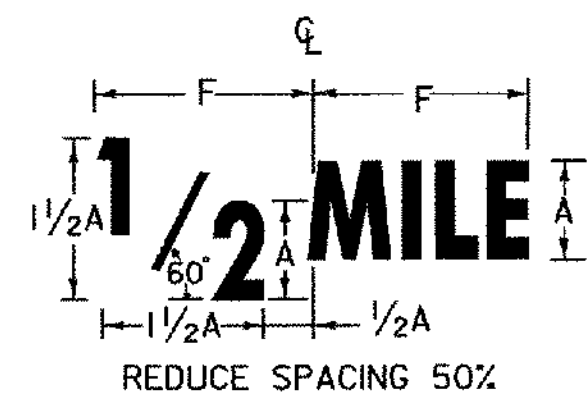
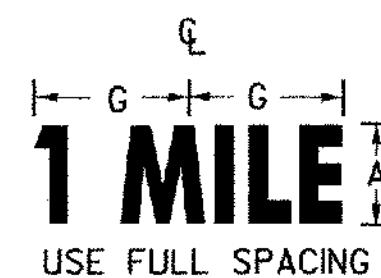
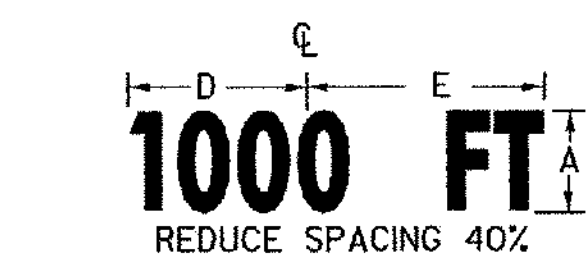
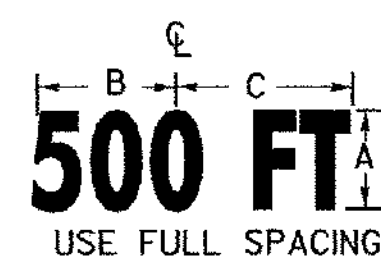
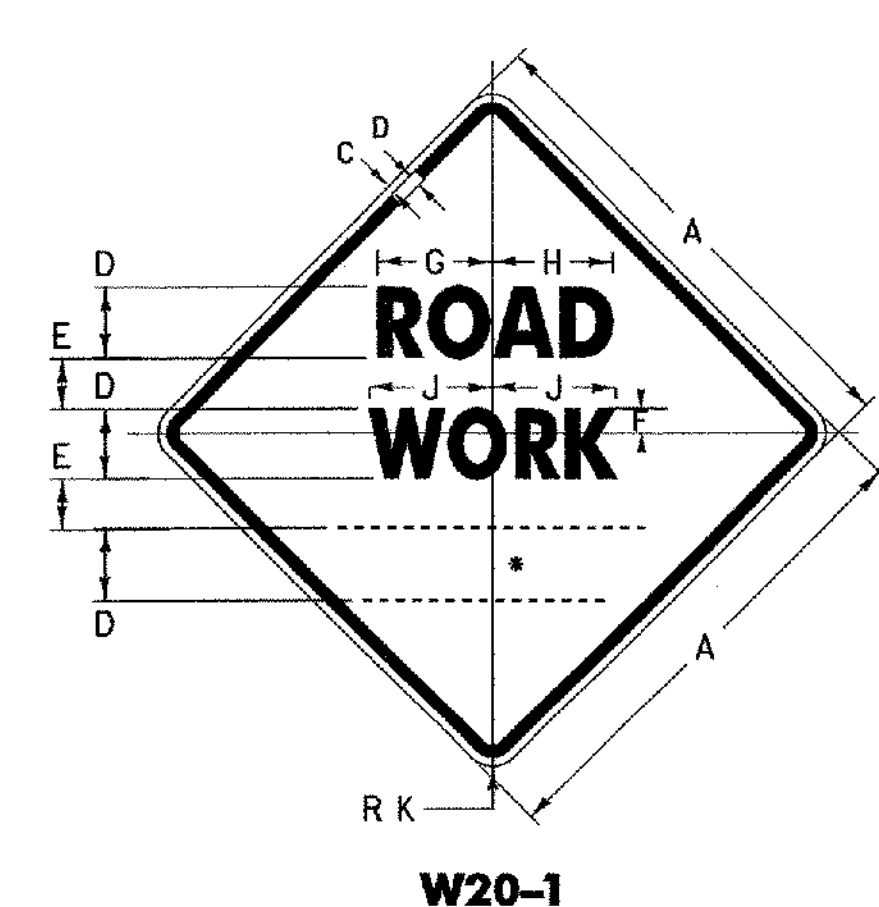
WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARD RAIL OR OTHER APPROVED TRAFFIC BARRIERS, THE POSTS ON WHICH THE SIGNS ARE MOUNTED SHALL BE YIELDING METAL POSTS AS DESIGNATED IN THE E SERIES OF STANDARD DRAWINGS OR YIELDING WOODEN POSTS IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:

WOODEN POSTS ARE ACCEPTABLE FOR USE WITH CONSTRUCTION SIGNS. THESE POSTS SHALL HAVE A UNIFORM CROSS-SECTION AND SHALL BE MADE FROM GRADE 2, AIR-DRIED SOUTHERN YELLOW PINE OR ANOTHER EQUIVALENT SOFTWOOD. AN ACCEPTABLE EQUIVALENT SOFTWOOD SHALL HAVE AN EXTREME FIBER IN BENDING "Fb" DESIGN VALUE NOT TO EXCEED 1400 PSI AND HORIZONTAL SHEAR "Fv" DESIGN VALUE NOT TO EXCEED 90 PSI SPECIFICATION; "DESIGN VALUES FOR WOOD CONSTRUCTION" AND RELATED SUPPLEMENT, LATEST EDITION.

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

- 1. 4" X 4" (ACTUAL DIMENSIONS ARE S4S 3.5" X 3.5")
 - A) ACCEPTABLE FOR SINGLE OR DUAL POSTS INSTALLATION WITH NO MODIFICATIONS.
- ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS GOVERN:
 - A) THE SIGN WIDTH (HORIZONTAL DIMENSIONS FOR DIAMOND SHAPED SIGNS) EXCEEDS 3 1/2 FEET.
 - B) THE EXPOSED SIGN AREA OF ANY SINGLE SIGN OR ASSEMBLY EXCEEDS 7 SQ. FEET.
 - C) THE Sv OF A SINGLE POST IS 64

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



* SEE DISTANCE DETAILS

DISTANCE DETAILS

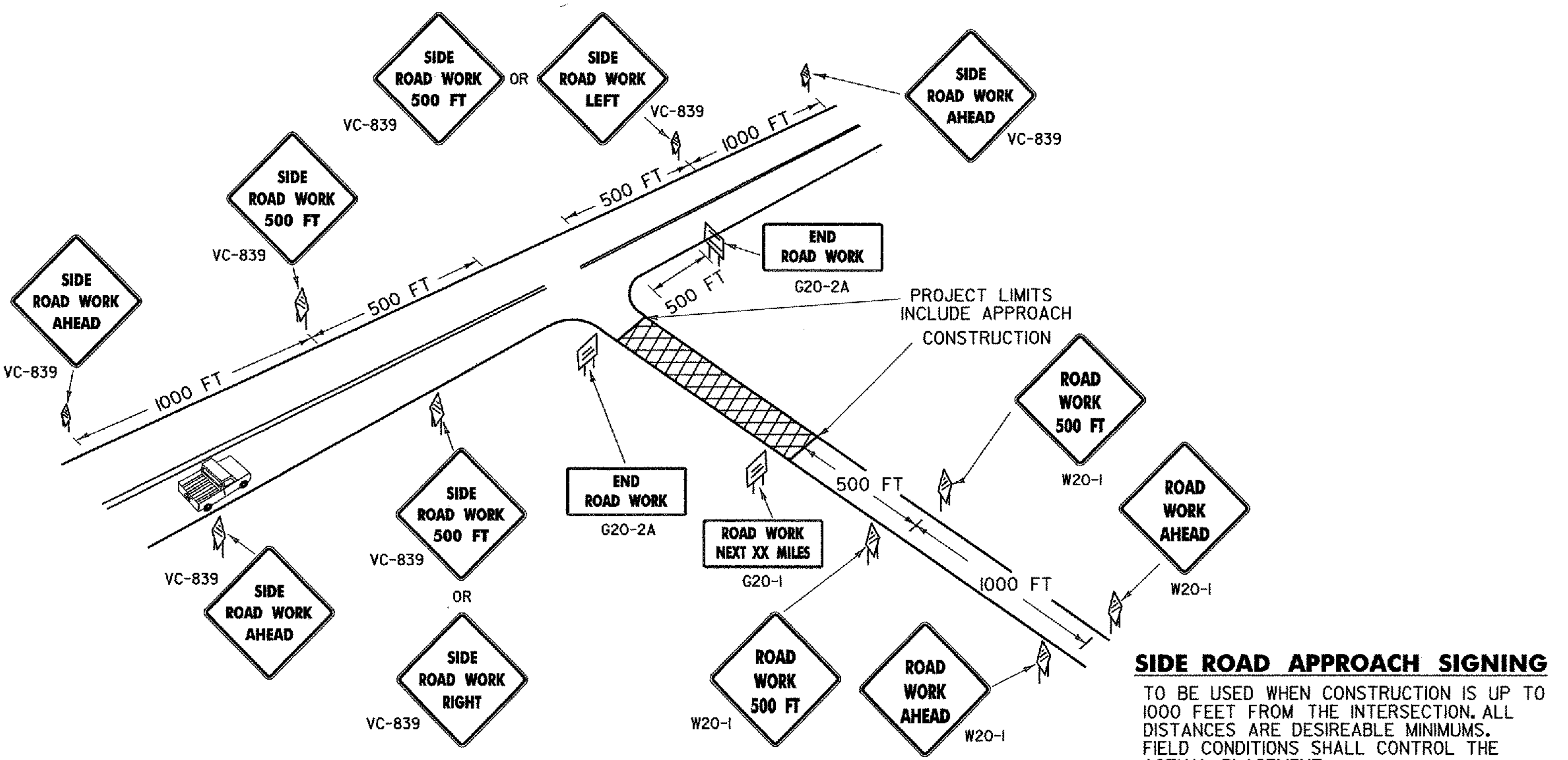
G20-1
* OPTICALLY CENTER

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

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	5/8	7/8	5D	3 1/2	3 1/4	8 3/8	8 7/8	9	2 1/4
STD.	48	3/4	1 1/4	7D	4 3/4	4 1/2	11 1/8	12 5/8	12 5/8	3

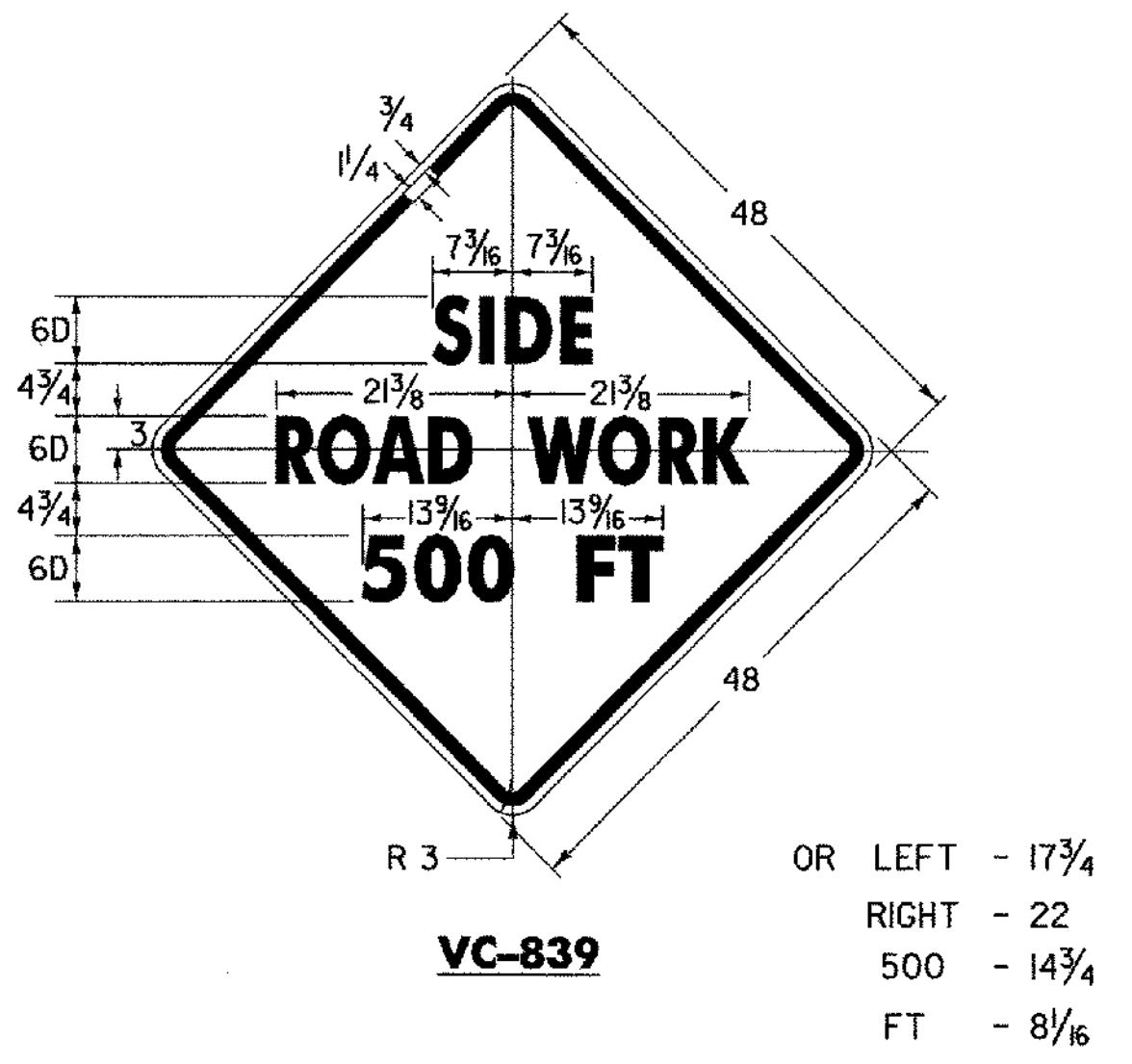
DIMENSIONS (INCHES)							
A	B	C	D	E	F	G	H
5D	10 3/16	10 3/16	11 5/8	11 1/4	11 1/4	9 1/2	10 7/8
7D	14 1/4	15 1/8	14 7/8	15 3/4	15 3/4	13 1/16	15 1/2

(ALL DIMENSIONS SHOWN IN INCHES)



SIDE ROAD APPROACH SIGNING

TO BE USED WHEN CONSTRUCTION IS UP TO 1000 FEET FROM THE INTERSECTION. ALL DISTANCES ARE DESIRABLE MINIMUMS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
 ALL W20-1 AND VC-839 SIGNS SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING.



VC-839
OR LEFT - 17 3/4
RIGHT - 22
500 - 14 3/4
FT - 8 1/8

NOTES

THE 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. FOR ON-PROJECT CONSTRUCTION SIGNS, REFER TO APPROPRIATE STANDARD SHEETS.

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 SHALL BE MADE TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" FOR THE PRINCIPLES, PROCEDURES, AND STANDARDS THAT WILL BE REQUIRED IN CONNECTION WITH ADVANCED WARNING AND ON-PROJECT CONSTRUCTION SIGNS AND BARRICADES. THE SIGNS SHOWN IN E-101 AND E-102 REPRESENT A SAMPLE OF THOSE MORE COMMONLY USED.

LOCATION

THE SIGNS SHALL BE LOCATED AS DETAILED ON THIS SHEET OR AS OTHERWISE SHOWN ON THE PLANS. THEY SHALL APPEAR AT EACH END OF THE HIGHWAY UNDER CONSTRUCTION AND ON ALL INTERSECTING PUBLIC HIGHWAYS. THE ENGINEER SHALL DETERMINE THE EXACT LOCATIONS.

DESIGN

LETTERS, DIGITS, ARROWS SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD HIGHWAY SIGNS BOOK" AND DESIGNS PRESCRIBED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) ADOPTED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA).

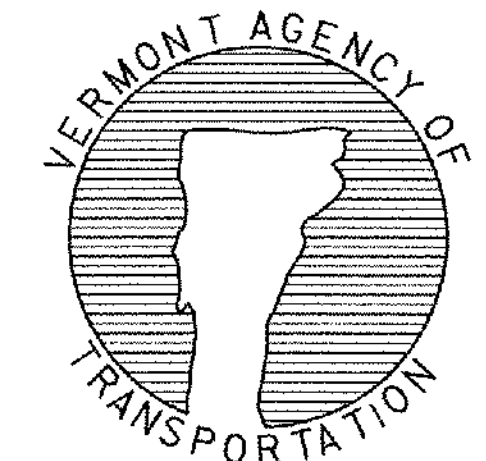
REVISIONS AND CORRECTIONS

JAN. 06, 1997 - DATE OF ORIGINAL ISSUE
 JAN. 2, 2004 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VIII

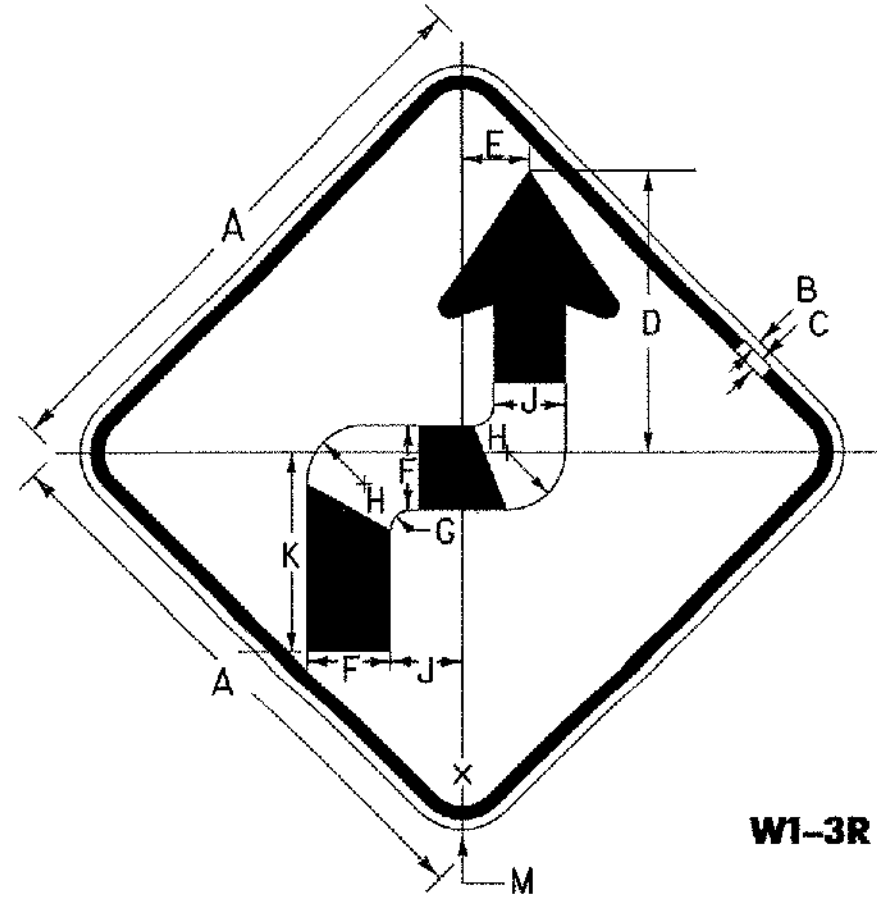
APPROVED

DIRECTOR OF PROGRAM DEVELOPMENT
 TRANSPORTATION ENGINEER
 FEDERAL HIGHWAY ADMINISTRATION

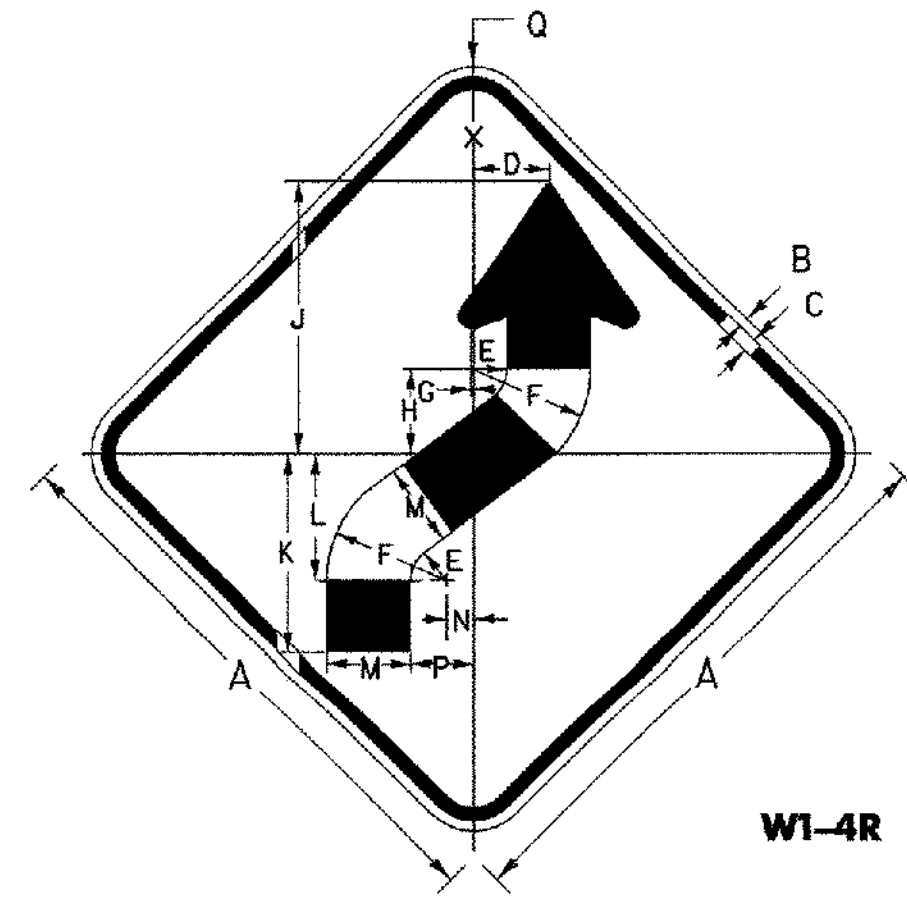
SIDE ROAD CONSTRUCTION APPROACH SIGNS



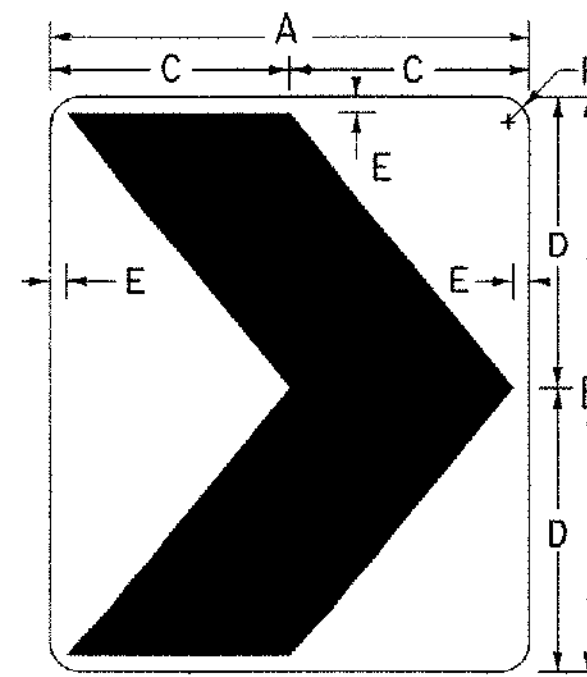
STANDARD E-100A



W1-3R

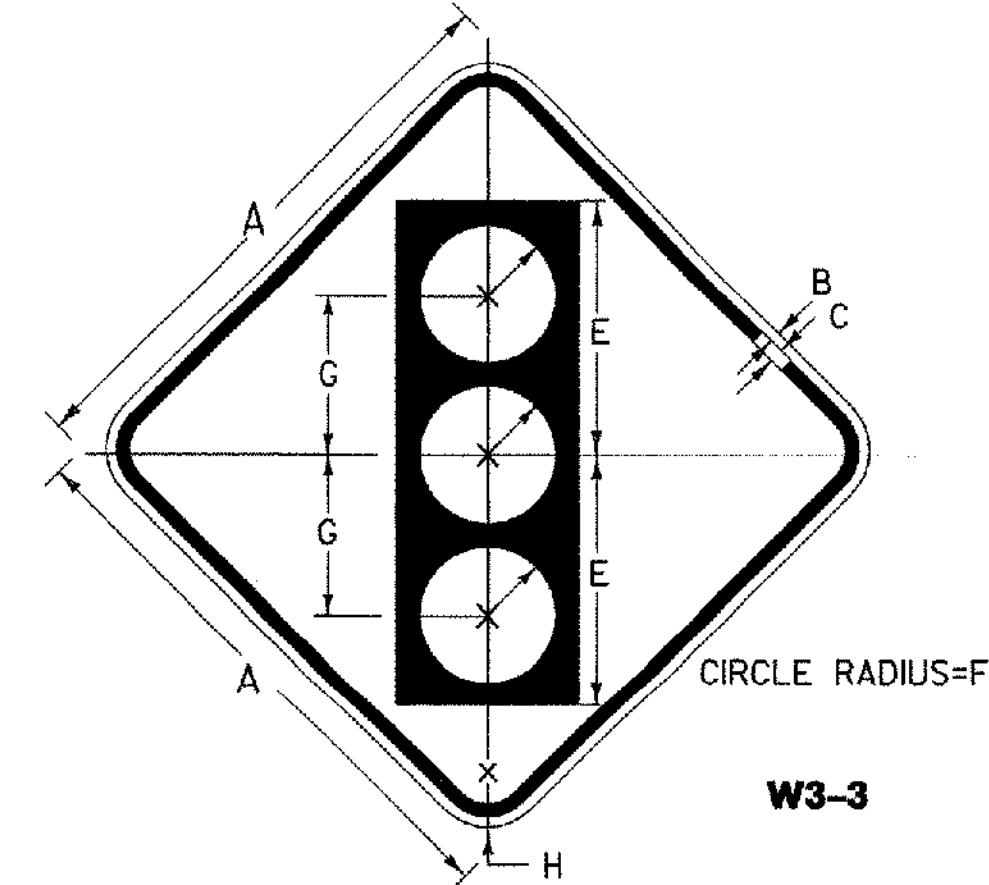


W1-4R



W1-8

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

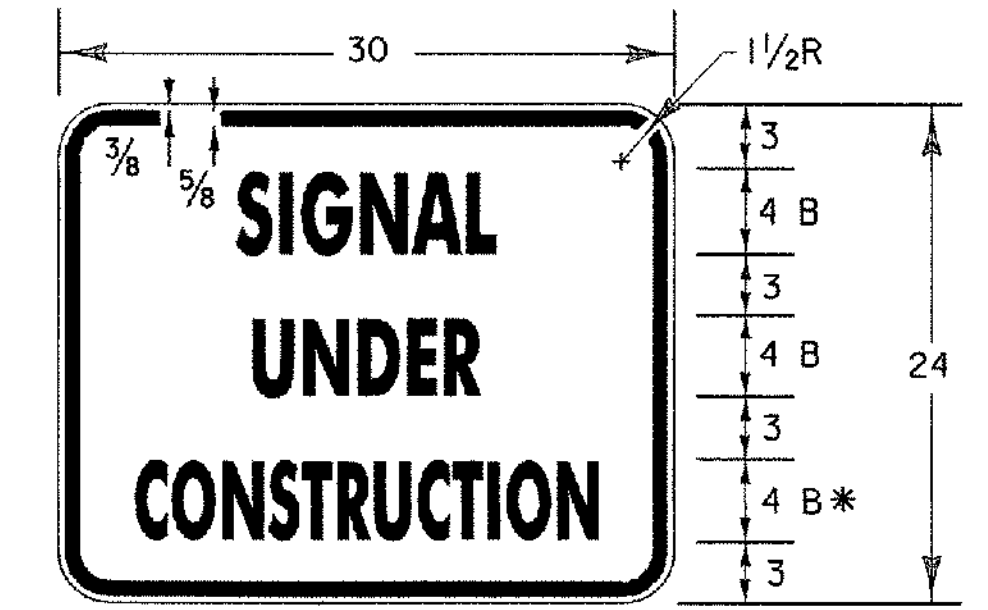


W3-3

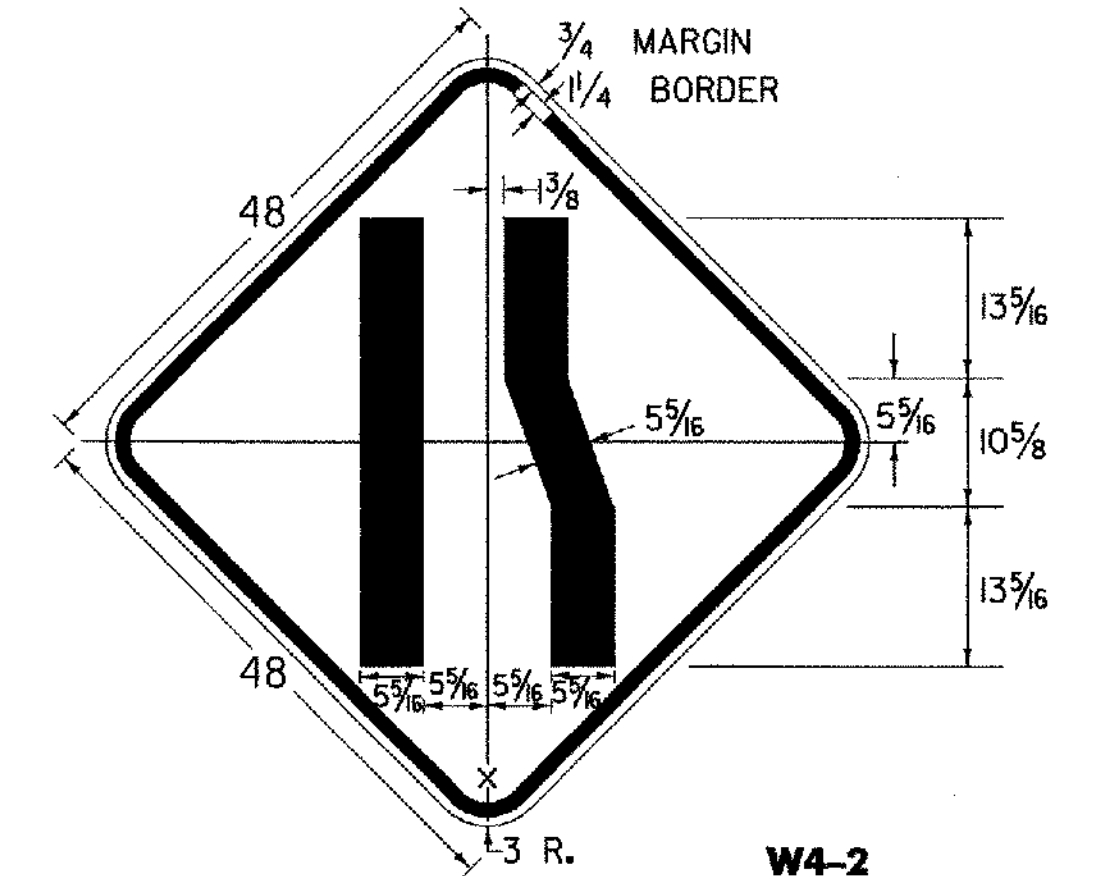
SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
STD. & MIN.	36	5/8	7/8	5 3/4	15 3/4	4 1/4	10	2 1/4
SPECIAL	48	3/4	1 1/4	7 1/2	20	5	12 1/2	3

COLORS

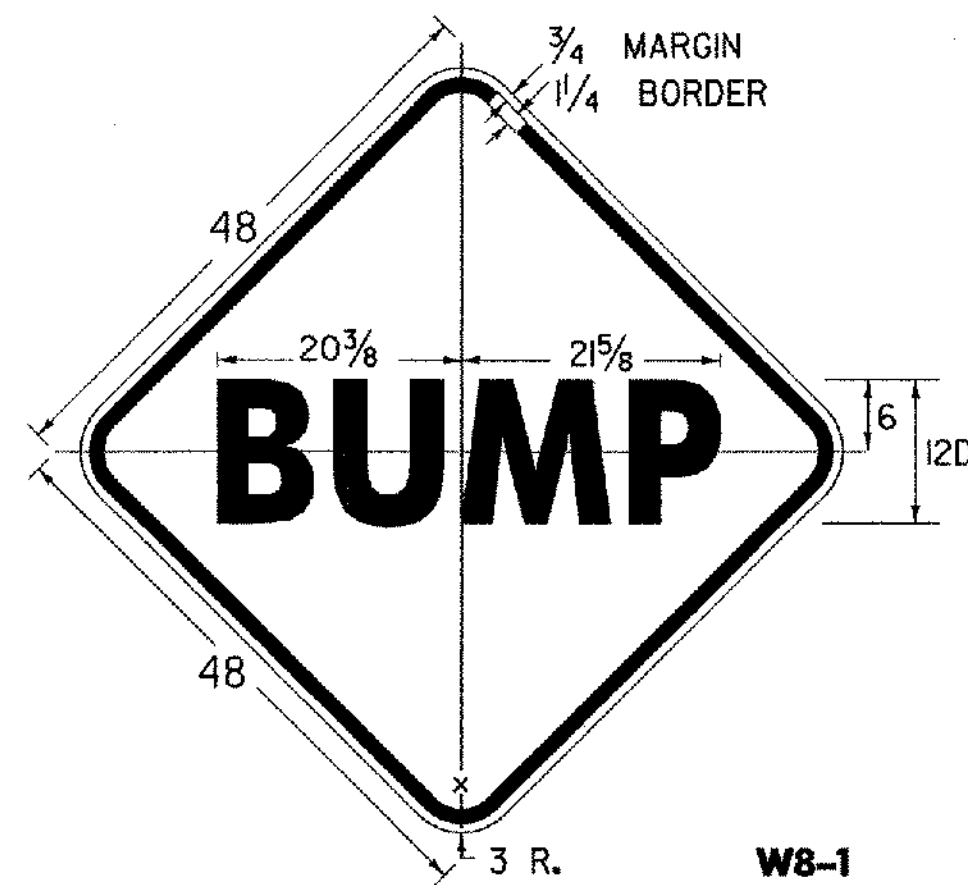
SYMBOL & LEGEND - BLACK (NON-REFL)
 BACKGROUND - ORANGE (REFL)
 TOP CIRCLE RED (REFL)
 MIDDLE CIRCLE YELLOW (REFL)
 BOTTOM CIRCLE GREEN (REFL)



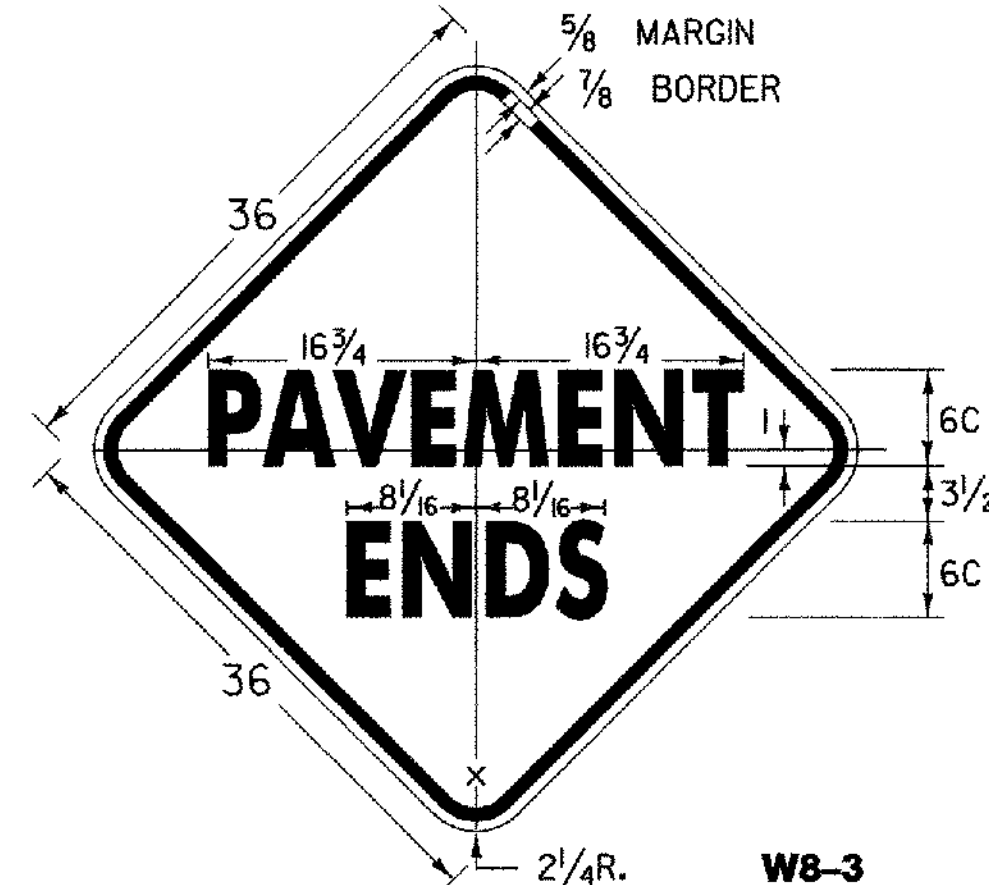
* REDUCE SPACING 50%



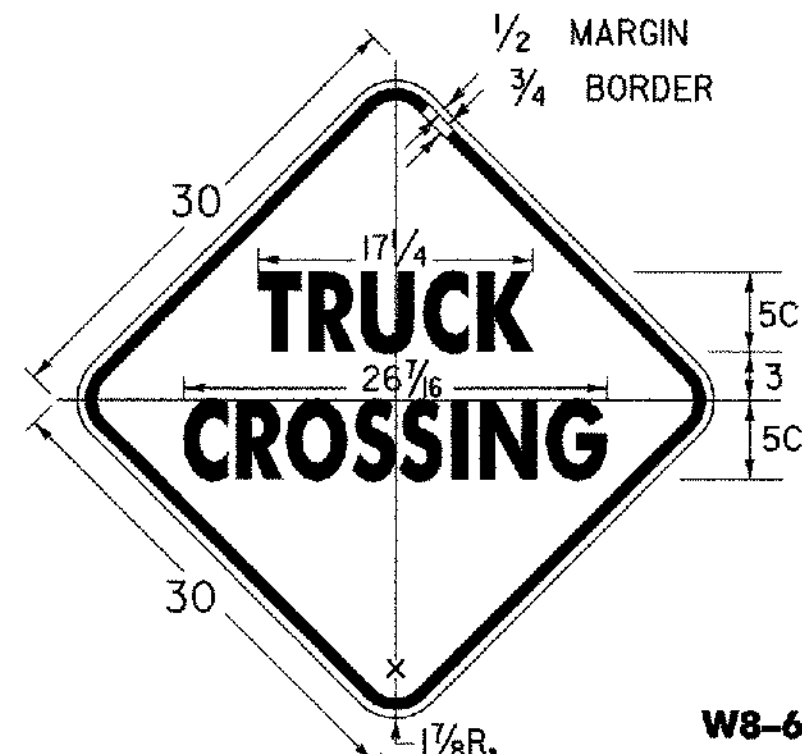
W4-2



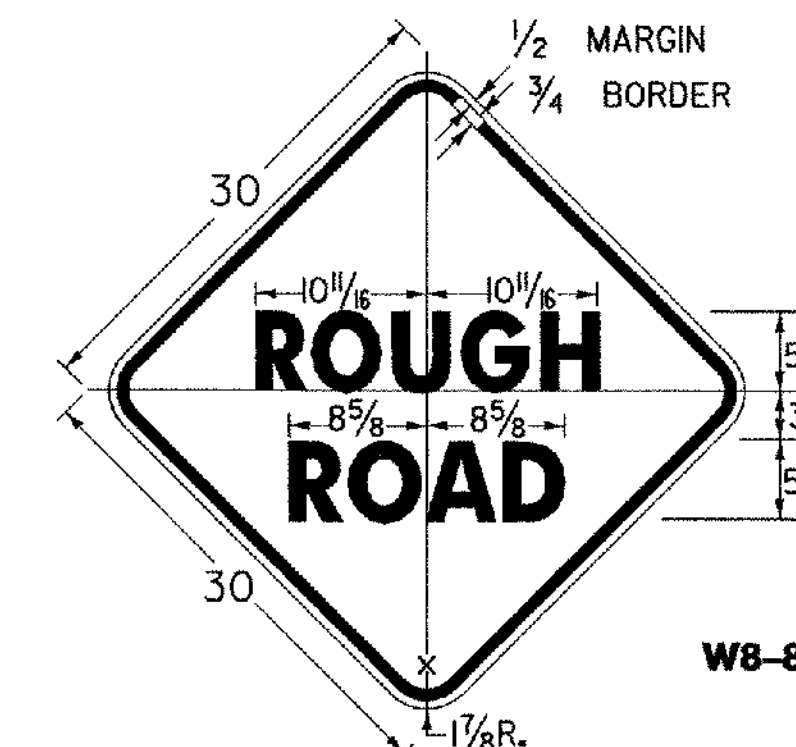
W8-1



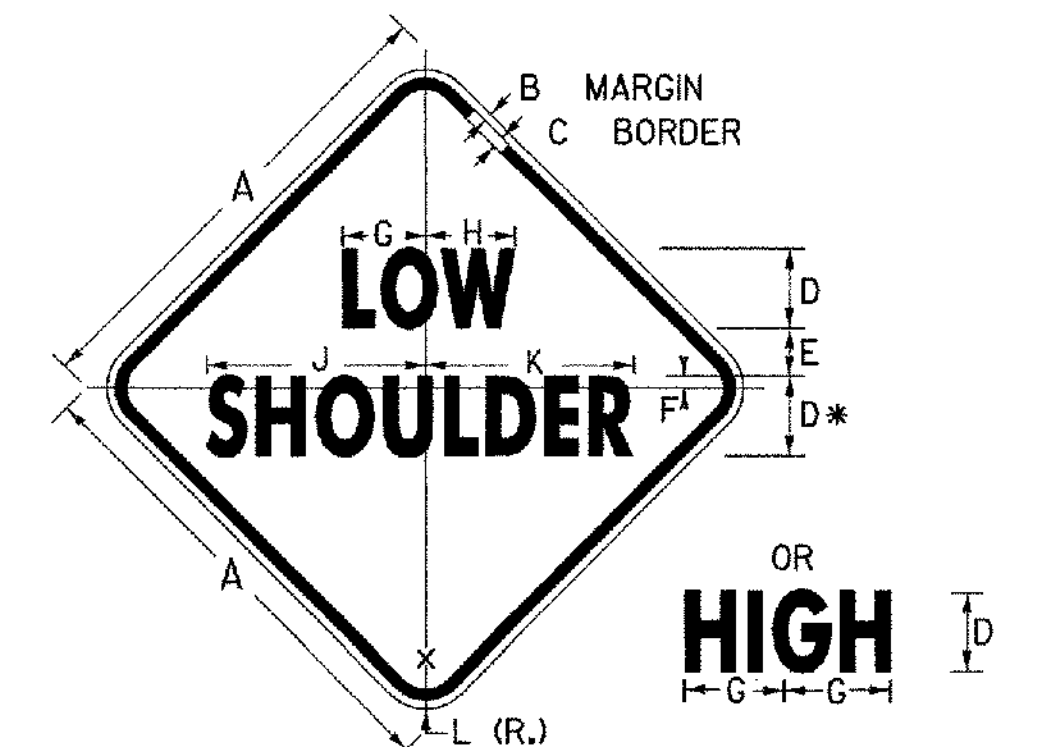
W8-3



W8-6



W8-8



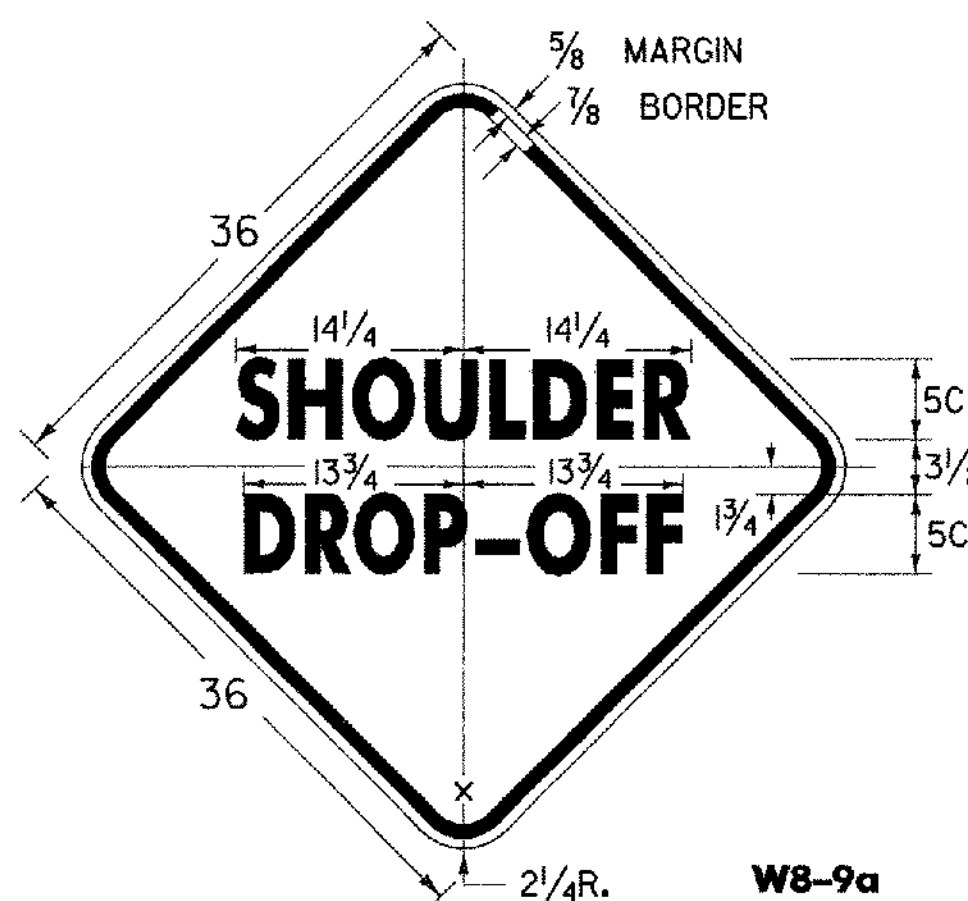
W8-9

* REDUCE SPACING 25%

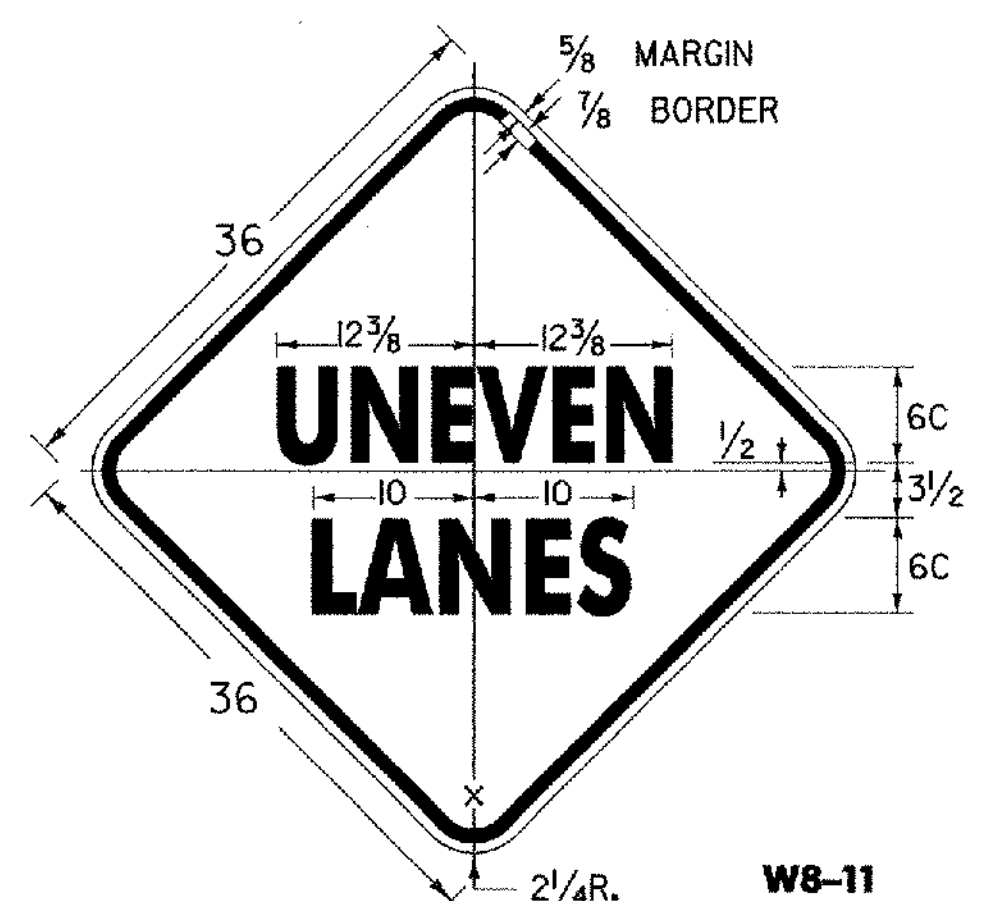
SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
STD.	30	1 1/2	3/4	5 C	3	3/4	5 3/8	5 3/8	13 1/8	13 1/8	1 1/8
FWY.	48	3/4	1 1/4	8 C	5	1 1/4	8 1/4	8 1/4	9	21 1/8	20 1/8

NOTES

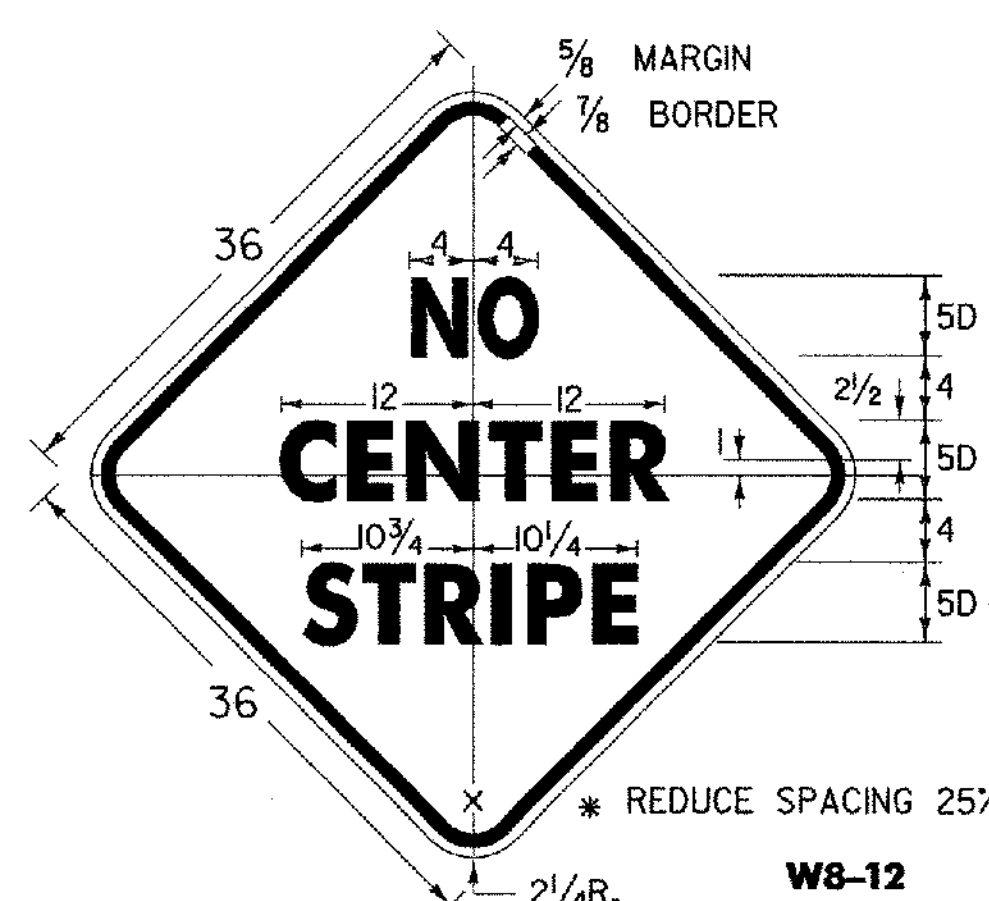
SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS
 COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS ON ASTM TYPE III OR TYPE VI RETROREFLECTORIZED ORANGE BACKGROUND, UNLESS OTHERWISE NOTED.



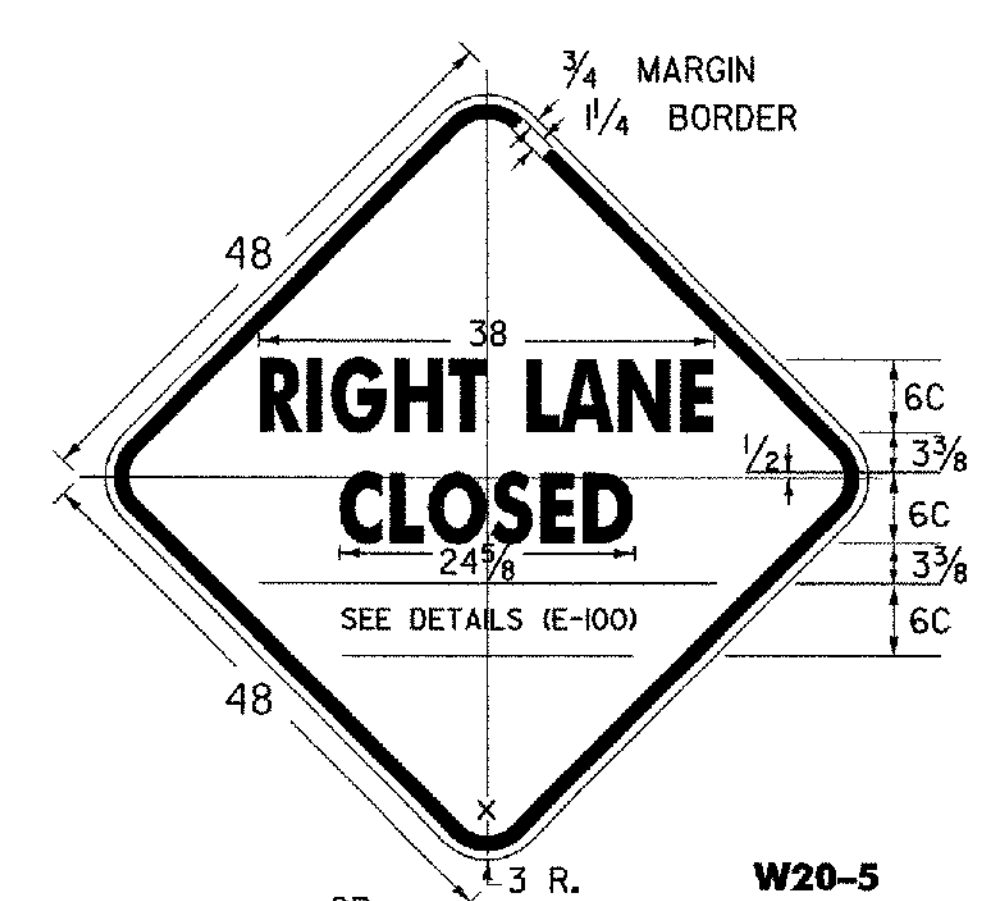
W8-9a



W8-11



W8-12



W20-5

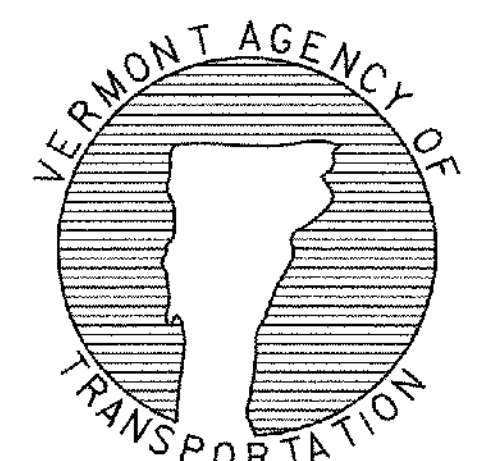
(ALL DIMENSIONS SHOWN IN INCHES) LEFT LANE

OTHER STDS. E-100 REQUIRED:

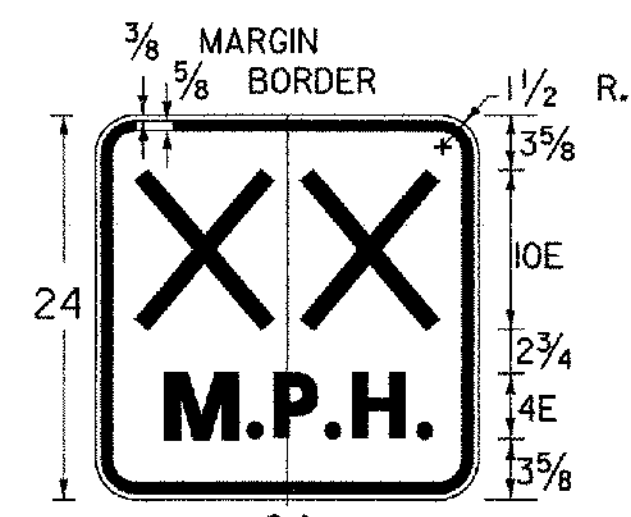
REVISIONS AND CORRECTIONS
 OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
 OCT. 21, 1992 - ADDED ADDITIONAL SIGN DIMENSIONS, REVISED CHEVRON BACKGROUND TO ORANGE, & REVISED TITLE BLOCK
 AUG. 08, 1995 - ADDED AND DELETED VARIOUS SIGN DETAILS
 MAR., 10 1997 - REVISED SIGN DETAILS
 MAY 30, 2003 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VI

APPROVED
[Signature]
 DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
 TRAFFIC OPERATIONS ENGINEER
[Signature]
 FEDERAL HIGHWAY ADMINISTRATION

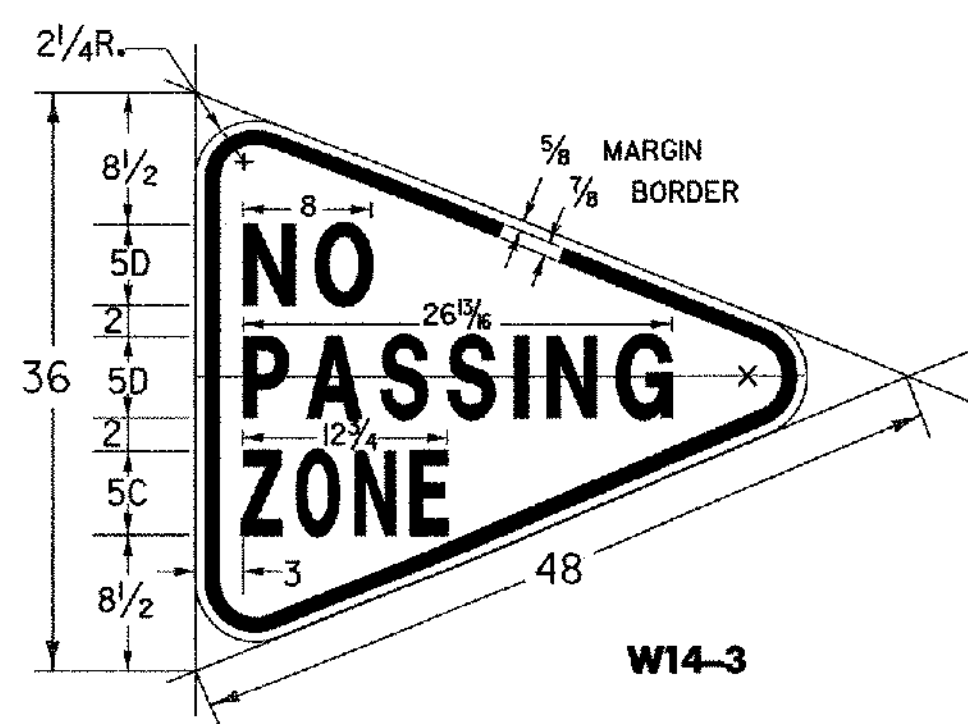
CONSTRUCTION SIGN DETAILS



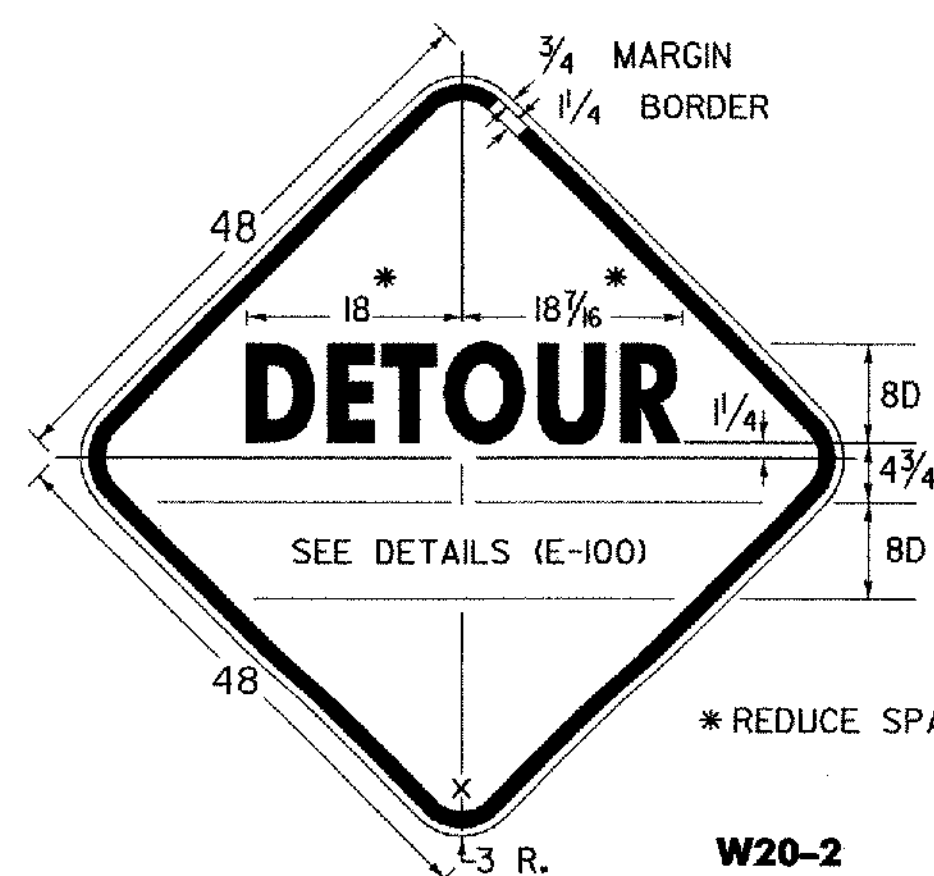
STANDARD E-101



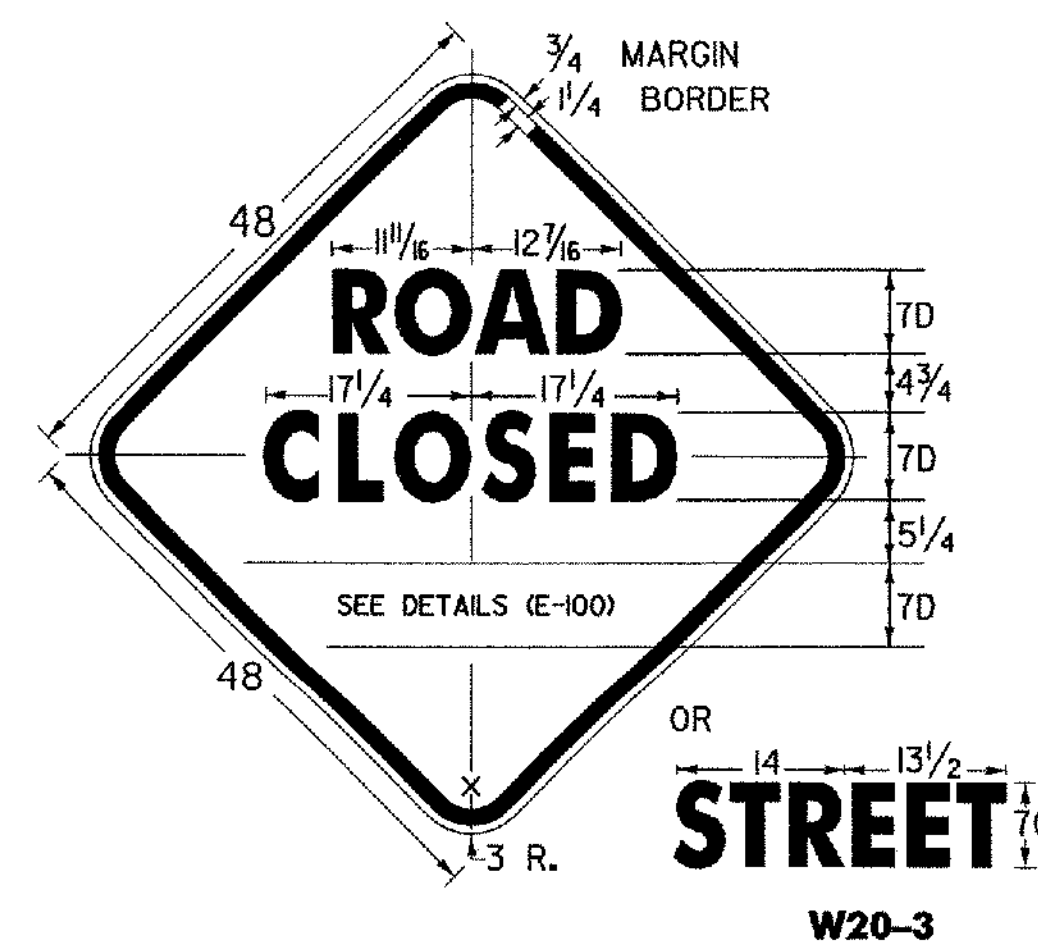
W13-1
XX DENOTES ADVISORY SPEED AS SHOWN ON THE PLANS



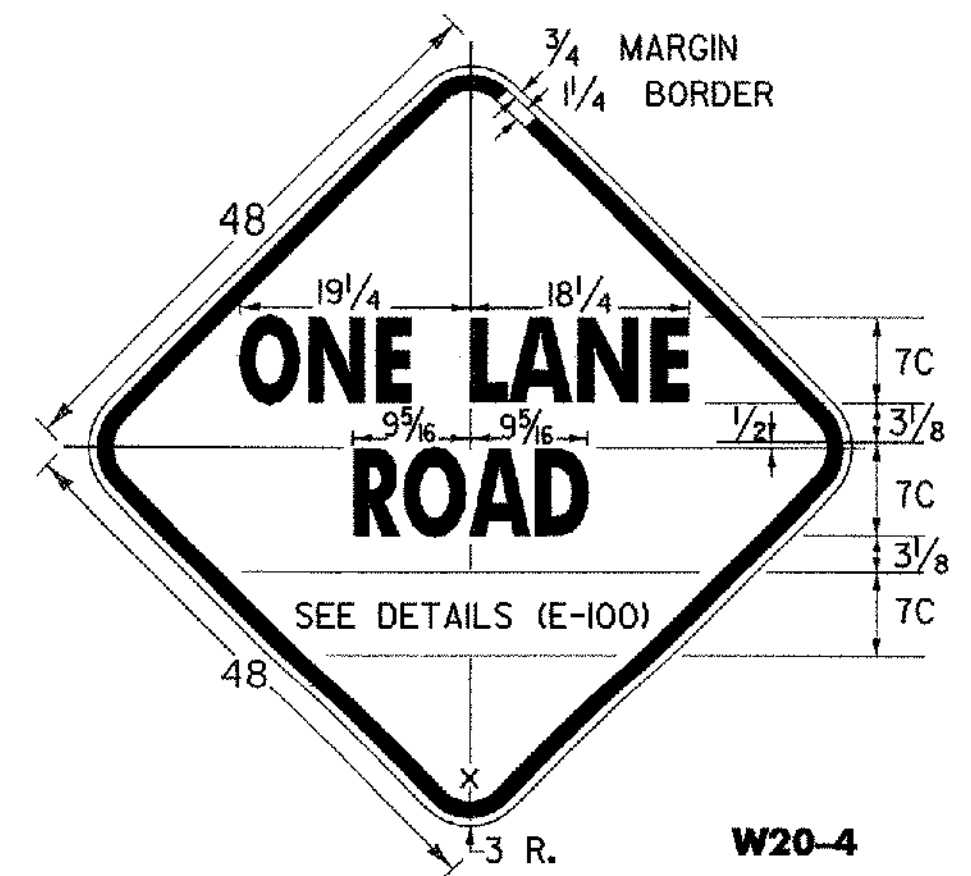
W14-3



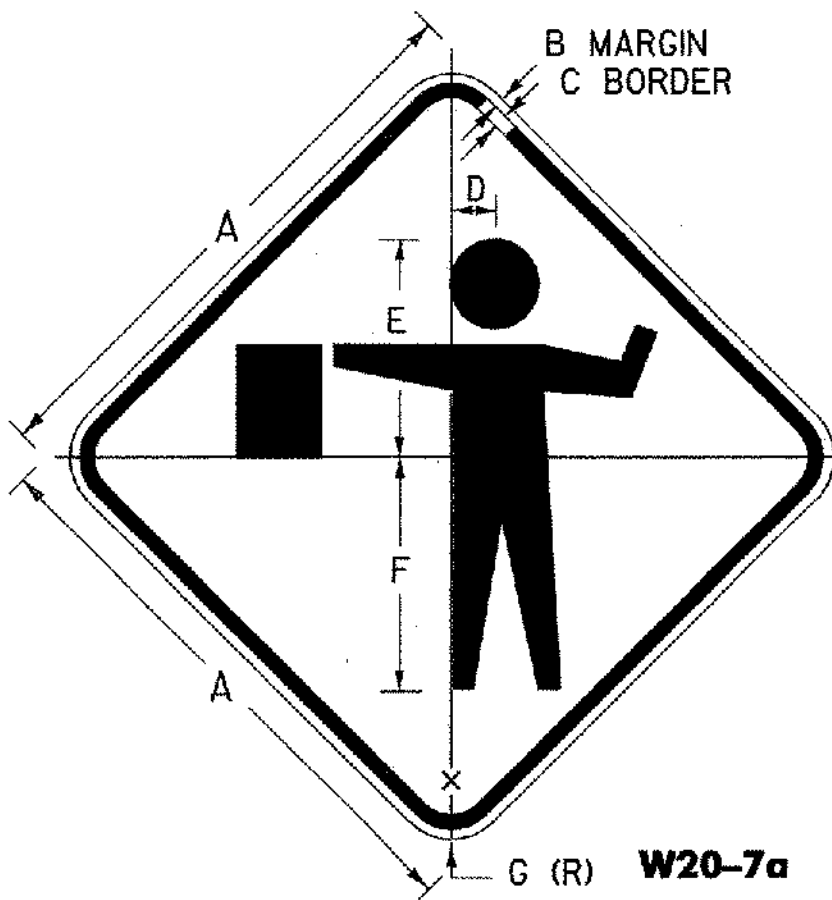
W20-2
* REDUCE SPACING 40%*



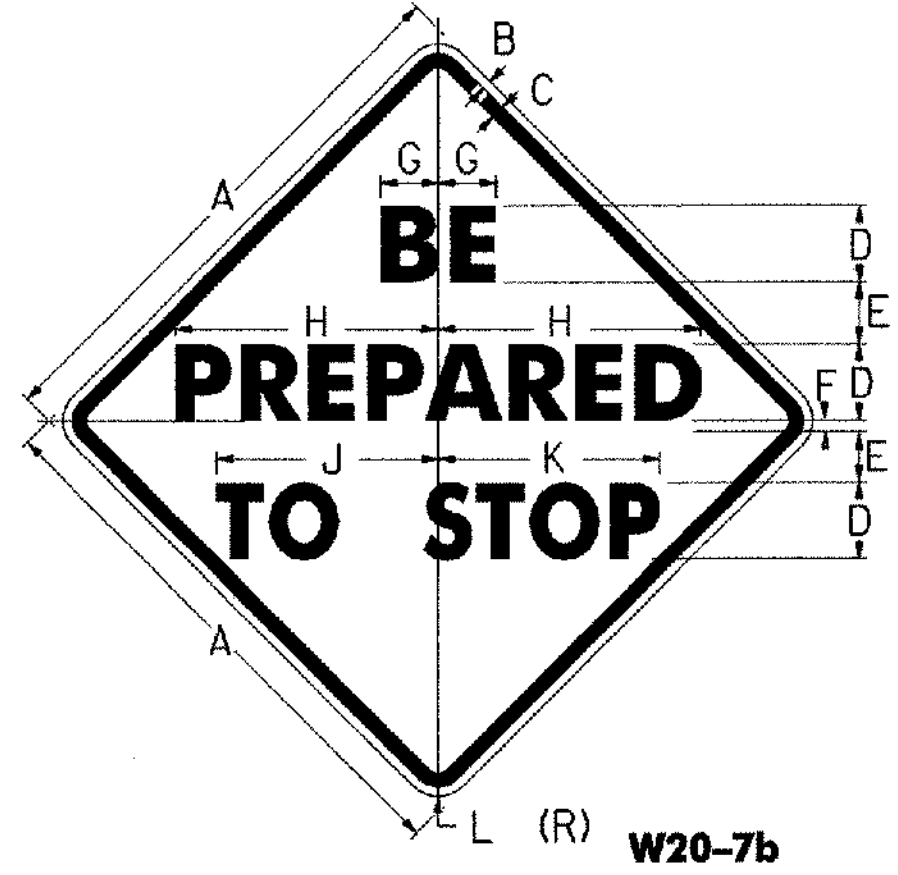
W20-3
OR
STREET



W20-4



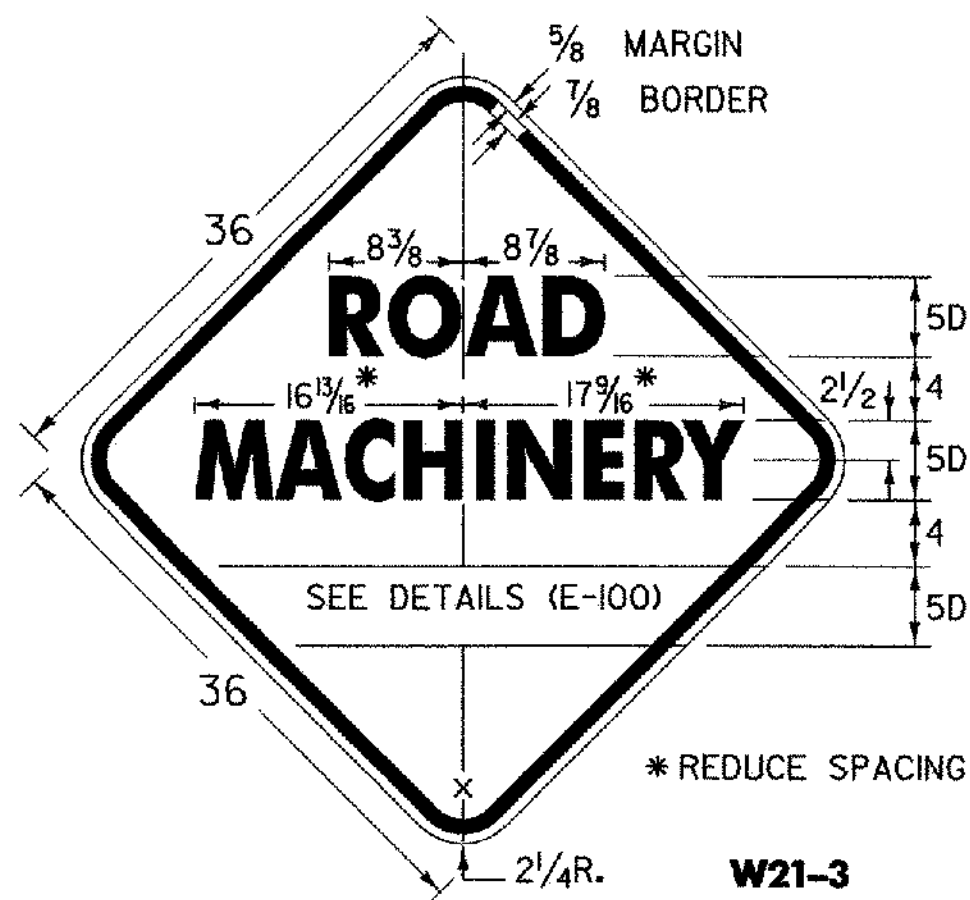
W20-7a



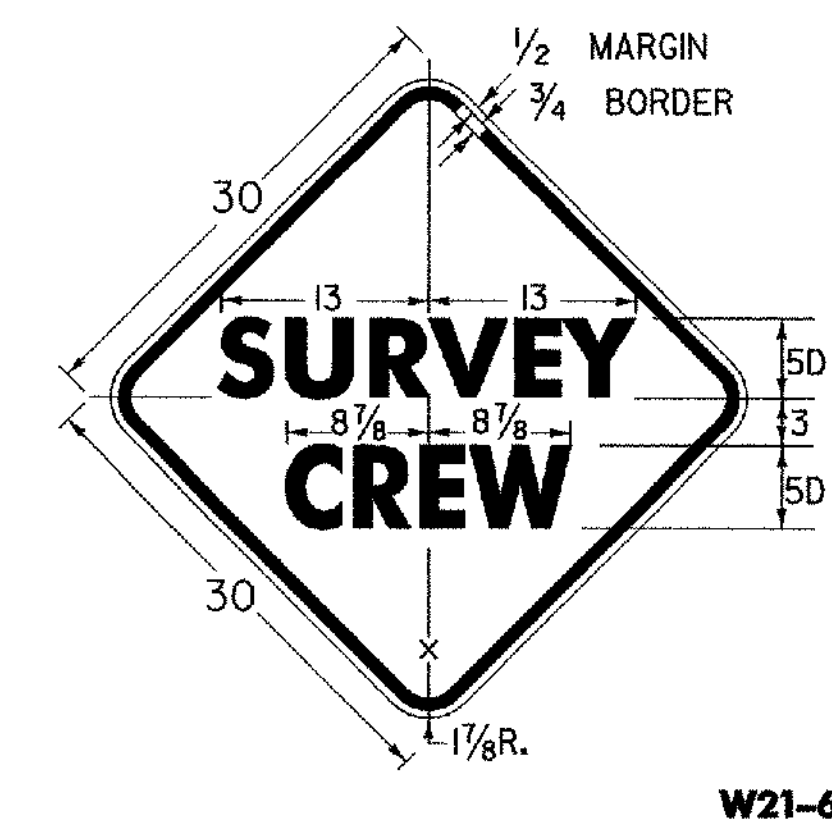
W20-7b

COLORS:
BLACK BORDER AND TEXT (NON RETROREFL.)
ORANGE BACKGROUND (RETROREFL.)
W3-4

COLORS:
BLACK BORDER AND TEXT (NON RETROREFL.)
YELLOW BACKGROUND (RETROREFL.)

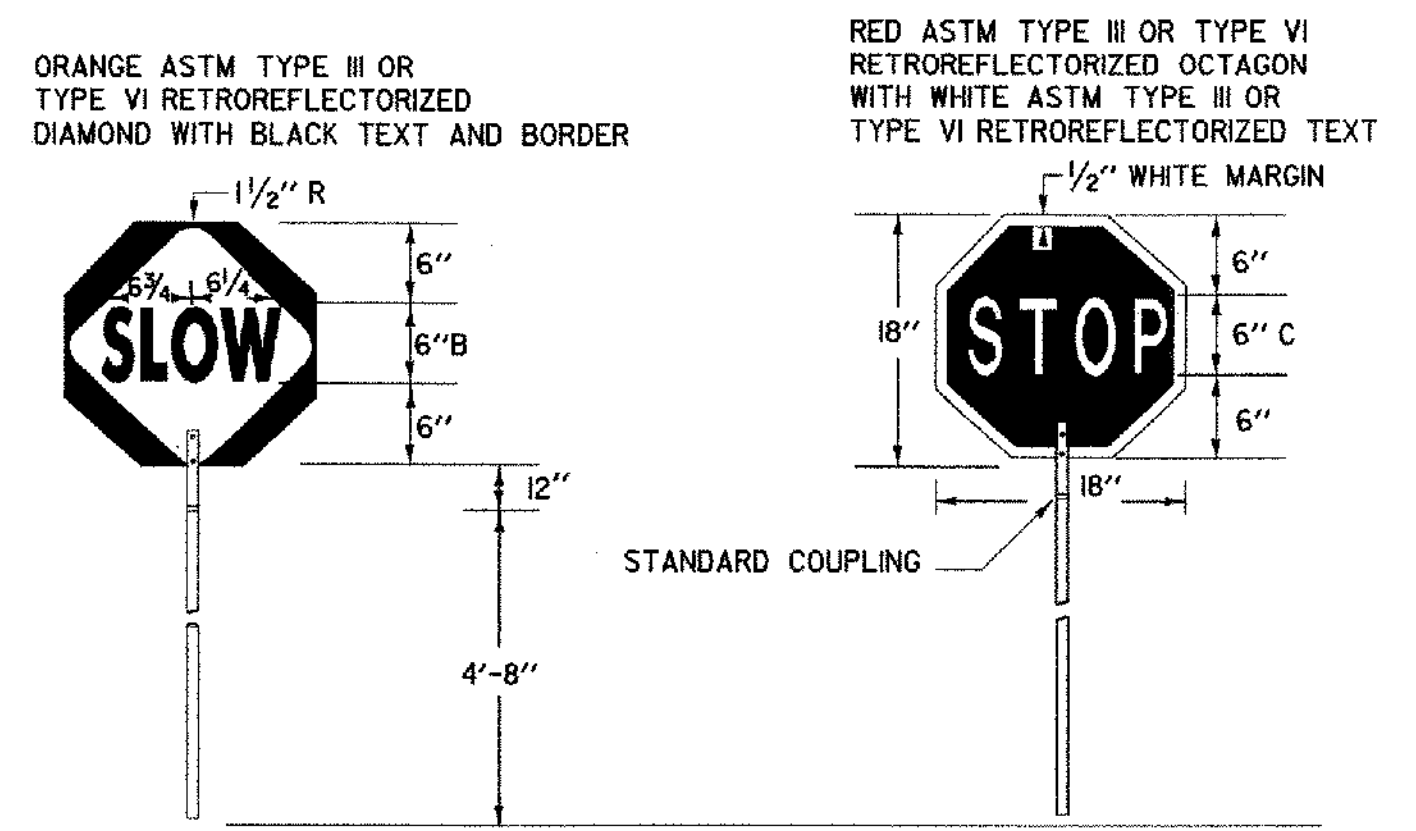


W21-3
* REDUCE SPACING 40%*

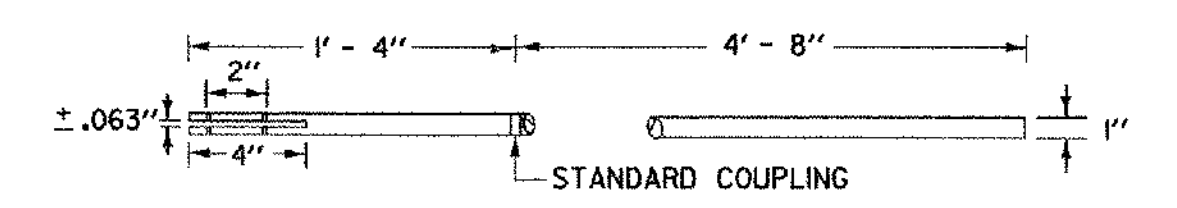


W21-6

SIGN PADDLE FOR FLAGPERSON



SIGN DETAIL



STAFF DETAIL

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

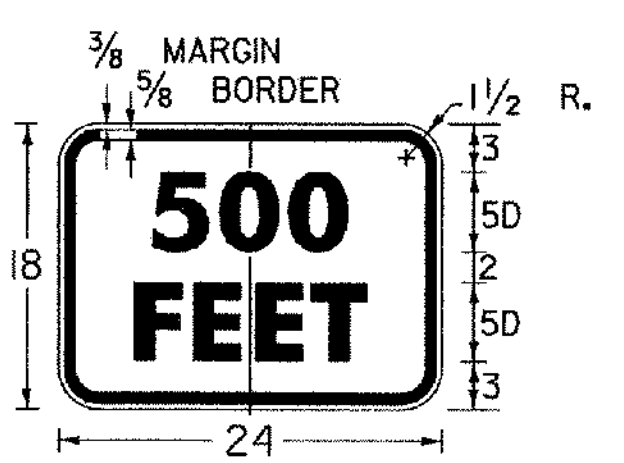
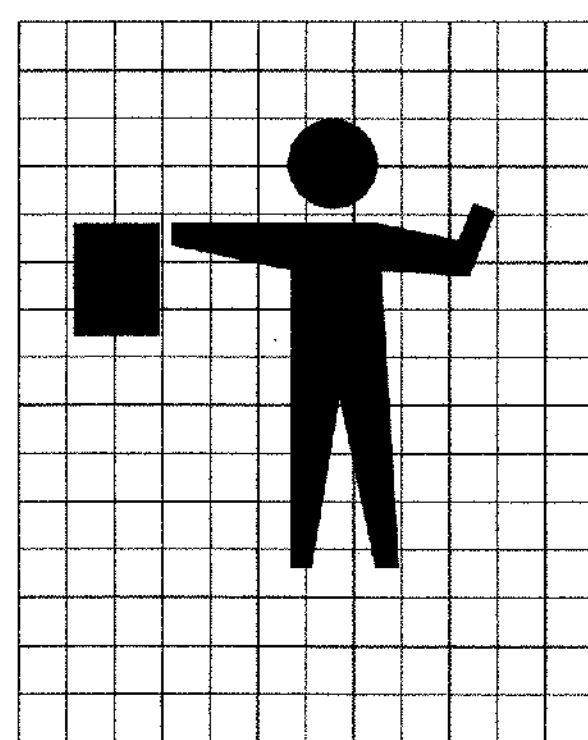
MOUNTING
THE STAFF SHALL BE MOUNTED WITH EITHER TWO 1/4" DIAMETER ALUMINUM BOLTS OR TWO 1/4" DIAMETER ALUMINUM RIVETS.

NOTES

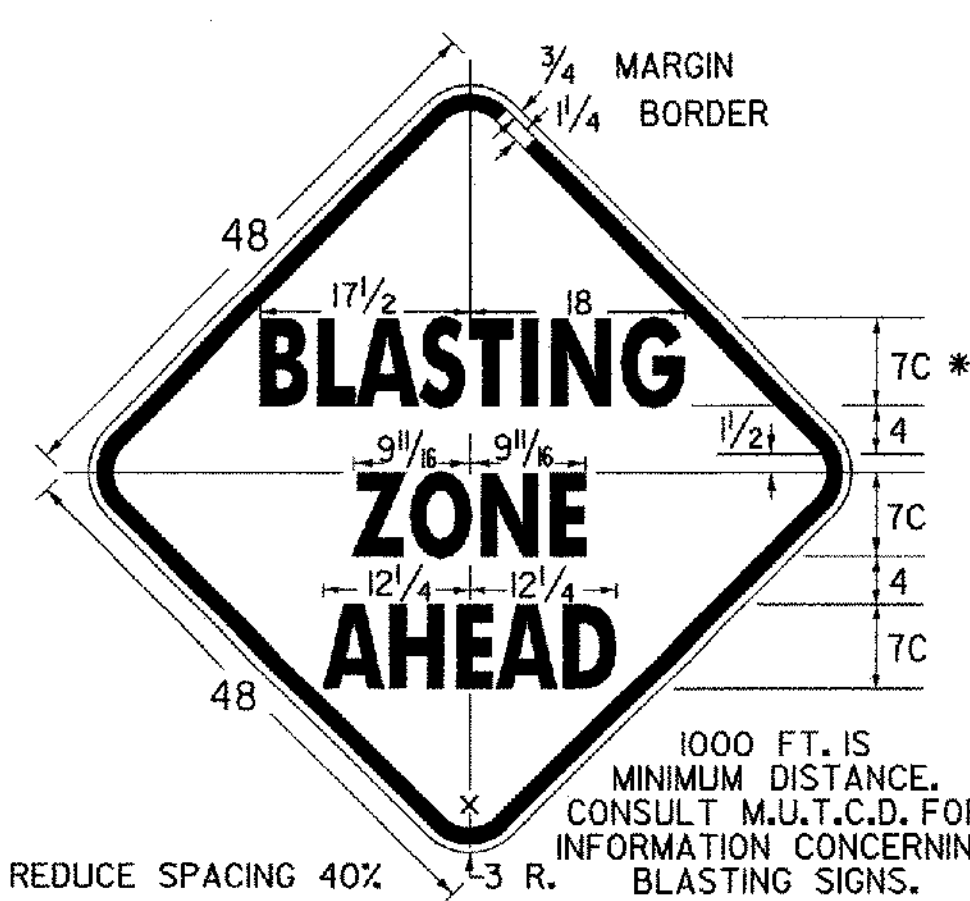
SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS. COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS ON ASTM TYPE III OR TYPE VI RETROREFLECTORIZED ORANGE BACKGROUND, UNLESS OTHERWISE NOTED. SIGN DETAILS INDICATE THE APPROPRIATE COLOR.

SIGN	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	G
STD.	36	5/8	7/8	2 3/4	13 1/2	14 5/8	2 1/4
FWY.	48	3/4	1 1/4	3 3/4	18	19 1/2	3

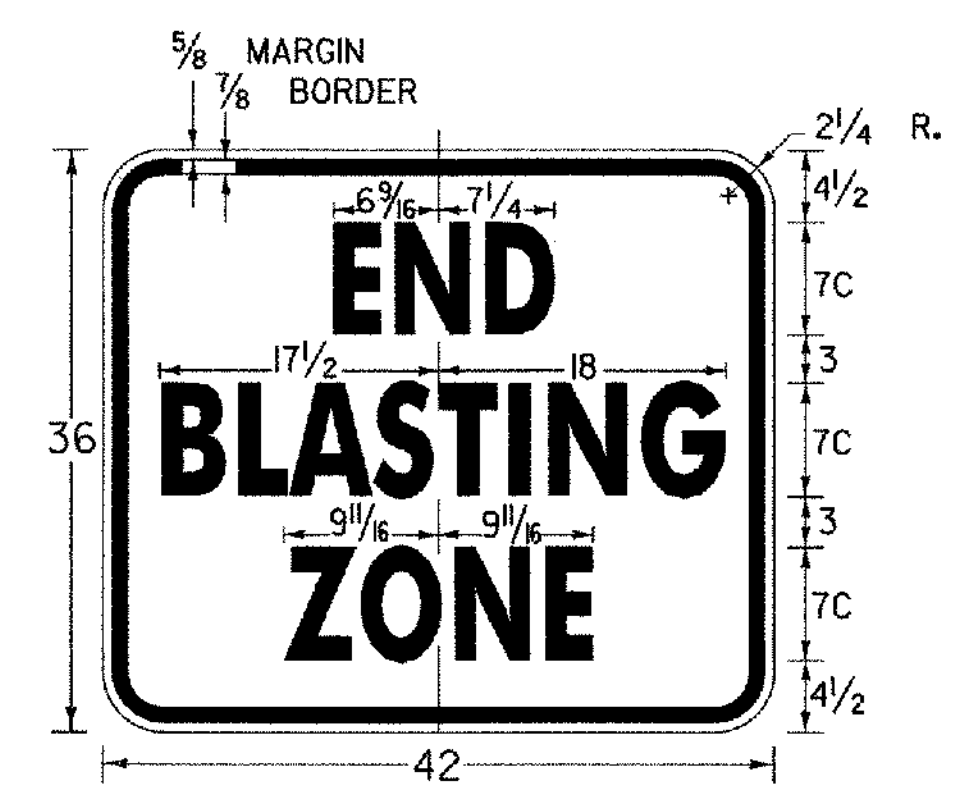
SIGN	DIMENSIONS (INCHES)											
	A	B	C	D	E	F	G	H	J	K	L	
MIN.	36	5/8	7/8	6C	3 3/8	7/8	3 3/4	16 3/8	13	13 3/8	2 1/4	
STD.	48	3/4	1 1/4	8C	4 7/8	1 1/4	5	21 7/8	17 3/8	18 1/2	3	
EXPWY.	60	3/4	1 1/4	9C	5 3/8	1 3/8	5 5/8	24 9/8	19 3/8	20 1/4	3	



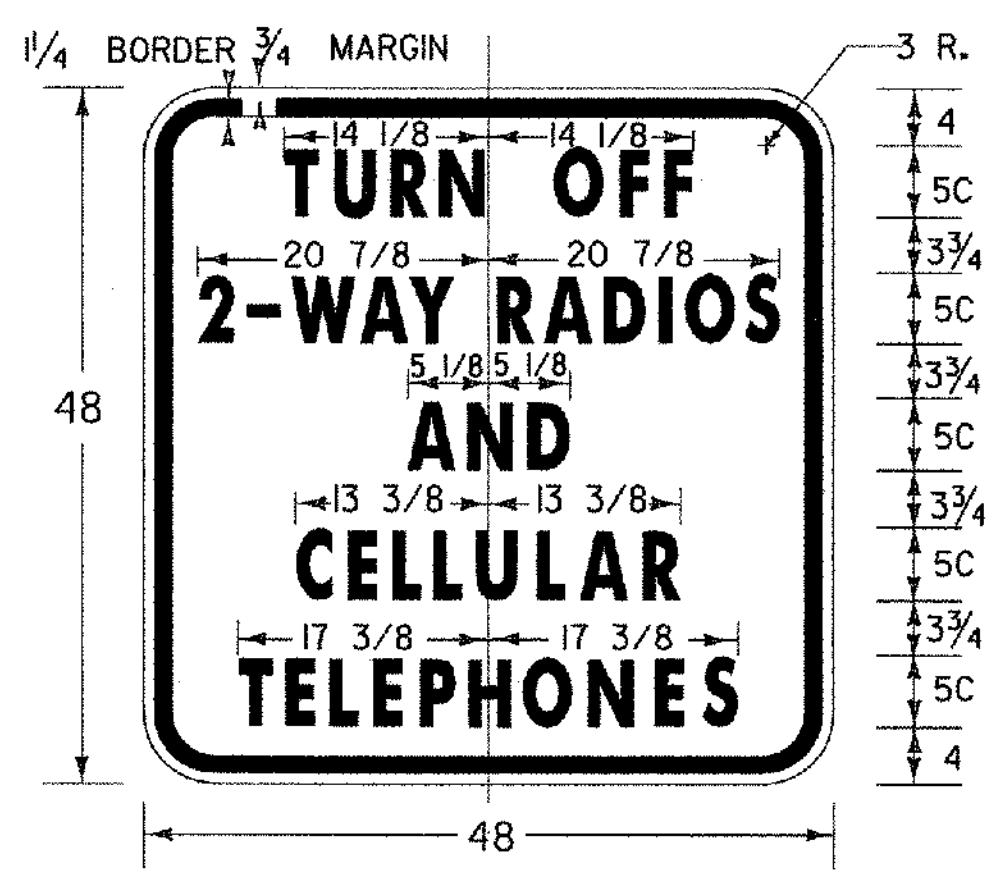
W16-2a



W22-1



W22-3



VW22-1

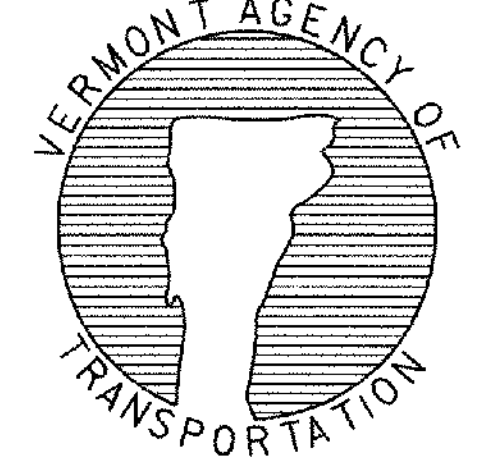
OTHER STDS. E-100 REQUIRED:

NOTE: ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED

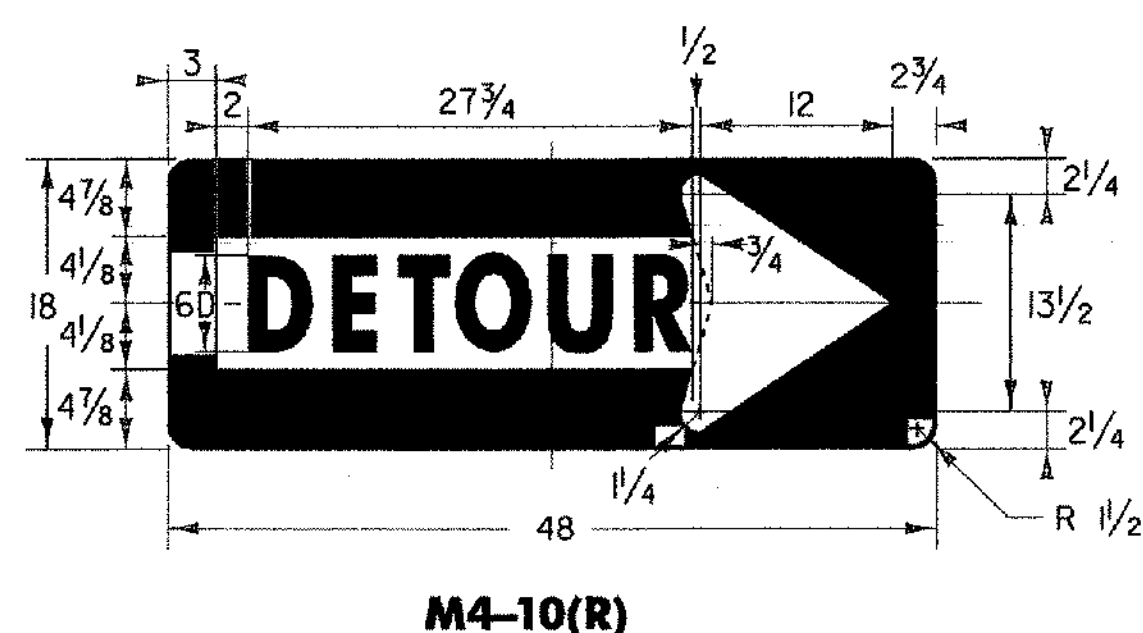
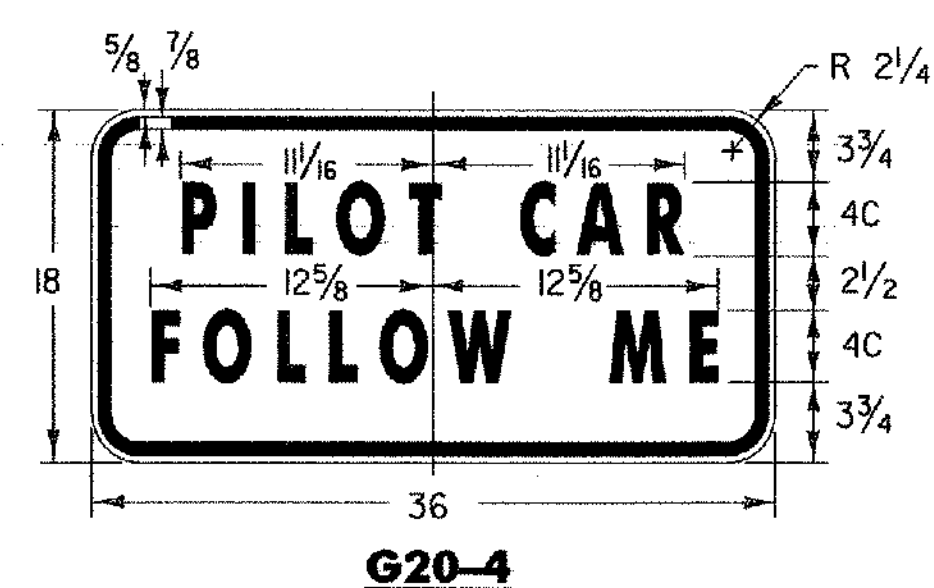
REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
JAN. 23, 1989 - DELETE MOTORCYCLE SYMBOL SIGN AND SPEED SIGN, ADDED TWO SIGNS
OCT. 21, 1992 - ADDED A SIGN, REVISED A SIGN DIMENSION & TYPE ERROR & REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED FLAGGER GRID
JUNE 30, 2003 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VI CHANGED TEXT ON W20-7b SIGN

APPROVED
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
TRAFFIC OPERATIONS ENGINEER
[Signature]
FEDERAL HIGHWAY ADMINISTRATION

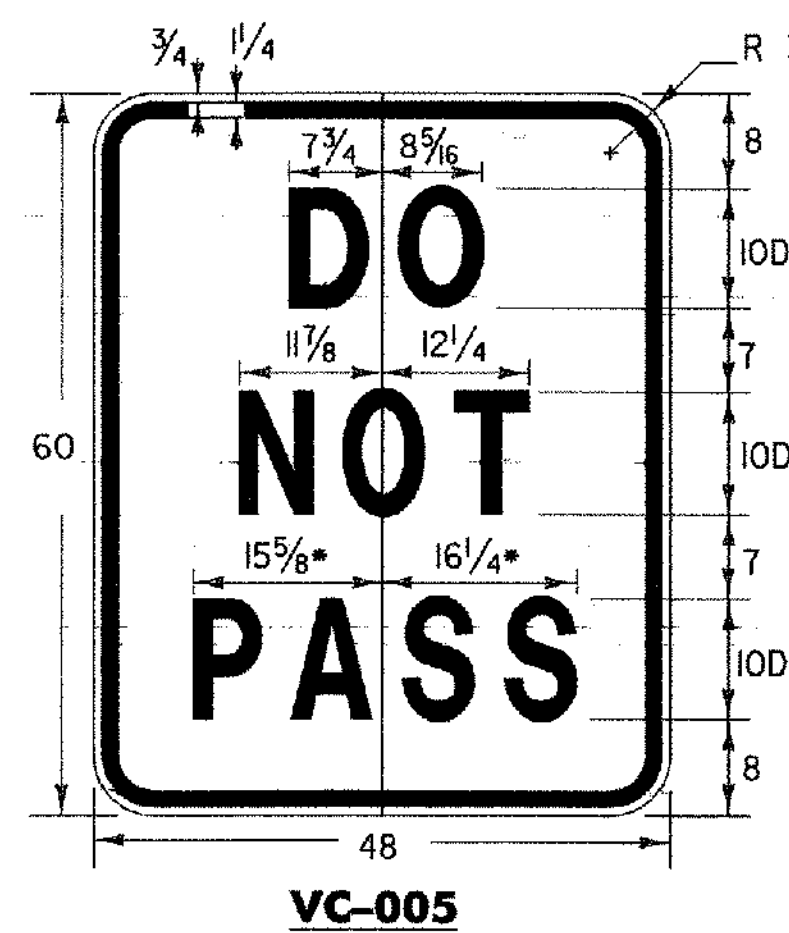
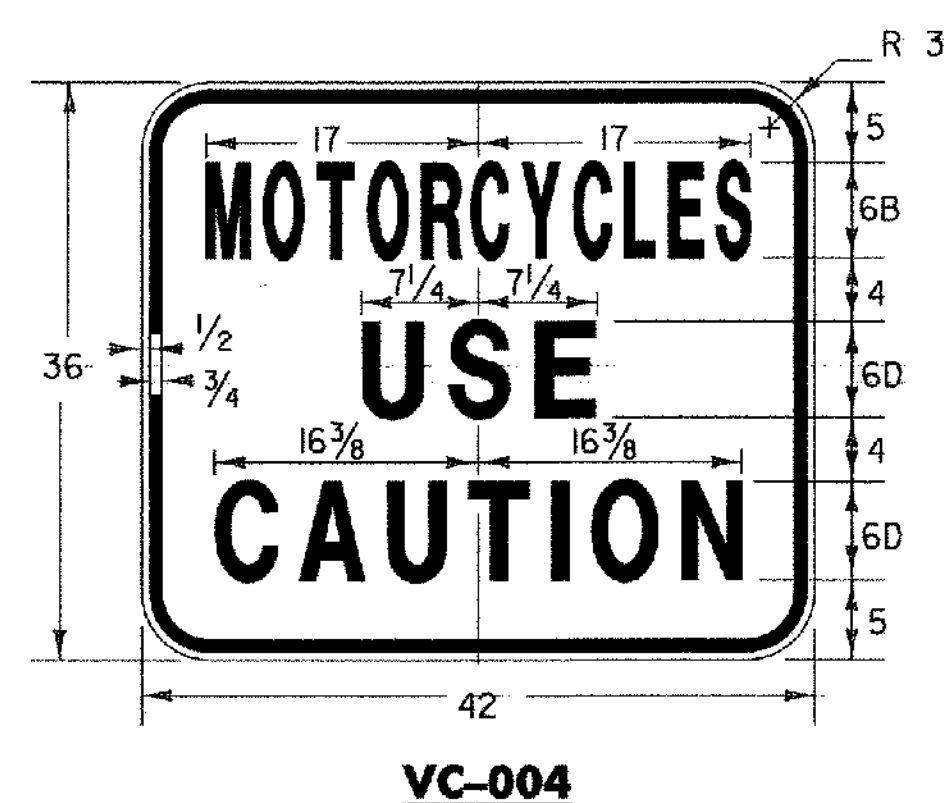
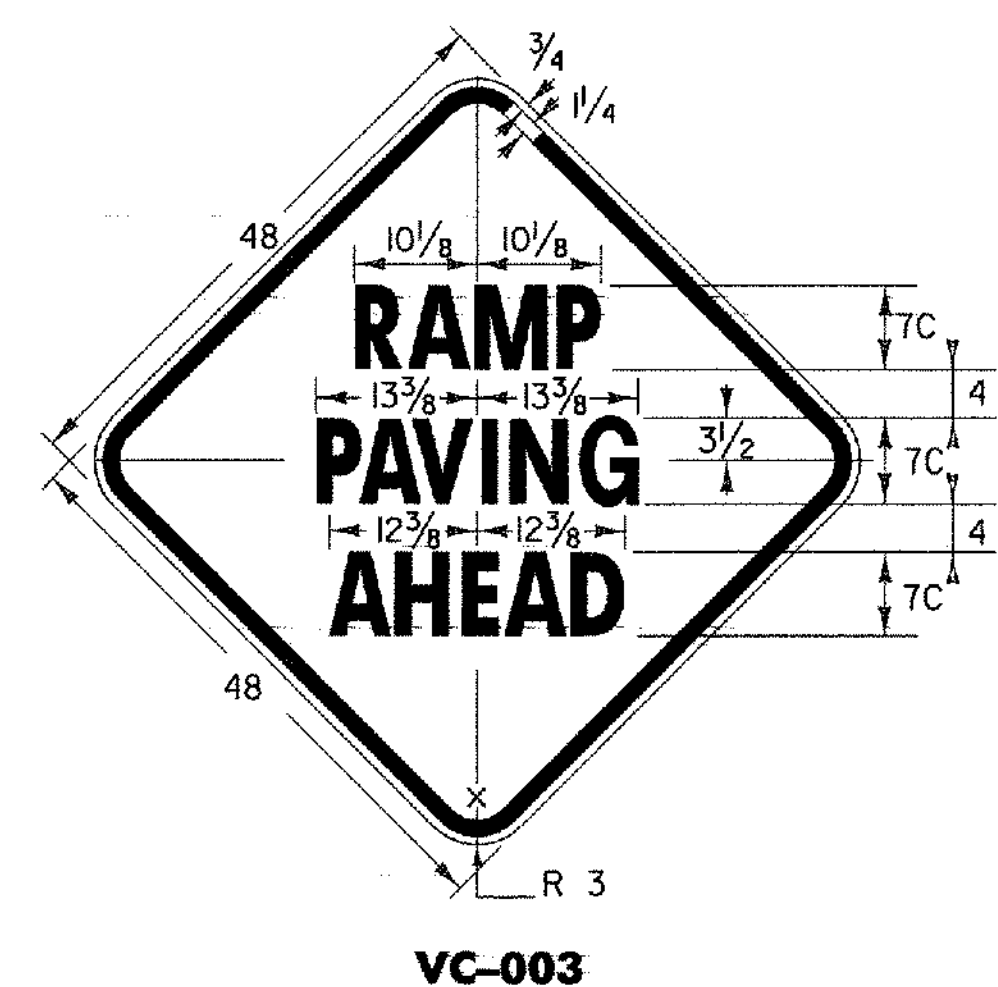
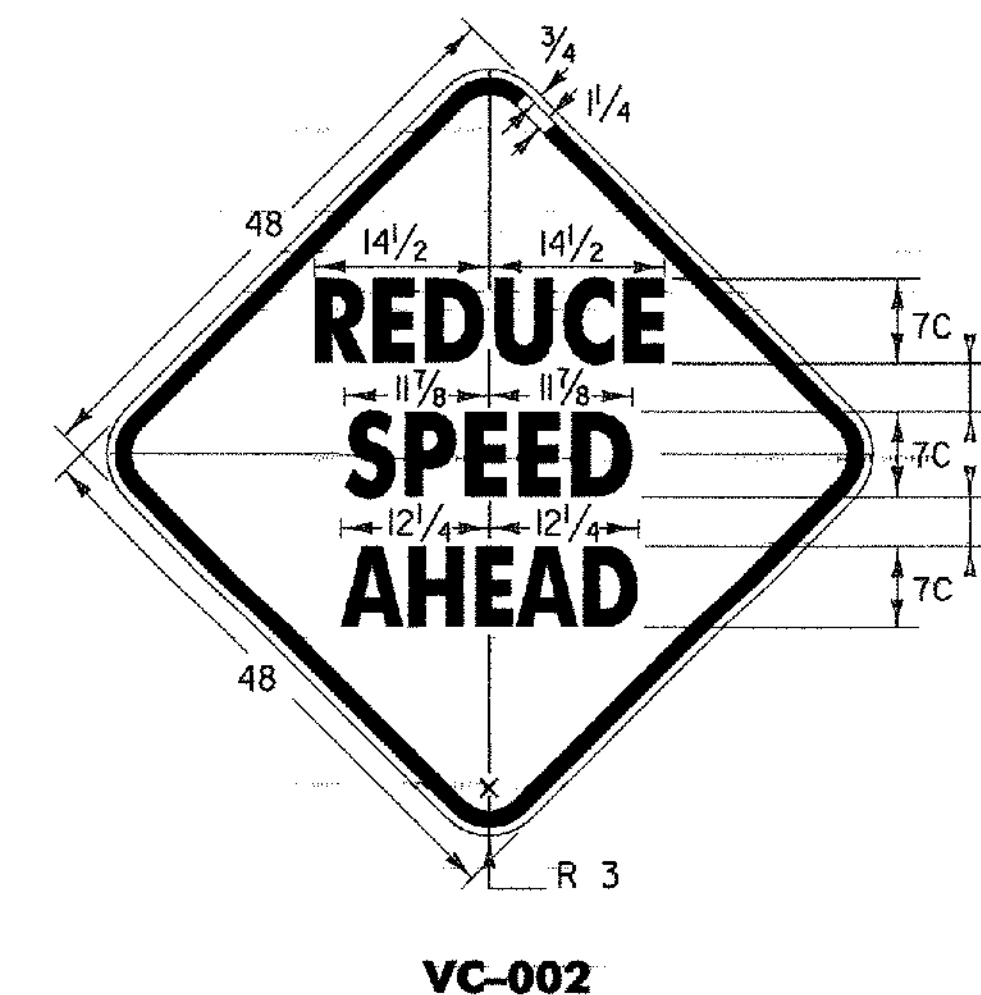
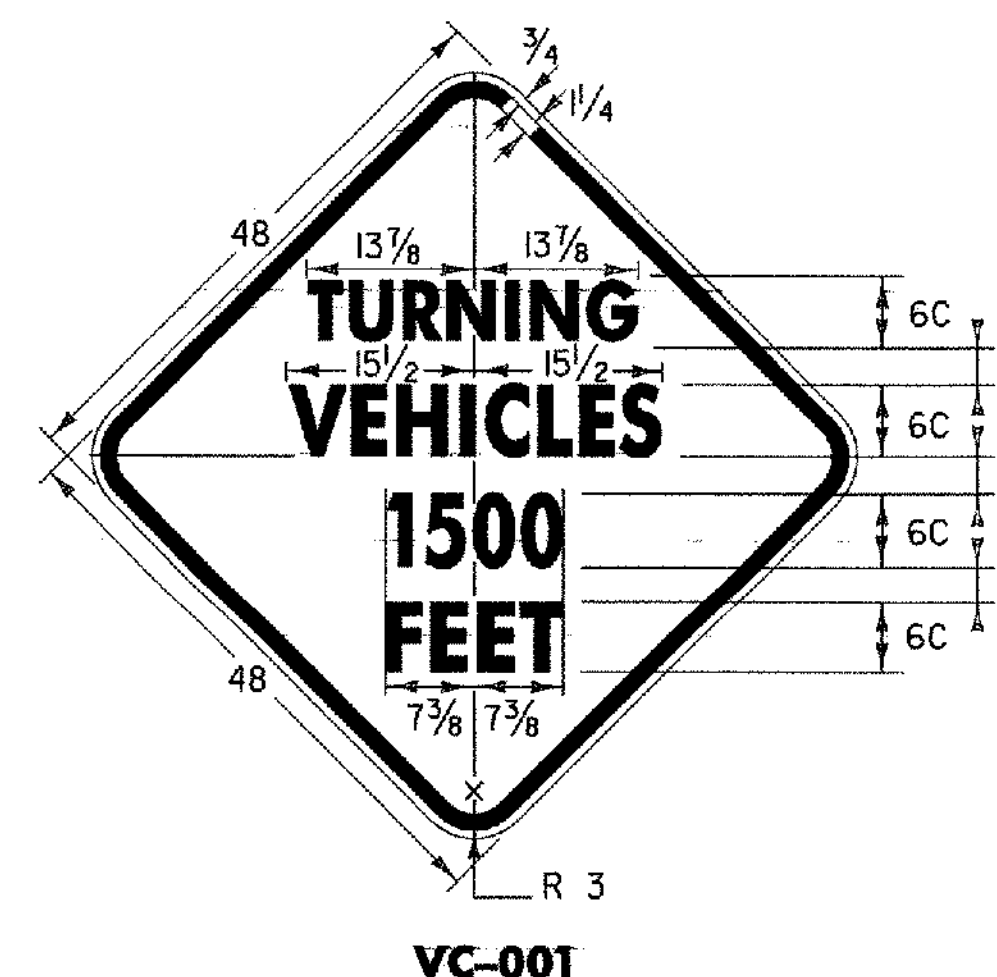
CONSTRUCTION SIGN DETAILS



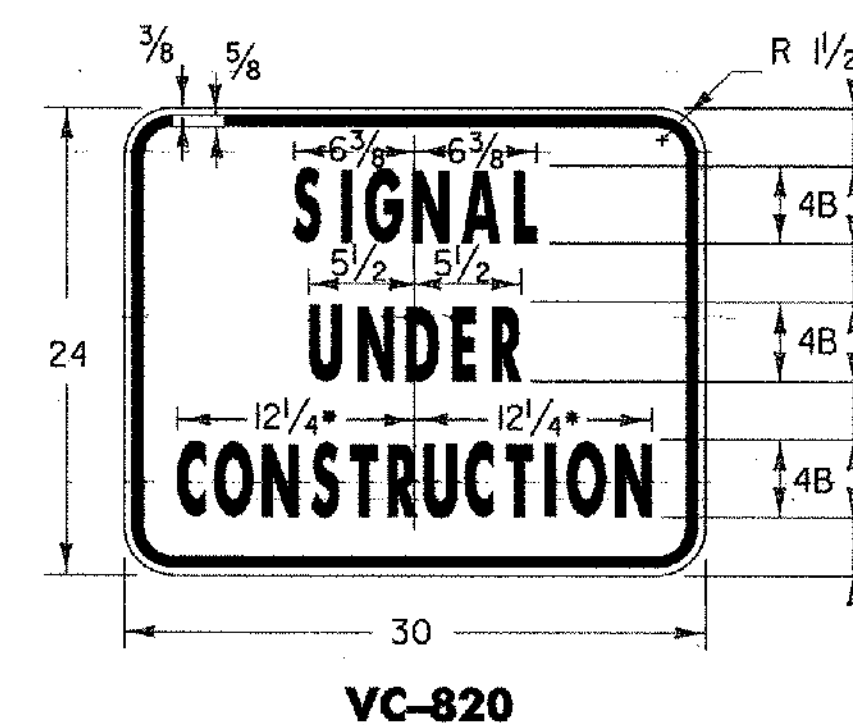
STANDARD E-102



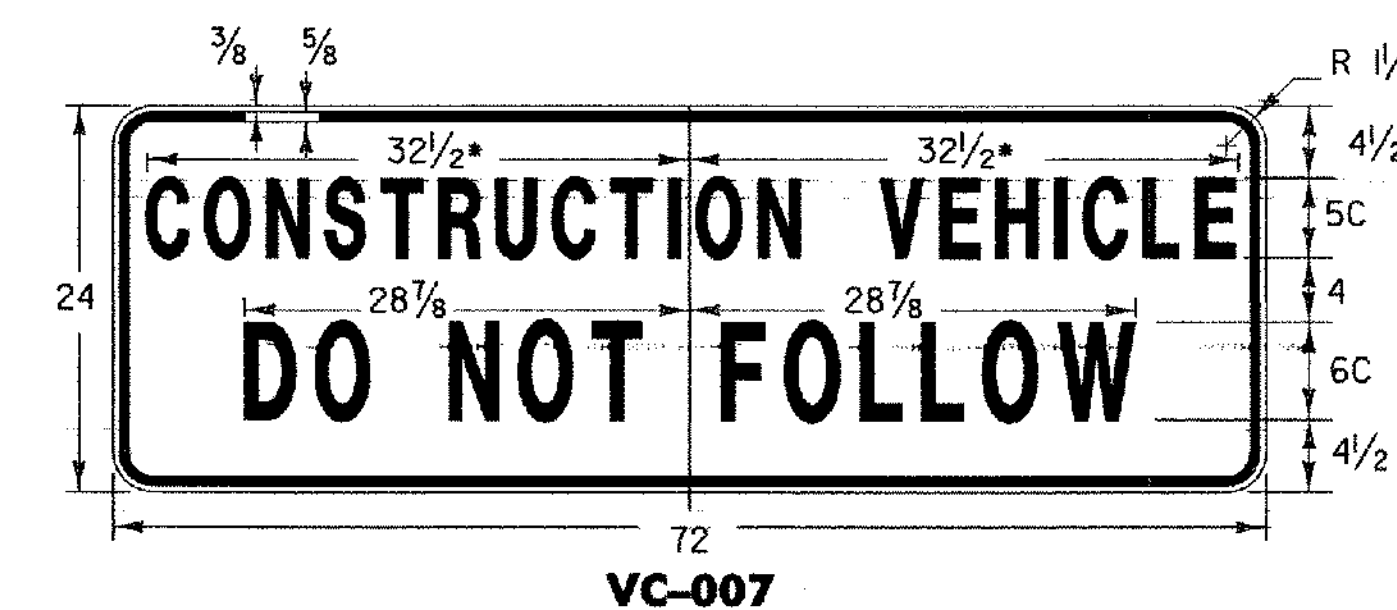
COLORS:
BLACK TEXT AND BORDER
WHITE RETROREFLECTORIZED BACKGROUND



* REDUCE SPACING BY 40%

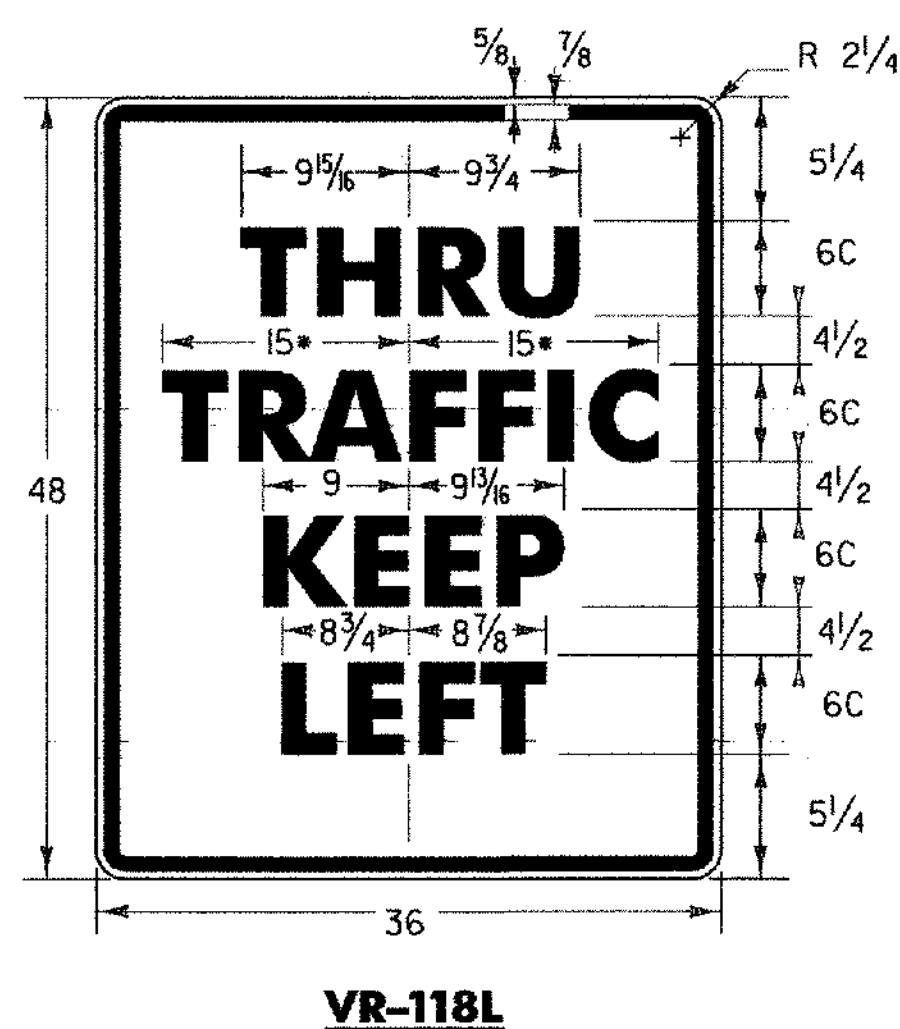
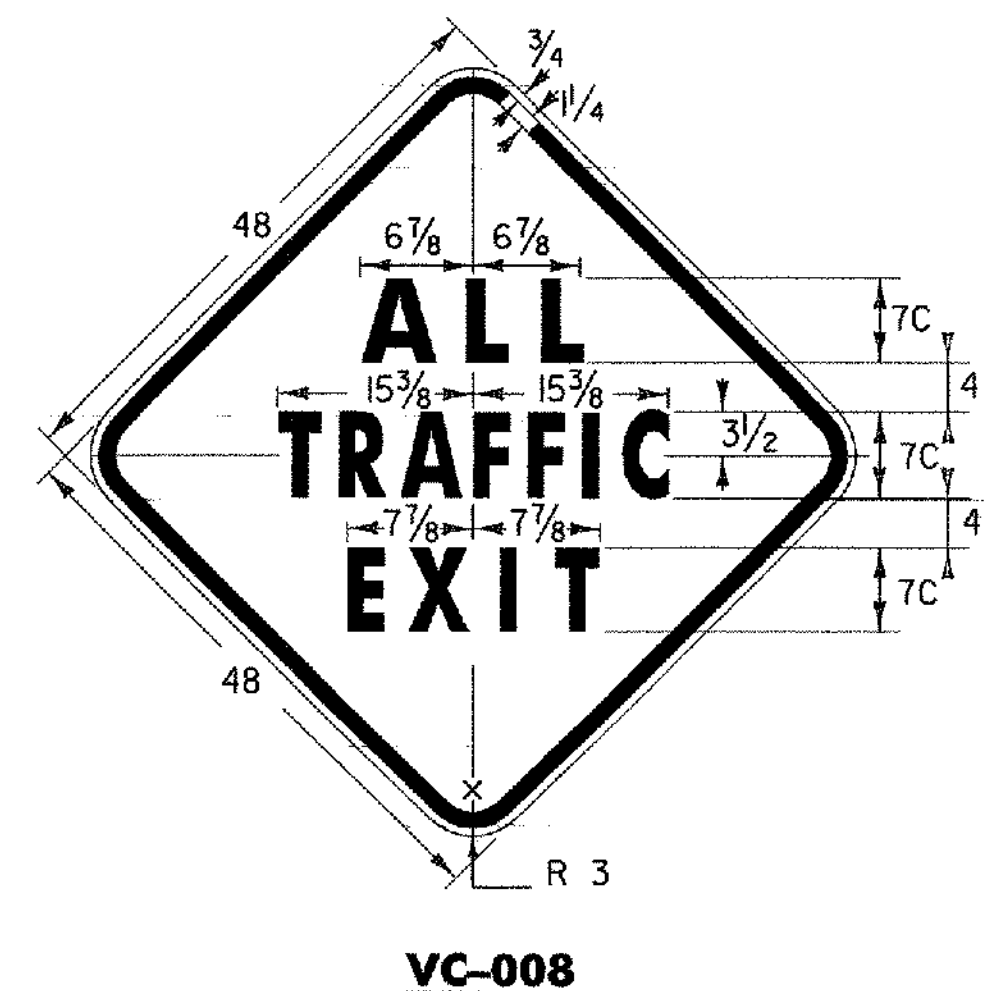


* REDUCE SPACING 25%



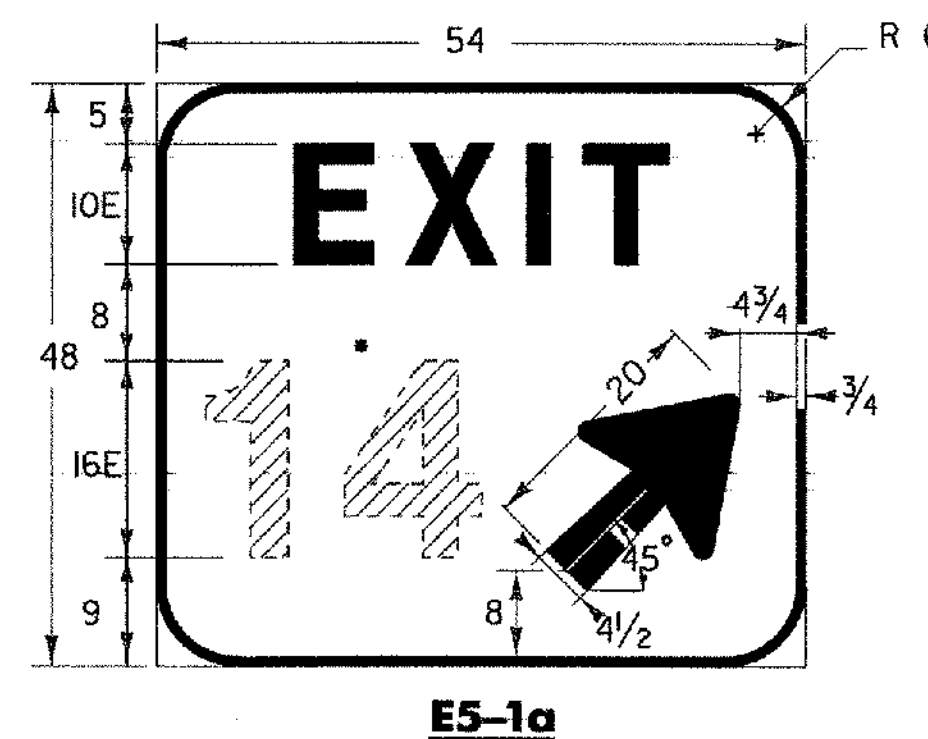
* REDUCE SPACING 20%

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



* REDUCE SPACING 25 %

COLORS:
BLACK TEXT AND BORDER
WHITE (RETROREFLECTORIZED) BACKGROUND



* EXIT NUMBER AS PER PLANS OPTICALLY SPACED
COLORS:
WHITE RETROREFLECTORIZED BORDER, ARROW AND LEGEND
GREEN RETROREFLECTORIZED BACKGROUND

(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)

NOTES

SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS
COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS ON ASTM TYPE III OR TYPE VIII RETROREFLECTIVE ORANGE BACKGROUND, UNLESS OTHERWISE NOTED.
SIGN DETAILS INDICATE THE PROPER COLOR.

OTHER STDS. E-100, E-151 REQUIRED:

REVISIONS AND CORRECTIONS

AUG 08, 1995 - DATE OF ORIGINAL ISSUE
MAY 01, 2004 - CHANGED REFLECTIVE SHEETING TO TYPE III

APPROVED

[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
TRAFFIC OPERATIONS ENGINEER
[Signature]
FEDERAL HIGHWAY ADMINISTRATION

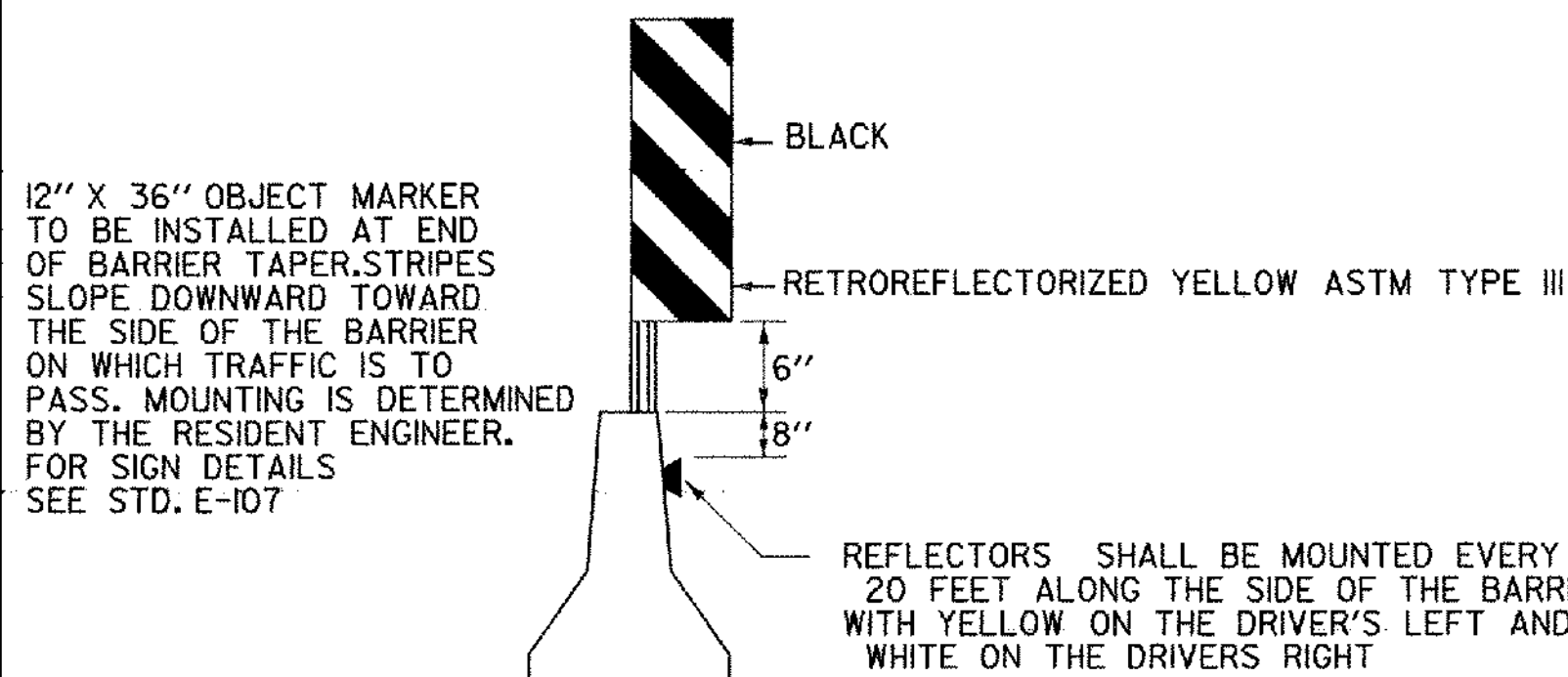
**CONSTRUCTION SIGN
DETAILS**



**STANDARD
E-102A**

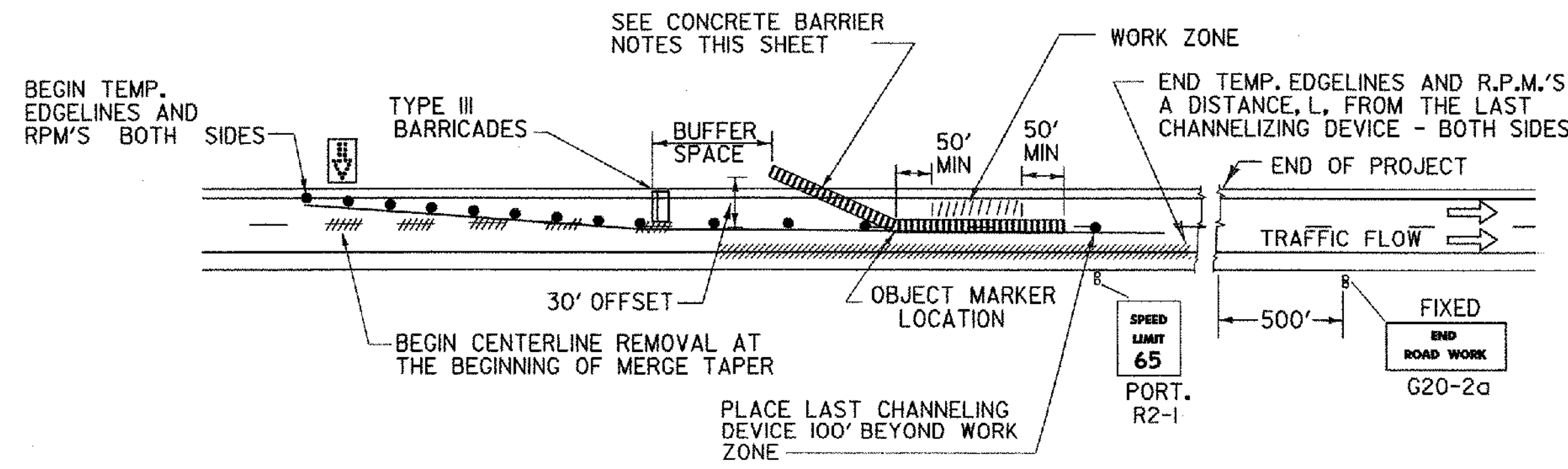
TRAVEL LANE REQUIREMENTS

1. BARRIER SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE CENTERLINE TO ALLOW THE TRAFFIC TO USE THE NORMAL LANE WIDTH.
2. EDGELINES SHALL BE REMOVED AND NEW TEMPORARY TAPE EDGELINES SHALL BE APPLIED. THE DRIVERS LEFT EDGELINE SHALL BE A MINIMUM OF ONE FOOT (TWO FEET IS DESIRABLE) FROM BARRIER. TRAVEL LANE SHALL BE 12 FEET WIDE.
3. THE TEMPORARY TAPE PAVEMENT MARKINGS SHALL BE OF A TYPE WHICH CAN BE COMPLETELY REMOVED AFTER THE PROJECT IS COMPLETED WITHOUT, SCARRING OR MARKING THE PAVEMENT SURFACE.
4. PAYMENT FOR THE TAPE MARKINGS SHALL BE UNDER THE APPROPRIATE ITEM NUMBERS. PAVEMENT MARKING REMOVALS SHALL BE PAID UNDER THE APPROPRIATE ITEM NUMBER. TEMPORARY TAPE REMOVAL IS NOT PAID UNDER THE REMOVAL ITEM, IT IS PAID INCIDENTAL TO THE TAPE ITEM.
5. THE RAISED PAVEMENT MARKERS (RPM'S) SHALL BE OF A TYPE WHICH CAN BE EASILY REMOVED AND, SHALL BE PLACED TO THE OUTSIDE OF THE TEMPORARY TAPE PAVEMENT MARKINGS. THE RPM'S SHALL BE SPACED AT 20 FEET. THE RPM'S ARE INCIDENTAL TO ITEM 646.08 TEMPORARY PAVEMENT MARKINGS.
6. THE COST OF THE RAISED PAVEMENT MARKERS SHALL BE CONSIDERED A PART OF THE TEMPORARY PAVEMENT MARKING ITEM AND SEPARATE RPM'S SHALL NOT BE REQUIRED.



CONCRETE MEDIAN BARRIER NOTES

1. PROVIDE A MINIMUM TAPER RATE AS SHOWN IN THE TABLE BELOW, WITH A MINIMUM OF 50 FEET OF TANGENT SECTION ON EACH END OF THE WORK ZONE.
2. THE END OF THE BARRIER FACING APPROACHING TRAFFIC SHALL MEET THE FOLLOWING REQUIREMENTS:
 - A. WHEN NO GUARDRAIL IS PRESENT, USE 30 FOOT OFFSET FROM EDGE OF TRAVELLED WAY.
 - B. IF GUARDRAIL IS PRESENT, THEN CONCRETE BARRIER CAN BE TAPERED TO A DISTANCE BEYOND THE DEFLECTION DISTANCE OF THE GUARDRAIL. IF A 30 FOOT OFFSET IS NOT ATTAINABLE OR TO A DISTANCE BEYOND THE DEFLECTION DISTANCE OF THE GUARDRAIL, THEN A CRASH ATTENUATOR SHALL BE PROVIDED.
3. IF THE BARRIER IS PLACED SUCH THAT THE TEMPORARY TAPE CAN BE PLACED OVER THE EXISTING DASHED LINE, THEN THE EDGELINES DO NOT NEED TO BE TAPERED BEFORE THE BARRIER AND THE DASHED MARKINGS DO NOT NEED TO BE REMOVED IN THE TANGENT SECTION. IF THE BARRIER LINE IS PLACED SUCH THAT COVERING THE DASHED EDGELINE WITH TEMPORARY TAPE IS NOT POSSIBLE, THE EDGELINES SHALL BE TAPERED A LENGTH 'L', BOTH IN ADVANCE AND BEYOND THE BARRIER PLACED ON THE TANGENT.

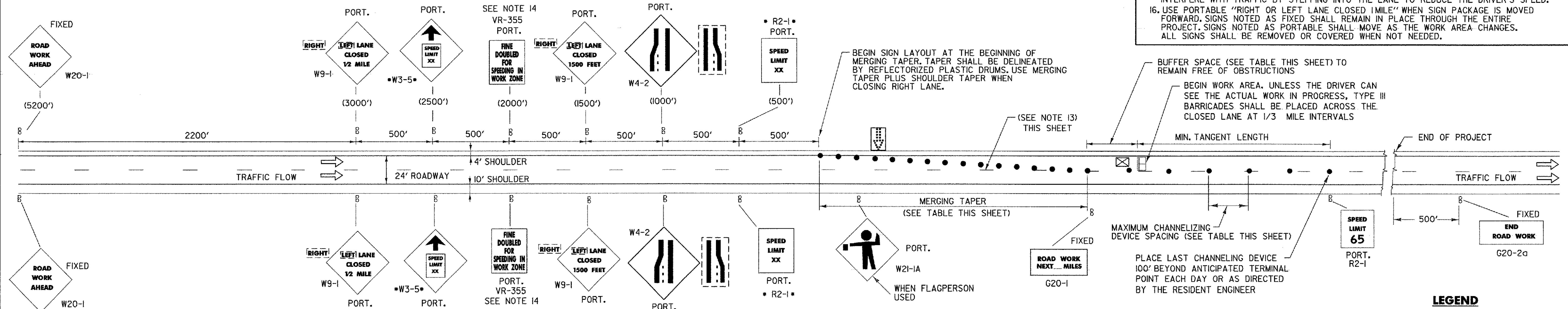


ONE LANE CLOSED WITH POSITIVE BARRIER PROTECTION

ADVANCE SIGNS AND LAYOUT REQUIREMENTS ARE THE SAME AS SHOWN BELOW USING FIXED SIGN MOUNTING THROUGHOUT

NOTES

1. WHEN CONSTRUCTION EQUIPMENT IS WORKING AT OR NEAR THE EXIT OR ENTRANCE RAMP, FLAGPERSONS OR UNIFORMED TRAFFIC CONTROL OFFICERS (UTO'S) SHOULD BE USED TO ASSIST IN CONTROLLING TRAFFIC. SEE STD. E-106 FOR TRAFFIC CONTROL DETAILS.
2. ALL SIGNS SHALL BE PLACED BEFORE ANY WORK BEGINS OR EQUIPMENT IS PUT ON THE ROADWAY. SIGNS SHALL BE COVERED OR REMOVED WHEN NOT APPLICABLE, SEE STANDARD SHEET E-100 FOR REQUIREMENTS.
3. CONTRACTOR SHALL HAVE CHANNELIZING DEVICES AND SIGNS FOR LEFT SIDE CLOSURE AND RIGHT SIDE CLOSURE ON PROJECT BEFORE STARTING PROJECT.
4. EXISTING SPEED LIMIT SIGNS SHALL BE COVERED WHEN REDUCED SPEED SIGNS ARE POSTED.
5. CHANNELIZING DEVICES OTHER THAN REFLECTORIZED PLASTIC DRUMS WILL BE ALLOWED ALONG TANGENT SECTIONS AS LONG AS THEY CONFORM TO THE M.U.T.C.D. AND ARE APPROVED BY THE RESIDENT ENGINEER. THE TYPE OF DEVICE SHALL BE CONSISTENT THROUGHOUT THE TANGENT SECTION.
6. THE "SPEED LIMIT XX" AND OTHER RELATED SIGNS SHALL BE REMOVED OR COVERED WHEN WORK IS NOT IN PROGRESS AND ROADWAY IS NOT RESTRICTED.
7. "REDUCED SPEED AHEAD" SIGNS MAY BE USED IN LIEU OF "SPEED ZONE AHEAD".
8. FOR RELATIVELY SHORT TERM PROJECTS WITH NO OFFICIAL SPEED ZONE ENACTMENT, THE SPEED LIMIT AND REDUCED SPEED LIMIT SIGNS CAN BE SUBSTITUTED WITH ADVISORY SPEED PLAQUES MOUNTED AS SUPPLEMENTAL SIGNS ON OTHER WARNING SIGNS.
9. ALL FIXED SIGNS SHALL BE MOUNTED ON YIELDING STEEL, ALUMINUM OR WOOD SUPPORTS AS SHOWN ON APPROPRIATE STANDARD SHEETS.
10. PORTABLE SIGNS SHALL BE KEPT LEVEL WHEN PLACED ON THE EDGE OF ROADWAY AND ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. PAYMENT INCIDENTAL TO OTHER CONTRACT ITEMS. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACES SHALL BE PLACED ABOVE THE TOP OF THE GUARDRAIL.
11. WARNING LIGHTS SHALL NOT BE USED ON CHANNELIZING DEVICES.
12. THE NUMBER OF CHANNELIZING DEVICES, TYPE III BARRICADES AND OTHER TRAFFIC CONTROL DEVICES SHOWN ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE ACTUAL NUMBER REQUIRED ARE TO BE DETERMINED BASED ON INDIVIDUAL DETOUR CONDITIONS (TAPERS, SPEED LIMITS, LENGTH OF DETOUR, CURVE, ETC.)
13. FOR ANY LONG TERM CLOSURE (GREATER THAN 3 DAYS) EXISTING CENTERLINE SHALL BE REMOVED AND TEMPORARY EDGELINES PLACED AS SHOWN WITH POSITIVE BARRIER.
14. FINE DOUBLED FOR SPEEDING IN WORK ZONE WILL ONLY BE USED IF TEMPORARY SPEED LIMIT FORM HAS BEEN FILED.
15. IF CONSTRUCTION ACTIVITIES REDUCE LANE WIDTHS TO THE POINT WHERE 40 MPH CANNOT BE MAINTAINED, ADDITIONAL ADVISORY SPEED PLATE SIGNS SHALL BE INSTALLED UNDER THE LANE REDUCTION TRANSITION SIGN. FLAGPERSONS AND U.T.O.'S SHALL NOT BE ALLOWED TO INTERFERE WITH TRAFFIC BY STEPPING INTO THE LANE TO REDUCE THE DRIVER'S SPEED.
16. USE PORTABLE "RIGHT OR LEFT LANE CLOSED 1 MILE" WHEN SIGN PACKAGE IS MOVED FORWARD. SIGNS NOTED AS FIXED SHALL REMAIN IN PLACE THROUGH THE ENTIRE PROJECT. SIGNS NOTED AS PORTABLE SHALL MOVE AS THE WORK AREA CHANGES. ALL SIGNS SHALL BE REMOVED OR COVERED WHEN NOT NEEDED.



CHANNELIZING DEVICES

TAPER RATES ARE DETERMINED USING THE FOLLOWING EQUATION:
 $L = WS^2/60$ FOR DESIGN SPEEDS OF 45 MPH OR GREATER
 $L = WS^2/60$ FOR DESIGN SPEEDS OF 40 MPH OR LESS
 WHERE: L = MINIMUM LENGTH OF TAPER
 W = WIDTH OF OFFSET (USUALLY LANE WIDTH) IN FEET
 S = DESIGN SPEED IN MPH

POSTED SPEED OR 85th PERCENTILE (mph)	DESIGN SPEED (mph)	TAPER LENGTHS (ft)			TANGENT SECTION LENGTHS (L/2) (ft)	MINIMUM BUFFER SPACE LENGTH (ft)	MAXIMUM CHANNELIZING DEVICE SPACING (ft)		BARRIER FLARE RATE (MIN)
		MERGING 12 FT LANE (L)	SHIFTING W=16 FT (L/2)	SHOULDER W=10 FT (L/3)			TAPER	ALONG LANE LINE & WORK ZONE	
40	40	320	215	90	160	35	70	1:9	
45	45	540	360	150	270	40	80	1:9	
50	50	600	400	170	300	50	100	1:11	
55	55	660	440	185	330	55	110	1:13	
60 & 65	60	720	480	200	360	60	120	1:13	
70	70	840	560	235	420	65	130	1:13	

LEGEND

- ▶ - FLASHING ARROW PANEL
- - REFLECTORIZED PLASTIC DRUM
- //// - PAVEMENT MARKING REMOVAL
- ▬ - CONCRETE MEDIAN BARRIER
- - TYPE III BARRICADE
- ⊠ - TRUCK/TRAILER MOUNTED ATTENUATOR (OPTIONAL)

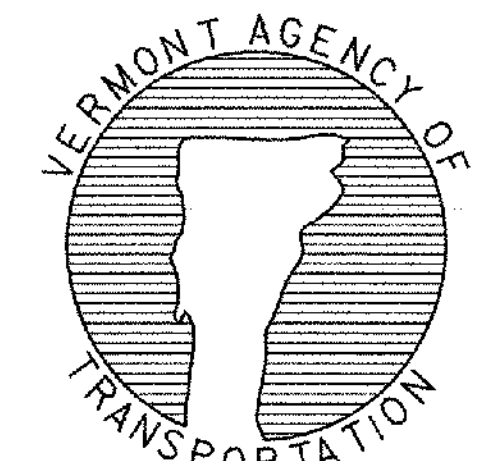
OTHER STDS. REQUIRED: E-100, E-101, E-102, E-102A, E-106, E-107, E-107A, E-108

REVISIONS AND CORRECTIONS

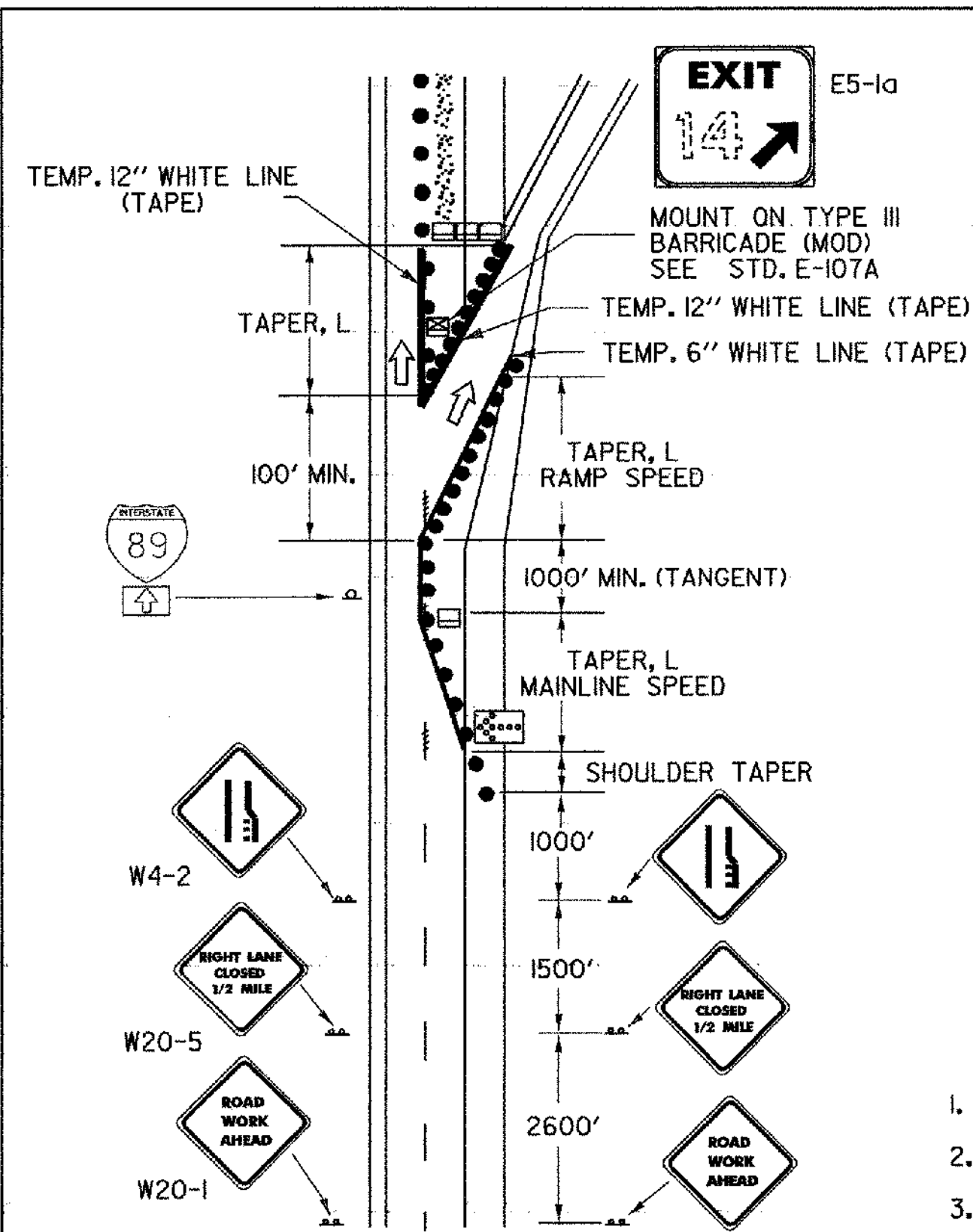
- OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
- JAN. 23, 1989 - FHWA COMMENTS - CHANGE TO 65 M.P.H. TAPER RATES
- OCT. 21, 1992 - ADDED TAPER RATE TABLE & REVISED TITLE BLOCK
- AUG. 08, 1995 - DELETED AN INVALID NOTE
- SEPT. 23, 1998 - ADDED FINE SIGN VR-355
- MAR. 01, 2004 - CHANGED REFLECTIVE SHEETING AND REVISED TO MUTCD 2003

APPROVED
 DIRECTOR OF PROGRAM DEVELOPMENT
John H. Kelly
 TRAFFIC OPERATIONS ENGINEER
 FEDERAL HIGHWAY ADMINISTRATION

MAINLINE TRAFFIC CONTROL DIVIDED HIGHWAY ONE LANE CLOSED



STANDARD E-103



- LEGEND**
- REFL. PLASTIC DRUMS
 - PAVEMENT MARKING REMOVAL
 - ↑ INDICATES TRAFFIC FLOW
 - ▨ WORK AREA
 - ◻ FLASHING ARROW PANEL
 - ▣ TYPE III BARRICADES
 - ▣ TYPE III BARRICADES (MOD.)

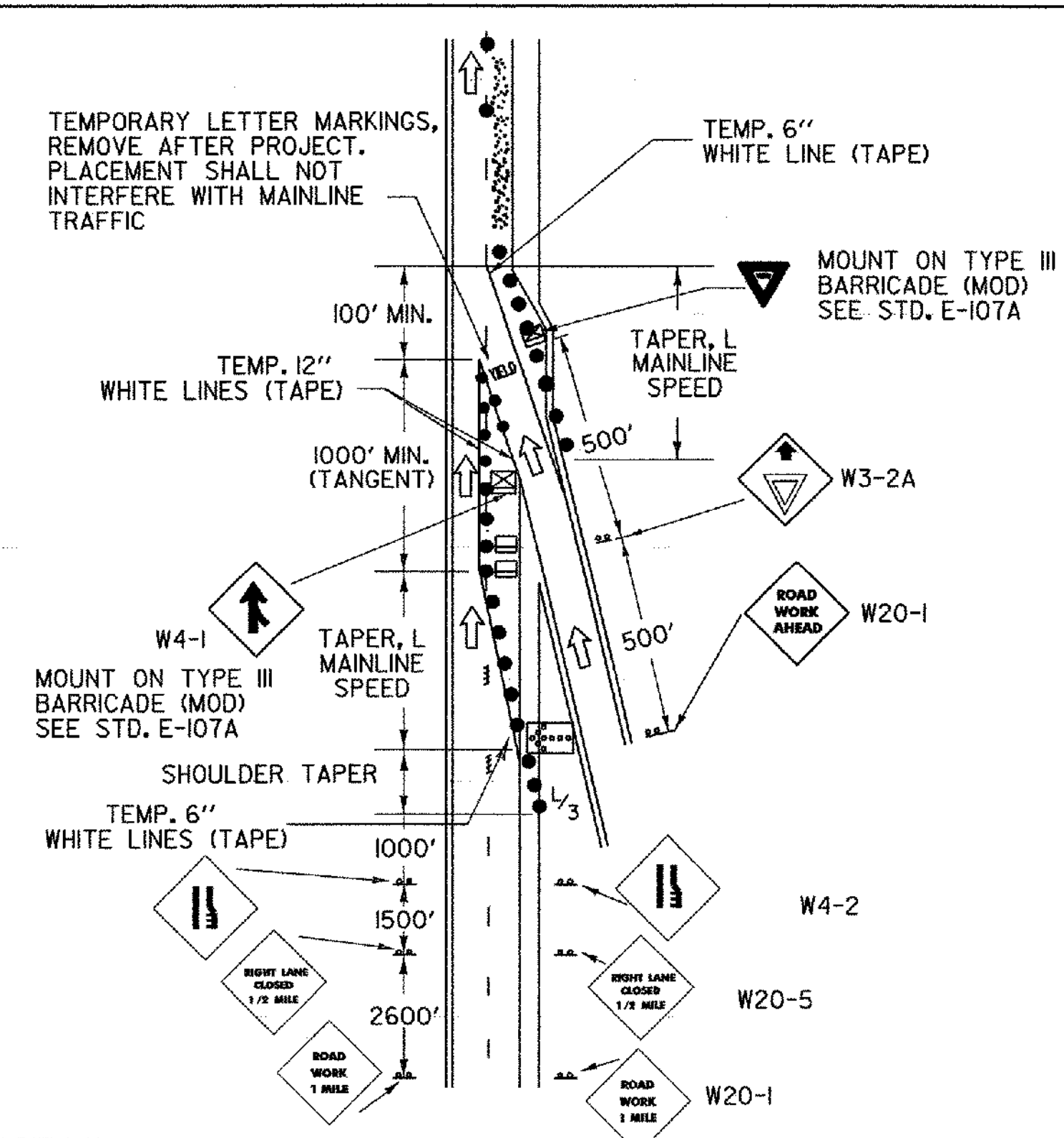
NOTES

1. ALL SIGNS SHALL BE MOUNTED ON FIXED POSTS (YIELDING TYPE) UNLESS OTHERWISE NOTED.
2. CHANNELIZING DEVICES SHALL BE PLACED IN ACCORDANCE WITH THE TABLE ON THIS SHEET
3. ALL DISTANCES ARE DESIRABLE MINIMUMS, FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
4. TAPER RATES ARE BASED ON THE POSTED MAINLINE AND EXIT SPEEDS.
5. TEMPORARY PAVEMENT MARKINGS ARE REQUIRED WHEN THE LAYOUT IS TO BE IN EFFECT FOR THREE DAYS OR MORE.
6. LANE CLOSURES AND TAPER LENGTHS, L, AS DETAILED ON THIS SHEET.
7. EXIT SIGN SHALL BE MOUNTED A MINIMUM OF 7 FEET ABOVE THE GROUND AND HIGH ENOUGH TO BE SEEN ABOVE CHANNELIZING DEVICES.

MAINLINE LANE CLOSURE AT AN EXIT RAMP

NOT TO SCALE

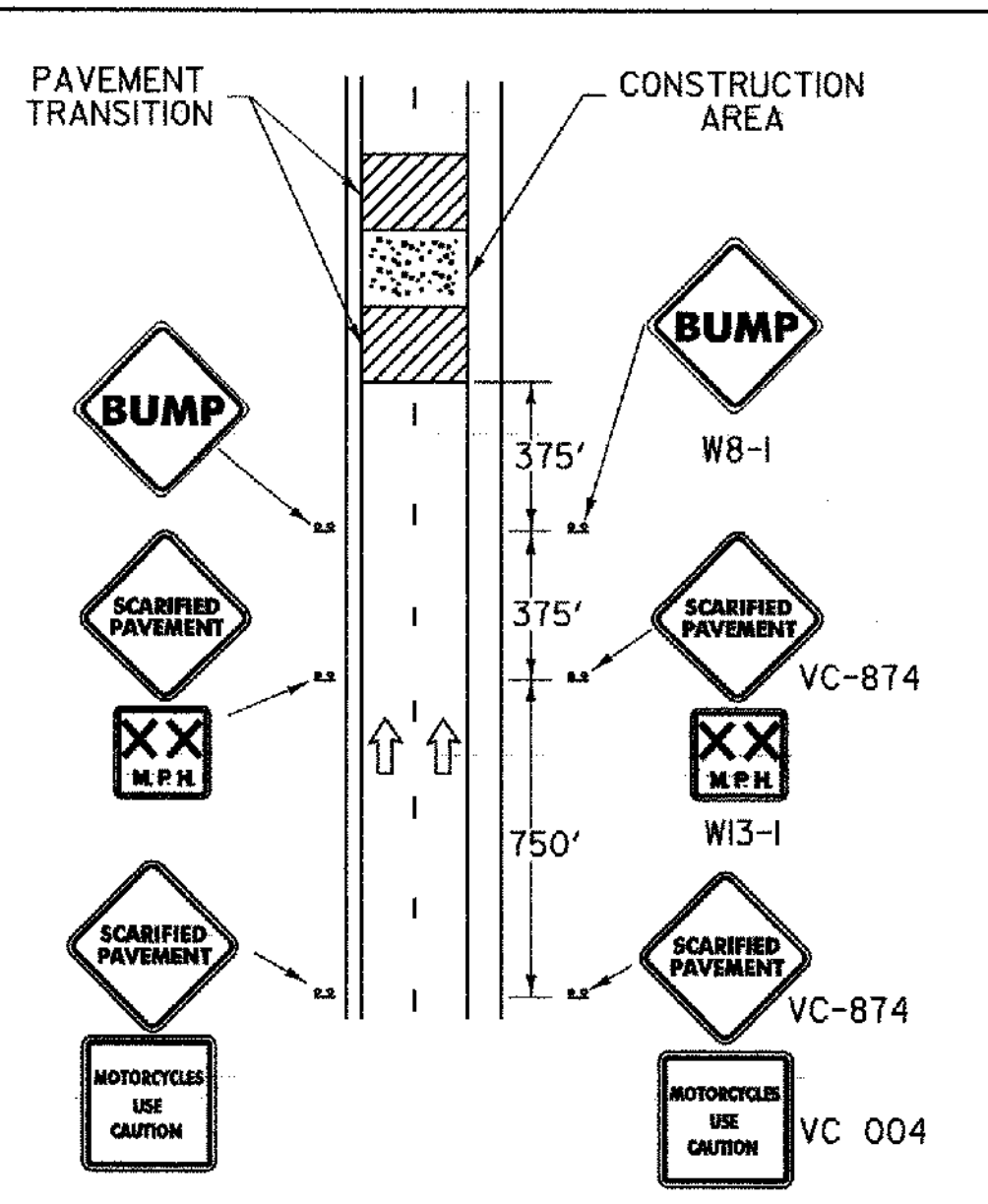
THIS DETAIL SHALL BE USED WHEN THE WORK ZONE BEGINS AT THE CORE OR THE MAINLINE LANE CLOSURE DRUM PLACEMENT INTERFERES WITH THE EXIT RAMP.



MAINLINE LANE CLOSURE AT AN ENTRANCE RAMP

NOT TO SCALE

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

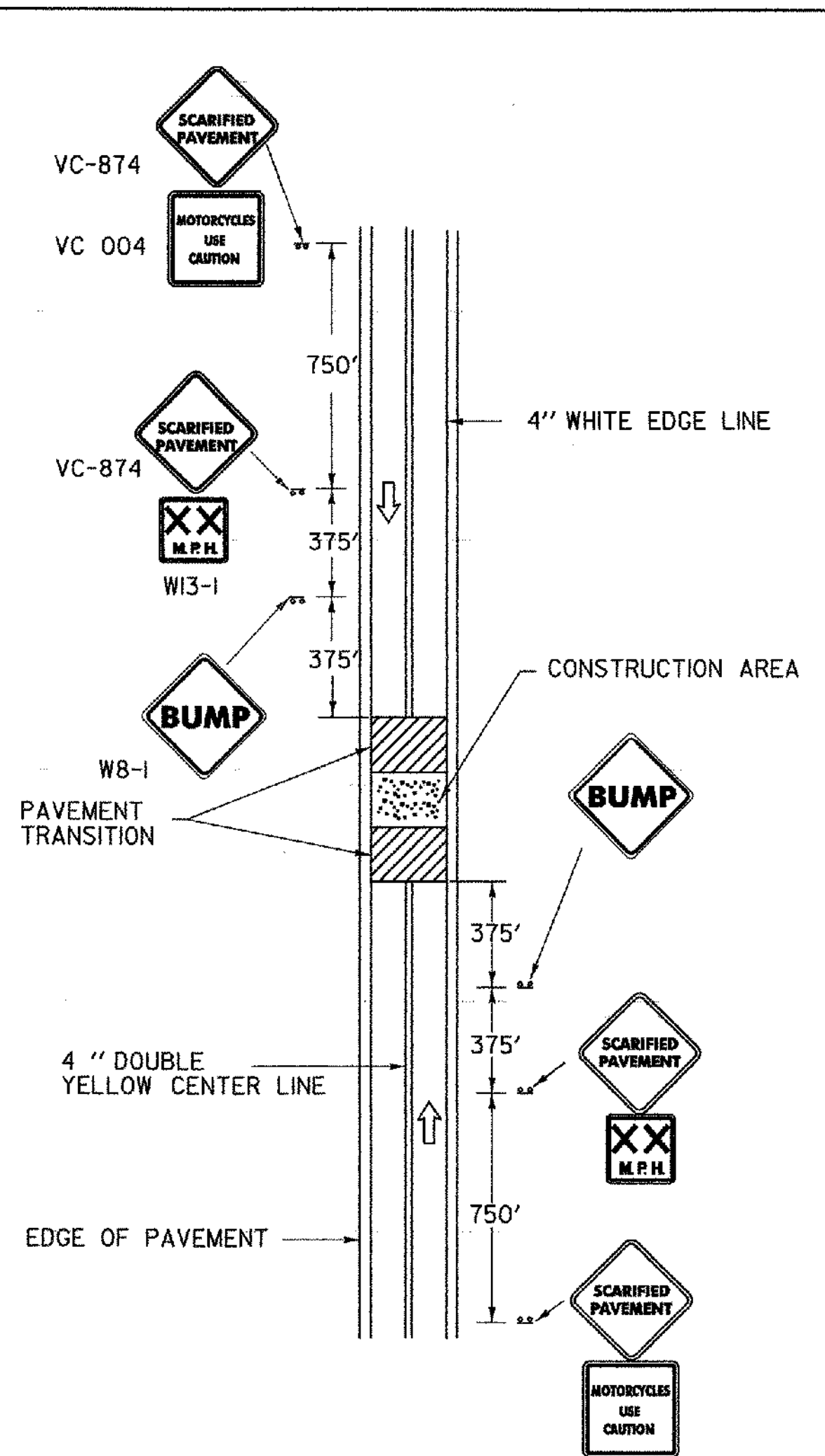


ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES DIVIDED HIGHWAY

NOT TO SCALE

NOTES

1. ADVISORY SPEED AS DETERMINED BY THE RESIDENT ENGINEER (40 MPH MINIMUM RECOMMENDED).
2. ALL SIGNS SHALL BE MOUNTED ON FIXED POSTS (YIELDING TYPE).
3. ALL DISTANCES ARE DESIRABLE MINIMUMS, FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
4. THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED, SEE STD.E-103.
5. GATE POSTING OF SIGNS IS AN OPTION AS DETERMINED BY THE RESIDENT ENGINEER (WHEN PASSING, TURNING OR CLIMBING LANES LIMIT VISIBILITY).

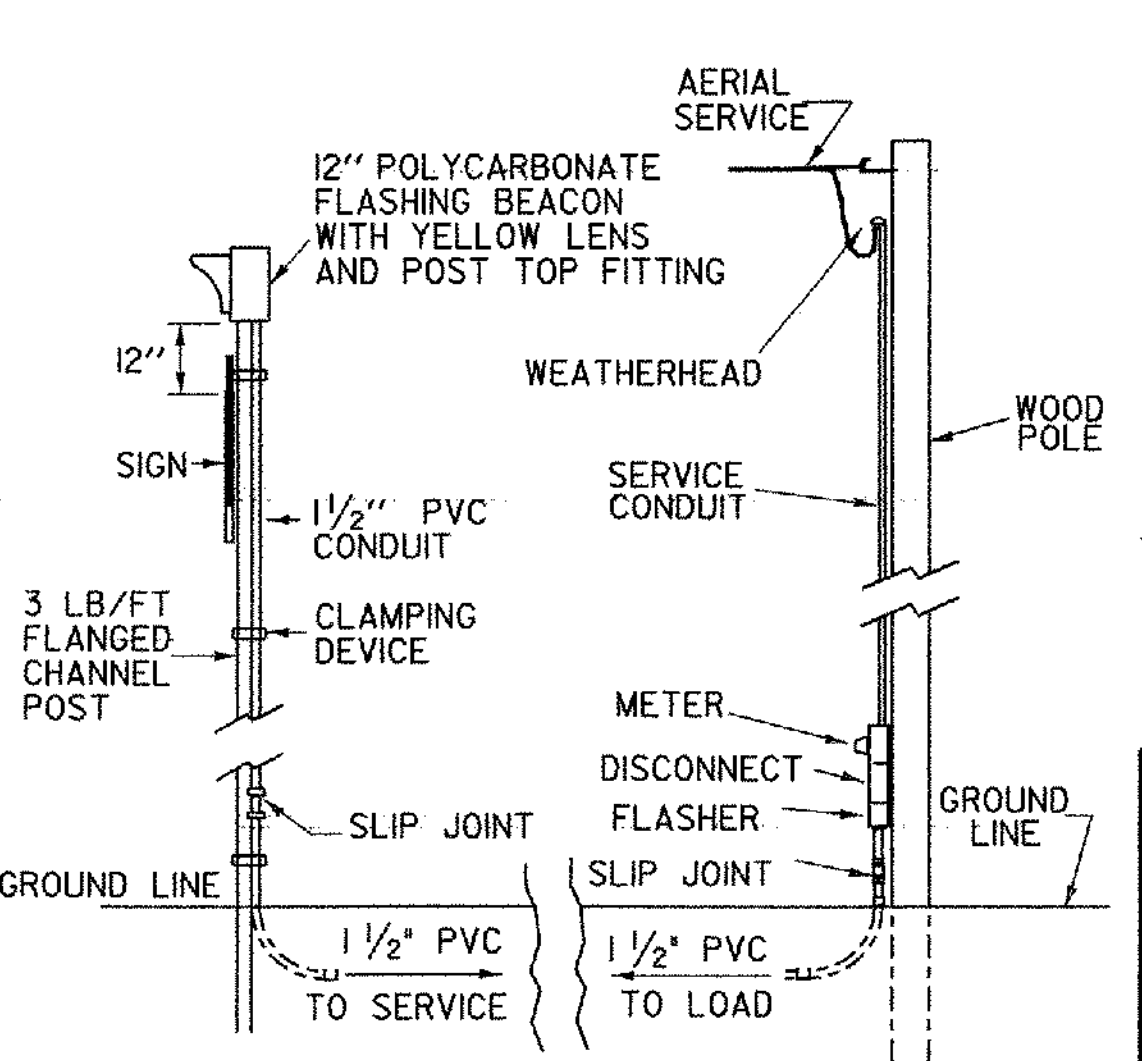


ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES 2 LANE ROADWAY

NOT TO SCALE

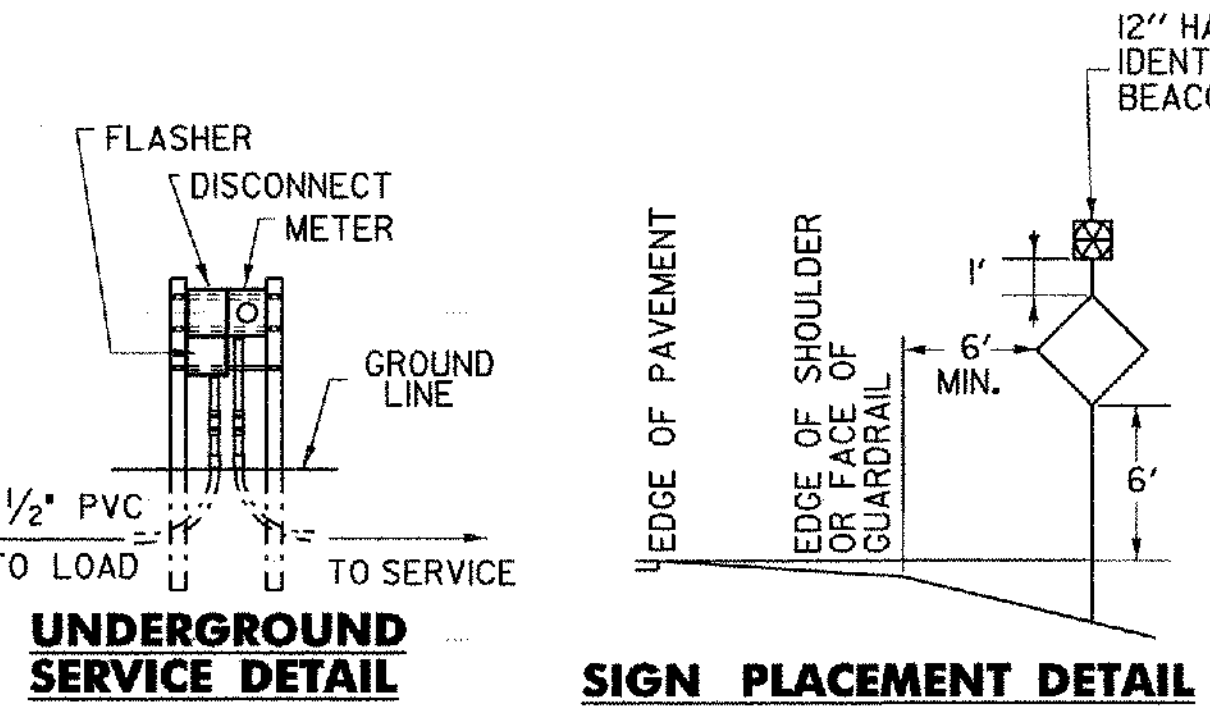
NOTES

1. ADVISORY SPEED AS DETERMINED BY THE RESIDENT ENGINEER (40 MPH MINIMUM RECOMMENDED).
2. ALL SIGNS SHALL BE MOUNTED ON FIXED POSTS (YIELDING TYPE).
3. ALL DISTANCES ARE DESIRABLE MINIMUMS, FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
4. THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED, SEE STD.E-103.
5. GATE POSTING OF SIGNS IS AN OPTION AS DETERMINED BY THE RESIDENT ENGINEER (WHEN PASSING, TURNING OR CLIMBING LANES LIMIT VISIBILITY).



FLASHING BEACON DETAIL

AERIAL SERVICE WITHOUT LUMINAIRE

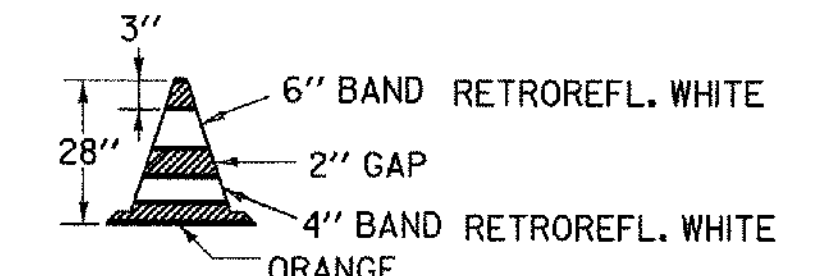


UNDERGROUND SERVICE DETAIL

SIGN PLACEMENT DETAIL

NOTES

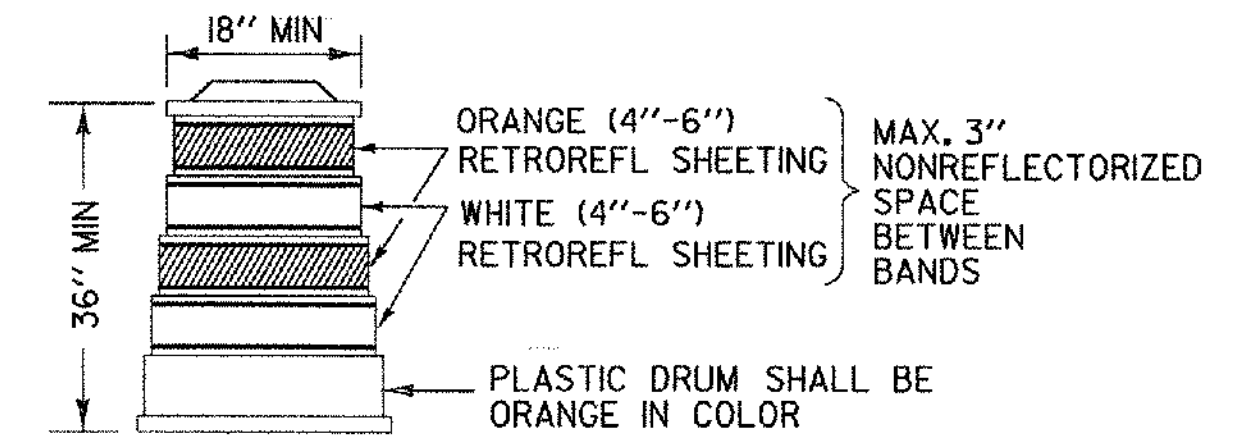
1. AT THE CONTRACTOR'S OPTION:
 - A. THE POWER SUPPLY MAY BE AERIAL OR UNDERGROUND (SEE DETAIL).
 - B. POWER FOR A FLASHING BEACON MAY BE COMBINED WITH POWER FOR A TRAFFIC SIGNAL OR THEY MAY HAVE SEPARATE POWER SOURCES.
 - C. THE FLASHER MAY BE INSTALLED ON A STANCHION NEAR THE SIGN, ON A UTILITY POLE (WITH UTILITY COMPANY APPROVAL) OR AT THE SAME LOCATION AS A TRAFFIC SIGNAL CONTROLLER.
2. THE FLASHER UNIT SHALL BE ONE CIRCUIT AND INCLUDE A RADIO INTERFERENCE FILTER.
3. BATTERY OPERATED FLASHERS WILL NOT BE ALLOWED.
4. BOTTOM OF THE BEACON SHALL BE A MIN. OF 8' AND A MAX. OF 12' ABOVE THE EDGE OF THE PAVEMENT.
5. FOR URBAN AREA PLACEMENT SEE STD. E-121.
6. FOR POWER DROP STANCHIONS SEE STD. E-175



28" REFLECTORIZED CONE

NOTES

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



REFLECTORIZED PLASTIC DRUM

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

CHANNELIZING DEVICES

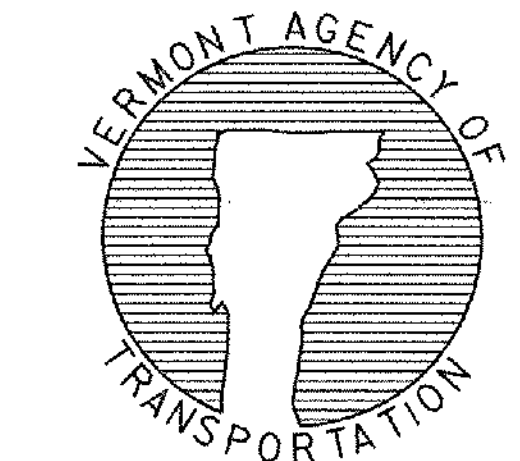
TAPER RATES ARE DETERMINED USING THE FOLLOWING EQUATION:
 $L = WS$ FOR DESIGN SPEEDS OF 45 MPH OR GREATER
 $L = WS^2/60$ FOR DESIGN SPEEDS OF 40 MPH OR LESS
 WHERE: L = MINIMUM LENGTH OF TAPER IN FEET
 W = WIDTH OF OFFSET (USUALLY LANE WIDTH) IN FEET
 S = DESIGN SPEED IN MPH

POSTED SPEED OR 85th PERCENTILE (mph)	DESIGN SPEED (mph)	TAPER LENGTHS (ft)			TANGENT SECTION LENGTHS (L/2) (ft)	MINIMUM BUFFER SPACE LENGTH (ft)	MAXIMUM CHANNELIZING DEVICE SPACING (ft)		BARRIER FLARE RATE (MIN)
		MERGING 12ft LANE (L)	SHIFTING W=16ft (L/2)	SHOULDER W=10ft (L/3)			TAPER	ALONG LANE LINE & WORK ZONE	
≤40	40	320	215	90	160	160	35	70	1:9
45	45	540	360	150	270	270	40	80	1:9
50	50	600	400	170	300	300	50	100	1:11
55	55	660	440	185	330	330	55	110	1:13
60 & 65	60	720	480	200	360	360	60	120	1:13
70	70	840	560	235	420	440	65	130	1:13

REVISIONS AND CORRECTIONS
 APR 12, 1988 - DATE OF ORIGINAL ISSUE
 JAN 23, 1989 - REVISED EXIT SIGN - CLARIFIED EXIT TAPER
 SEPT 20, 1993 - REVISED RAMP CLOSURES, FLASHING BEACON DETAILS AND MOVED TYPE III BARRICADE (MOD) TO STDE-107A
 AUG 08, 1995 - REVISED BEACON SIZE
 MAR. 01, 2004 - ADDED ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED TWO WAY HIGHWAYS, CHANNELIZING DEVICES CHART

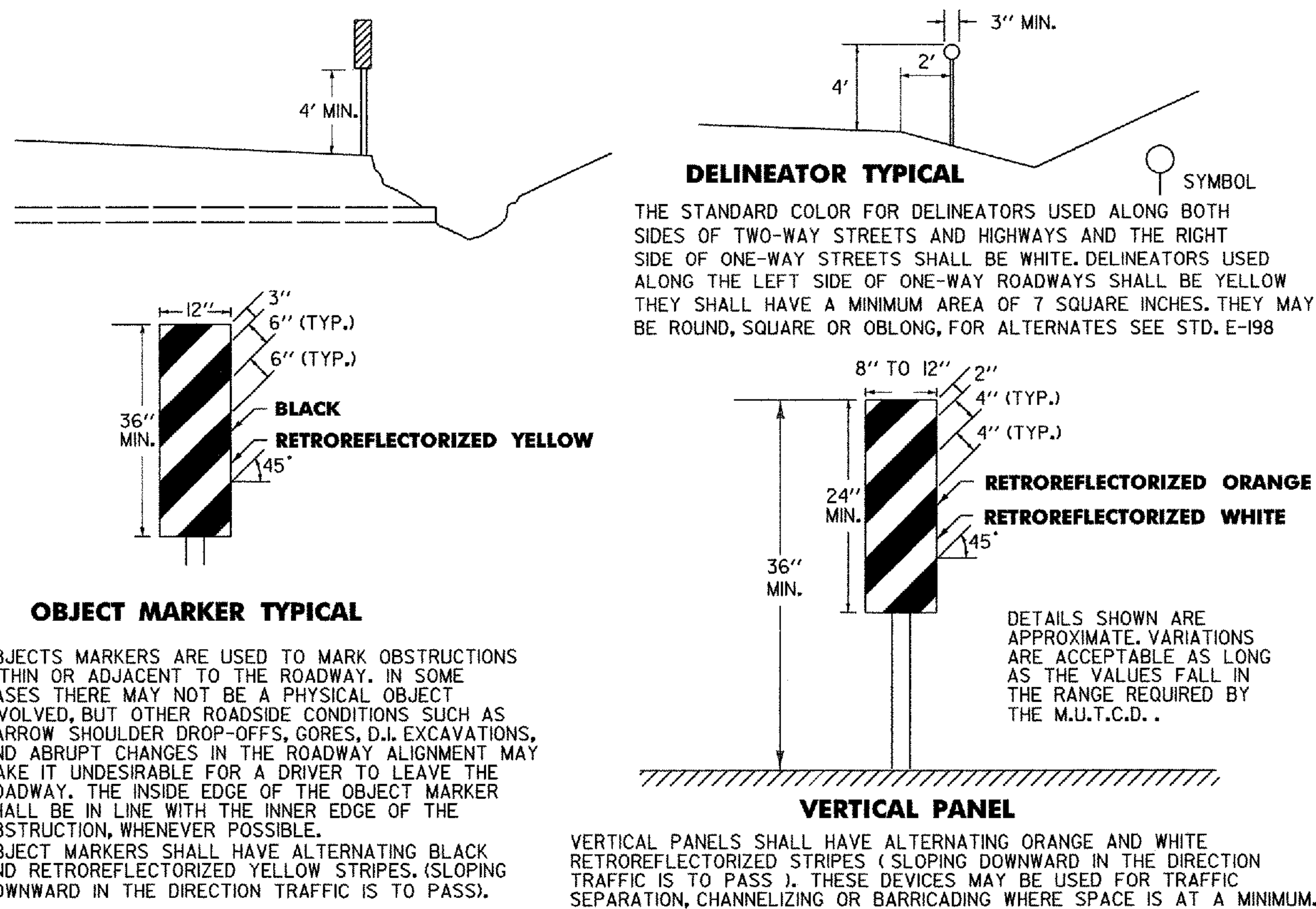
APPROVED
 DIRECTOR OF PROGRAM DEVELOPMENT
 TRAFFIC OPERATIONS ENGINEER
 FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL MISCELLANEOUS DETAILS

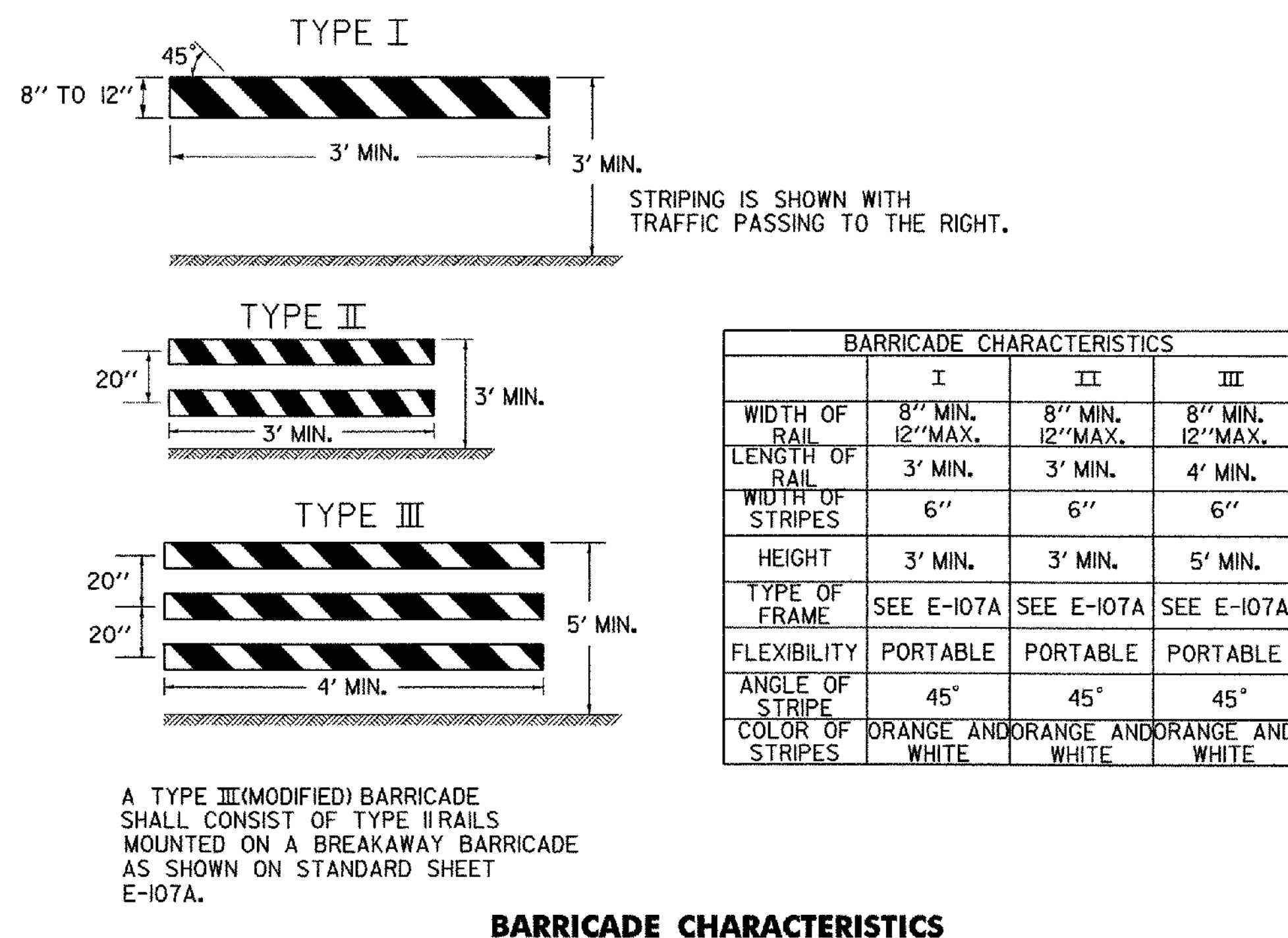


STANDARD E-106

OTHER STDS. E-101, E-102, E-102A, E-103, E-107A, E-110, E-121, E-136, REQUIRED: E-150, E-175



DELINEATOR, VERTICAL PANEL AND OBJECT MARKER DETAILS FOR CONSTRUCTION AREAS WHERE TRAFFIC IS MAINTAINED

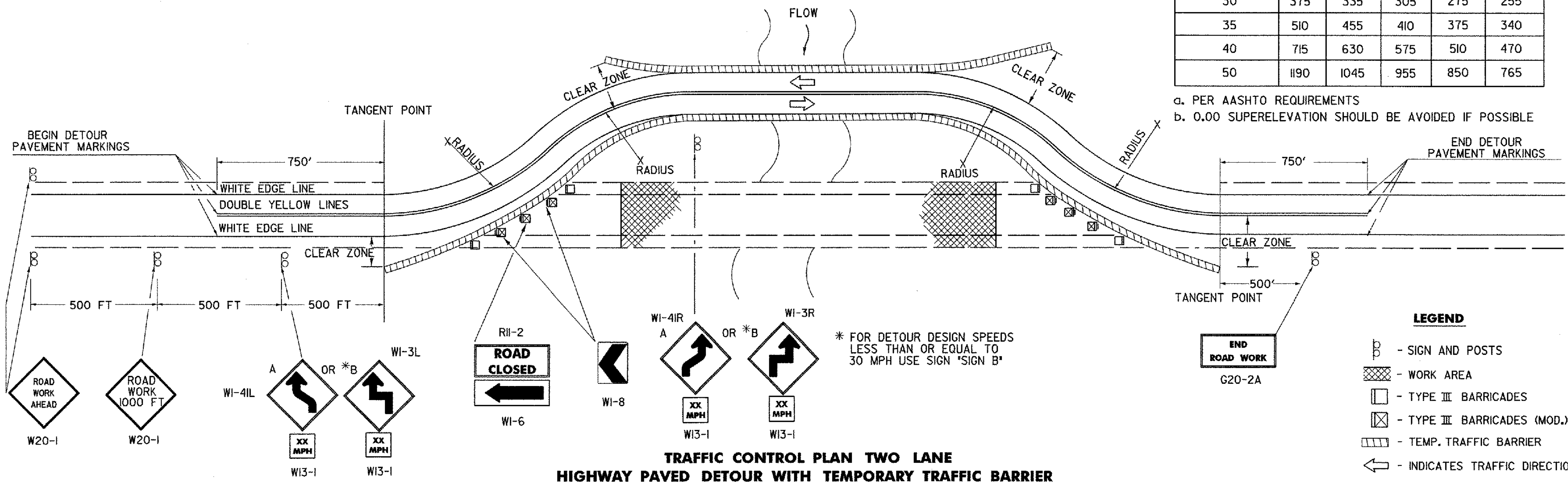


BARRICADE CHARACTERISTICS

DETOUR DESIGN SPEED (M.P.H.)	MINIMUM RADIUS (FT.) ^a				
	SUPERELEVATION (FT./FT.)				
	0.00 ^b	0.02	0.04	0.06	0.08
20	160	140	130	120	110
25	245	220	200	185	170
30	375	335	305	275	255
35	510	455	410	375	340
40	715	630	575	510	470
50	1190	1045	955	850	765

a. PER AASHTO REQUIREMENTS
b. 0.00 SUPERELEVATION SHOULD BE AVOIDED IF POSSIBLE

ALL SIGN PLACEMENT DISTANCES ARE DESIRABLE SPECIFICATIONS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT. PROJECT CONSTRUCTION APPROACH SIGNING PLACEMENT SHALL TAKE INTO CONSIDERATION SPACING REQUIREMENTS FOR THE DETOUR SIGN LAYOUT REQUIREMENTS.



BARRICADES

APPLICATION NOTES

TYPE I BARRICADES SHALL BE USED ON CONVENTIONAL ROADS OR URBAN STREETS AND ARTERIALS TO MARK A SPECIFIC HAZARD.

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

TYPE III BARRICADES (SEE STD. E-107A) SHALL ONLY BE USED WHEN A ROAD SECTION OR LANE IS CLOSED TO TRAFFIC AND ARE TO BE ERECTED AT THE POINT OF CLOSURE.

MATERIALS

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

- WOODEN BARRICADES (TYPE I AND II)
 - SHALL NOT BE USED TO CHANNELIZE OR DELINEATE WORK AREAS WITHIN THE CLEAR ZONE OF ANY HIGHWAY WHERE OPERATING SPEEDS IN EXCESS OF 20 M.P.H. ARE EXPECTED UNLESS INSTALLED FOR PEDESTRIAN CONTROL BEHIND APPROVED POSITIVE BARRIERS.
 - MAY BE USED WHERE OPERATING SPEEDS OF 20 M.P.H. OR LESS ARE EXPECTED.
- TYPE III WOODEN BARRICADES SHALL NOT BE USED.

COLORS

THE BARRICADE PANELS SHOWN ON THIS SHEET SHALL HAVE ALTERNATING RETRO-REFLECTORIZED WHITE AND ORANGE STRIPES. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE US DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION. THE BARRICADE COMPONENTS SHALL BE WHITE UNLESS UNPAINTED METAL OR ALUMINUM IS USED.

REFLECTORIZATION

THE RETROREFLECTIVE SHEETING ON BARRICADE PANELS SHALL BE ASTM TYPE III.

LOCATION

THE BARRICADES SHOWN ON THIS SHEET WILL BE LOCATED BY THE RESIDENT 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.

MAINTENANCE

BARRICADES SHALL BE MAINTAINED IN CLEAN CONDITION, SATISFACTORY TO THE RESIDENT ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO THE APPROACHING TRAFFIC AT ALL TIMES. DAMAGED, DEFACTED, OR DIRTY BARRICADES SHALL BE REPAIRED, CLEANED, OR REPLACED AS ORDERED BY THE RESIDENT ENGINEER.

DETOUR NOTES

- SIGNS AND DELINEATION SHOWN FOR ONE DIRECTION OF TRAFFIC ONLY.
- THE CONTRACTOR IS RESPONSIBLE FOR PAVEMENT MARKING AND SHALL REMOVE ANY CONFLICTING OR CONFUSING EXISTING MARKINGS.
- ADDITIONAL SIGNING MAY BE REQUIRED AT THE DISCRETION OF THE RESIDENT ENGINEER.
- UNPAVED DETOURS REQUIRE PAVEMENT MARKINGS FOR TRANSITIONS FROM EXISTING PAVEMENT.
- THE NUMBER OF CHANNELIZING DEVICES, BARRICADES AND OTHER TRAFFIC CONTROL DEVICES SHOWN ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE ACTUAL NUMBER REQUIRED SHALL BE DETERMINED BASED ON INDIVIDUAL DETOUR CONDITIONS (TAPERS, SPEED LIMITS, LENGTH OF DETOUR CURVE, ETC.).
- AASHTO CLEAR ZONE REQUIREMENTS SHOULD BE MET. IF NOT THEN AN APPROVED ENERGY ABSORPTION ATTENUATOR (SUITABLE FOR THE TEMPORARY TRAFFIC BARRIER USED AND FOR THE DESIGN SPEED) SHALL BE INSTALLED PER THE CURRENT AASHTO ROADSIDE DESIGN GUIDE.
- THE DETOUR DESIGN SPEED SHOULD BE NO LESS THAN 10 M.P.H. BELOW THE POSTED SPEED LIMIT, UNLESS PHYSICAL RESTRICTIONS PREVENT THIS.
- SEE STANDARD SHEETS E-100, E-101 AND E-102 FOR SIGN DETAIL AND MATERIAL REQUIREMENTS.
- IF THE USE OF TEMPORARY TRAFFIC BARRIER IS NOT REQUIRED, THEN REFLECTORIZED PLASTIC DRUMS SHALL BE USED.

OTHER STDS. REQUIRED:	E-100 E-101	E-102 E-102a	E-107a E-198
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REVISIONS AND CORRECTIONS

SEPT. 10, 1987 - DATE OF ORIGINAL ISSUE
APRIL 29, 1988 - FHWA REVIEW COMMENTS
SEPT. 20, 1993 - NEW RADIUS CHART, BARRICADE ALIGNMENT AND USE OF TEMPORARY TRAFFIC BARRIER
AUG. 08, 1995 - REVISED SIGNING PER MUTCD
JUNE 30, 2003 - CHANGED REFLECTIVE SHEETING TO TYPE III

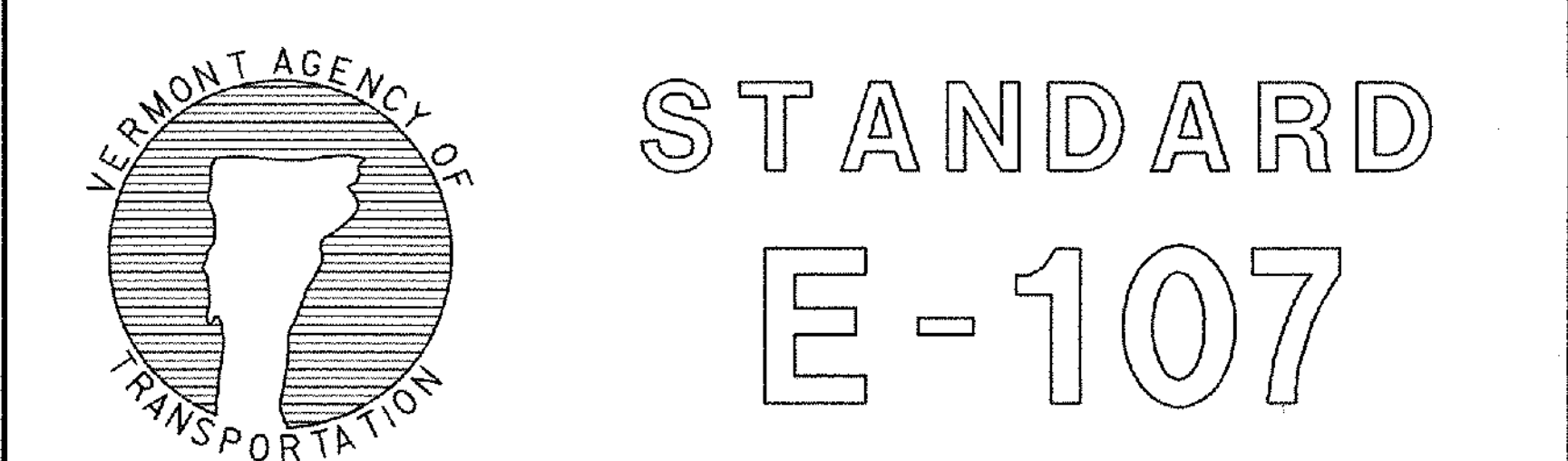
APPROVED

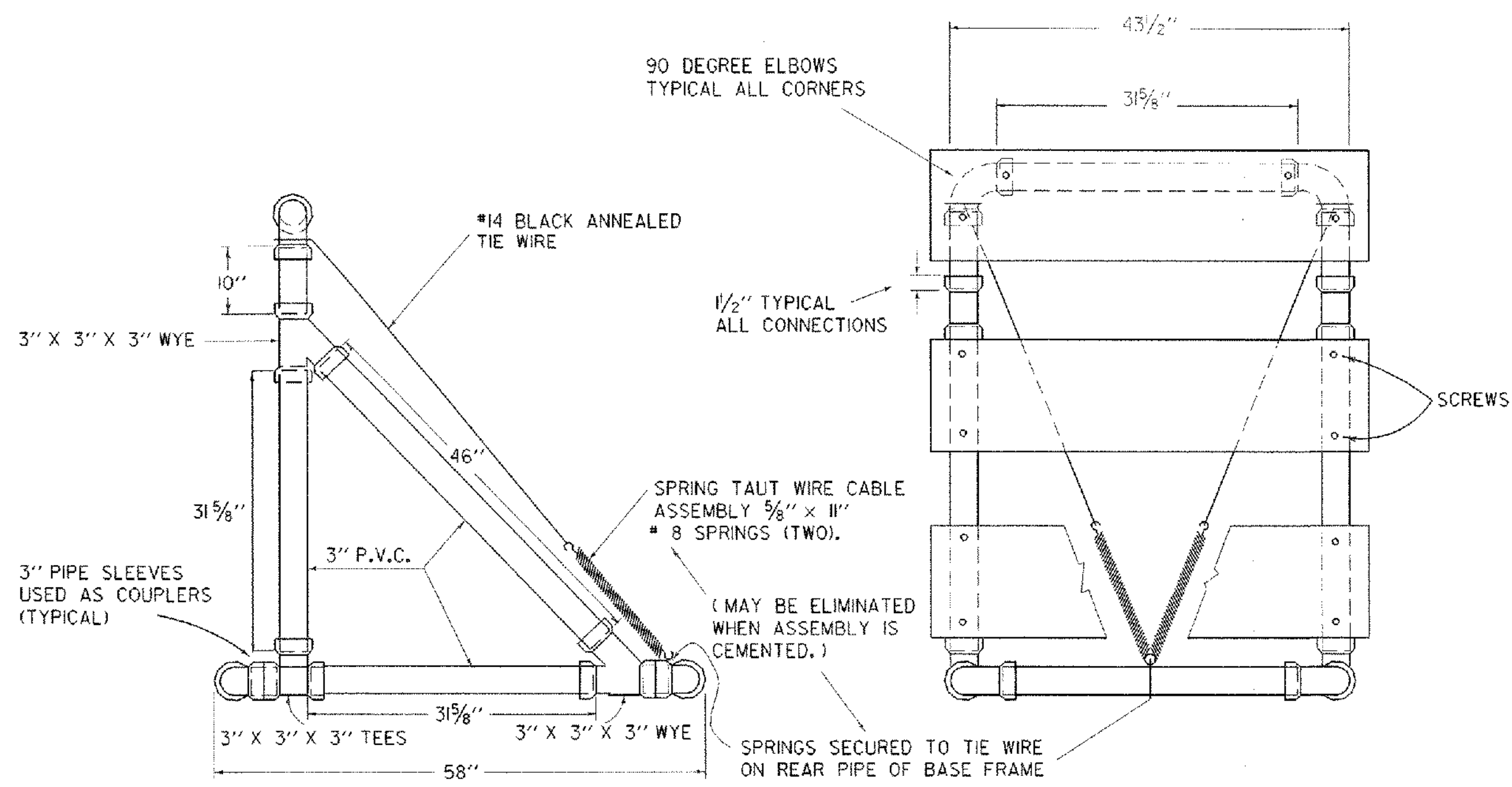
DIRECTOR OF PROGRAM DEVELOPMENT

TRAFFIC OPERATIONS ENGINEER

FEDERAL HIGHWAY ADMINISTRATION

DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS





**SIDE VIEW
TYPE III BARRICADE**

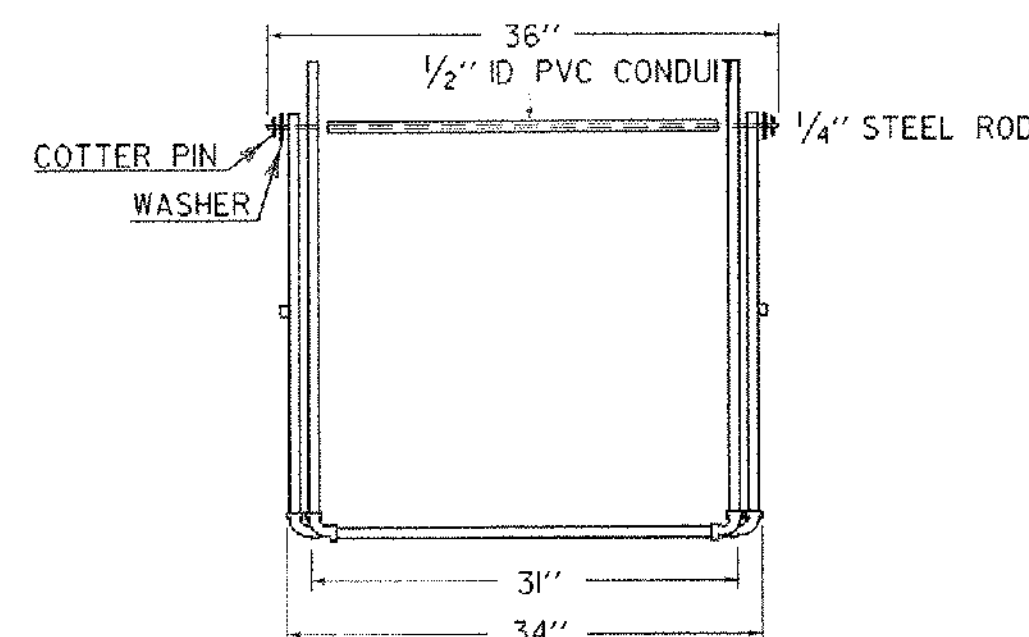
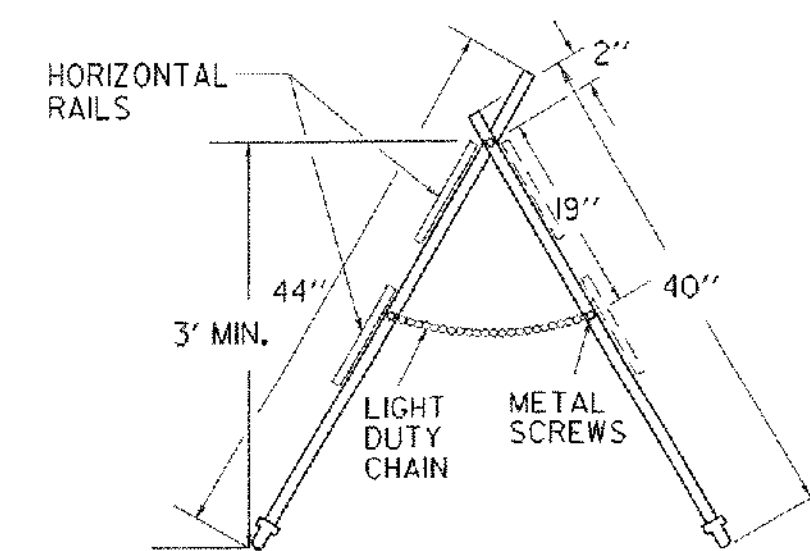
**FRONT VIEW
TYPE III BARRICADE**

MATERIALS FOR TYPE I AND II BARRICADES

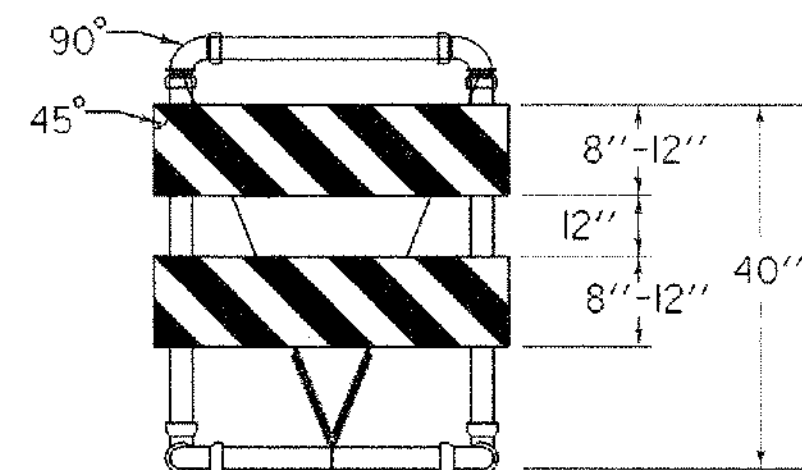
- 20' - 1" PVC
- 4 - 1" PVC 90° ELBOWS
- 30" - 1/2" ID THINWALL PVC CONDUIT
- 36" - 1/4" STEEL ROD
- 4 - 1" WASHERS
- 24" - LIGHT DUTY CHAIN
- 1/2" - #14 PAN HEAD METAL SCREWS (AS REQUIRED)
- 2 - 3/4" COTTER PINS
- 2 OR 4 - 8" OR 12" X 36" X 0.025" BARRICADE RAILS (AS REQUIRED)

MATERIALS FOR TYPE III BARRICADES

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



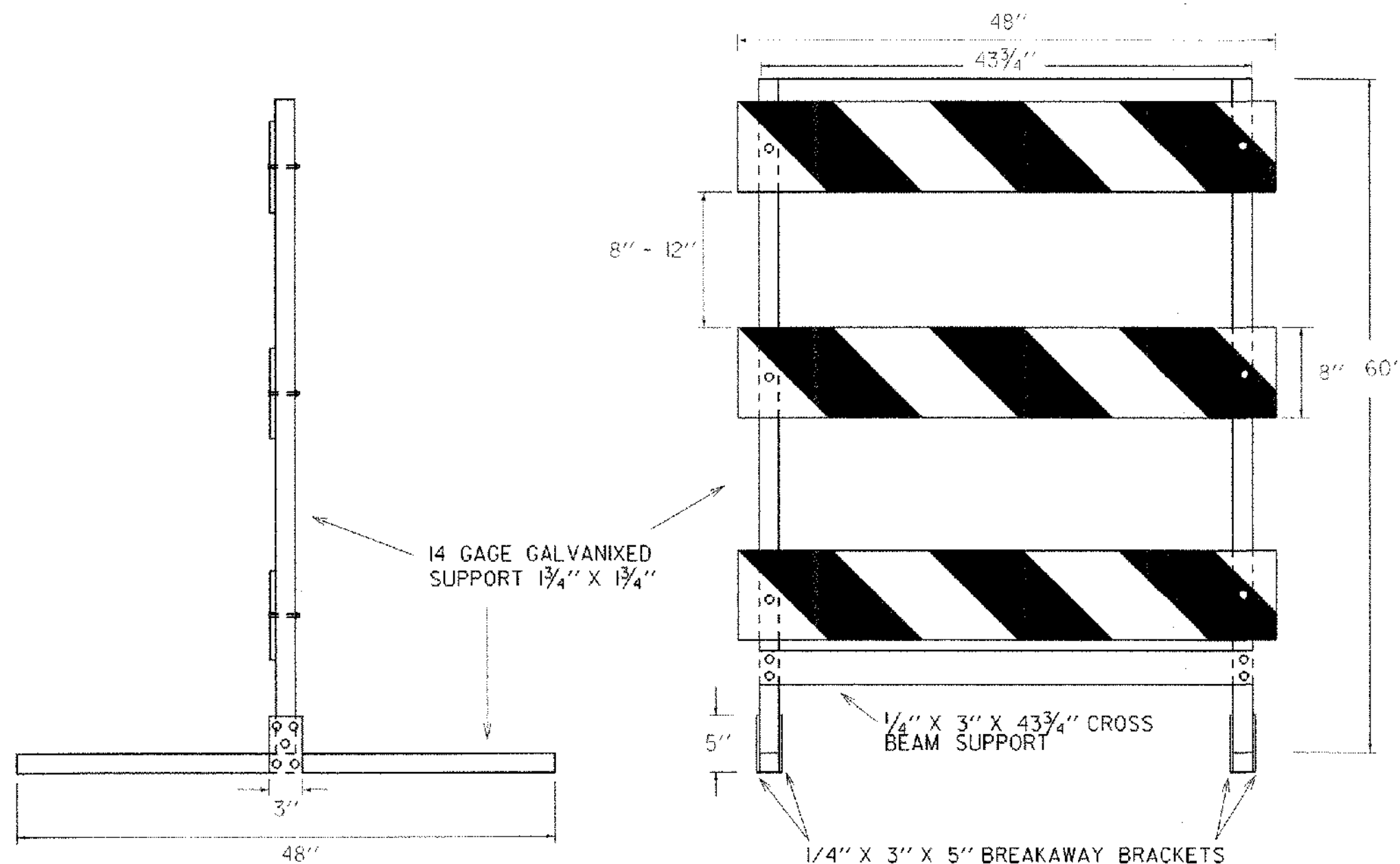
TYPE I AND TYPE II BARRICADE



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

MATERIALS FOR METAL TYPE III BARRICADES

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



SIDE AND FRONT VIEW OF TYPE III METAL BARRICADE

MATERIALS

THE PIPE, WYES, TEES AND ELBOWS USED TO CONSTRUCT BARRICADES SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 2241 FOR P.V.C. 1120 OR 1220 SDR-21, PRESSURE RATING 200 PSI. THE WYES, TEES AND ELBOWS SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION D 2466, TYPE II, GRADE I. ALL JOINTS SHALL BE SLIP-FIT AND MAY BE LIGHTLY CEMENTED. THE BARRICADE RAILS SHALL BE FABRICATED FROM 0.025" ANODIZED ALUMINUM AND SHALL HAVE REFLECTORIZED ALTERNATING ORANGE AND WHITE STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS).

MAINTENANCE

BARRICADES SHALL BE MAINTAINED IN CLEAN AND LEGIBLE CONDITIONS SATISFACTORY TO THE ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO APPROACHING TRAFFIC AT ALL TIMES. DAMAGED, DEFACED, OR DIRTY BARRICADES SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER. THE P.V.C. PIPE AND FITTINGS SHALL BE WHITE IN COLOR. AT LEAST TWO (2) HOLES SHALL BE DRILLED (3/16" DIAM.) IN EACH SECTION OF PIPE AND FITTINGS IF THE ASSEMBLY IS NOT CEMENTED.

BARRICADES SHALL BE STABILIZED WITH SAND BAGS OF MINIMUM WEIGHT WHICH WILL NOT CONSTITUTE A HAZARD IF THE BARRICADE IS HIT. THESE SHALL BE PLACED ONLY ON THE FRONT AND REAR PIPES OF THE BASE FRAME OF THE BARRICADE. SAND BAG STABILIZERS SHALL BE SO PLACED AS NOT TO BE A HAZARD TO VEHICLES PASSING ON EITHER SIDE. IF BARRICADE REPLACEMENT COSTS CAN BE CONSIDERED NEGLIGIBLE, GLUED JOINTS MAY PROVIDE ADDITIONAL STABILITY TO THE INSTALLATION.

TYPE I BARRICADES SHALL UTILIZE ONE HORIZONTAL RAIL IN EACH DIRECTION.

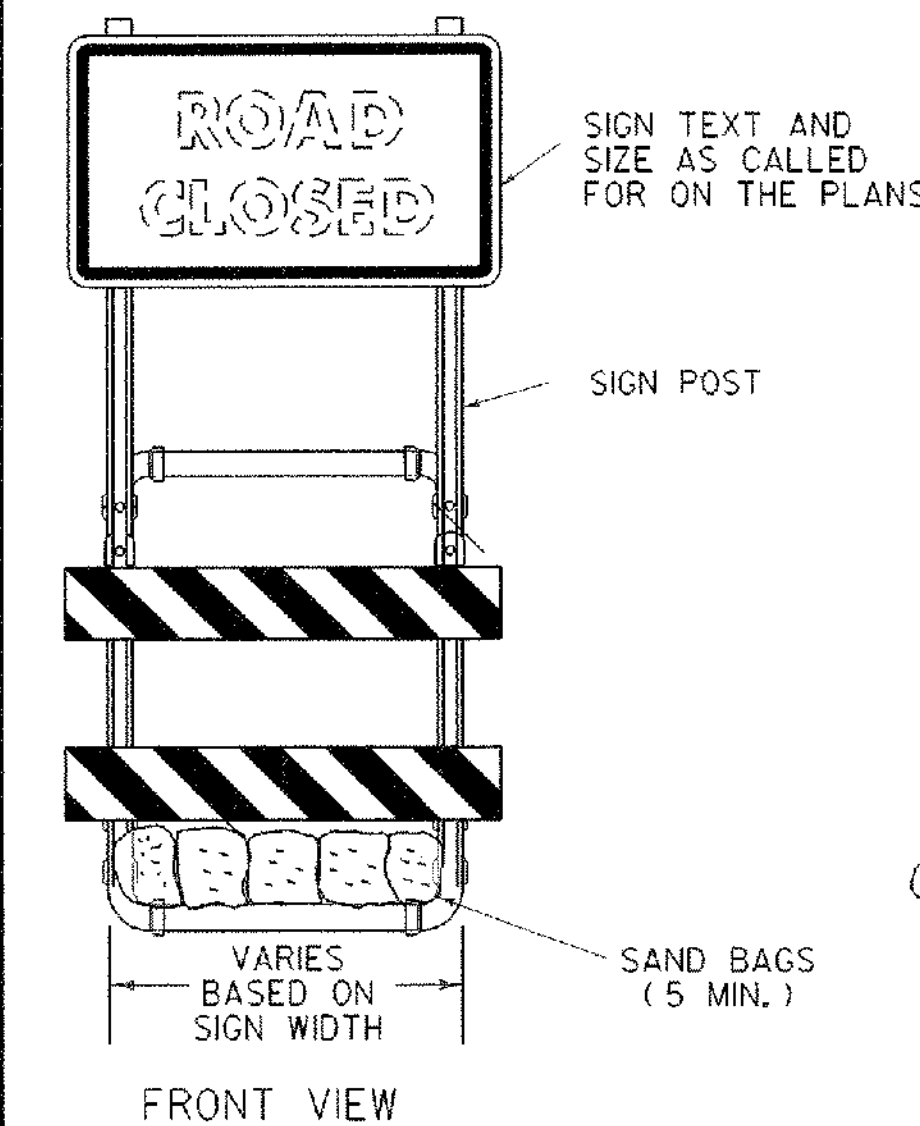
TYPE II BARRICADES SHALL BE A TYPE I BARRICADE WITH AN ADDITIONAL HORIZONTAL RAIL MOUNTED BELOW THE OTHER IN EACH DIRECTION.

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

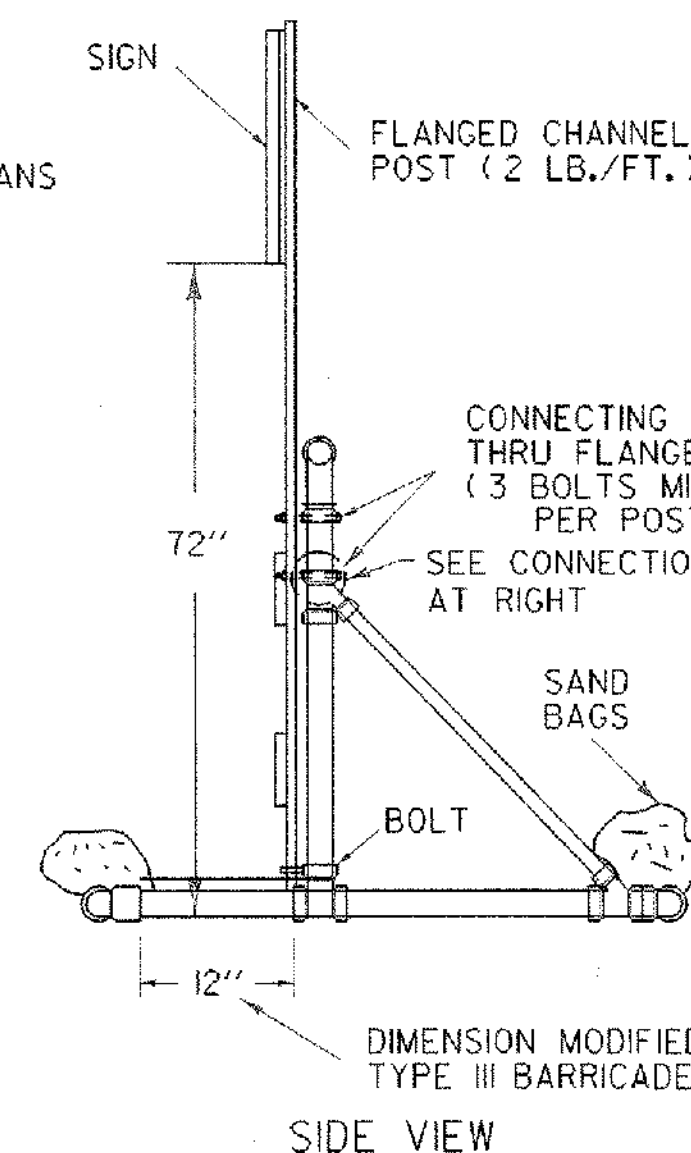
SEE STD E-107 FOR ADDITIONAL INFORMATION.

NOTES:

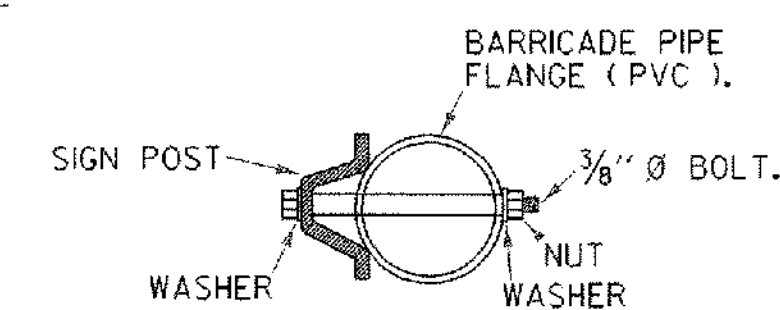
- 1) REFER TO STANDARD TYPE III BARRICADE (ABOVE LEFT)
- 2) ALL BARRICADE JOINTS SHALL BE GLUED.
- 3) FIVE SAND BAGS ARE REQUIRED BOTH FRONT AND BACK, 50 LB. MINIMUM EACH.



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



SIDE VIEW



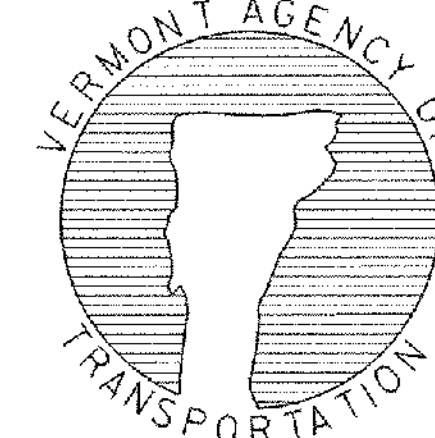
CONNECTION DETAIL

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

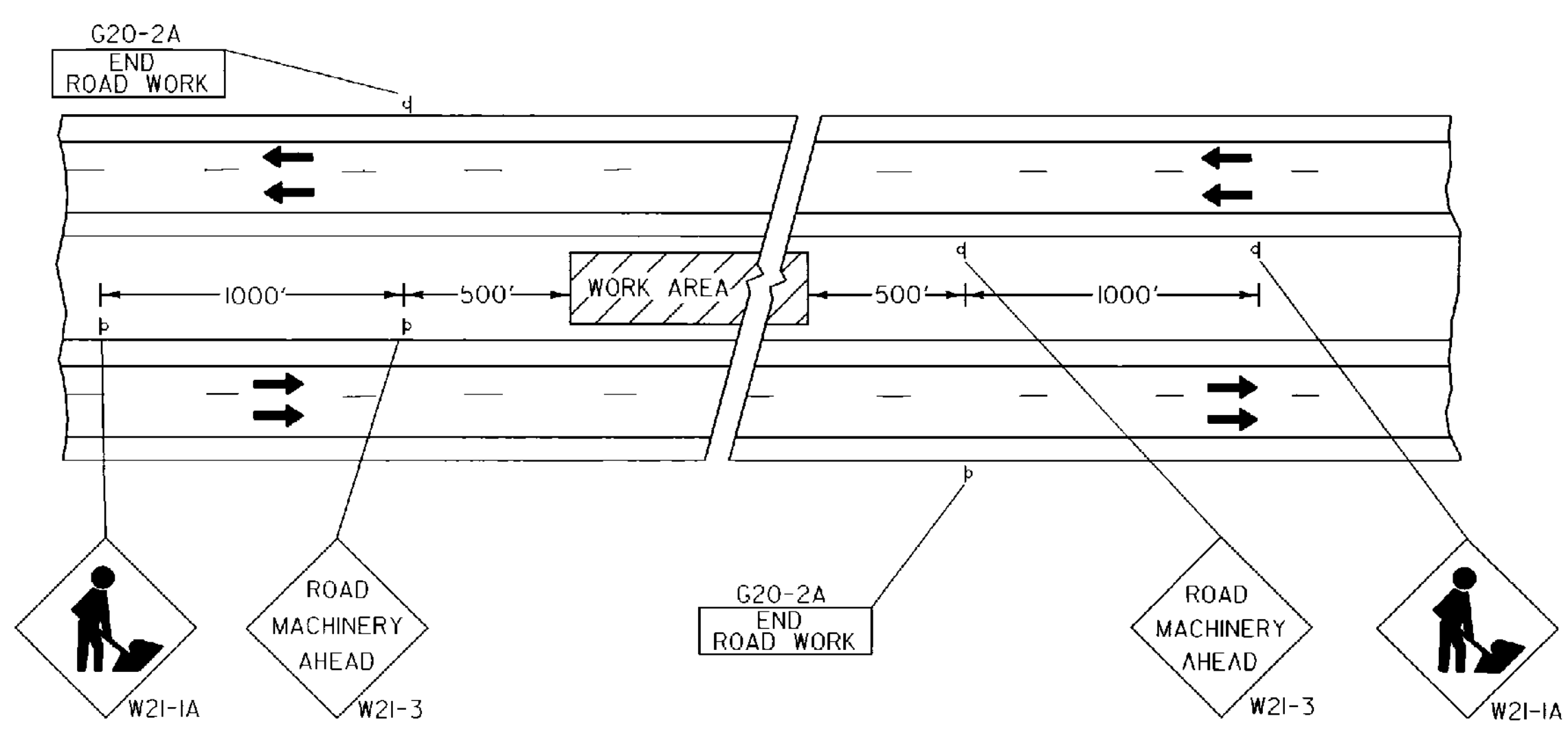
REVISIONS AND CORRECTIONS
SEPT. 10, 1987 - ORIGINAL APPROVAL DATE
SEPT. 20, 1993 - REVISED NOTES AND TYPE III (MOD.) BARRICADE DETAIL
AUG. 08, 1995 - ADDED METAL TYPE III BARRICADE
JUN. 08, 2009 - MINOR CORRECTIONS

APPROVED
Kevin A. Plaskie
HIGHWAY SAFETY & DESIGN ENGINEER
Richard J. Stewart
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

**BREAKAWAY BARRICADE
DETAILS**

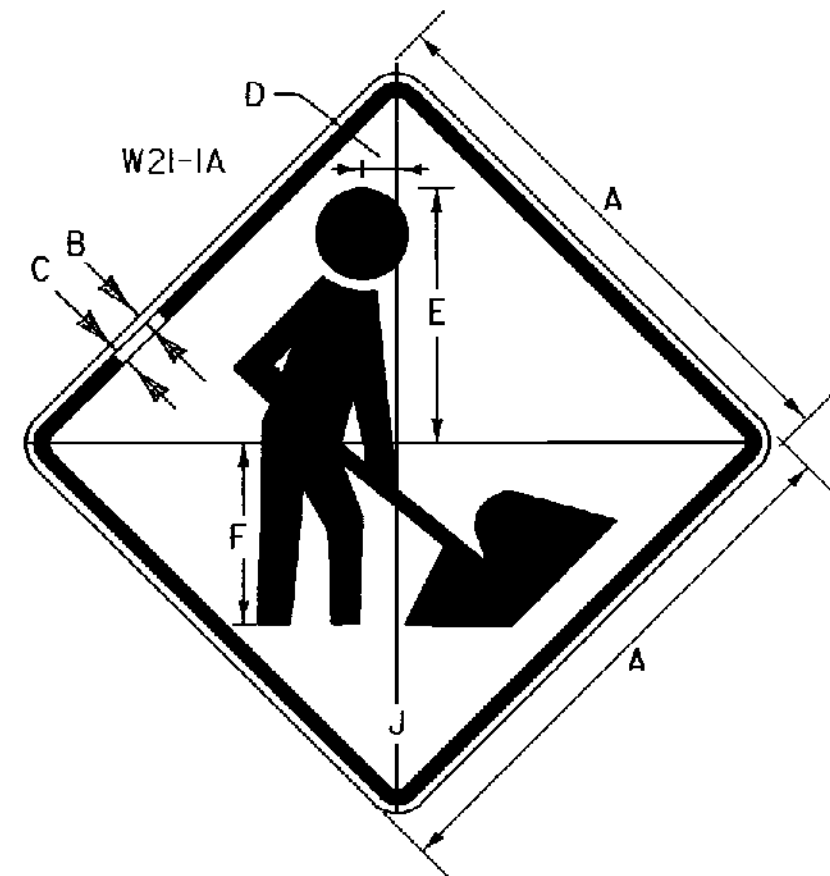


**STANDARD
E-107 A**

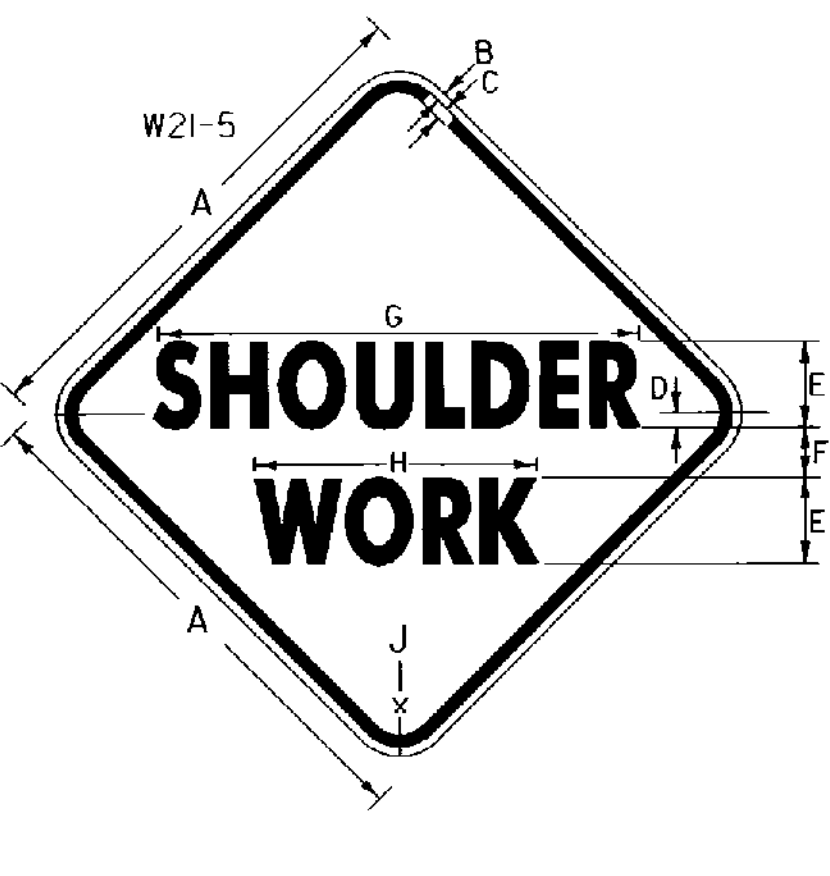


**4 - LANE HIGHWAY
MEDIAN MAINTENANCE**

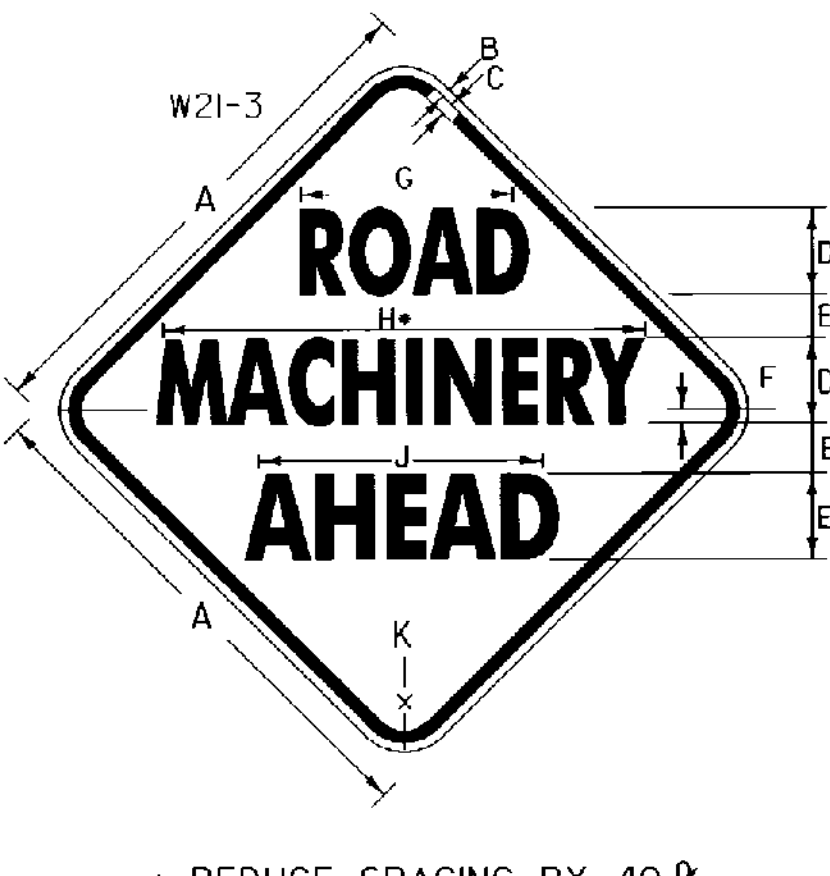
MOVE SIGNS AHEAD AS WORK PROGRESSES



SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	J
2 LANE	36	5/8	7/8	5 3/4	15 3/4	4 1/4		2 1/4
4 LANE	48	3/4	1 1/4	7 1/2	20	5		3

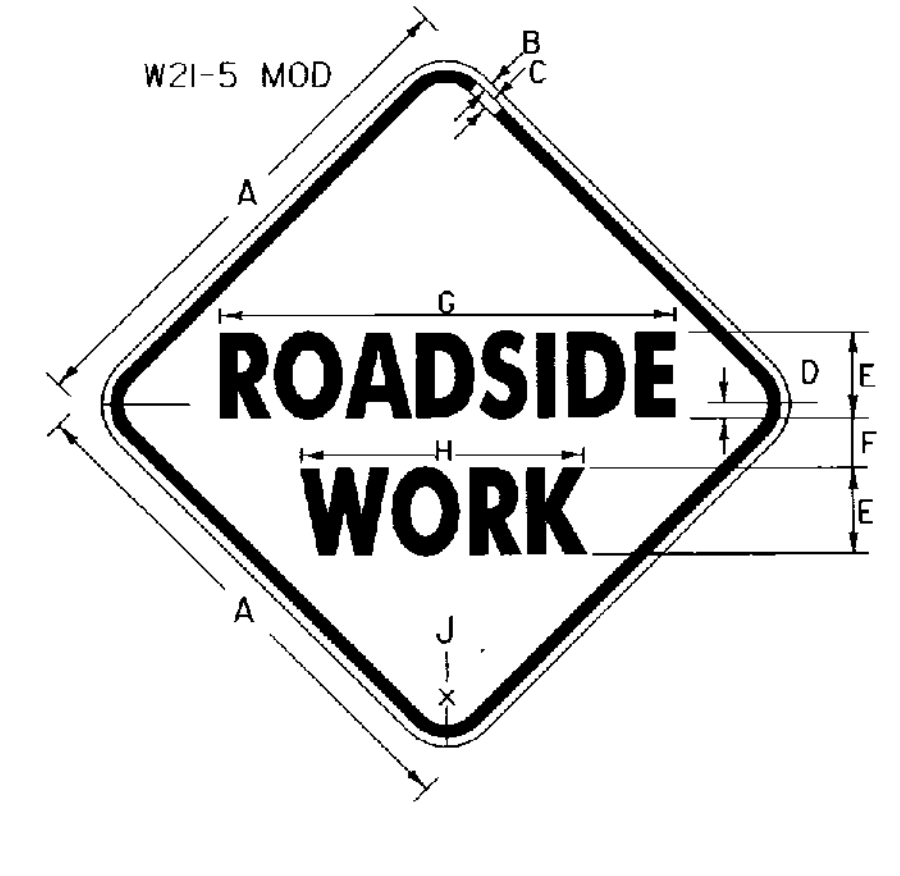


SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	J
2 LANE	36	5/8	7/8	1	5-D	3 1/2	3 1/4	17 3/4
4 LANE	48	3/4	1 1/4	1	7-C	4	3 3/8	20 1/4

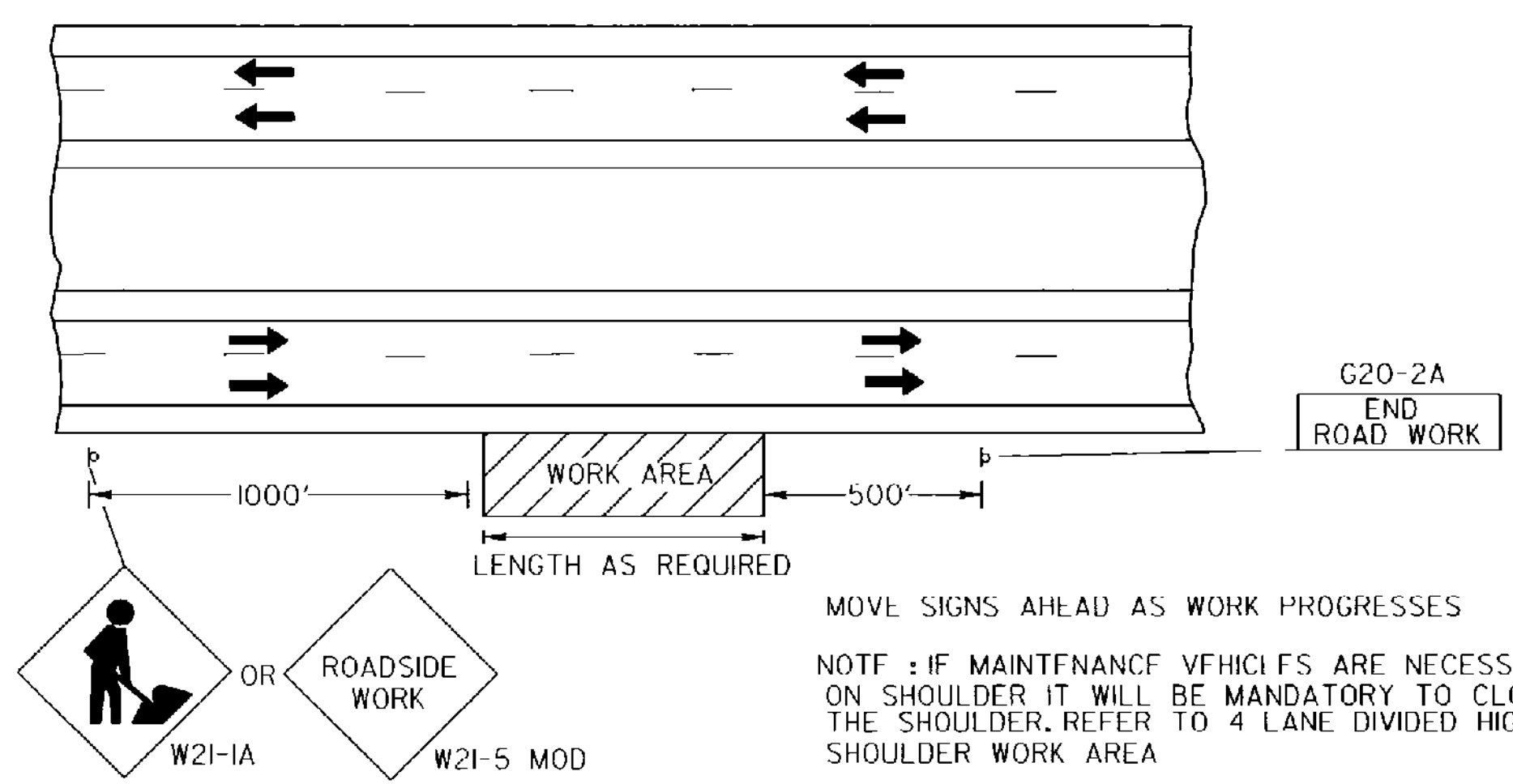


SIGN	DIMENSIONS (INCHES)								
	A	B	C	D	E	F	G	H	J
2 LANE	36	5/8	7/8	5-D	4	2 1/2	17 1/4	3 1/4	21 3/4
4 LANE	48	3/4	1 1/4	7-D	5	3 1/2	24 1/8	4 1/4	31

* REDUCE SPACING BY 40 %

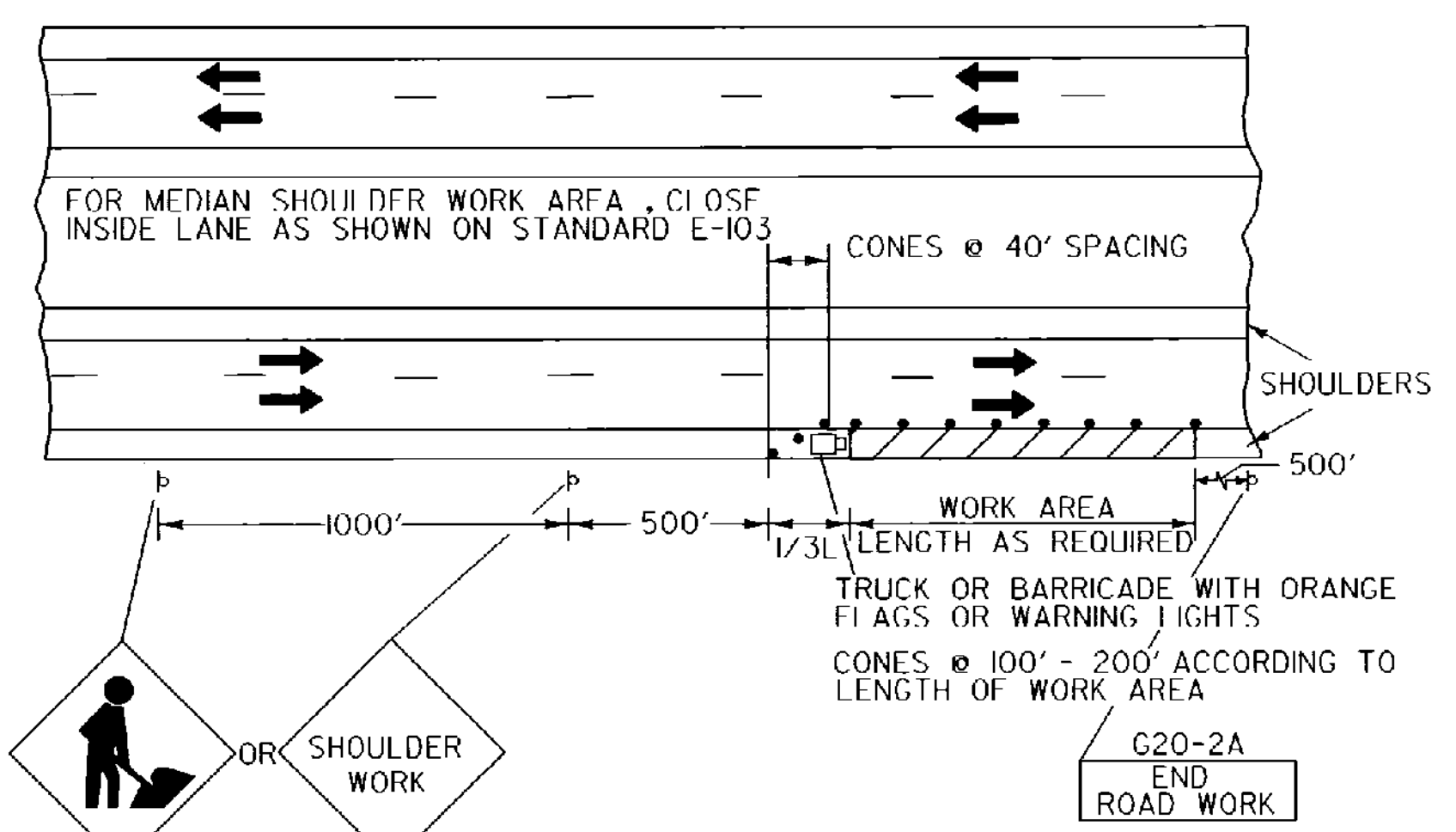


SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	J
2 LANE	36	5/8	7/8	1/2	5-D	3 1/2	3 1/4	17 3/4
4 LANE	48	3/4	1 1/4	1	7-C	4	3 5/8	20 1/4

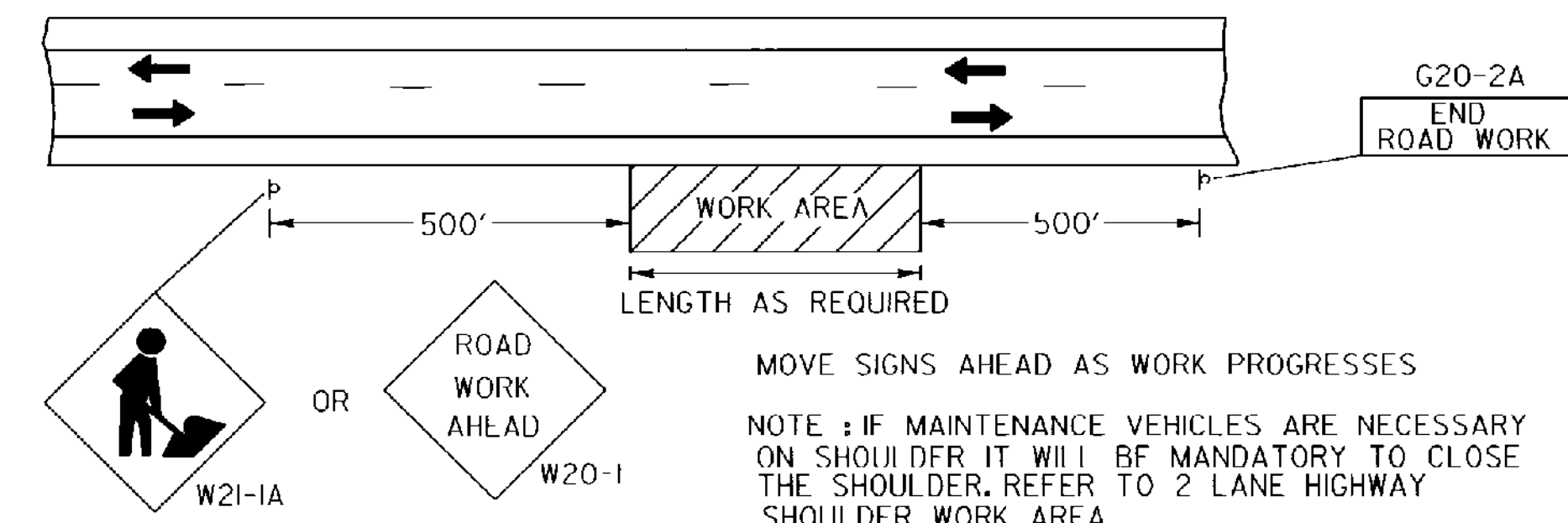


**4 - LANE HIGHWAY
MAINTENANCE OUTSIDE SHOULDER**

NOTE: IF MAINTENANCE VEHICLES ARE NECESSARY ON SHOULDER IT WILL BE MANDATORY TO CLOSE THE SHOULDER. REFER TO 4 LANE DIVIDED HIGHWAY SHOULDER WORK AREA

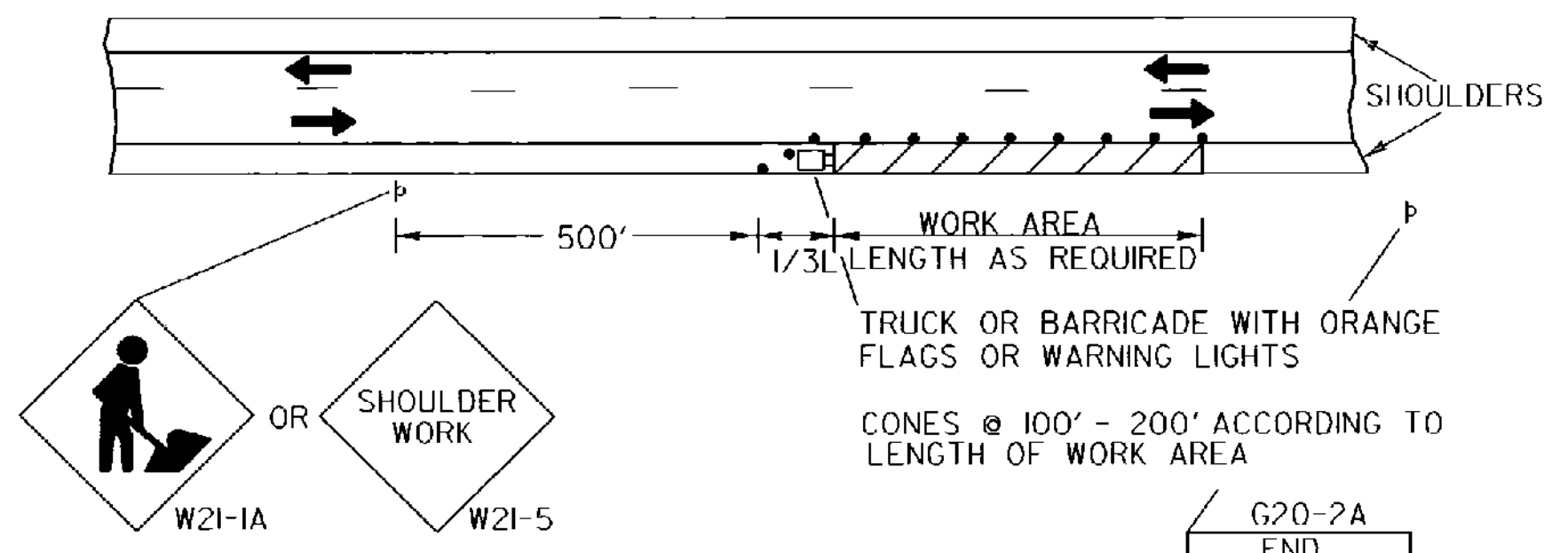


**4 - LANE DIVIDED HIGHWAY
SHOULDER WORK AREA**



**2 - LANE HIGHWAY
MAINTENANCE OUTSIDE SHOULDER**

NOTE: IF MAINTENANCE VEHICLES ARE NECESSARY ON SHOULDER IT WILL BE MANDATORY TO CLOSE THE SHOULDER. REFER TO 2 LANE HIGHWAY SHOULDER WORK AREA



**2 - LANE HIGHWAY
SHOULDER WORK AREA**

NOTES:

REFLECTORIZATION:
ALL REFLECTIVE MATERIAL SHALL CONSIST OF ENCAPSULATED LENS REFLECTIVE SHEETING. THE TEXT AND BORDERS MAY BE SCREENED, LETTERING FILM, OR HAND PAINTED.

COLORS:
THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE A BLACK TEXT AND BORDER ON A REFLECTORIZED ORANGE BACKGROUND. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE U.S. DEPT. OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

TEXT DESIGN:
LETTERS, SPACING, AND TEXT DIMENSIONS SHALL CONFORM TO THE LATEST VERSION OF FHWA'S STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS.

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

SIGN BASE MATERIAL:
THE SIGN BASE MATERIAL USED FOR THE WARNING SIGNS SHOWN ON THIS SHEET MAY BE OF ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED:

(1) FLA1 SHEET ALUMINUM	36X36	48X48	INCHES
	0.100	0.125	INCHES
(2) HIGH DENSITY OVERLAYED PLYWOOD	5/8	3/4	INCHES
(3) GALVANIZED SHEET STEEL	1/4	1/2	GAGE

OTHER STDS. E-100 E-103
REQUIRED:

REVISIONS AND CORRECTIONS
 JAN. 26, 1972 - DATE OF ORIGINAL ISSUE
 FEB. 29, 1972 - REVISED PER DIRECTION OF THE FEDERAL HIGHWAY ADMINISTRATION
 MAY 14, 1974 - REFLECTIVE MATERIAL CHANGE
 JUN. 8, 1977 - REFLECTIVE MATERIAL NOTE CHANGE SIGNS REFERENCED TO NUMBERS IN M.U.T.C.D.
 AUG. 10, 1977 - PERSON WORKING SIGN CHANGED TO SYMBOL
 DEC. 9, 1981 - MINOR SIGN DIMENTION CHANGES
 FEB. 3, 1986 - UPDATED TO 1986 SPECIFICATIONS
 AUG. 08, 1995 - UPDATED TO 1993 CHAPTER 6 - M.U.T.C.D.
 MAR. 11, 1997 - NUMBER CHANGE FROM E-10 TO E-111
 REMOVED ROAD WORK AND END ROAD WORK

APPROVED

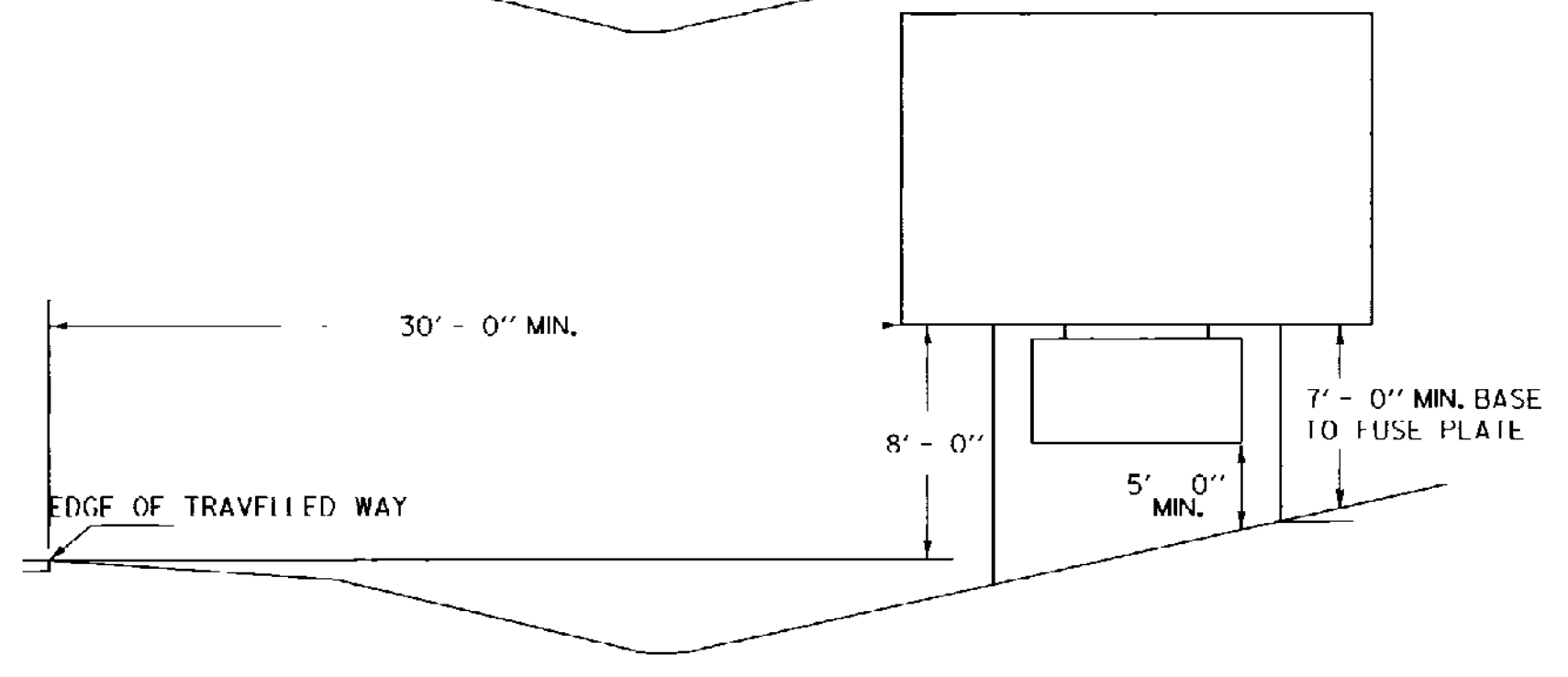
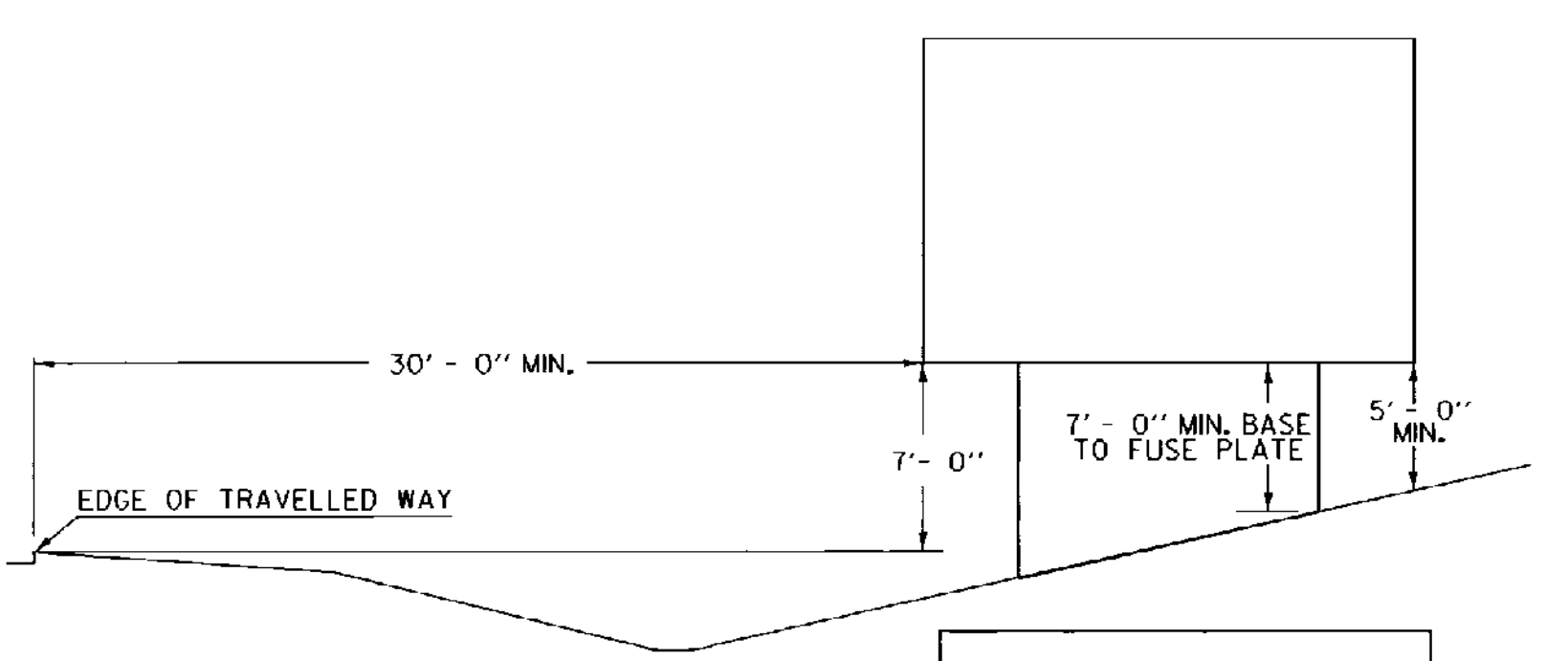
 DIRECTOR OF ENGINEERING

 DIRECTOR OF CONSTRUCTION AND MAINTENANCE

**MINOR
MAINTENANCE OPERATION**



**STANDARD
E-111**

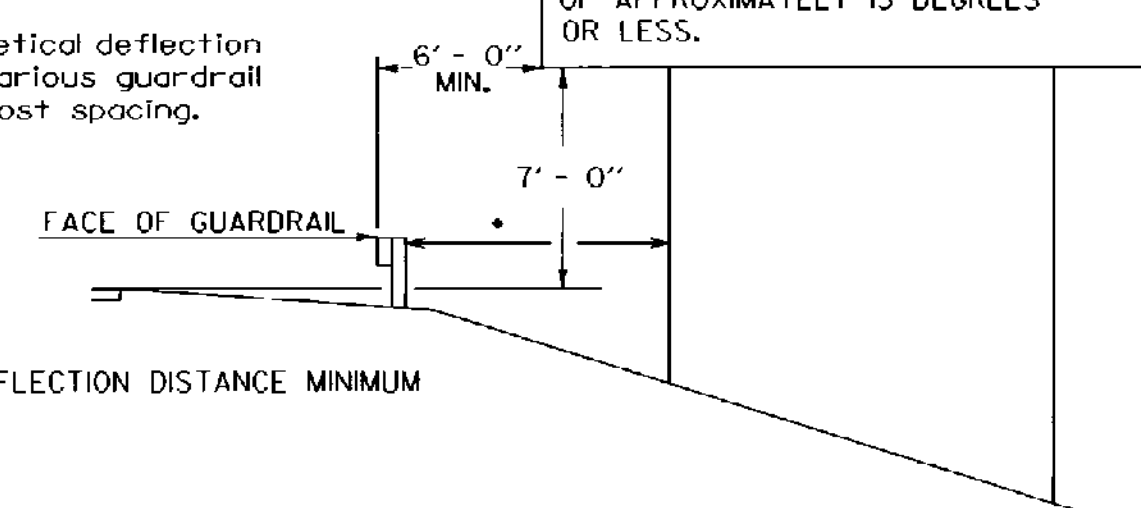


GUARDRAIL DEFLECTION CHART
(PER AASHTO - ROADSIDE DESIGN GUIDE 1988)

TYPE	SPACING	DEFLEC.
Three Cable w/Steel Posts	16'-0"	12 ft.
w/Wooden Posts	12'-6"	12 ft.
W-Beam w/WEAK Posts	12'-6"	7 ft.
w/Strong Posts	6'-3"	3 ft.
Box Beam	6'-0"	5 ft.
Three Beam w/Weak Posts	12'-6"	4 ft.
w/Strong Posts	6'-3"	2 ft.

WHEN PLACED BEHIND GUARDRAIL AND BEYOND THE DEFLECTION DISTANCE FOR THAT PARTICULAR RAIL, SIGN POSTS DO NOT HAVE TO BE PLACED ON YIELDING SUPPORTS. SIGN POSTS SHALL BE PLACED ON YIELDING SUPPORTS WHEN THEY CAN BE STRUCK BY AN ERRANT VEHICLE LEAVING THE ROADWAY AT AN ENCROACHMENT ANGLE OF APPROXIMATELY 15 DEGREES OR LESS.

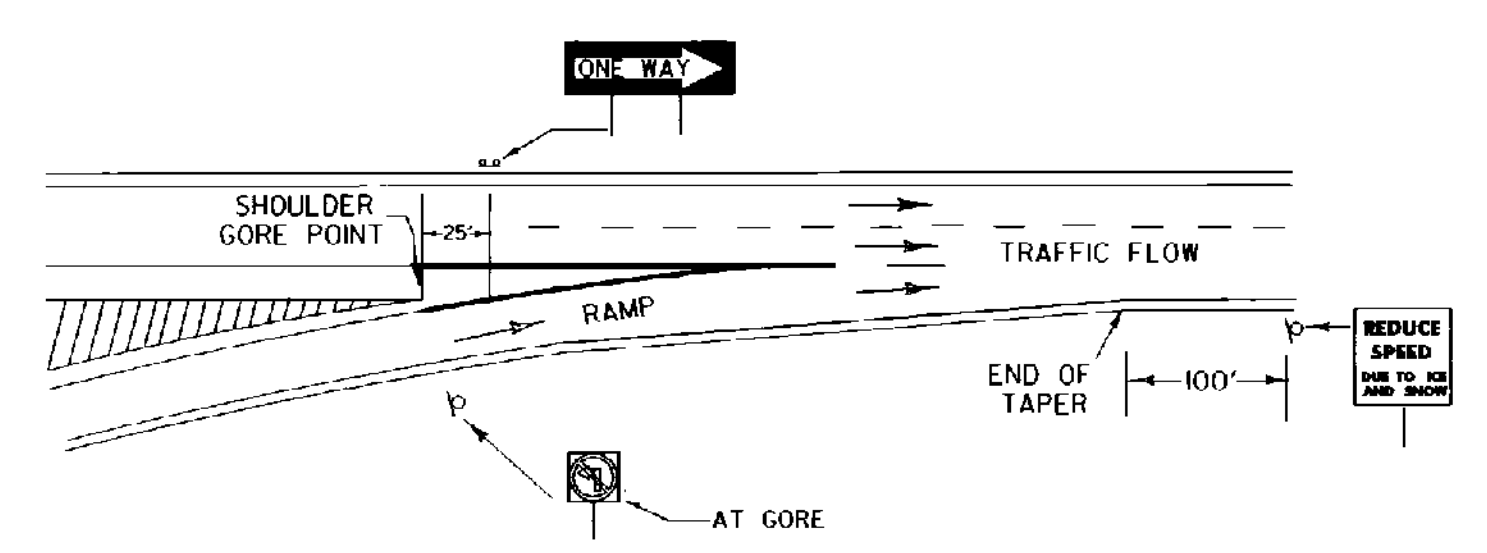
This chart lists the theoretical deflection distance upon impact of various guardrail with different type and post spacing.



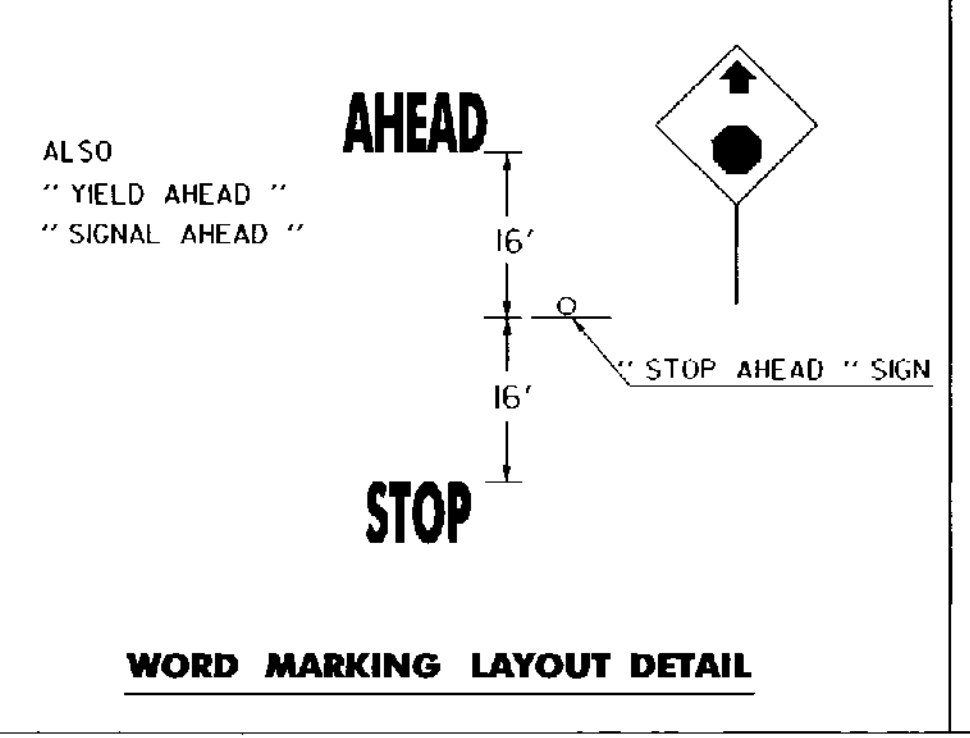
INSTALLATION DETAILS

NORMALLY SIGNS SHOULD BE MOUNTED AT 93° TO THE DIRECTION OF TRAFFIC. ON CURVED ALIGNMENT THE ANGLE OF PLACEMENT SHOULD BE DETERMINED BY THE PATH OF APPROACHING TRAFFIC RATHER THAN BY THE ROADSIDE EDGE AT THE POINT WHERE THE SIGN IS LOCATED. WHEN INSTALLING OVERHEAD SIGNS, CANT THE SIGN FROM THE TOP TOWARD APPROACHING TRAFFIC AT A THREE DEGREE TILT ANGLE.

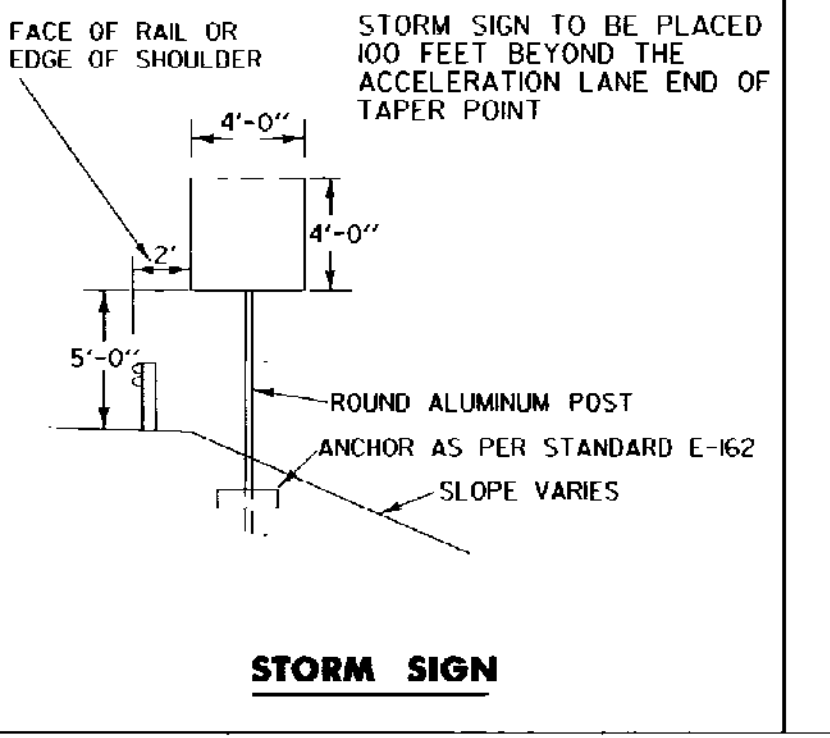
GUIDE SIGNS



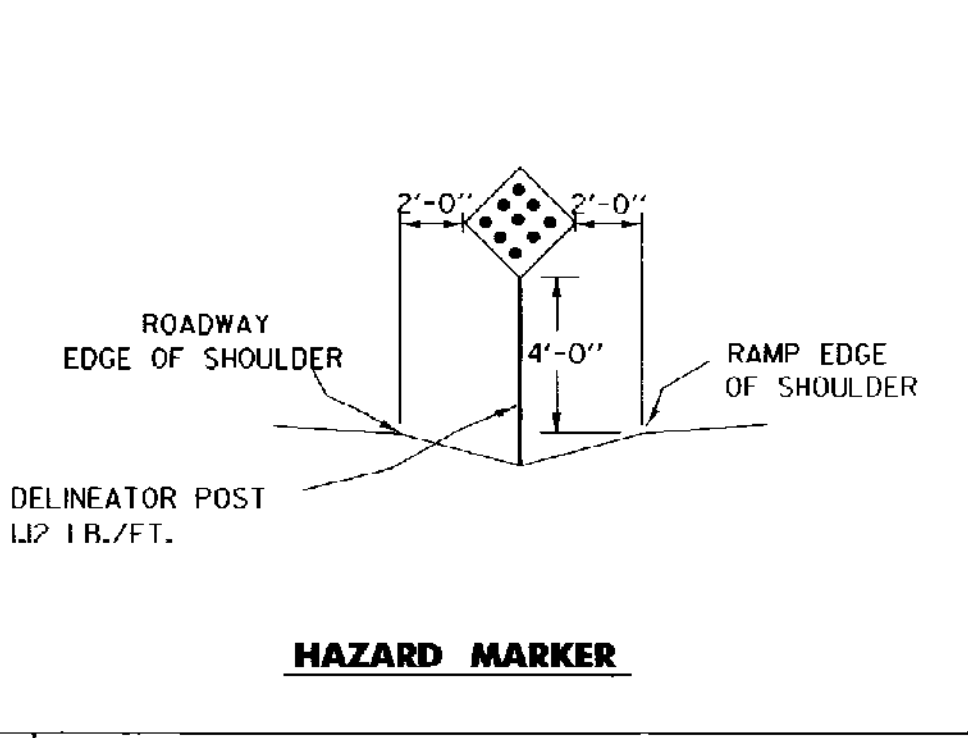
SIGN PLACEMENT AT END OF RAMP



WORD MARKING LAYOUT DETAIL



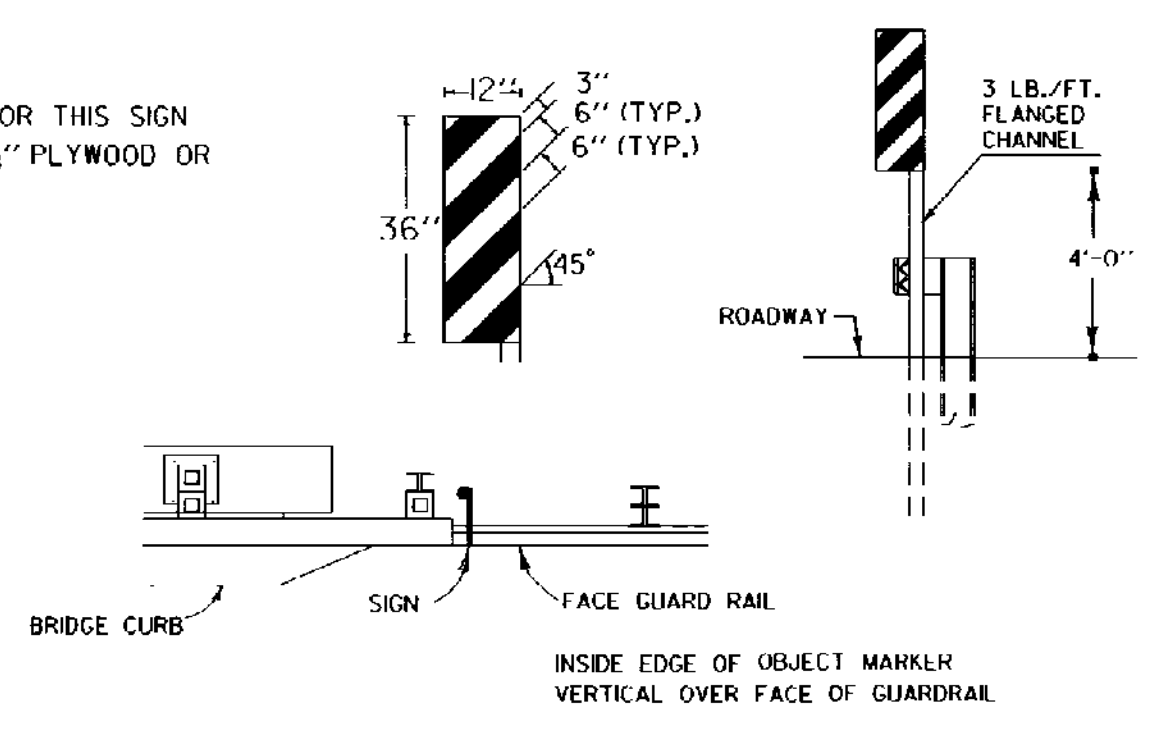
STORM SIGN



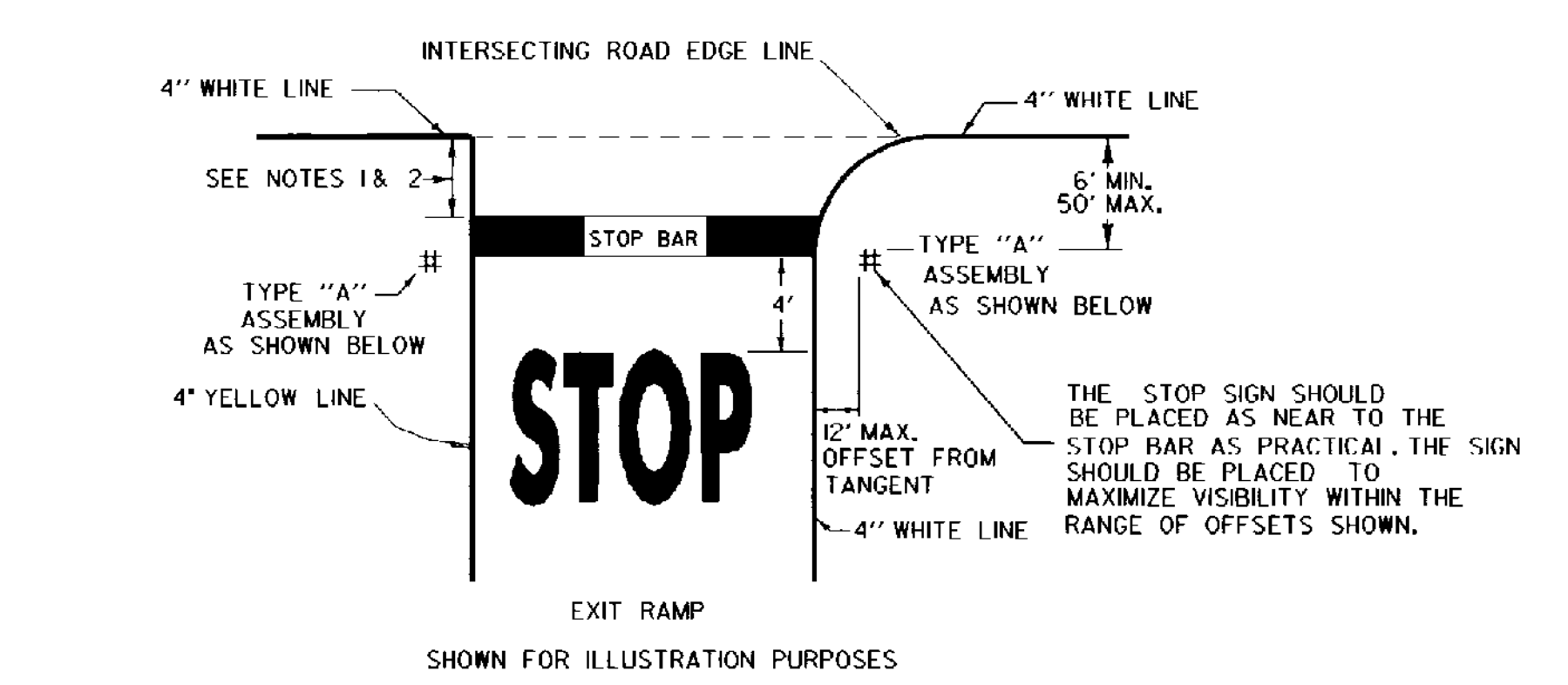
HAZARD MARKER

MATERIALS:
THE SIGN BASE MATERIAL USED FOR THIS SIGN MAY BE EITHER HIGH DENSITY 3/4" PLYWOOD OR 0.100" FLAT SHEET ALUMINUM.

COLORS:
THIS SIGN SHALL HAVE A REFLECTORIZED YELLOW BACKGROUND WITH BLACK PAINTED OR LETTERING FILM STRIPES.



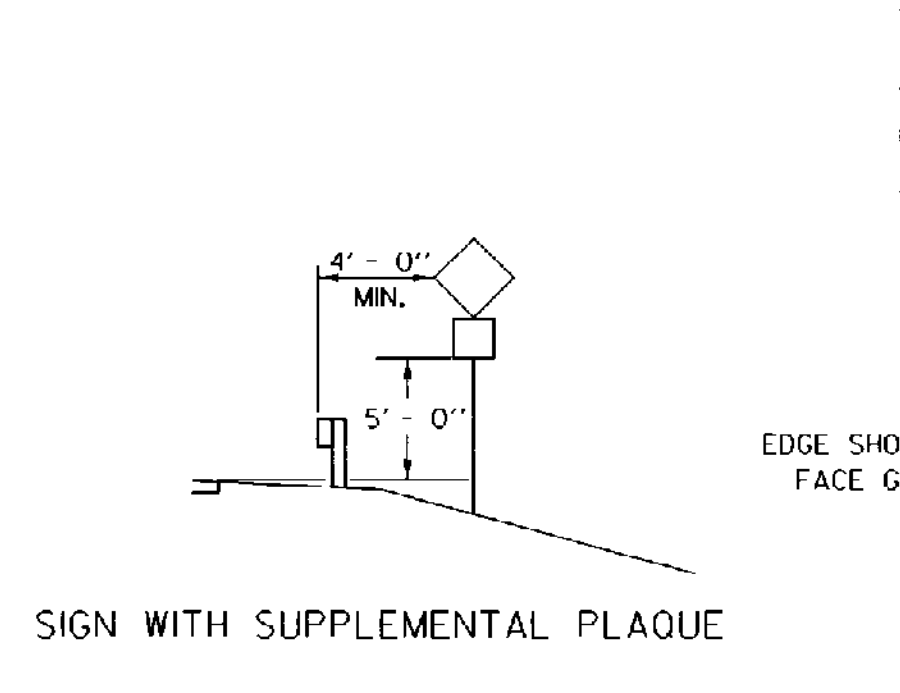
OBJECT MARKER
(TO BE USED WHEN FULL WIDTH SHOULDERS ARE NOT CARRIED ACROSS THE BRIDGE)



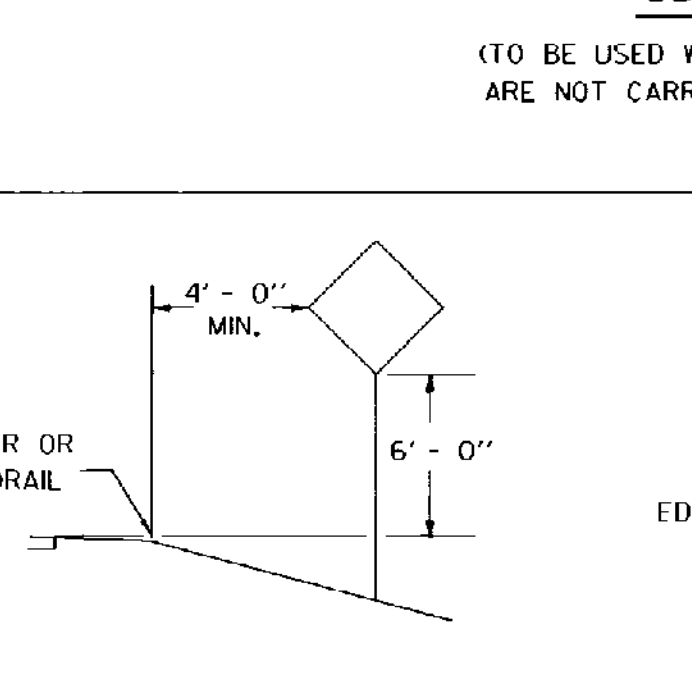
NOTES:

1. THE STOP BAR SHOULD BE PLACED AT THE DESIRED STOPPING POINT. IN NO CASE MORE THAN 30' OR LESS THAN 4' FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY.
2. AT A SIGNALIZED INTERSECTION, DELETE WORDING "STOP" AND THE STOP SIGN AND PLACE STOP BAR A MINIMUM OF 40' FROM THE NEAREST SIGNAL HEAD FOR THE APPROACH.
3. EXCLUDE THE STOP BAR FOR A YIELD CONDITION.

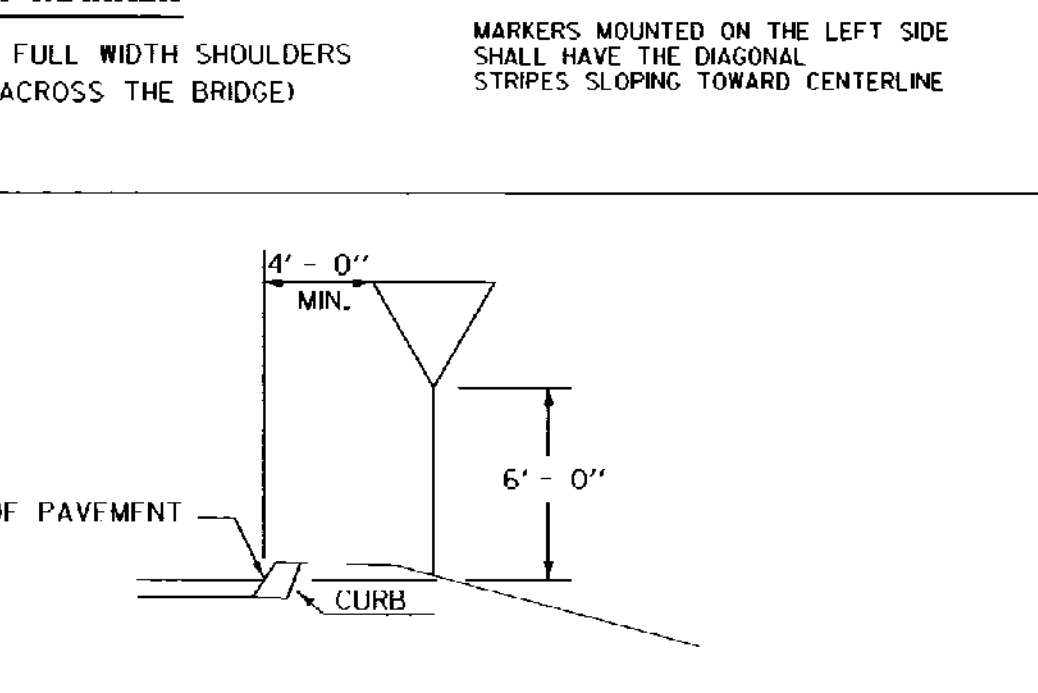
PAVEMENT MARKING & STOP SIGN LOCATION DETAILS FOR OFF RAMP



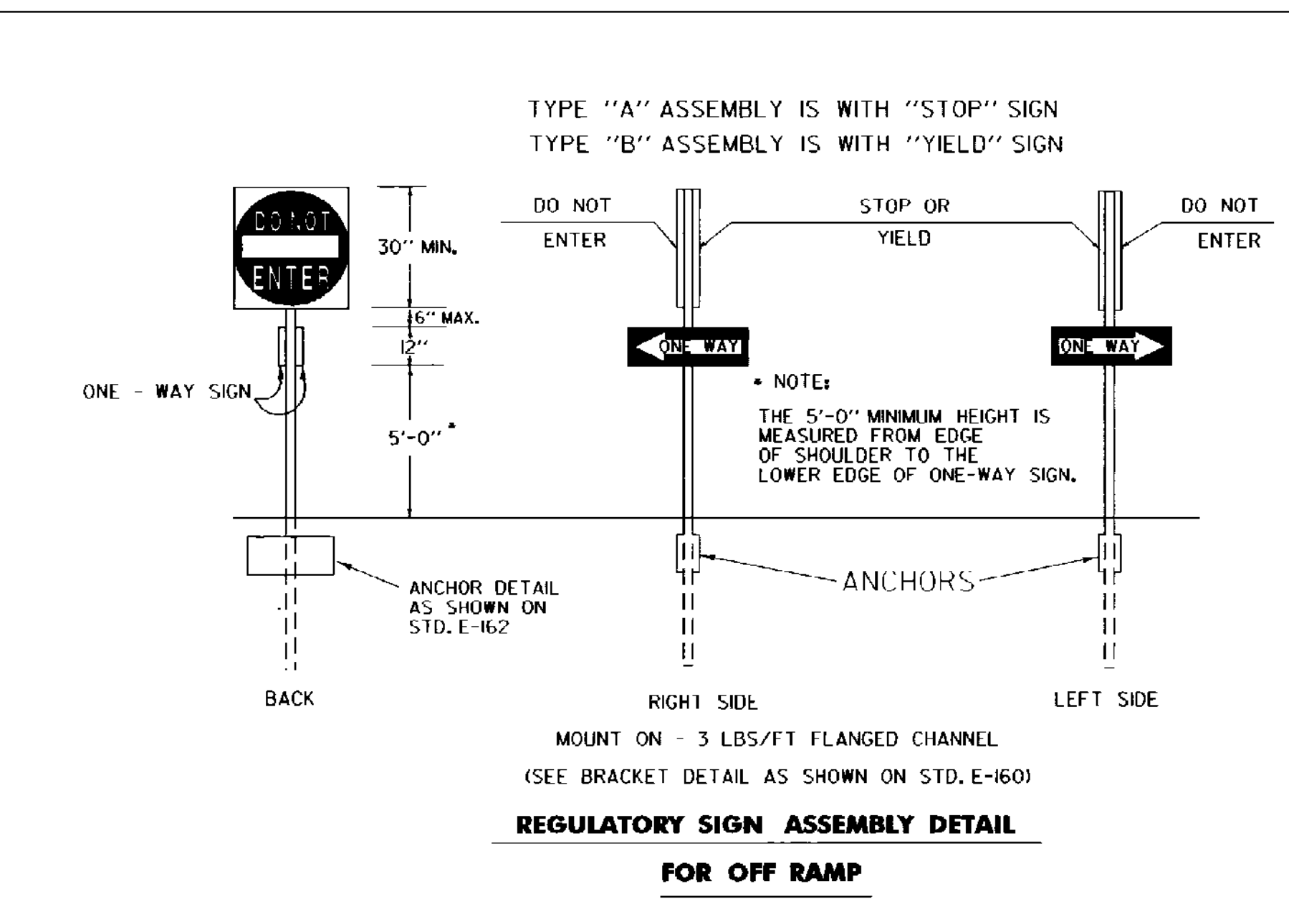
SIGN WITH SUPPLEMENTAL PLAQUE



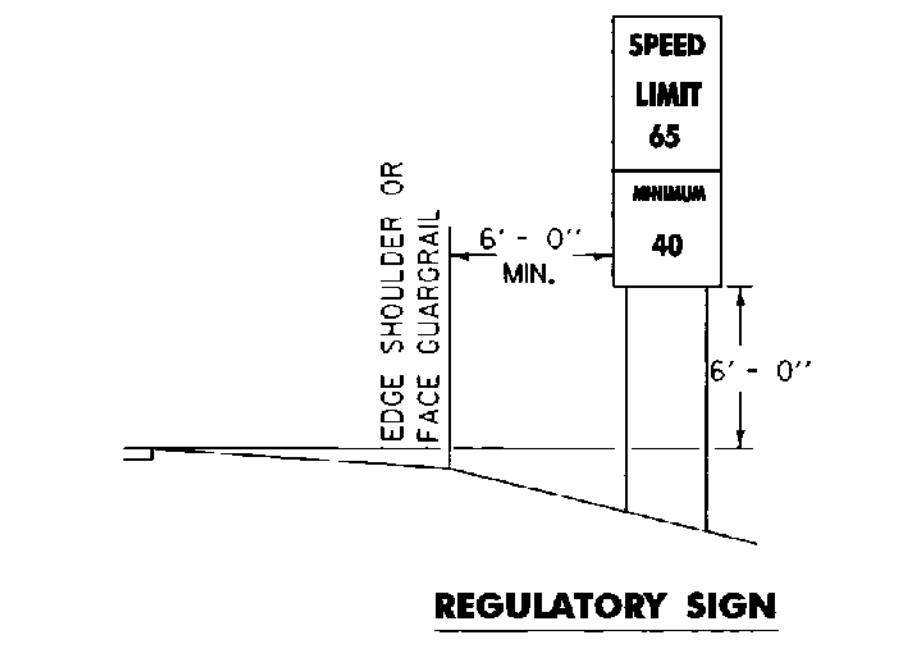
STANDARD SIGN PLACEMENT RAMP



STANDARD SIGN PLACEMENT MAINLINE

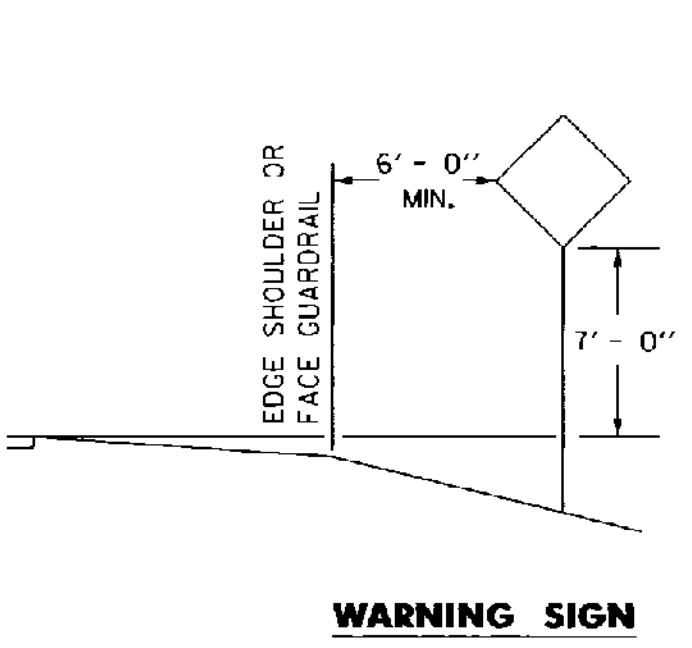


REGULATORY SIGN ASSEMBLY DETAIL FOR OFF RAMP

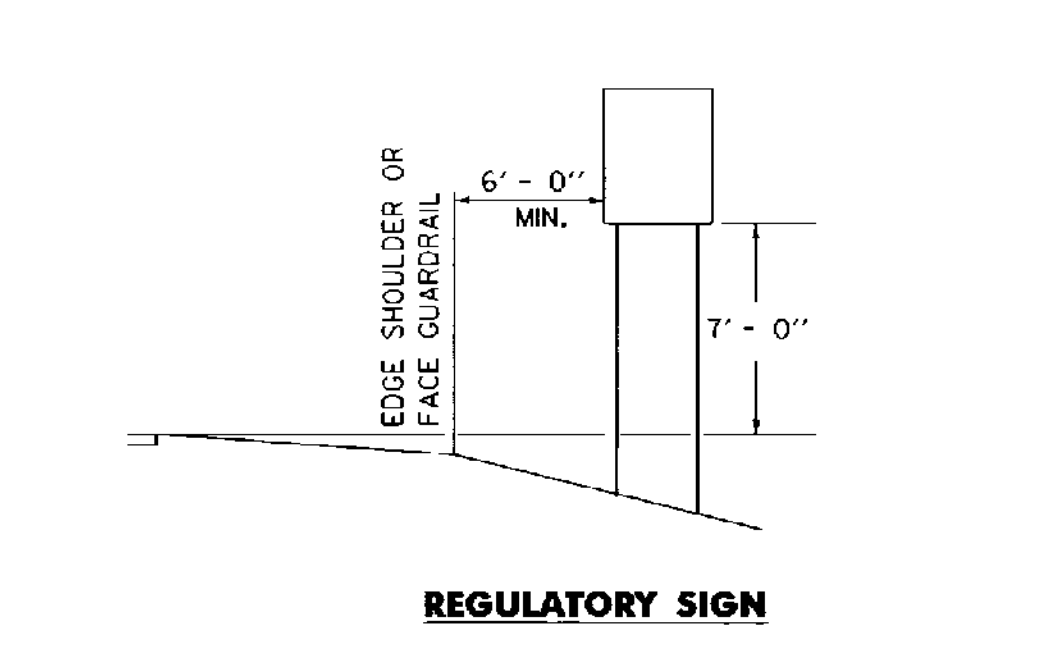


REGULATORY SIGN

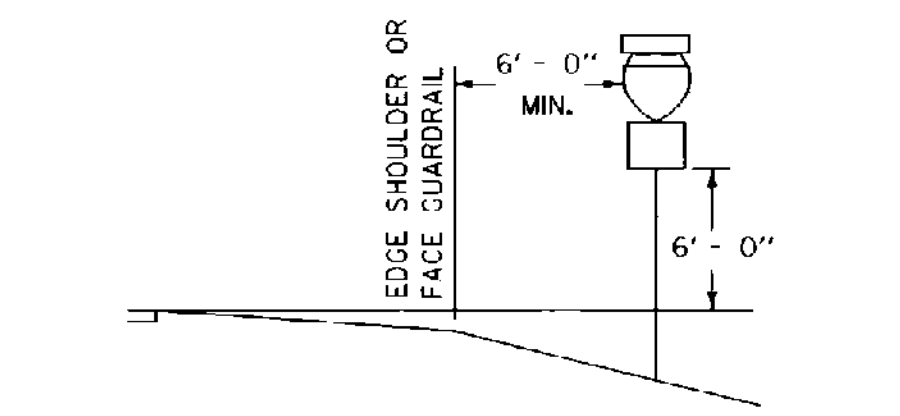
SPEED LIMIT SIGN TO BE PLACED 1600 FEET BEYOND THE END OF THE ACCELERATION LANE TAPER POINT.



WARNING SIGN

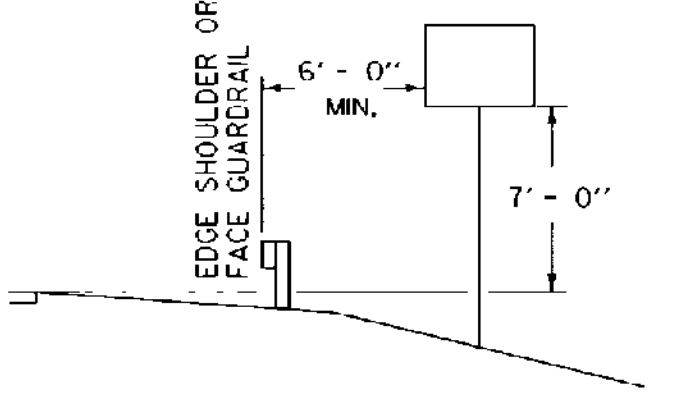


REGULATORY SIGN

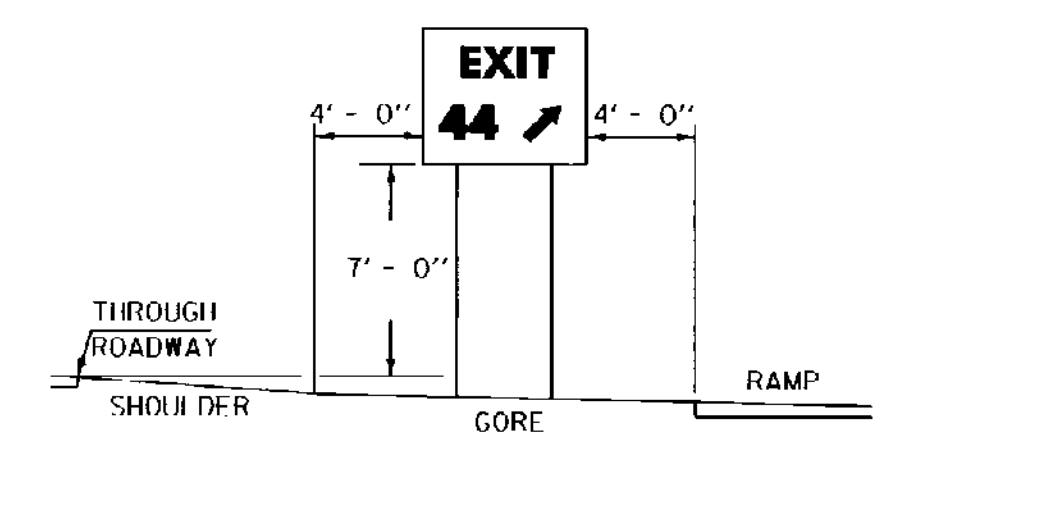


ROUTE MARKER

ROUTE REASSURANCE MARKER TO BE PLACED 600' BEYOND THE END OF THE ACCELERATION LANE TAPER POINT



GUIDE SIGN



GORE SIGN

STANDARD SIGN PLACEMENT MAINLINE

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

REVISIONS AND CORRECTIONS

APR. 01, 1988 - DATE OF ORIGINAL ISSUE

JUNE 24, 1989 - FHWA - CHANGE TO 7" FUSE PLATE CLEARANCE

AUG. 08, 1995 - DELETED TWO RAIL ALUMINUM FROM DEFLECTION CHART AND MINOR NOTF REVISIONS

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

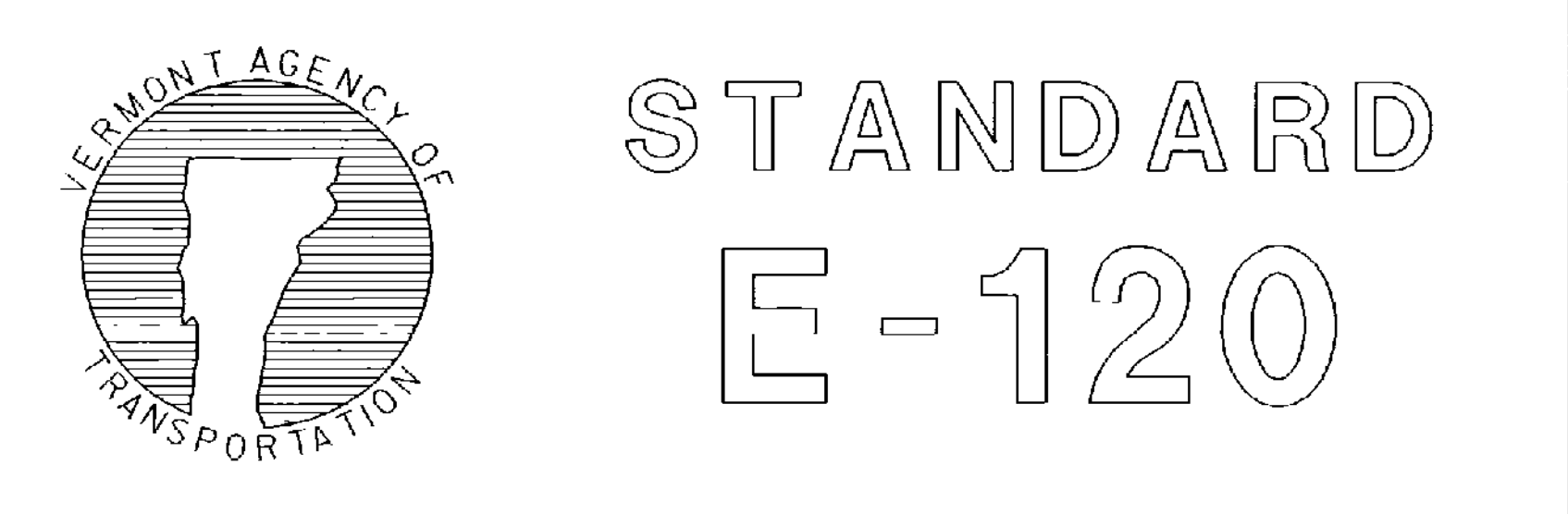
APPROVED

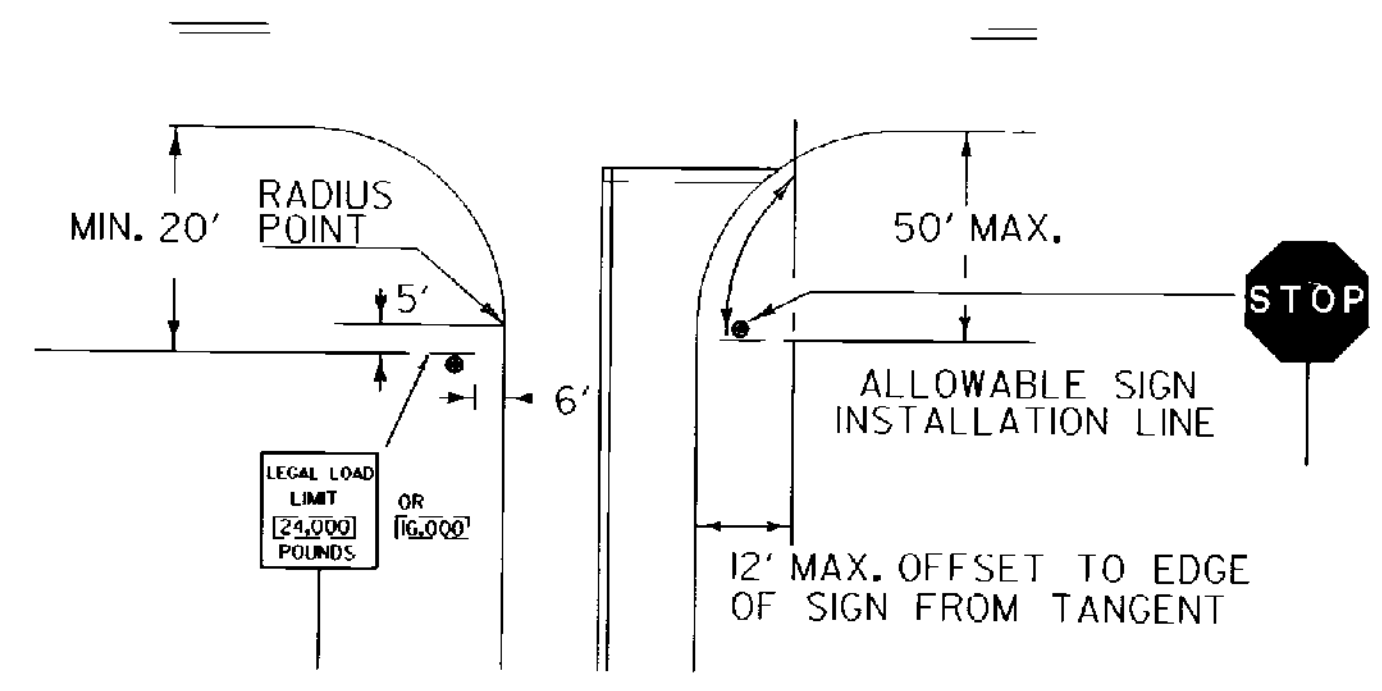
Stephen D. MacArthur
DIRECTOR OF ENGINEERING

David A. Ross
TRAFFIC AND SAFETY ENGINEER

STANDARD SIGN PLACEMENT EXPRESSWAY AND FREEWAY

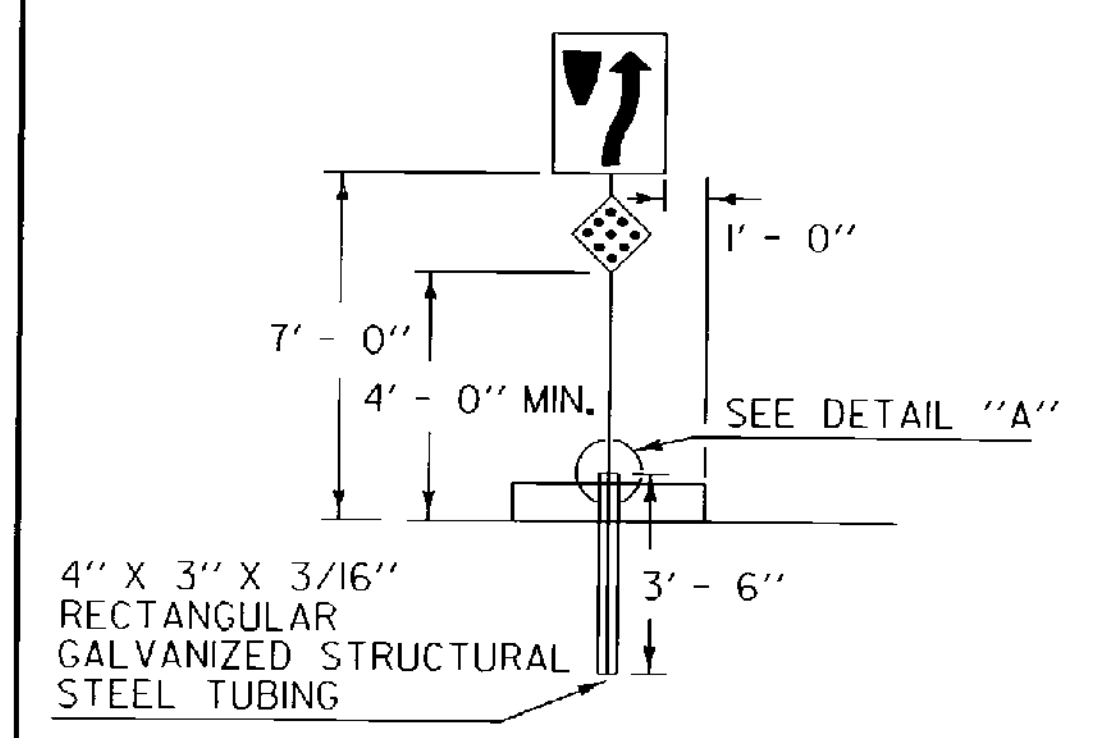
/traf/std/stdel20.dgn : stdel20.i



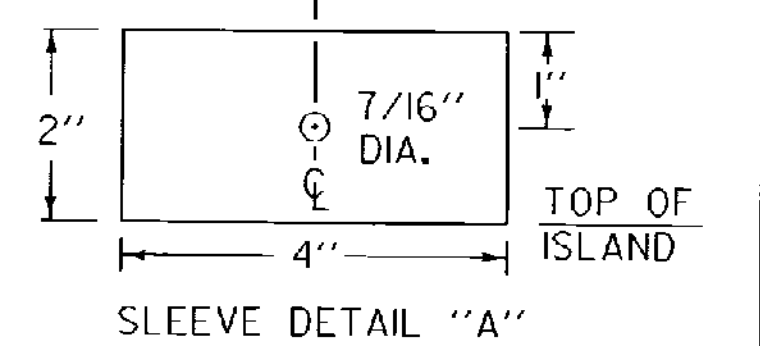
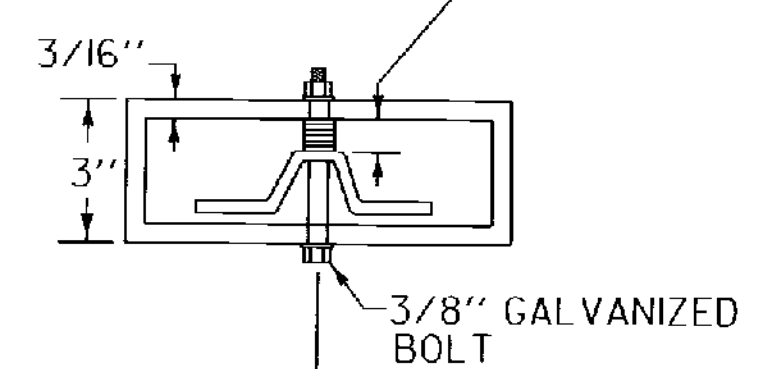


STOP SIGN SHALL BE PLACED ON DRIVERS RIGHT, MAINTAINING MAXIMUM VISIBILITY. CLEARANCE SHALL BE A MINIMUM OF 6' AND A MAXIMUM OF 50' FROM EDGE LINE OF INTERSECTING ROADWAY AND DOES NOT HAVE TO BE ADJACENT TO THE STOP BAR.

LEGAL LOAD LIMIT AND STOP SIGNS AT INTERSECTIONS WITH TOWN HIGHWAYS

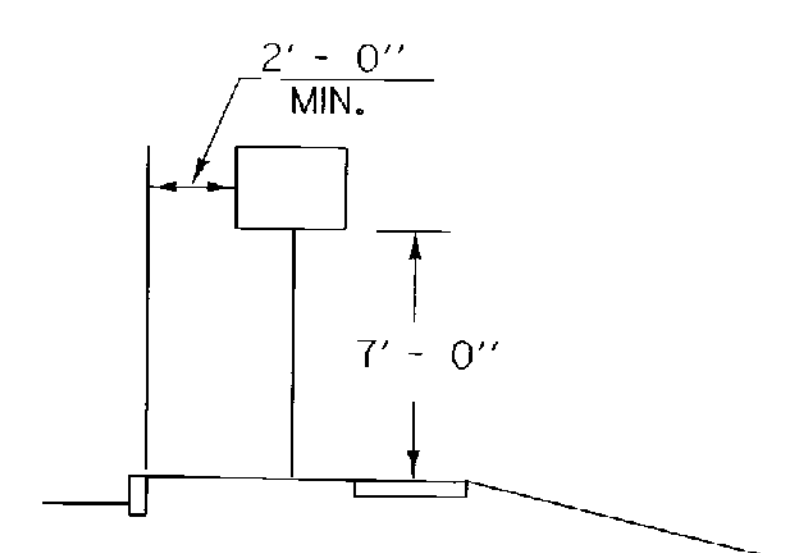
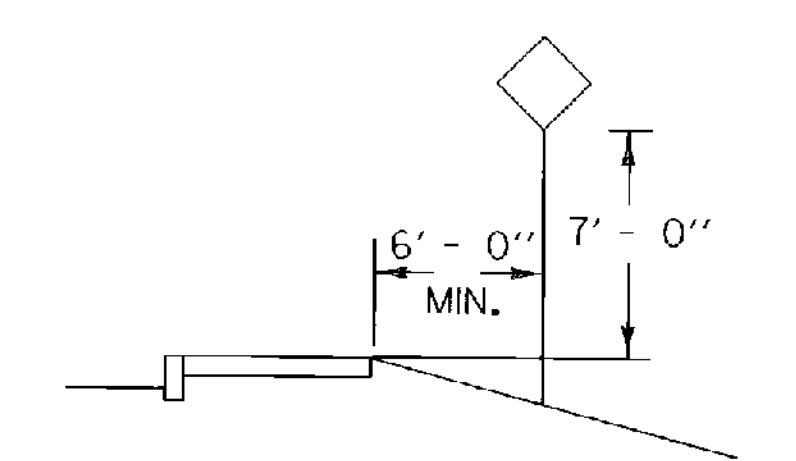
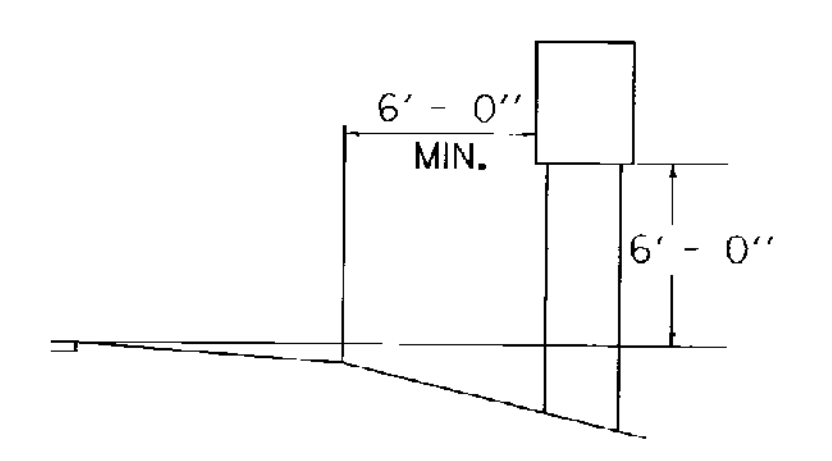


TO INSURE A TIGHT CONNECTION GALVANIZED WASHERS SHALL BE USED AS SPACERS.

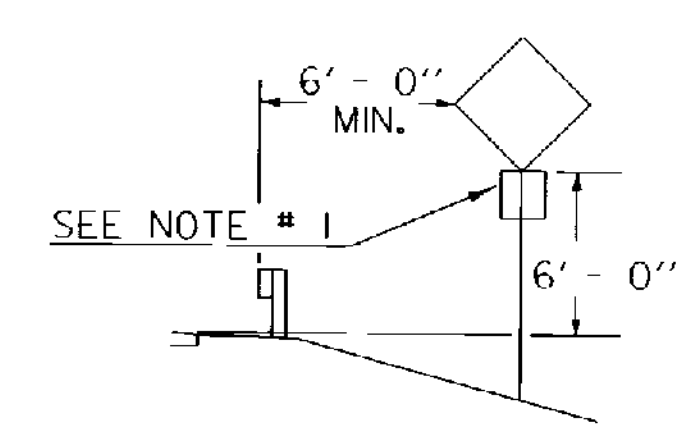
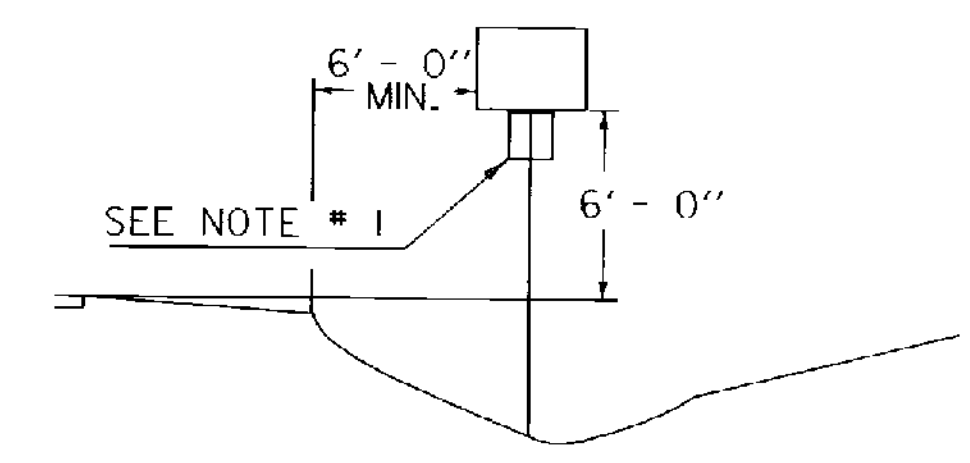


SIGNS ON MEDIAN ISLANDS IN THE LINE OF TRAFFIC

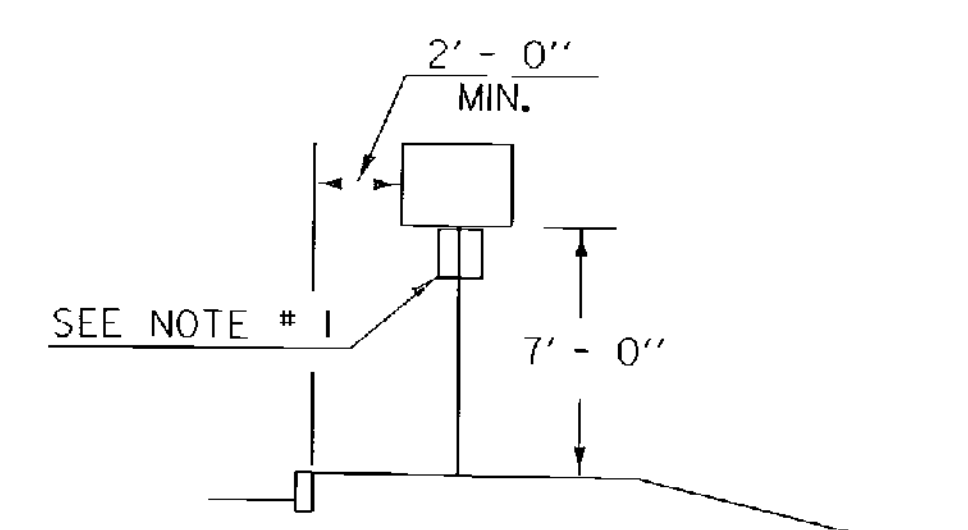
INCREASE VERTICAL CLEARANCE TO 7' IN AREAS OF FREQUENT ROADSIDE PARKING OR PEDESTRIAN ACTIVITY



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



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 OR MINIMAL SHOULDER, THE LATERAL CLEARANCE TO THE EDGE OF A SIGN SHOULD BE A MINIMUM OF 12' FROM THE EDGE OF THE TRAVELED WAY.
3. ALSO SEE OTHER STANDARD SHEETS FOR MOUNTING CLEARANCE AND SPACING OF DESTINATION AND ROUTE MARKER ASSEMBLIES AND TOWN LINE SIGNS.

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

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

REVISIONS AND CORRECTIONS

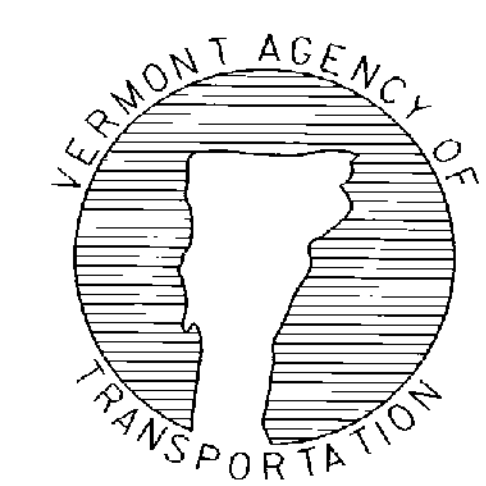
JAN. 23, 1995 - DATE OF ORIGINAL ISSUE
AUG. 08, 1995 - VARIOUS MINOR NOTE REVISIONS

APPROVED

Stephen D. McArthur
DIRECTOR OF ENGINEERING

David A. Ross
TRAFFIC AND SAFETY ENGINEER

**STANDARD SIGN PLACEMENT
CONVENTIONAL ROAD**



**STANDARD
E-121**

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



60" O.D. RELINE CORLIX PIPE

VT RT 58, 2.2 MILES WEST OF VT RT 14 IRASBURG, VT

INDEX:	
1	COVER SHEET
2	PIPE LAYOUT
3	PIPE BRACING
4	DETAILS

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (4) PAGES.

CUSTOMER

DATE

SPECIFICATION FOR CORRUGATED ALUMINUM PIPE - ALUMINUM:

SCOPE:
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED ALUMINUM PIPE (CAP) DETAILED IN THE PROJECT PLANS.

MATERIALS:
THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M 197 OR ASTM B 744.

PIPE:
THE CAP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M-196 OR ASTM A 745. THE PIPE SIZES, GAUGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

HANDLING & ASSEMBLY:
SHALL BE IN ACCORDANCE WITH NCSPA'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) RECOMMENDATIONS.

INSTALLATION:
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A 788 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS, THE CONTRACTOR MUST BRING THEM TO THE ATTENTION OF THE PROJECT ENGINEER.

IT IS ALWAYS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

CONSTRUCTION LOADS:
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURERS OR NCSPA'S GUIDELINES.

SUGGESTED GROUT MIX DESIGN AND PLACEMENT REQUIREMENTS:

DESCRIPTION:
THIS WORK SHALL CONSIST OF THE IN-PLACE GROUTING OF CORRUGATED METAL PIPE INSERTS WITHIN EXISTING CULVERT PIPES AS SHOWN ON THE PLANS.

THE REQUIREMENTS OF THE WORK ARE SUCH THAT THE ENTIRE PORTION OF THE CELLS WHICH SURROUND THE CULVERT PIPE INSERTS SHALL BE COMPLETELY FILLED WITH GROUT FOR THE FULL LENGTHS OF THE CULVERT PIPE INSERTS.

MATERIALS:
MATERIALS USED FOR GROUT MANUFACTURE SHALL CONFORM TO THE REQUIREMENTS OF THE FOLLOWING SPECIFICATIONS:

MATERIAL
PORTLAND CEMENT, TYPE 2
FLYASH
GROUT SAND
WATER

GROUT MIX DESIGN:
THIS SHALL BE PROPORTIONED BY WEIGHT IN ACCORDANCE WITH THE FOLLOWING ONE (1) CUBIC YARD MIX:

THE GROUT SHALL BE A NON-SHRINK GROUT
CEMENT 479 LBS.
FLYASH 774 LBS.
GROUT SAND 1,949 LBS.

SLUMPS SHALL BE BETWEEN 6.5" AND 8.0".

THE CONTRACTOR MAY PROPOSE AN ALTERNATE TO THE MIX DESIGN SPECIFIED ABOVE FOR APPROVAL.

GROUTING EQUIPMENT SHALL BE CAPABLE OF PLACING GROUT AT ALL LOCATIONS REQUIRED BY THE PLANS. ALL EQUIPMENT SHALL BE APPROVED BY THE ENGINEER AT LEAST FIVE (5) WORKING DAYS PRIOR TO ITS INTENDED USE. A WORKING DEMONSTRATION OF THE PUMPING EQUIPMENT'S CAPABILITY WILL BE REQUIRED AS PART OF THE APPROVAL PROCEDURE.

ALL GROUTING SHALL BE BATCHED FROM AN APPROVED AUTOMATED BATCH PLANT.

MINIMUM REQUIRED COMPRESSIVE STRENGTH PER PROJECT PLANS.

CONSTRUCTION DETAILS:
THE CONTRACTOR MAY PLACE THE GROUT IN ACCORDANCE WITH THE SCHEME SHOWN ON THE PLANS OR MAY SUBMIT AN ALTERNATE SCHEME TO THE ENGINEER FOR APPROVAL.

GROUT SHALL BE TRANSFERRED FROM THE POINT OF MIXING TO THE POINTS OF DEPOSITION ONLY BY APPROVED EQUIPMENT. THE GROUT SHALL BE PUMPED IN SUCH A MANNER THAT:

1. THE GROUT DOES NOT DILUTE OR SEPARATE
2. THE PIPE INSERT DOES NOT MOVE
3. THE ABUTTING ENDS OF THE PIPE ARE NOT DEFORMED
4. ALL VOIDS BETWEEN THE LINER PIPE AND EXISTING CULVERT ARE COMPLETELY FILLED
5. THE GROUT DIFFERENTIAL LEVEL BETWEEN SIDES OF THE PIPE DOES NOT EXCEED 8"
6. THE GROUT PRESSURE CAN BE VARIED TO EFFECTIVELY MOVE THE GROUT AGAINST A HEAD PRESSURE OF NO MORE THAN 5 LBS. PER SQUARE INCH.

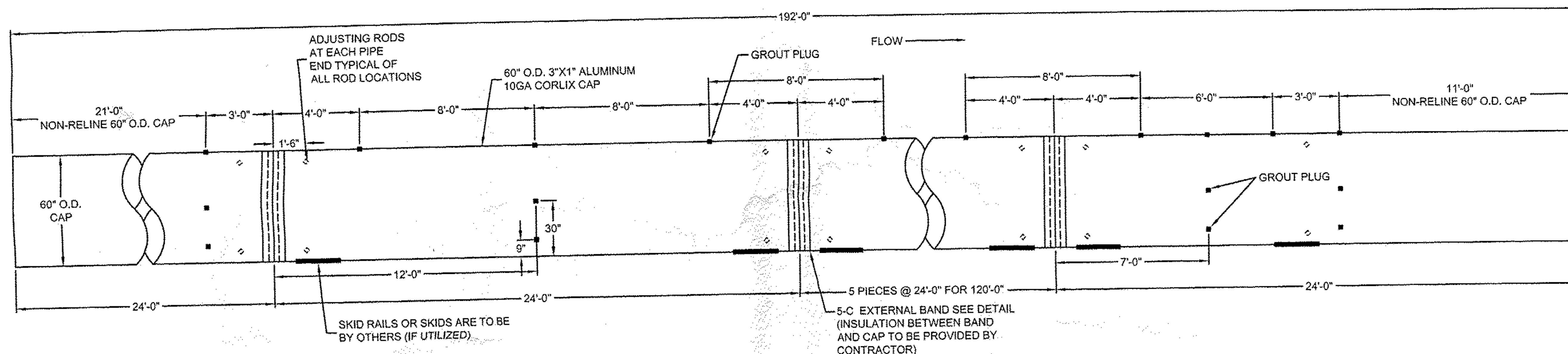
IF IT BECOMES NECESSARY TO CHANGE THE RATE OF PUMPING, THE PRESSURE WILL BE INCREASED AT A RATE NOT TO EXCEED ONE PSI PER MINUTE UP TO THE EQUIPMENT RATE.

AGITATION SHALL BE CONTINUOUS AND SHALL BE CONTINUED DURING SHUT-DOWNS. IF A SHUT-DOWN EQUALS OR EXCEEDS FIFTEEN (15) MINUTES, THE GROUT SHALL BE RECIRCULATED THROUGH THE PUMP AND DELIVERY LINES. IF REQUIRED BY THE ENGINEER, THE DELIVERY LINES SHALL BE FLUSHED CLEAN OF GROUT WITH CLEAN WATER. IF, IN THE OPINION OF THE ENGINEER, THE GROUT HAS BEGUN TO SET IN THE AGITATOR, PUMP, OR LINES, IT SHALL NOT BE PLACED REGARDLESS OF THE REASON.

CONTRACTOR SHOULD "SOUND" STRUCTURE TO BE ABLE TO OBSERVE GROUT PLACEMENT AND MOVEMENT.

NOTES:

- 1) FIELD CAULKING OF PIPE JOINTS MAY BE REQUIRED TO PROVIDE ADEQUATE GROUT SEAL.
- 2) FLOTATION CONTROL IS CRITICAL AND THE RESPONSIBILITY OF THE INSTALLER. THE INFORMATION IS SUBMITTED AS A GUIDELINE ONLY. CONTECH IS NOT RESPONSIBLE FOR THE USE AND INTERPRETATION OF THIS INFORMATION.
- 3) PIPE MUST BE CONTINUOUSLY MONITORED DURING GROUT OPERATION TO OBSERVE/CONTROL ANY PIPE OR PIPE WALL MOVEMENT.
- 4) BLOCKING LAYOUT AND DESIGN BY CONTRACTOR.
- 5) THE RELINE PIPE IS MADE FROM 60" O.D., 10GA, ALUMINUM 3"X1" PIPE.
- 6) COUPLINGS WILL BE 5-C ALT2 EXTERNAL BAND.
- 7) TO ACHIEVE A GROUT UNIT WEIGHT OF LESS THAN 110 PCF, A FOAMING AGENT OR OTHER MODIFICATION OF THE MIX DESIGN WILL BE REQUIRED. THE MIX PROVIDED IS FOR REFERENCE PURPOSES ONLY.



PROFILE LAYOUT FOR RELINE STRUCTURE

SCALE: 1"=5'

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MARK	DATE	REVISION DESCRIPTION	BY
2	02/16/11	REVISED PER COMMENTS	FAM
1	01/12/11	REVISED PER COMMENTS	FAM

CONTECH
CONSTRUCTION PRODUCTS INC.
www.contech-cpl.com

9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

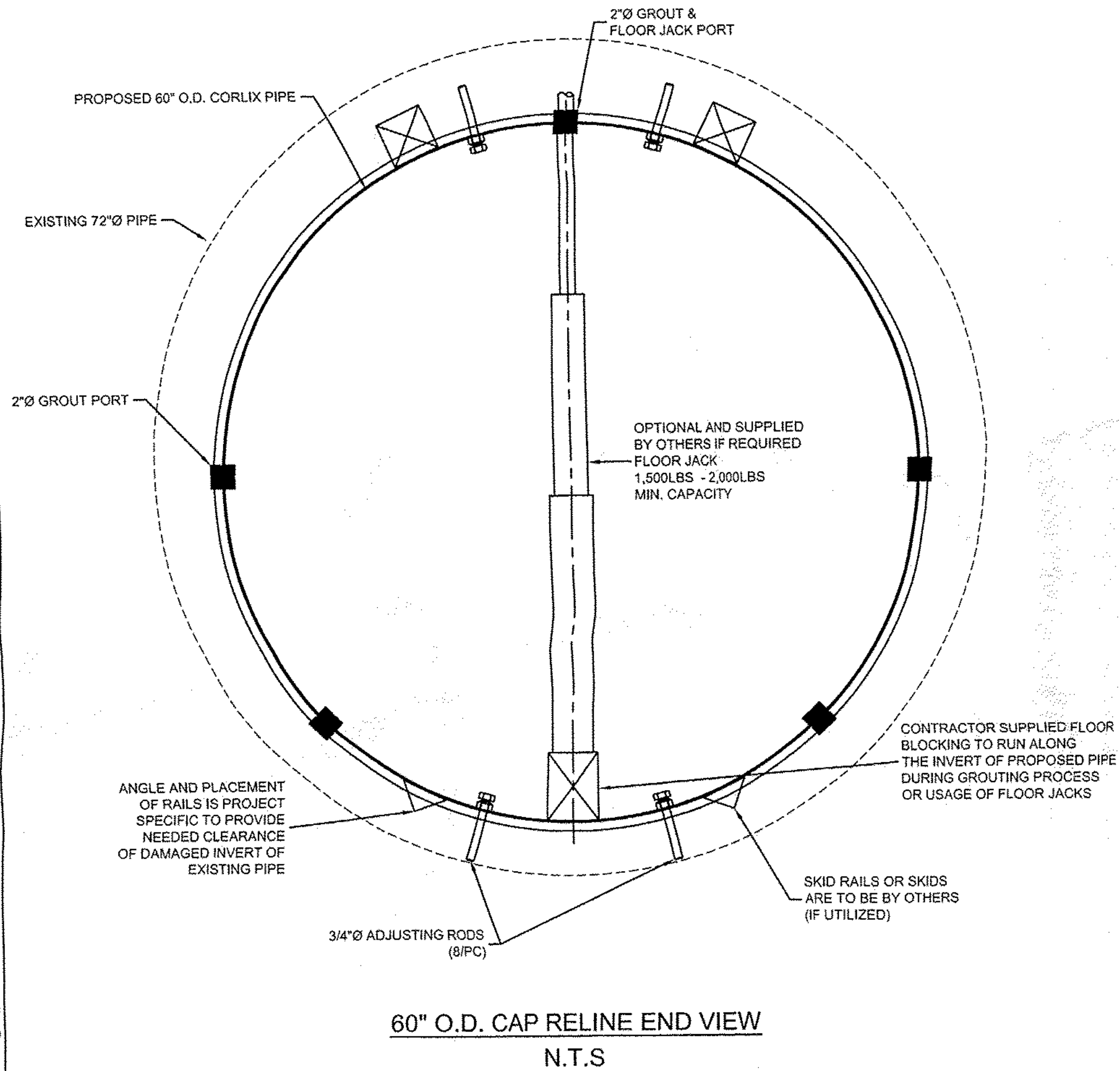
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DRAINAGE SYSTEMS

CONTECH
CONTRACT
DRAWING

CORLIX - 431769-001
VT RT 58, 2.2 MILES WEST OF VT RT 14
IRASBURG, VT
SITE DESIGNATION: RELINE

PROJECT No: 431769	SEQ. No.: 001	DATE: 01/10/11
DESIGNED: ----	DRAWN: FAM	
CHECKED: ----	APPROVED: ----	
SHEET NO.: 2 OF 4		

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AREA TO NOT BE FACTORED

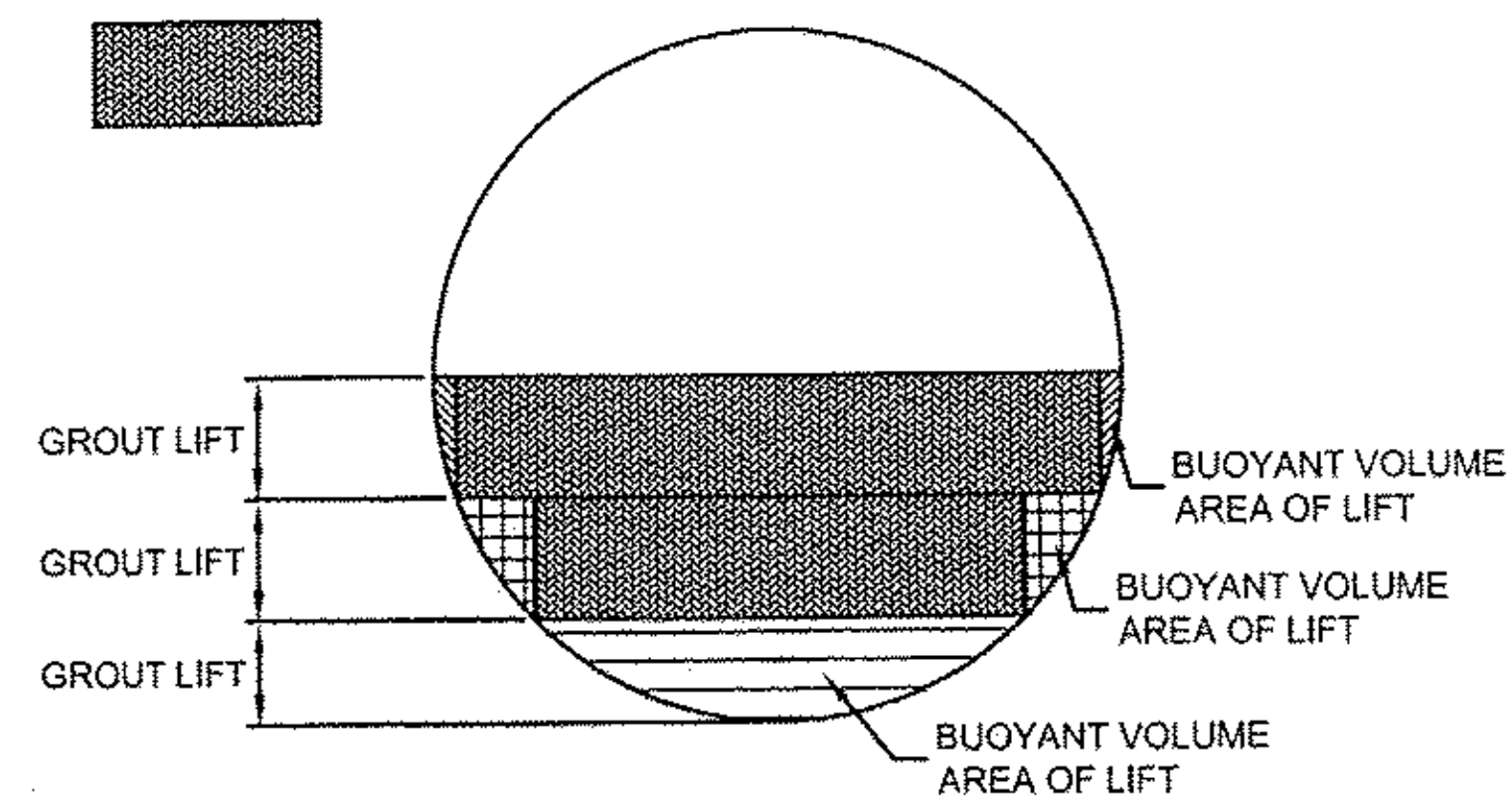


ILLUSTRATION OF LIFT AREAS AND THEIR RESPECTIVE AREAS OF INFLUENCE. THE LIFT HEIGHTS & NUMBER WILL VARY WITH PROJECT REQUIREMENTS INCLUDING GROUT DENSITY & HOLD DOWN METHODS.

- 1.) ASSUMED GROUT WT. PROJECT SPECIFIC
- 2.) GROUT PRESSURE = INJECTION PRESSURE + HEAD PRESSURE (MUST NOT EXCEED 5 PSI ON THE PIPE)
- 3.) FLOOR JACKS TO PASS THROUGH 12 O'CLOCK GROUT PORTS TO EXISTING STRUCTURE.
- 4.) THIS INFORMATION IS PROVIDED AS A GUIDELINE ONLY AND IS BASED ON MANY ASSUMPTIONS. USE OF THIS INFORMATION IS AT THE SOLE DISCRETION OF THE USER AND DOES NOT OBLIGATE CONTECH IN ANY WAY.

SLIPLINE & BRACING EXPLANATION
N.T.S.

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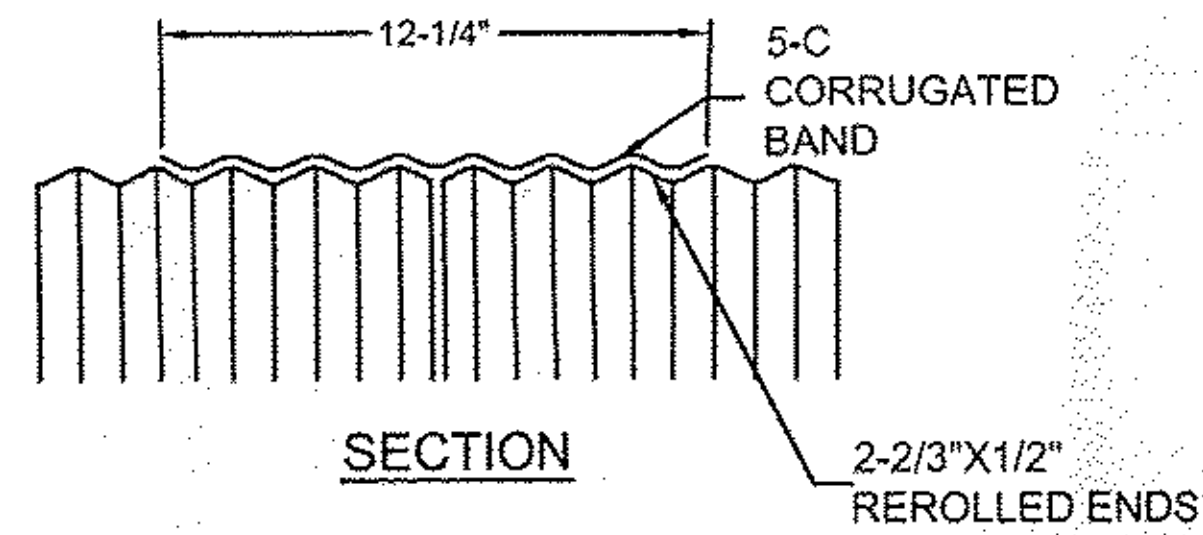
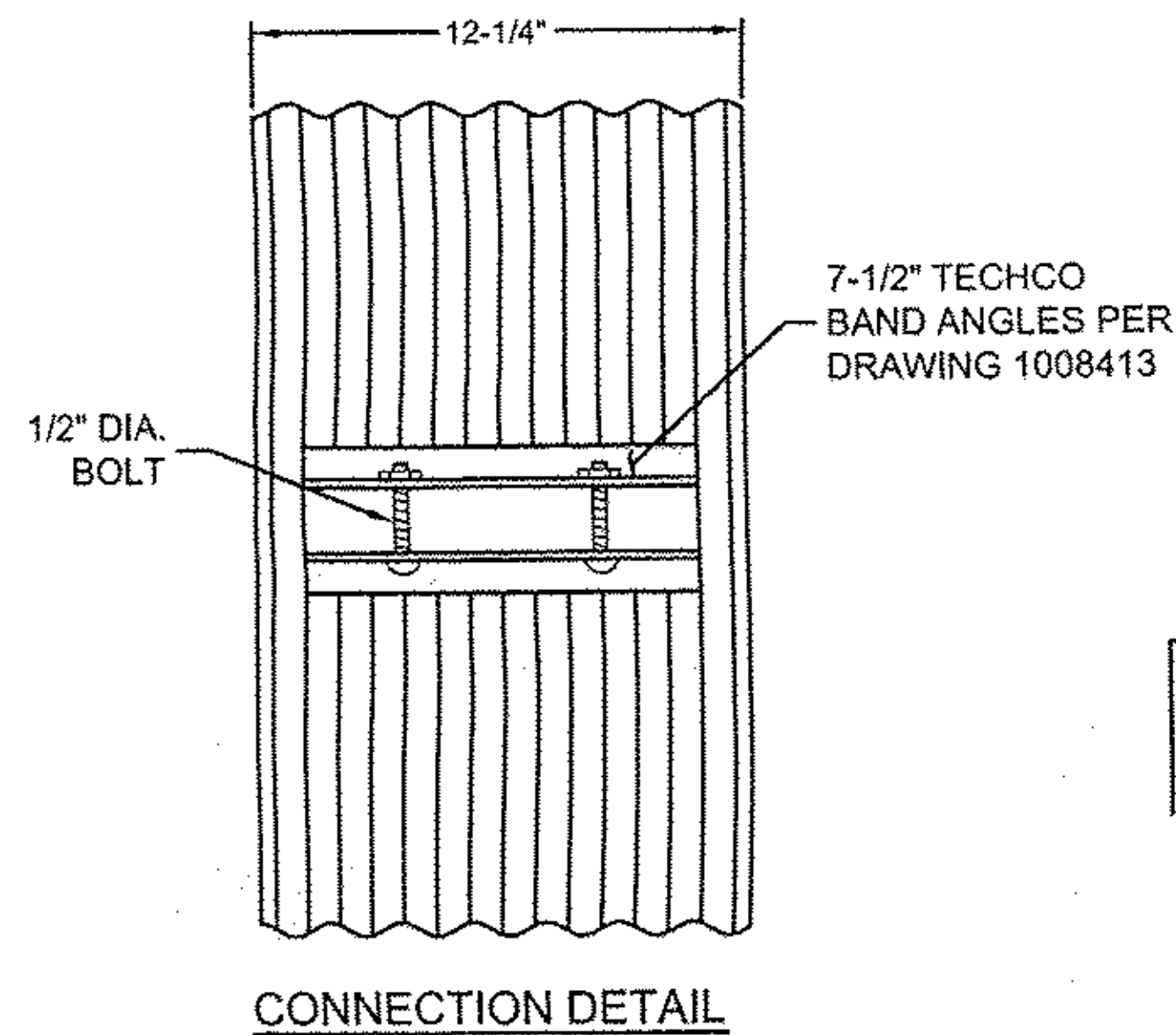
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DRAINAGE SYSTEMS

CONTECH
CONTRACT
DRAWING

CORLIX - 431769-001
VT RT 58, 2.2 MILES WEST OF VT RT 14
IRASBURG, VT
SITE DESIGNATION: RELINE

PROJECT No:	SEQ. No:	DATE:
431769	001	01/10/11
DESIGNED:	DRAWN:	
---	FAM	
CHECKED:	APPROVED:	
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SHEET NO.:	3 OF 4	

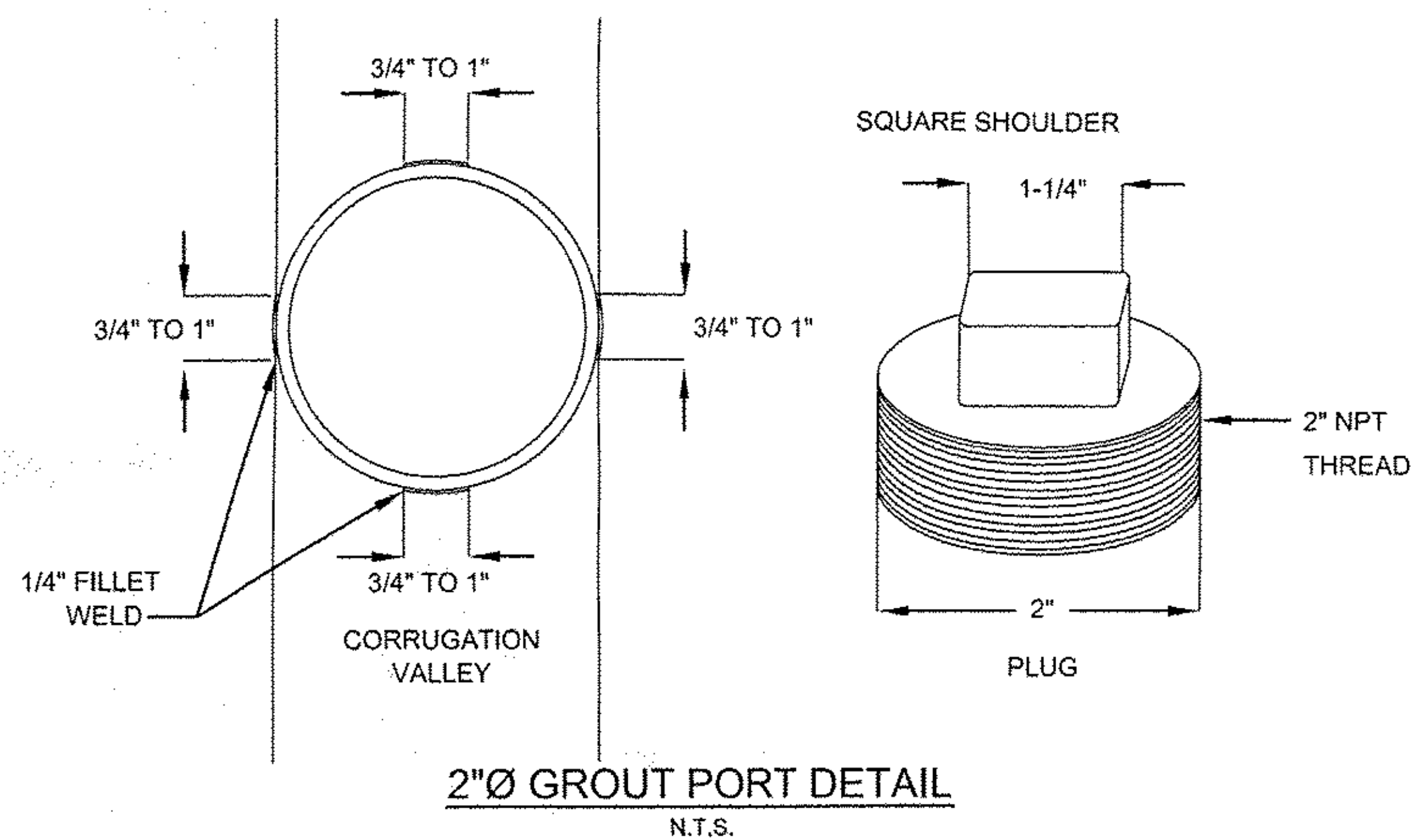
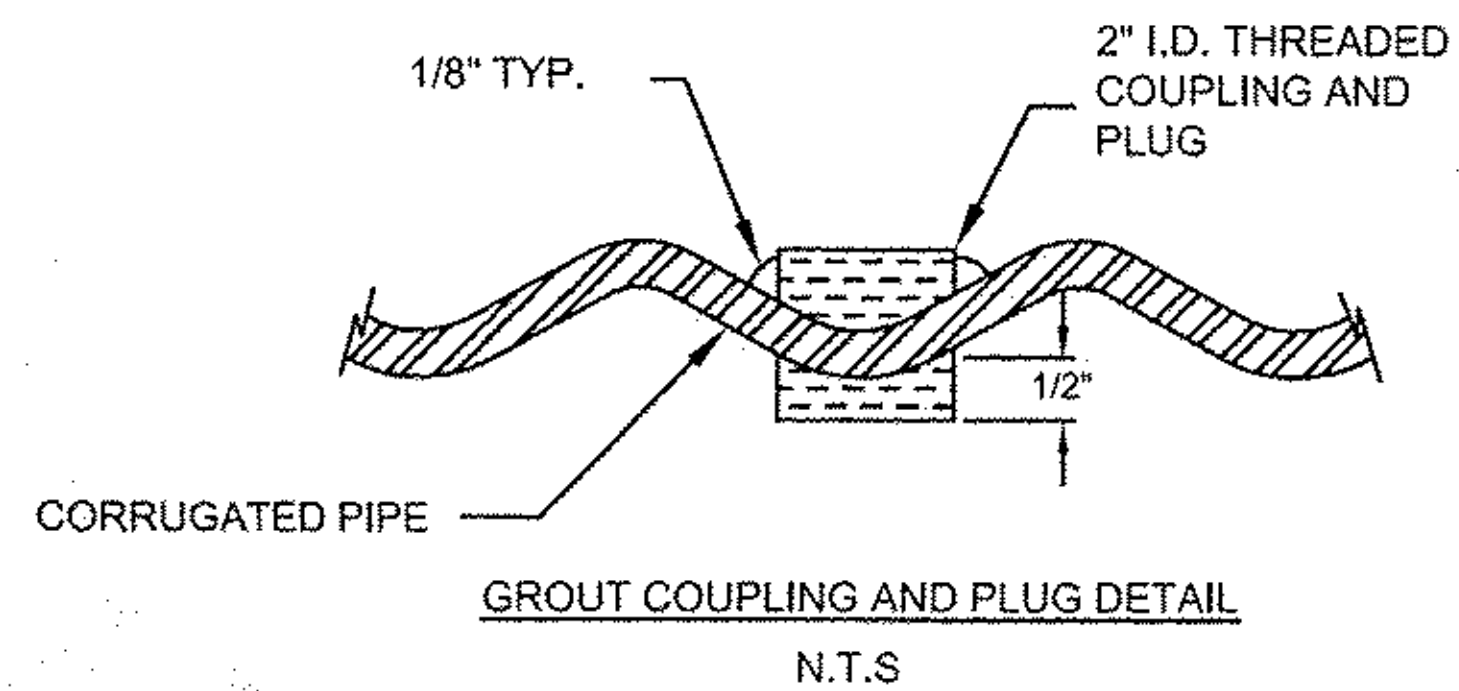
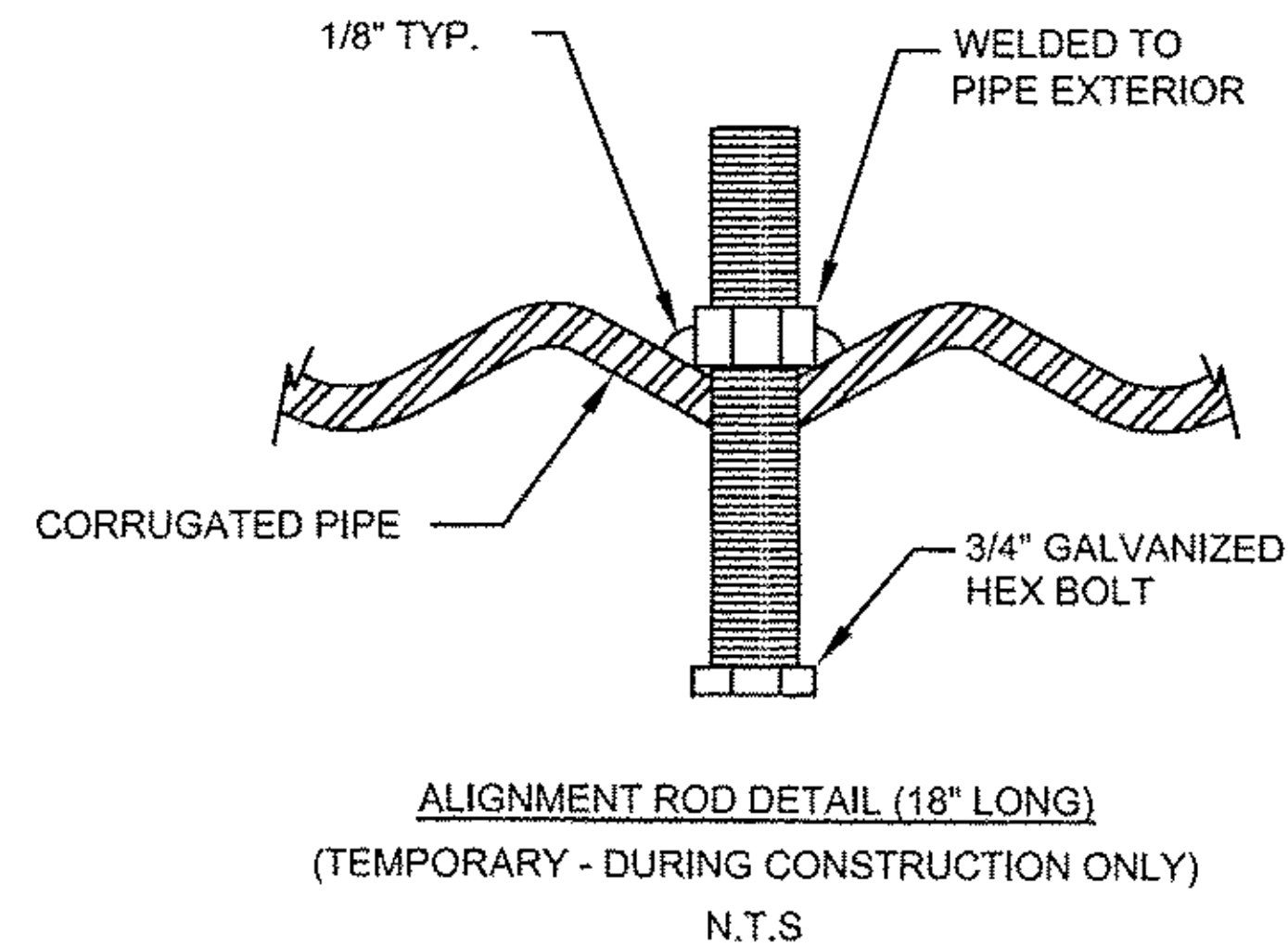


CORRUGATIONS	PIPE PRODUCTS
2-2/3"X1/2"	ALUMINIZED

GENERAL NOTES:

1. REFER TO CONTECH BAND SELECTION GUIDE FOR BAND WIDTH, GAGE, AND FASTENER TYPES.
2. BANDS FOR PIPE-ARCH ARE THE SAME AS FOR EQUIVALENT DIAMETER ROUND PIPE.
3. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
12" THRU 48" 1-PIECE
54" THRU 96" 2-PIECE
4. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
5. ALL ALUMINUM BANDS, BOTH SINGLE AND DOUBLE BB&S, ARE FURNISHED WITH A 14 GAGE ALUMINUM BACK-UP PLATE WELDED TO THE BAND AND THE STRAP.
6. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2-2/3" X 1/2".
7. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.

5-C EXTERNAL BAND DETAIL
N.T.S.



M:\ERL\PROJECTS\ACTIVE\431769\431769-001-REL_COR_PIPE\DRAWINGS\CONTRACT\PRE-431769-001-CA\PR-COR-CDWG - 2/16/2011 2:06 PM

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431769	001	01/10/11
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CHECKED:	APPROVED:	
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SHEET NO.:	4 OF 4	