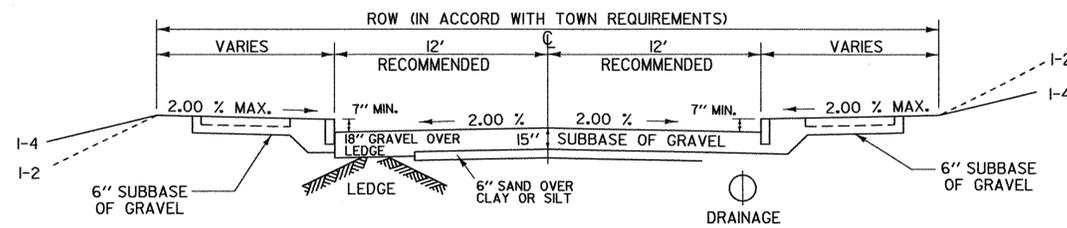
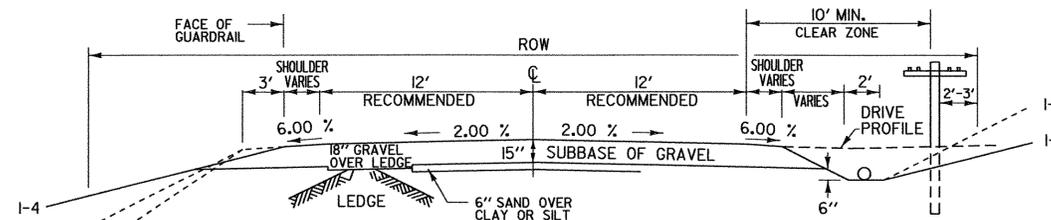


## ROADWAY TYPICALS

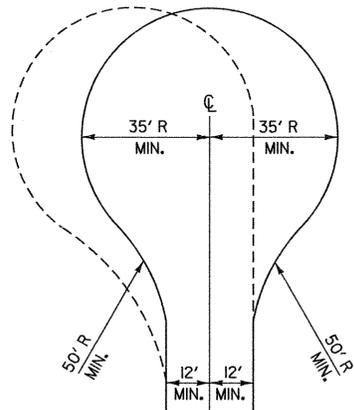


TYPICAL - CURBED SECTION WITH 5' SIDEWALKS

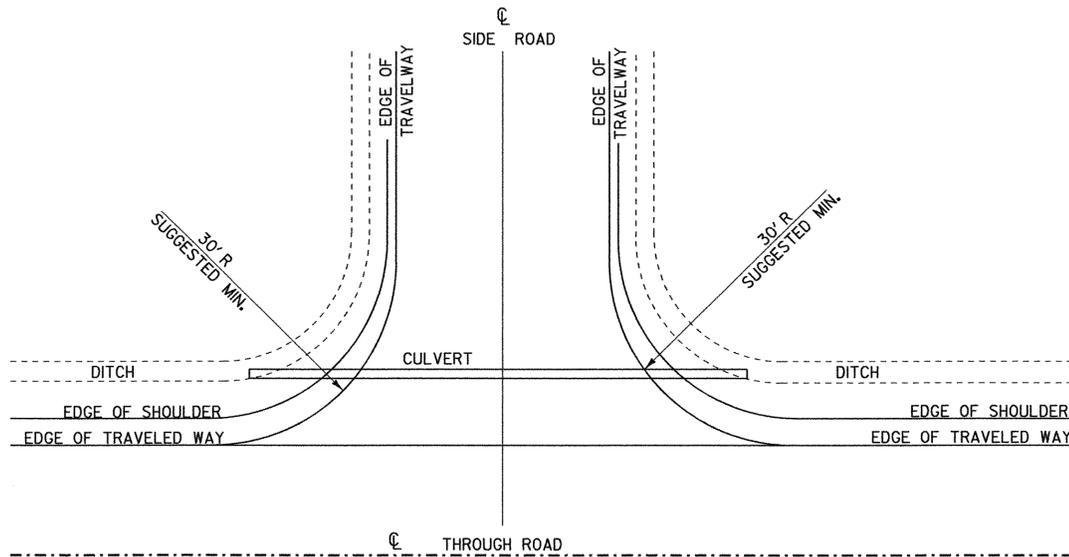


TYPICAL - NON-CURBED SECTION WITH DITCH

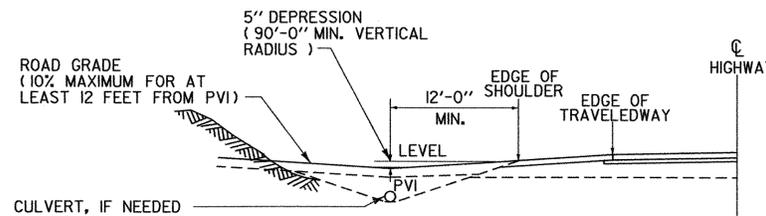
### CUL-DE-SAC FOR DEAD END ROADS



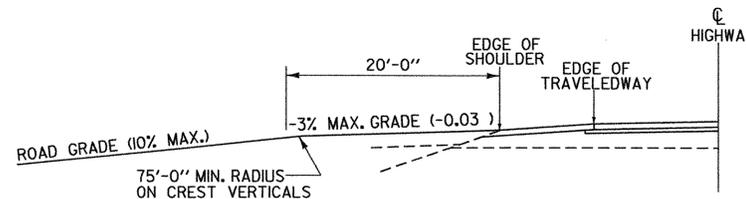
### INTERSECTION OF THROUGH ROAD AND SIDE ROAD



FOR THROUGH ROADS WITH SIDEWALKS & CURBING, SEE STANDARDS C2 & C3.  
PROVIDE DROP INLETS ON EACH SIDE OF SIDE ROAD AT INTERSECTION AS NECESSARY.



PROFILE OF INTERSECTION ( CUT SECTION )  
SHOWING 5" DEPRESSION



PROFILE OF INTERSECTION ( FILL SECTION )

## GENERAL NOTES FOR LOCAL ROADS

1. SUBBASE, SAND CUSHION AND SUBGRADE SHOULD BE CONSTRUCTED AND COMPACTED TO THE DIMENSIONS SHOWN IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. WHERE LOCAL ORDINANCES HAVE BEEN ADOPTED RELATIVE TO ROAD DIMENSIONS AND CONSTRUCTION, THEY SHOULD GOVERN. THE DIMENSIONS SUGGESTED ARE INTENDED TO BE APPLIED ONLY IN LOW TRAFFIC VOLUME CONDITIONS (AVERAGE DAILY TRAFFIC LESS THAN 250 VEHICLES PER DAY), AND WHERE HEAVY TRUCK TRAFFIC IS INFREQUENT.
2. EXPOSED EARTH SLOPES SHOULD BE SEEDED, FERTILIZED AND MULCHED IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
3. DRAINAGE:
  - ROADWAY - 18" MINIMUM DIAMETER, OF METAL, REINFORCED CONCRETE OR POLYETHYLENE PIPE, WITH DROP INLETS OR CATCH BASINS, AS REQUIRED. HYDRAULIC ANALYSIS TO DETERMINE APPROPRIATE PIPE DIAMETER IS RECOMMENDED FOR ALL LIVE STREAM CROSSINGS AND ELSEWHERE WHERE LARGE STORM FLOWS MAY BE EXPECTED.
  - DRIVES - 15" MINIMUM DIAMETER, OF METAL, REINFORCED CONCRETE OR POLYETHYLENE PIPE.
  - UNDERDRAIN - 6" MINIMUM DIAMETER, OF METAL, PVC PLASTIC OR POLYETHYLENE PIPE.
- LOCATION, DEPTH AND CONSTRUCTION DETAILS SHOULD FOLLOW PRACTICE SPECIFIED BY LOCAL ORDINANCE OR THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

### 4. HORIZONTAL CURVATURE - THE FOLLOWING WILL APPLY:

DESIGN SPEED	MINIMUM RADII RURAL ①	MINIMUM RADII URBAN ②
25 MPH	185 FT.	180 FT.
30 MPH	275 FT.	300 FT.
35 MPH	380 FT.	460 FT.
40 MPH	510 FT.	675 FT.
45 MPH	660 FT.	945 FT.
50 MPH	835 FT.	1280 FT.

- ① BASED ON CROSS SLOPE = 6.0 %
  - ② BASED ON MAINTAINING NORMAL CROWN SECTION THROUGHOUT CURVE : EFFECTIVE CROSS SLOPE = 2.0 %
- FOR OTHER SUPERELEVATION RATES, SEE CHAPTER III OF THE AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" FOR APPROPRIATE CURVE RADII.

5. GRADIENT OF ROADS - 10% MAXIMUM GRADE SUGGESTED, ALTHOUGH GRADES UP TO 16 % MAY BE ALLOWED IN MOUNTAINOUS TERRAIN.
6. GUARD RAIL - PROVIDE GUARD RAIL WITH TREATED WOOD OR STEEL POSTS, OF A DESIGN IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE AASHTO ROADSIDE DESIGN GUIDE, AND VAOT STANDARD DRAWINGS. GENERALLY, WHERE SLOPES ARE 1:3 OR STEEPER, AND THE HEIGHT OF DROPOFF AT EDGE OF SHOULDER EXCEEDS 5', GUARD RAIL SHOULD BE INSTALLED. ALSO, WHERE SLOPES ARE 1:3 OR FLATTER, GUARD RAIL MAY NOT BE NEEDED IF THE AREA AT THE BOTTOM OF THE SLOPE IS FREE OF HAZARDS. THE LOCAL VAOT DISTRICT TRANSPORTATION ADMINISTRATOR MAY BE CONTACTED FOR ASSISTANCE.
7. PAVING - ROADS WITH GRADES EXCEEDING 7% SHOULD BE PAVED UNLESS WAIVED BY THE LOCAL GOVERNING BODY. FOR TRAFFIC VOLUMES GREATER THAN, OR EQUAL TO, 250 VEHICLES PER DAY, OR WHERE HEAVY TRUCKS ARE COMMON, A PAVEMENT DESIGN SHOULD BE PERFORMED TO DETERMINE APPROPRIATE THICKNESSES OF SUBBASE AND PAVEMENT.
8. TRAVELED WAY AND SHOULDER WIDTHS - WIDTHS SHOWN ON THIS STANDARD ARE FOR LOW SPEED/LOW TRAFFIC VOLUME CONDITIONS. FOR ADDITIONAL GUIDANCE IN THE DESIGN OF LOCAL ROADS AND STREETS, SEE THE LATEST EDITION OF AASHTO'S PUBLICATION "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", OR THE VAOT "VERMONT STATE STANDARDS".
9. UTILITY LINE LOCATION TO CONFORM TO LOCAL REQUIREMENTS.

REVISIONS AND CORRECTIONS  
 JAN. 21, 1971 - ORIGINAL DATE OF ISSUE  
 MAR. 12, 1971 - DIMENSIONS CHANGED ON TURN-A-ROUND  
 JULY 13, 1973 - INTERSECTION PROFILES ADDED  
 DEC. 7, 1993 - REVISED TO REFLECT CURRENT DESIGN CRITERIA  
 JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.  
 MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.  
 MARCH 3, 2003 - REVISED TO REFLECT CURRENT DESIGN CRITERIA

APPROVED

*[Signature]*  
 DIRECTOR OF PROGRAM DEVELOPMENT

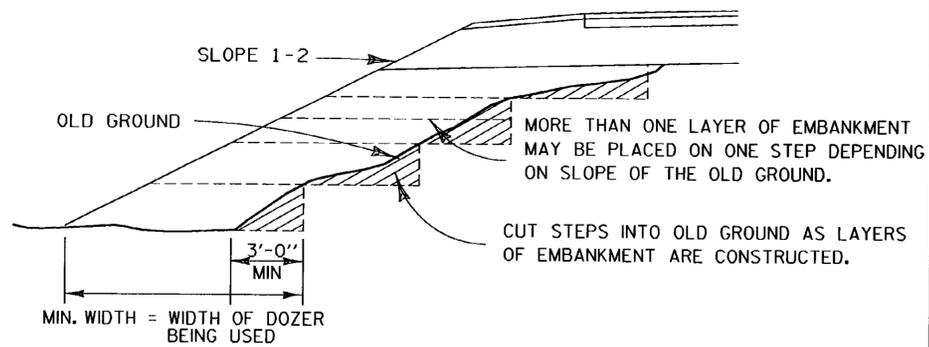
*[Signature]*  
 CHIEF OF UTILITIES

*[Signature]*  
 FEDERAL HIGHWAY ADMINISTRATION

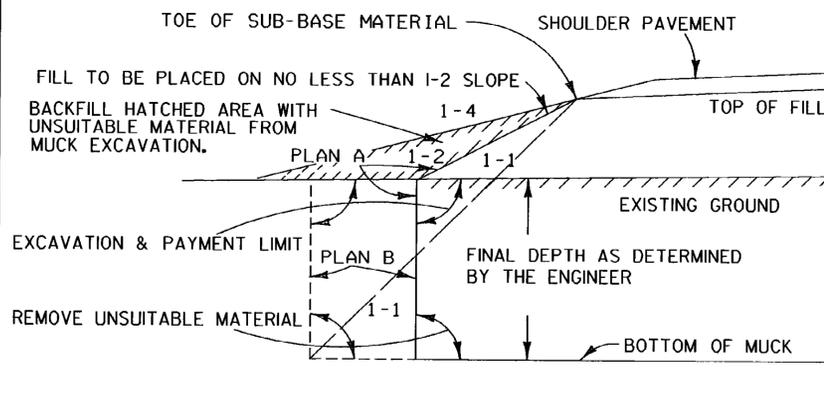
## STANDARDS FOR TOWN & DEVELOPMENT ROADS



# STANDARD A-76

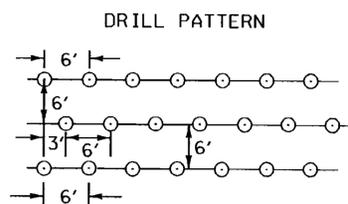
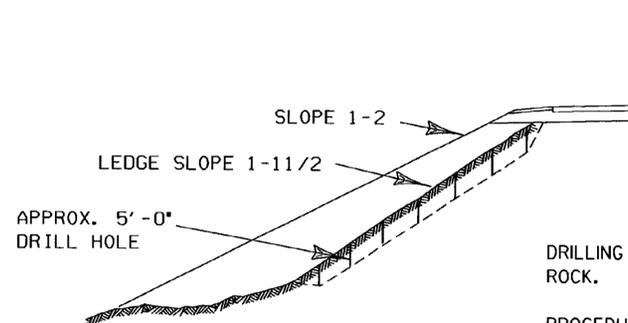


METHOD FOR CONSTRUCTING AN EMBANKMENT ON EARTH SLOPE



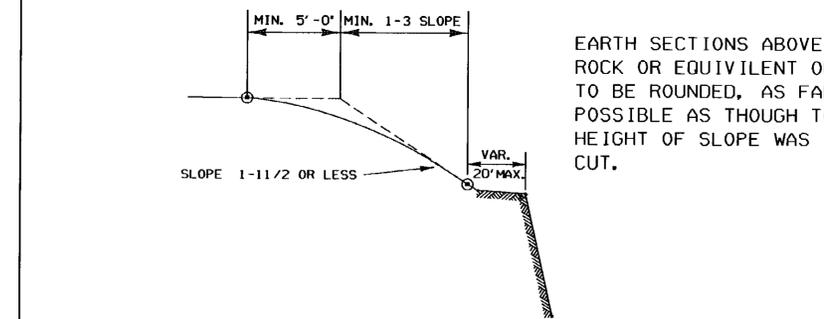
GENERAL NOTES:  
 THE MUCK OR UNSUITABLE MATERIAL SHALL BE EXCAVATED TO THE NEAT LINES SHOWN ON THE PLANS OR AS DETERMINED BY THE ENGINEER.  
 EXCAVATION AND PAYMENT LIMIT WILL BE DETERMINED FROM EITHER PLAN "A" OR PLAN "B", WHICHEVER PRODUCES THE GREATER WIDTH IN A GIVEN MUCK AREA.  
 BACKFILL MATERIAL MUST MEET THE REQUIREMENTS SET FORTH UNDER MUCK EXCAVATION, SECTION 203

TYPICAL NEAT PAY LINES FOR MUCK EXCAVATION

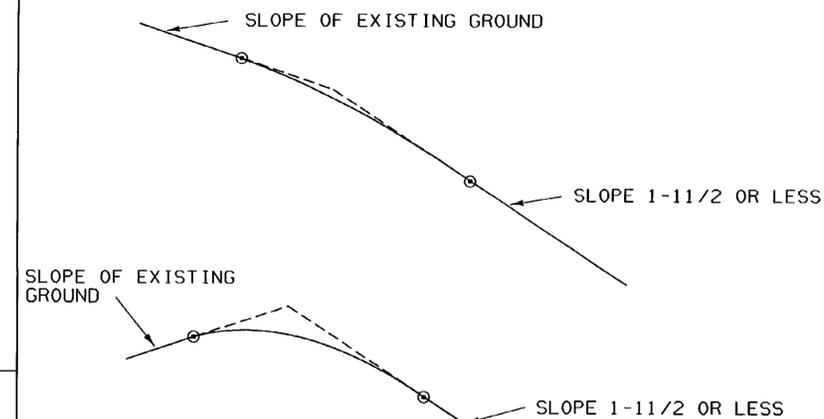


DRILLING AND BLASTING OF SOLID ROCK.  
 PROCEDURE TO BE FOLLOWED WHEN LEDGE SLOPE ON OLD GROUND IS BETWEEN A 1-1 AND A 1-5 SLOPE.  
 ALL HOLES TO BE APPROXIMATELY 5'-0" DEEP. HOLES TO BE IN ROWS, SPACED AND STAGGERED AS SHOWN IN DRILL PATTERN, OR AS DIRECTED BY THE ENGINEER, SEE SECTION 205

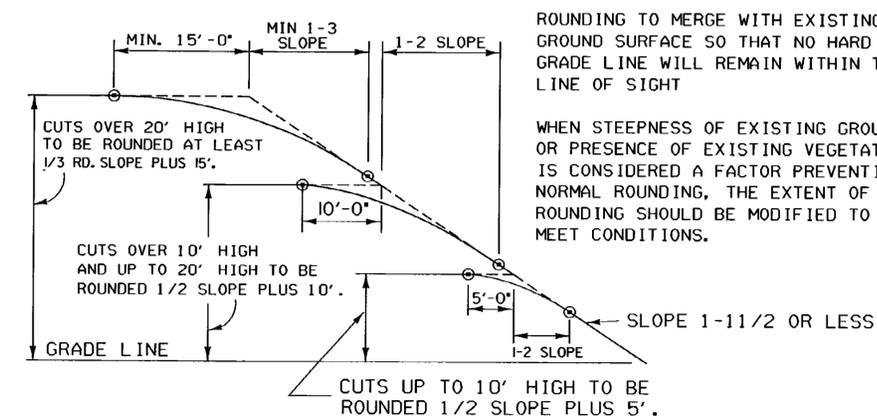
A METHOD FOR PREPARING LEDGE SLOPE BEFORE CONSTRUCTING AN EMBANKMENT



EARTH SECTIONS ABOVE STABLE ROCK OR EQUIVALENT OUTCROPS TO BE ROUNDED, AS FAR AS POSSIBLE AS THOUGH TOTAL HEIGHT OF SLOPE WAS IN EARTH CUT.



SLOPES TO BE ROUNDED AS SHOWN IN ORDER TO ALLOW FOR PERSPECTIVE FORESHORTENING AS SEEN FROM THE ROAD AND SO THAT FINISHED SLOPES WILL BETTER SUPPORT VEGETATIVE COVER.



ROUNDING TO MERGE WITH EXISTING GROUND SURFACE SO THAT NO HARD GRADE LINE WILL REMAIN WITHIN THE LINE OF SIGHT

WHEN STEEPNESS OF EXISTING GROUND OR PRESENCE OF EXISTING VEGETATION IS CONSIDERED A FACTOR PREVENTING NORMAL ROUNDING, THE EXTENT OF THE ROUNDING SHOULD BE MODIFIED TO MEET CONDITIONS.

TYPICAL SLOPE ROUNDDING

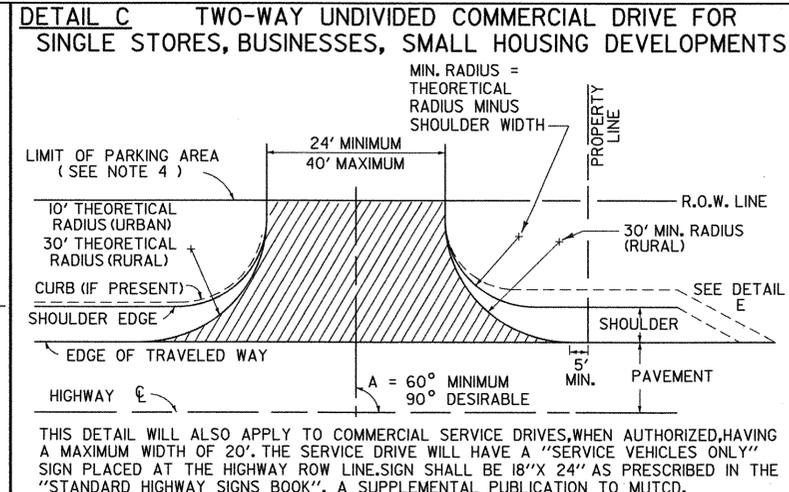
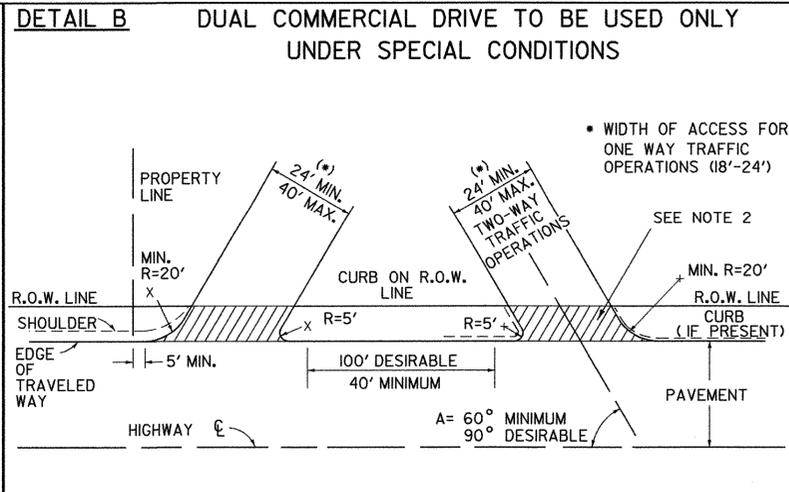
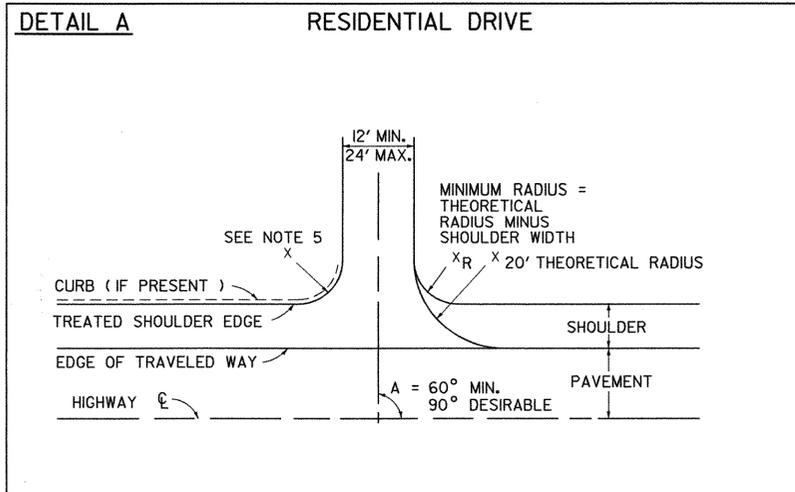
REVISIONS AND CORRECTIONS  
 DEC. 6, 1971 - ORIGINAL APPROVAL DATE  
 JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED  
 APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.  
 Gordon B. MacArthur, P.E. DIRECTOR OF ENGINEERING  
 Robert M. Murphy, P.E. DESIGN ENGINEER

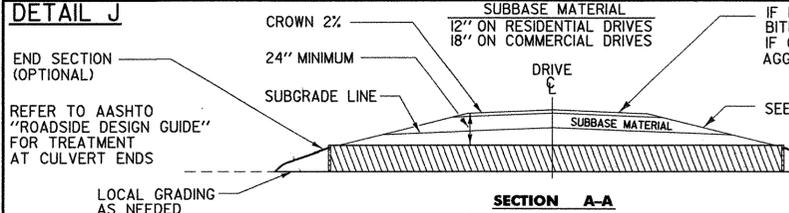
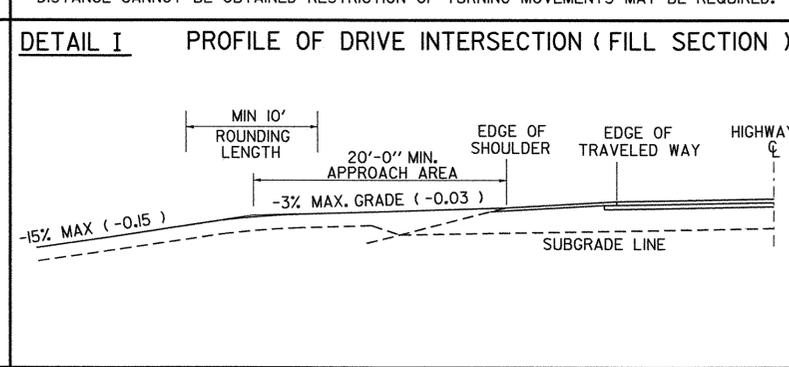
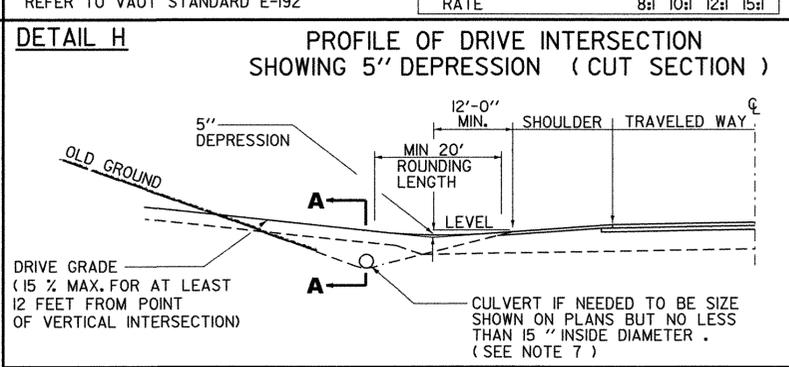
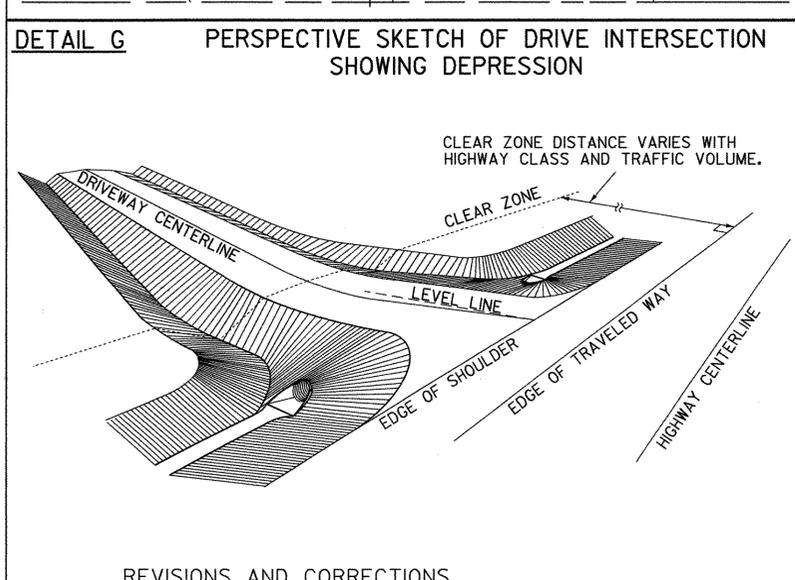
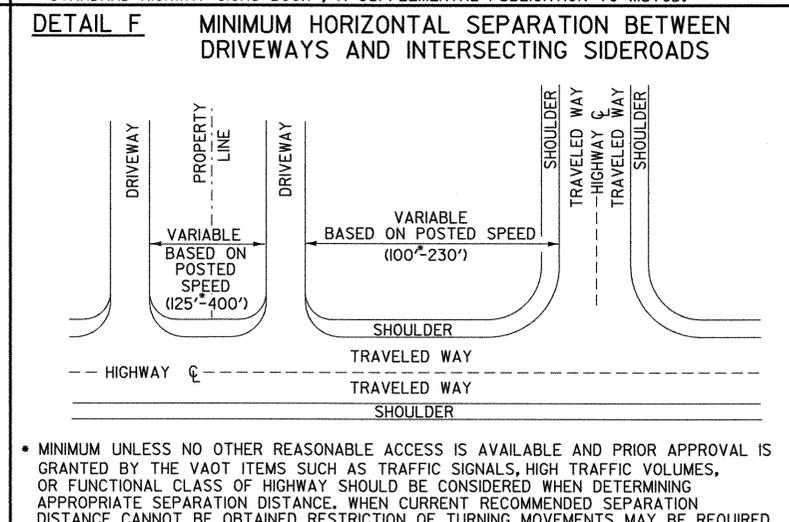
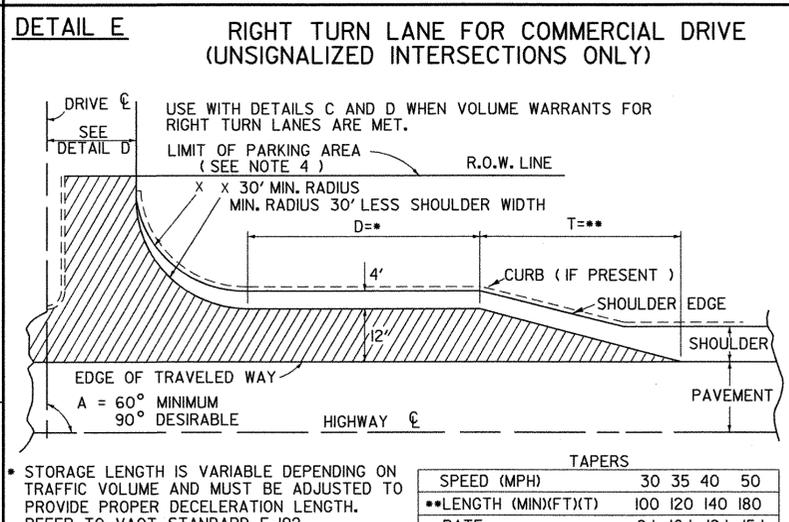
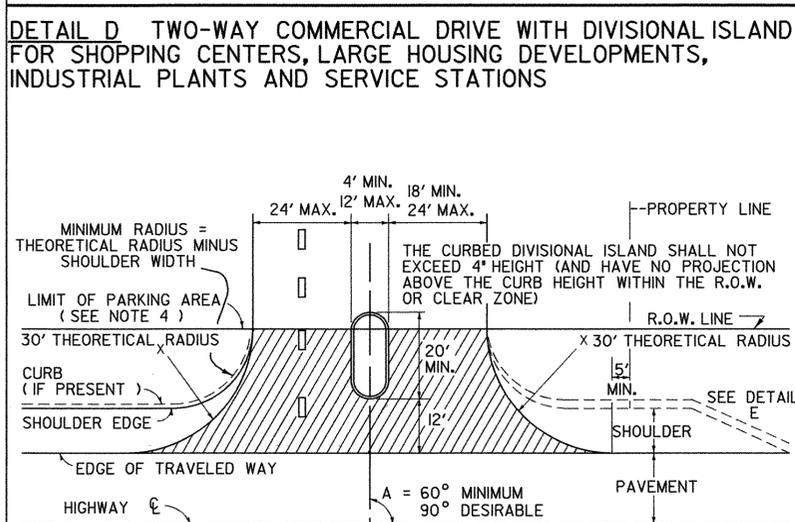
EMBANKMENT ON EARTH SLOPE  
 EMBANKMENT ON ROCK SLOPE  
 MUCK EXCAVATION  
 TYPICAL SLOPE ROUNDDING



STANDARD  
 B-5



- NOTES:
- THIS SHEET IS INTENDED FOR USE BY DESIGNERS ON HIGHWAY PROJECTS AND IN CONJUNCTION WITH A PERMIT FOR WORK WITHIN HIGHWAY RIGHTS OF WAY (FORM TA 210). ALL CONSTRUCTION REQUIRED BY THE PERMIT AND INDICATED ON THIS SHEET SHALL BE THE RESPONSIBILITY OF THE APPLICANT AND IS SUBJECT TO THE APPROVAL OF THE VT. AGENCY OF TRANSPORTATION. WHEN USED WITH THE PLANS FOR A HIGHWAY CONSTRUCTION PROJECT, THIS SHEET IS INTENDED TO BE A GUIDE FOR THE DESIGNER CONCERNING DRIVE WIDTHS, HORIZONTAL, VERTICAL AND GEOMETRIC CHARACTERISTICS.
  - ALL COMMERCIAL DRIVES SHALL BE PAVED FROM THE EDGE OF THE TRAVELED WAY TO THE HIGHWAY RIGHT-OF-WAY, TO THE FARTHEST POINT OF CURVATURE ON THE DRIVEWAY EDGE OR AS DIRECTED BY THE DISTRICT TRANSPORTATION ADMINISTRATOR. THIS PAVING IS INDICATED IN DETAILS (B THRU E) BY HATCHING.
  - DEPTH OF SUBBASE AND PAVEMENT TO BE THE SAME AS HIGHWAY OR AS SHOWN IN DETAIL J WITHIN THE LIMITS OF THE HIGHWAY RIGHT-OF-WAY.
  - VEHICULAR ACCESS FROM PARKING AREAS TO THE RIGHT-OF-WAY AT OTHER THAN APPROVED ACCESS POINTS WILL BE PREVENTED BY THE CONSTRUCTION OF CURBING OR OTHER SUITABLE PHYSICAL BARRIER.
  - IF CURB IS PRESENT, SEE APPROPRIATE CURB DETAIL STANDARD OR MATCH TOWN/CITY STANDARD CURB TREATMENT.
  - WHERE TRAFFIC VOLUME FOR A PROJECT IS SUBSTANTIAL THE AGENCY MAY REQUIRE SPECIAL LANES FOR TURNING, SIGNALS OR OTHER MODIFICATIONS. BASED ON TRAFFIC STUDIES THE AGENCY WILL DETERMINE SPECIFIC TREATMENT TO BE USED. ON DEVELOPER PROJECTS THE AGENCY WILL WORK WITH THE APPLICANT TO IMPLEMENT CHANGES TO THE STATE HIGHWAY.
  - CIRCULAR DRAINAGE CULVERTS UNDER DRIVES SHALL HAVE A MINIMUM INSIDE DIAMETER (I.D.) OF 15". PIPE ARCHES USED UNDER DRIVES SHALL HAVE A MINIMUM INSIDE CROSS-SECTIONAL AREA EQUIVALENT TO THAT PROVIDED BY A 15" CIRCULAR PIPE.
  - THE OFFSET BETWEEN THE PROPERTY LINE AND THE EDGE OF THE DRIVEWAY MAY BE GOVERNED BY LOCAL ZONING LAWS. DRIVEWAY WIDTH RESTRICTIONS SHOWN PERTAIN ONLY TO THE AREA WITHIN THE HIGHWAY R.O.W. OR THE END OF THE TURNING RADIUS WHICHEVER IS GREATEST.
  - DRIVEWAY GRADES STEEPER THAN THOSE SHOWN MAY BE ALLOWED AS LONG AS A 20' APPROACH AREA IS ACHIEVED FOR THE VEHICLE TO PAUSE BEFORE ENTERING THE HIGHWAY. (WHERE CURB & SIDEWALKS EXIST, SEE STANDARDS C-2A & C-2B)
  - INTERSECTION SIGHT DISTANCES, EQUAL TO OR GREATER THAN THOSE SHOWN BELOW, SHOULD BE PROVIDED IN BOTH DIRECTIONS FOR ALL DRIVES ENTERING ON PUBLIC HIGHWAYS, UNLESS OTHERWISE APPROVED BY THE AGENCY OF TRANSPORTATION. INTERSECTION SIGHT DISTANCE IS MEASURED FROM A POINT ON THE DRIVE AT LEAST 15 FEET FROM THE EDGE OF TRAVELED WAY OF THE ADJACENT ROADWAY AND MEASURED FROM A HEIGHT OF EYE OF 3.5 FEET ON THE DRIVE TO A HEIGHT OF 3.50 FEET ON THE ROADWAY.



### DRIVE SIDE SLOPES

LOCATION OF SLOPE	SLOPE RATE
V > 40 MPH	1:6 OR FLATTER
URBAN AREAS, OR V < 40 MPH	1:4 DESIRABLE 1:2 ALLOWABLE
OUTSIDE CLEAR ZONE	1:2 OR FLATTER

### SIGHT DISTANCE CHART

POSTED SPEED OR DESIGN SPEED (M.P.H.)	MINIMUM STOPPING SIGHT DISTANCE (FT)	MINIMUM INTERSECTION SIGHT DISTANCE (FT)
25	155	280
30	200	335
35	250	390
40	305	445
45	360	500
50	425	555
55	495	610
60	570	665
65	645	720

THE ABOVE VALUES ARE TAKEN FROM THE 2004 AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS & STREETS."

NOTE: ADVANCE WARNING SIGNS WILL BE REQUIRED IF OBTAINABLE INTERSECTION SIGHT DISTANCES ARE BELOW MINIMUM STOPPING SIGHT DISTANCES.

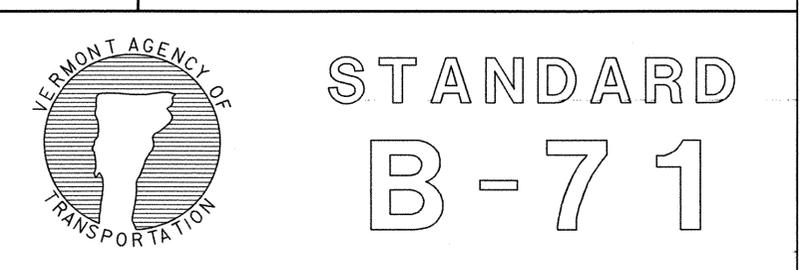
THE CHART IS ENTERED TO SELECT DESIGN VALUES BASED ON THE POSTED SPEED LIMIT IN MPH. VALUES FOR DESIGN ARE CALCULATED BASED ON THE DESIGN SPEED IN MPH.

\* ASSUMES A GAP OF 7.5 SECONDS IN THE TRAFFIC STREAM ON THE HIGHWAY MAINLINE BASED ON THE HIGHWAY DESIGN SPEED IN MPH. THIS ALLOWS A STOPPED PASSENGER VEHICLE TO ENTER THE MAINLINE FROM THE DRIVE WITHOUT UNDULY INTERFERING WITH THE HIGHWAY OPERATIONS.

DEC. 11, 1992 - THIS STANDARD SUPERCEDES B-71(7/23/80R), B-71A (3/12/90), AND B-13 (12/14/71).  
 JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.  
 MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.  
 NOV. 16, 2000 - CHANGES MADE TO CONFORM WITH LANGUAGE AND DIMENSIONS IN ACCESS MANAGEMENT PROGRAM GUIDELINES.  
 FEB 1, 2004 - CHANGES MADE TO SIGHT DISTANCE CHART TO CONFORM WITH NEWEST AASHTO CRITERIA.  
 JULY 8, 2005 - CHANGE MADE TO OBJECT HEIGHT TO CONFORM WITH NEWEST AASHTO CRITERIA

APPROVED  
*Richard F. Fournier*  
 DIRECTOR OF PROGRAM DEVELOPMENT  
*Greg S. Keller*  
 CHIEF OF UTILITIES AND PERMITS  
*Michael Conover*  
 FEDERAL HIGHWAY ADMINISTRATION

# STANDARDS FOR RESIDENTIAL AND COMMERCIAL DRIVES



**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.

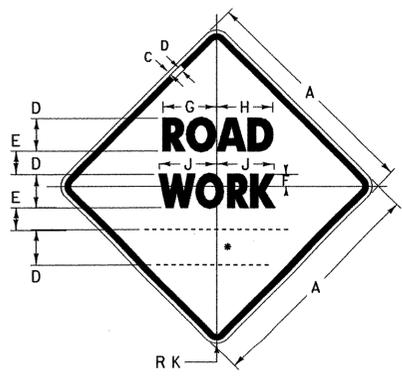
ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS, OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS GOVERN:

- 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.

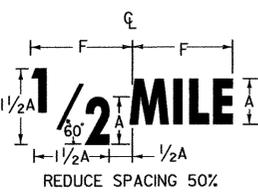
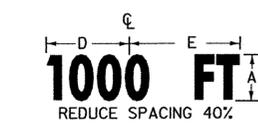
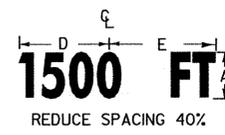
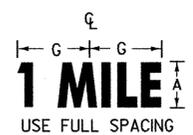
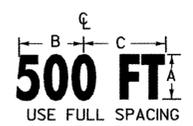
**OTHER STDS. REQUIRED:** E-100A, E-101, E-102



**STANDARD  
E-100**



**W20-1**  
• SEE DISTANCE DETAILS

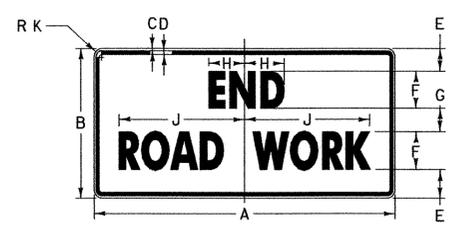


**DISTANCE DETAILS**

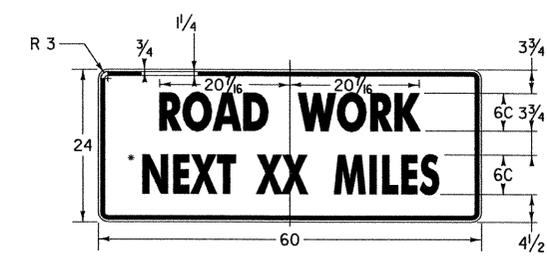
SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	3/8	7/8	5D	3 1/2	3 1/4	8 3/8	8 7/8	9	2 1/4
STD.	48	3/4	1 1/4	7D	4 3/4	4 1/2	11 1/8	12 1/8	12 5/8	3

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 7/8	15 3/4	15 3/4	13 1/8	15 1/2

( ALL DIMENSIONS SHOWN IN INCHES )



**G20-2A**



**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	18	3/8	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	

**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**

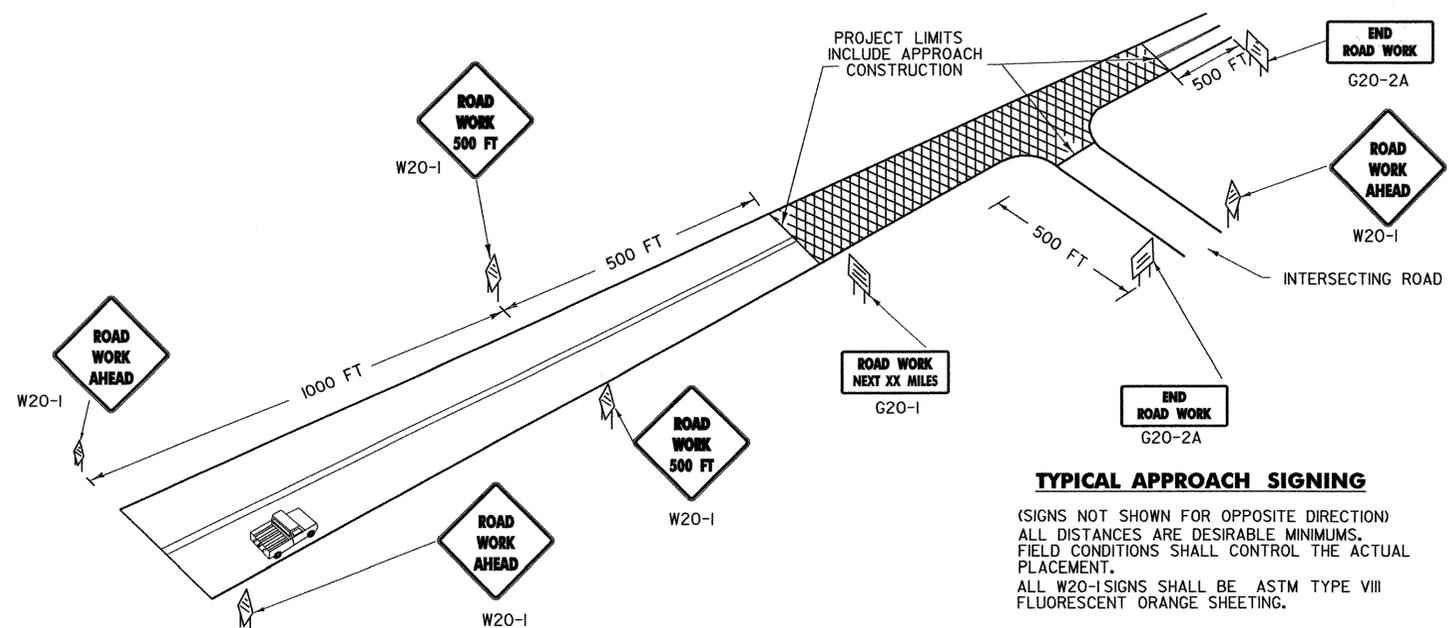
ALL LEAD SIGNS (W20-1) ON THIS SHEET SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING. ALL OTHER SIGNS ON THIS SHEET SHALL BE ASTM TYPE III RETROREFLECTORIZED SHEETING.

**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.



**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.

**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**

DIRECTOR OF PROGRAM DEVELOPMENT  
 TRAFFIC OPERATIONS ENGINEER  
 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 0.025 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:

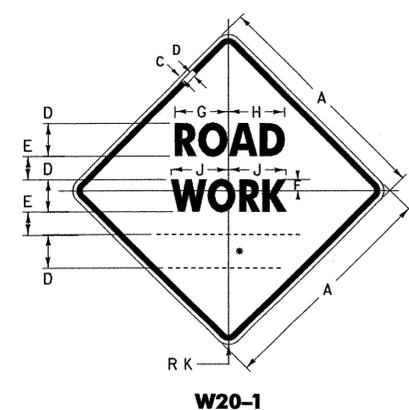
- 1. 4" X 4" (ACTUAL DIMENSIONS ARE S4S 3.5" X 3.5")

- 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:

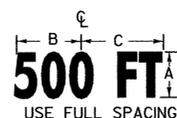
- A) THE SIGN WIDTH (HORIZONTAL DIMENSIONS FOR DIAMOND SHAPED SIGNS) EXCEEDS 3 1/2 FEET.
- B) THE EXPOSED SIGN AREA OF ANY SINGLE SIGN OR ASSEMBLY EXCEEDS 7 SQ. FEET.
- C) THE Sv OF A SINGLE POST IS 64

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

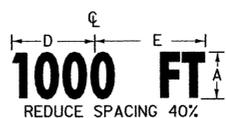


**W20-1**

\* SEE DISTANCE DETAILS



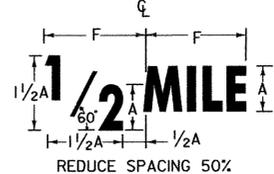
USE FULL SPACING



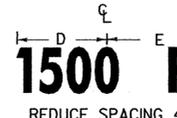
REDUCE SPACING 40%



USE FULL SPACING



REDUCE SPACING 50%



REDUCE SPACING 40%



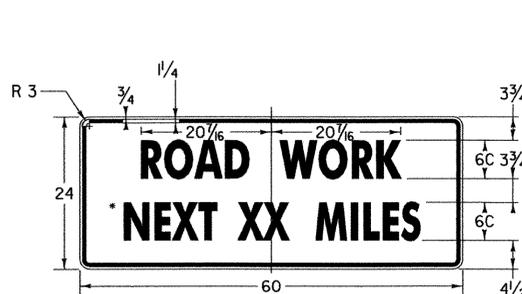
USE FULL SPACING

**DISTANCE DETAILS**

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 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 7/8	15 3/4	15 3/4	13 1/8	15 1/2

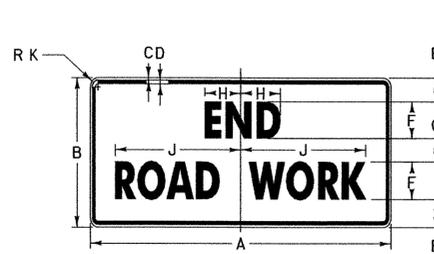
(ALL DIMENSIONS SHOWN IN INCHES)



**G20-1**

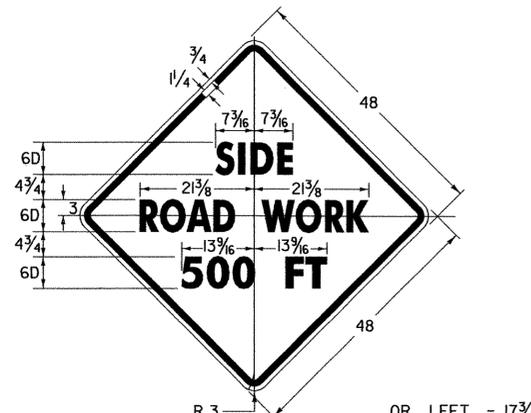
\* OPTICALLY CENTER

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.



**G20-2A**

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



**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**

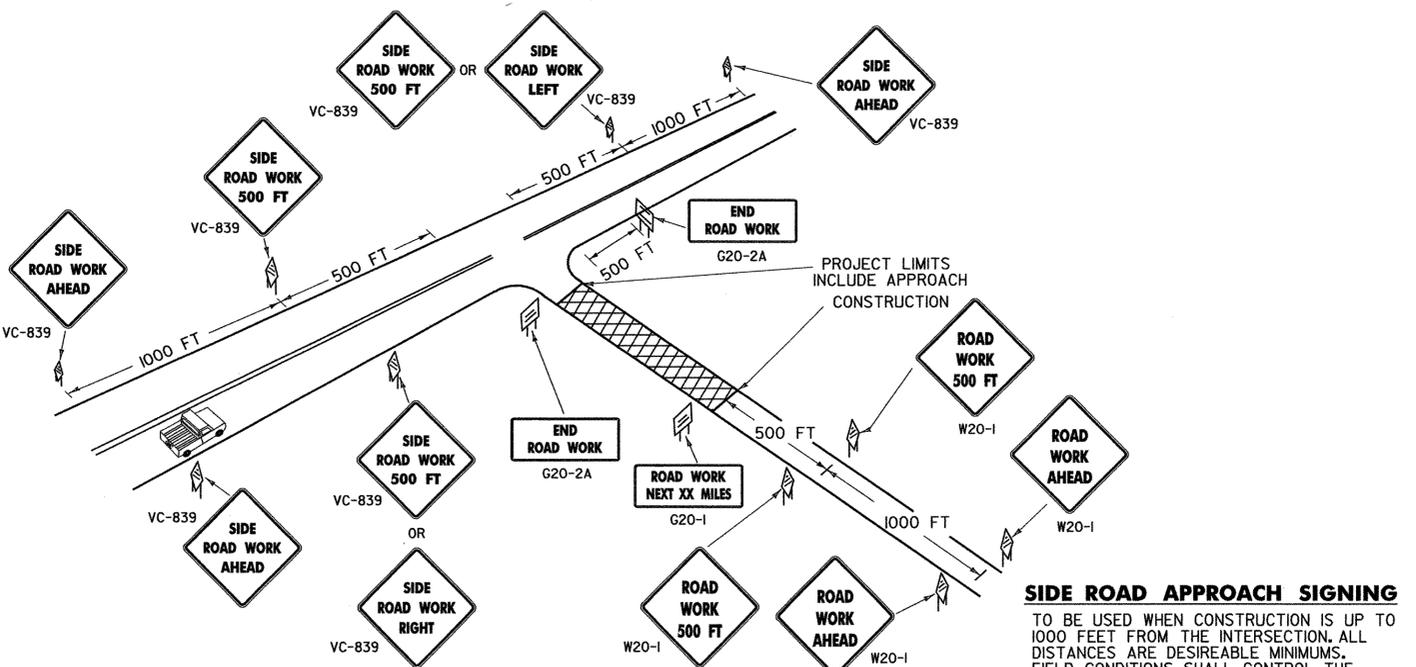
SINCE IT IS NOT POSSIBLE TO PRESCRIBE DETAILED STANDARDS OF APPLICATION FOR ALL OF THE SITUATIONS THAT MAY CONCEIVABLY ARISE ON A CONSTRUCTION PROJECT, REFERENCE SHALL BE MADE TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" FOR THE PRINCIPLES, PROCEDURES, AND STANDARDS THAT WILL BE REQUIRED IN CONNECTION 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).



**SIDE ROAD APPROACH SIGNING**

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

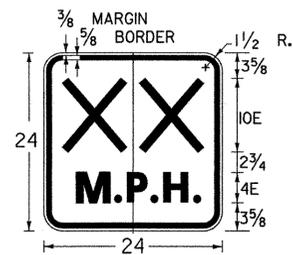
REVISIONS AND CORRECTIONS  
 JAN. 06, 1997 - DATE OF ORIGINAL ISSUE  
 JAN. 2, 2004 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VIII

APPROVED  
  
 DIRECTOR OF PROGRAM DEVELOPMENT  
  
 TRAFFIC OPERATIONS ENGINEER  
  
 FEDERAL HIGHWAY ADMINISTRATION

**SIDE ROAD CONSTRUCTION APPROACH SIGNS**

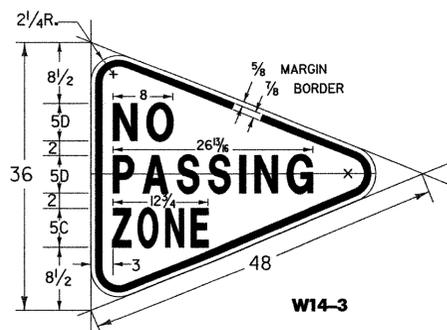


**STANDARD E-100A**

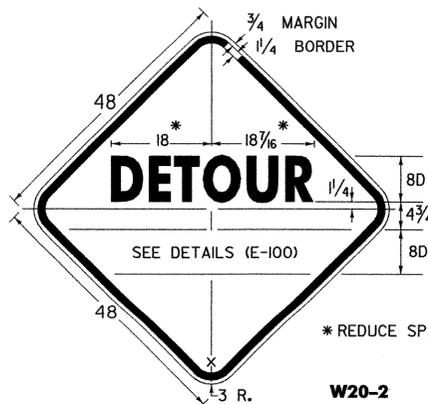


\*XX\* DENOTES ADVISORY SPEED AS SHOWN ON THE PLANS

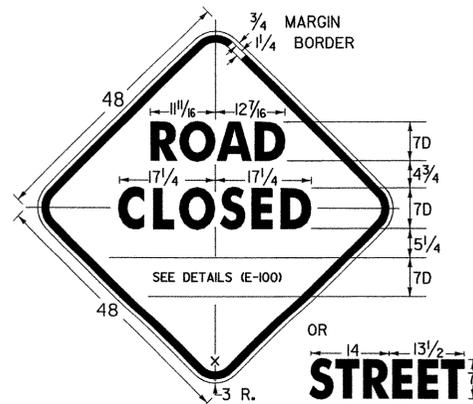
W13-1



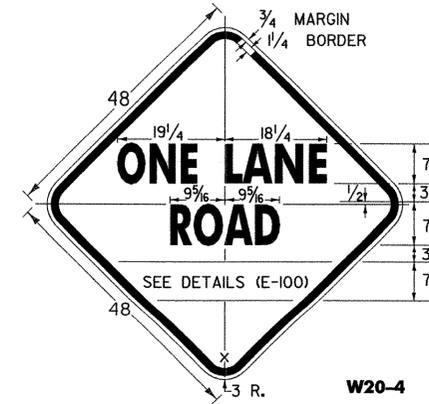
W14-3



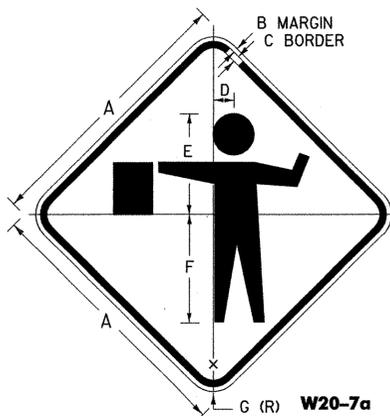
W20-2



W20-3



W20-4



W20-7a

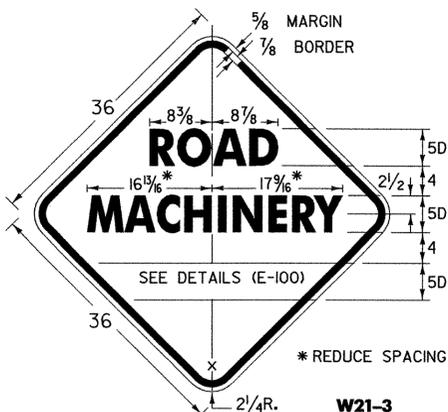


W20-7b

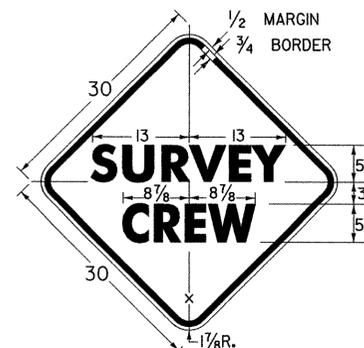
COLORS:  
BLACK BORDER AND TEXT (NON RETRORFL.)  
ORANGE BACKGROUND (RETRORFL.)

W3-4

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



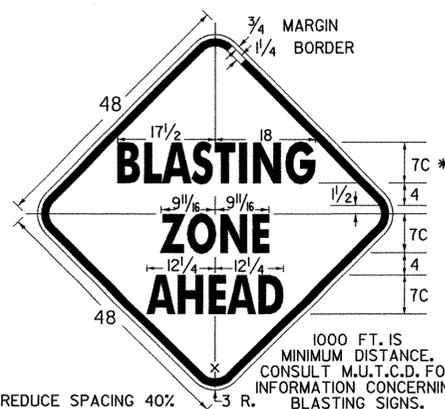
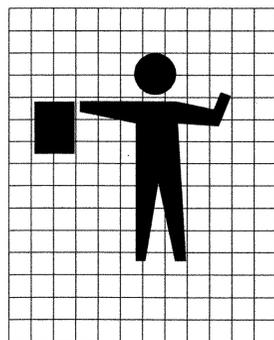
W21-3



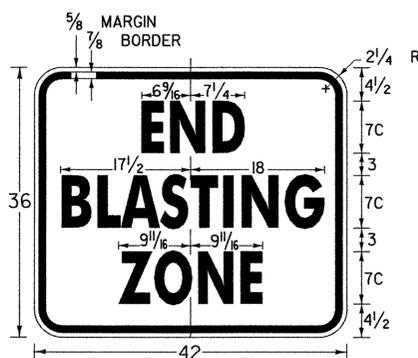
W21-6

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

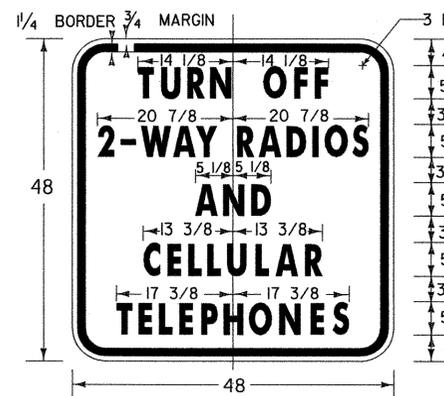
SIGN	DIMENSIONS ( INCHES )											
	A	B	C	D	E	F	G	H	J	K	L	
MIN.	36	5/8	7/8	6C	3 3/8	7/8	3 3/4	16 3/8	13	13 3/8	2 1/4	
STD.	48	3/4	1 1/4	8C	4 7/8	1 1/4	5	21 7/8	17 3/8	18 1/2	3	
EXPWY.	60	3/4	1 1/4	9C	5 3/8	1 3/8	5 5/8	24 3/4	19 3/8	20 1/4	3	



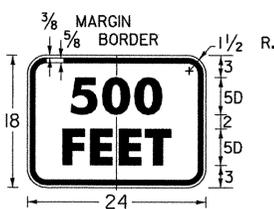
W22-1



W22-3



VW22-1

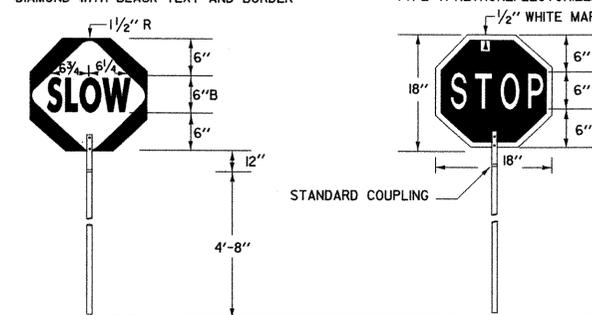


W16-2a

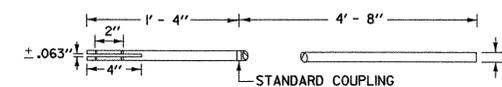
**SIGN PADDLE FOR FLAGPERSON**

ORANGE ASTM TYPE III OR TYPE VI RETROREFLECTORIZED DIAMOND WITH BLACK TEXT AND BORDER

RED ASTM TYPE III OR TYPE VI RETROREFLECTORIZED OCTAGON WITH WHITE ASTM TYPE III OR TYPE VI RETROREFLECTORIZED TEXT



**SIGN DETAIL**



**STAFF DETAIL**

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

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

**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.

**OTHER STDS. E-100 REQUIRED:**

NOTE: ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED

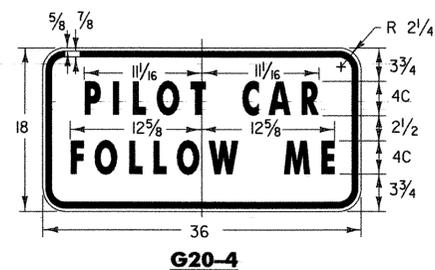
**REVISIONS AND CORRECTIONS**  
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE  
JAN. 23, 1989 - DELETE MOTORCYCLE SYMBOL SIGN AND SPEED SIGN, ADDED TWO SIGNS  
OCT. 21, 1992 - ADDED A SIGN, REVISED A SIGN DIMENSION & TYPE ERROR & REVISED TITLE BLOCK  
AUG. 08, 1995 - ADDED FLAGGER GRID  
JUNE 30, 2003 - CHANGED 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

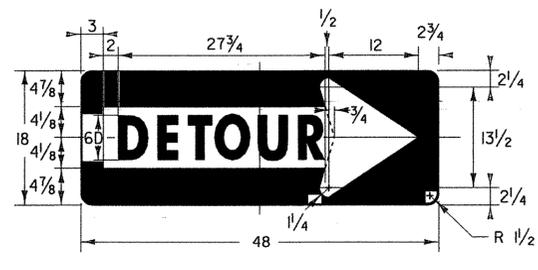
CONSTRUCTION SIGN  
DETAILS



STANDARD  
E-102



**G20-4**

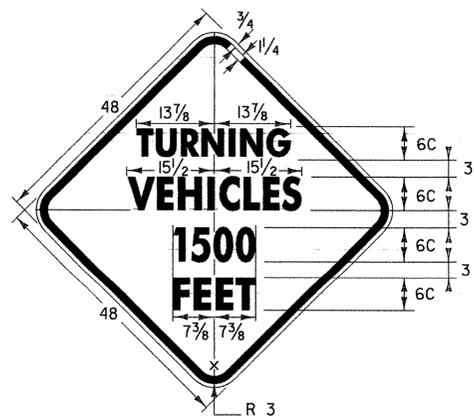


**M4-10(R)**

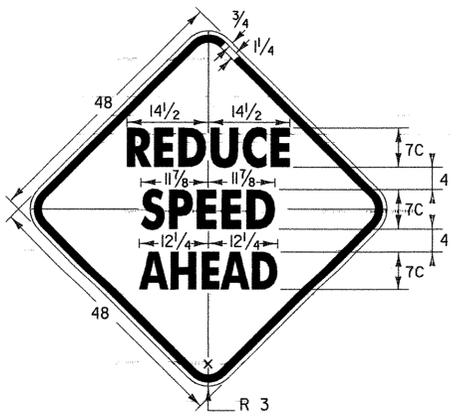


**R11-2**

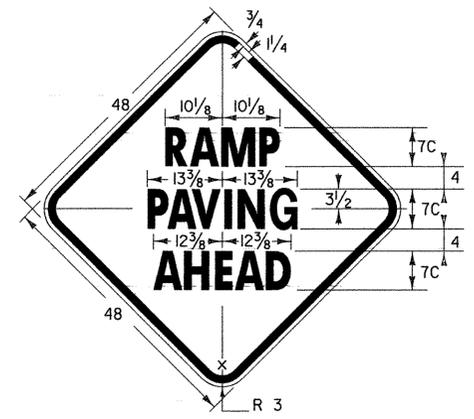
COLORS:  
BLACK TEXT AND BORDER  
WHITE RETROREFLECTORIZED BACKGROUND



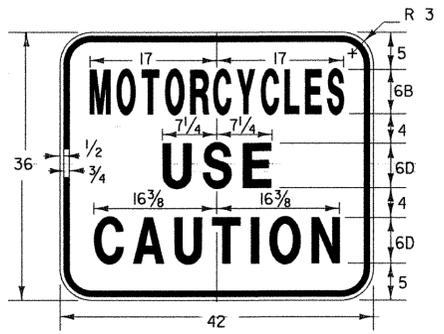
**VC-001**



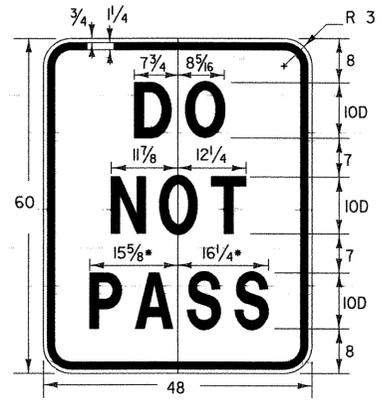
**VC-002**



**VC-003**

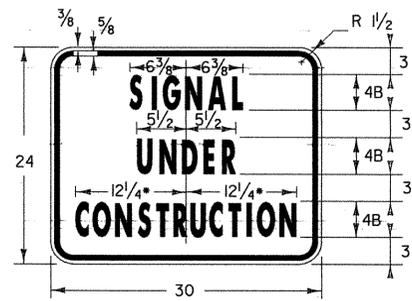


**VC-004**



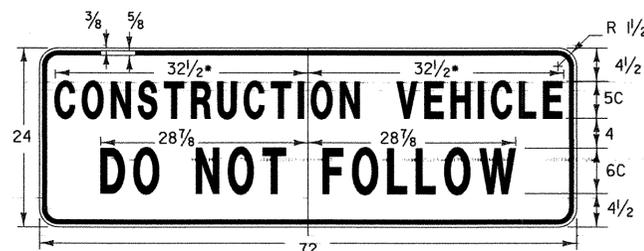
**VC-005**

\* REDUCE SPACING BY 40%



**VC-820**

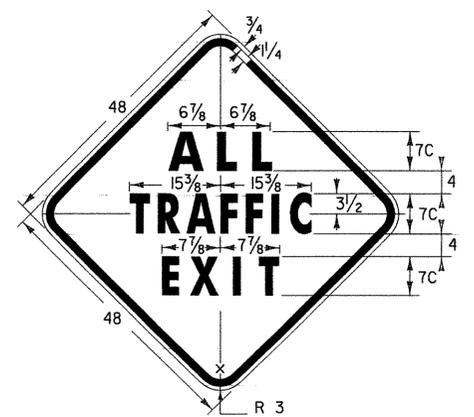
\* REDUCE SPACING 25%



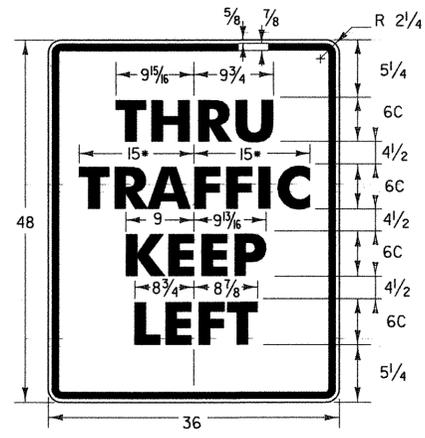
**VC-007**

\* 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.



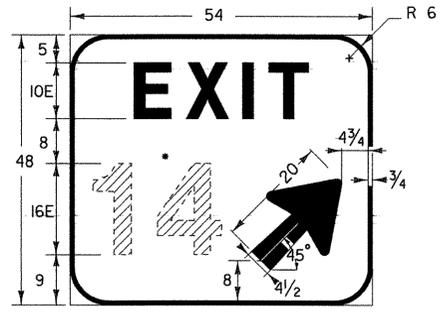
**VC-008**



**VR-118L**

\* REDUCE SPACING 25 %

COLORS:  
BLACK TEXT AND BORDER  
WHITE (RETROREFLECTORIZED) BACKGROUND



**E5-1a**

\* 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:**

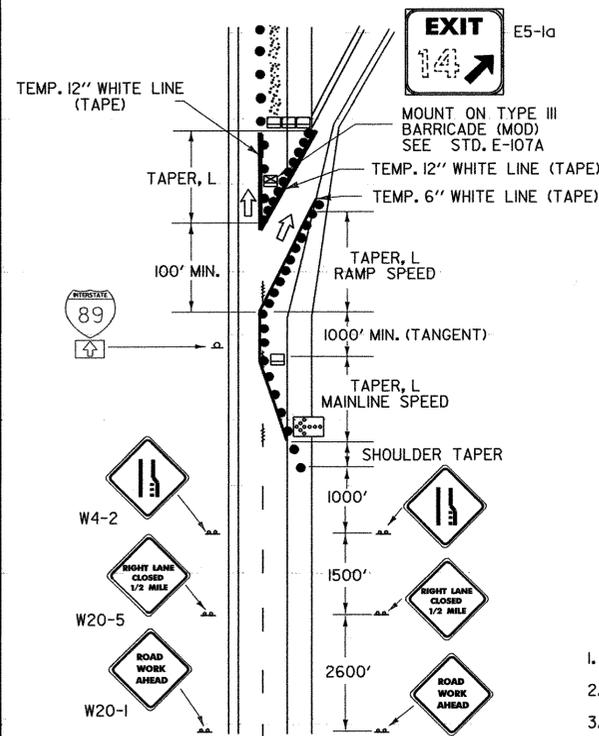
REVISIONS AND CORRECTIONS  
AUG 08, 1995 - DATE OF ORIGINAL ISSUE  
MAY 01, 2004 - CHANGED REFLECTIVE SHEETING TO TYPE III

APPROVED  
DIRECTOR OF PROGRAM DEVELOPMENT  
TRAFFIC OPERATIONS ENGINEER  
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN  
DETAILS



STANDARD  
E-102A



**MAINLINE LANE CLOSURE AT AN EXIT RAMP**

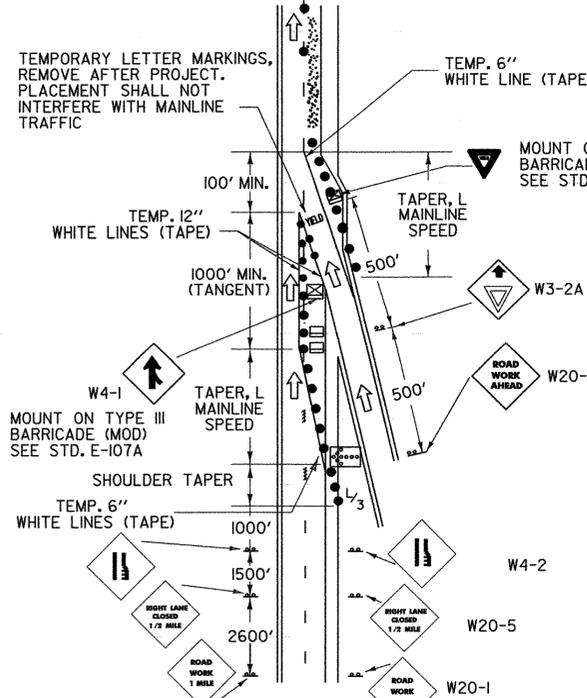
NOT TO SCALE  
THIS DETAIL SHALL BE USED WHEN THE WORK ZONE BEGINS AT THE GORE OR THE MAINLINE LANE CLOSURE DRUM PLACEMENT INTERFERES WITH THE EXIT RAMP.

**LEGEND**

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

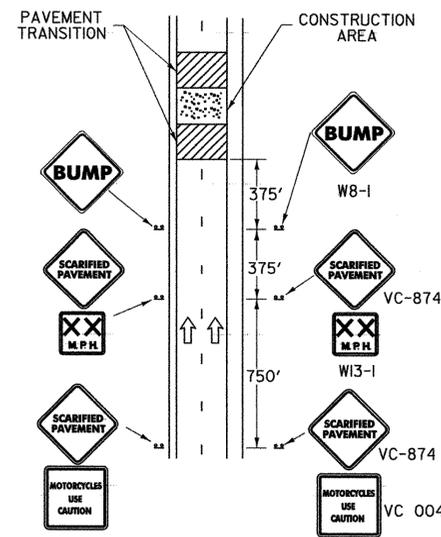
**NOTES**

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.



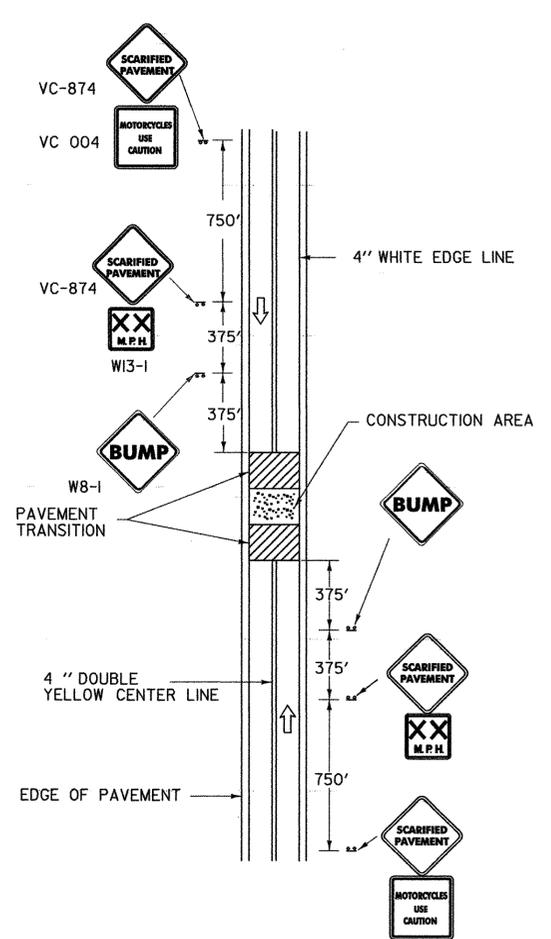
**MAINLINE LANE CLOSURE AT AN ENTRANCE RAMP**

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.



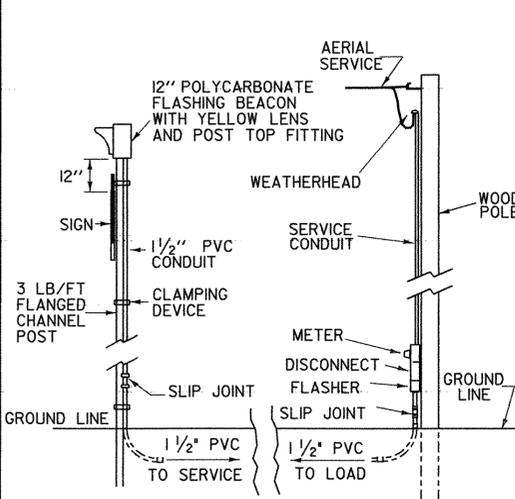
**ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES DIVIDED HIGHWAY**

- 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).

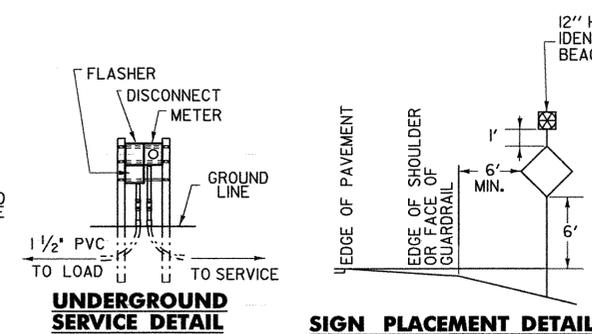


**ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES 2 LANE ROADWAY**

- 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-110.
  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**

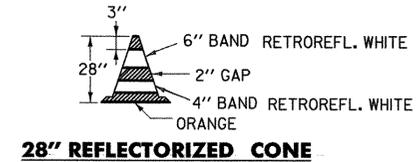


**UNDERGROUND SERVICE DETAIL**

**SIGN PLACEMENT DETAIL**

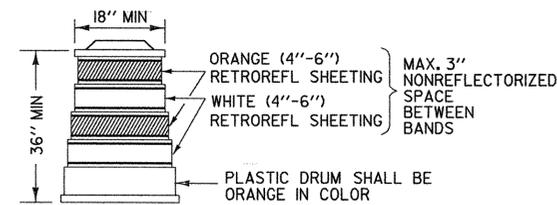
**NOTES**

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\"/>**

- 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 12-ft 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

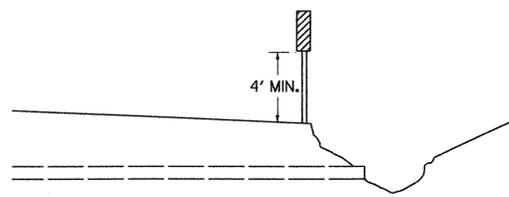
**REVISIONS AND CORRECTIONS**  
 APR 12, 1988 - DATE OF ORIGINAL ISSUE  
 JAN 23, 1989 - REVISED EXIT SIGN - CLARIFIED EXIT TAPER  
 SEPT 20, 1993 - REVISED RAMP CLOSURES, FLASHING BEACON DETAILS AND MOVED TYPE III BARRICADE (MOD) TO STDE-107A  
 AUG 08, 1995 - REVISED BEACON SIZE  
 MAR. 01, 2004 - 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**

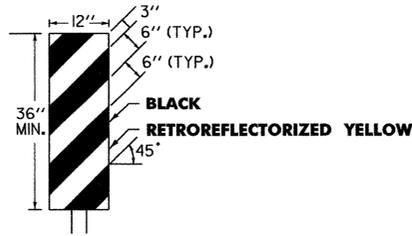
**OTHER STDS. E-101, E-102, E-102A, E-103, E-107A, E-110, E-121, E-136, REQUIRED: E-150, E-175**

**STANDARD E-106**



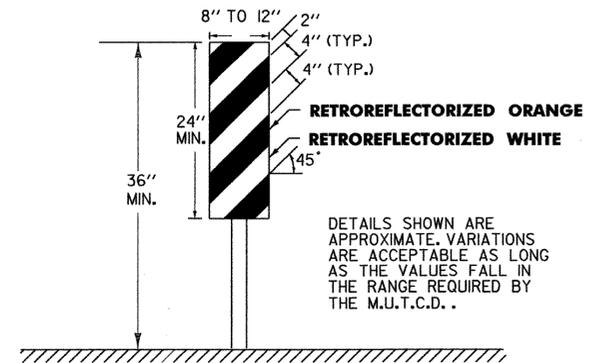
**DELINEATOR TYPICAL**

THE STANDARD COLOR FOR DELINEATORS USED ALONG BOTH SIDES OF TWO-WAY STREETS AND HIGHWAYS AND THE RIGHT SIDE OF ONE-WAY STREETS SHALL BE WHITE. DELINEATORS USED ALONG THE LEFT SIDE OF ONE-WAY ROADWAYS SHALL BE YELLOW THEY SHALL HAVE A MINIMUM AREA OF 7 SQUARE INCHES. THEY MAY BE ROUND, SQUARE OR OBLONG, FOR ALTERNATES SEE STD. E-198



**OBJECT MARKER TYPICAL**

OBJECTS MARKERS ARE USED TO MARK OBSTRUCTIONS WITHIN OR ADJACENT TO THE ROADWAY. IN SOME CASES THERE MAY NOT BE A PHYSICAL OBJECT INVOLVED, BUT OTHER ROADSIDE CONDITIONS SUCH AS NARROW SHOULDER DROP-OFFS, GORES, D.I. EXCAVATIONS, AND ABRUPT CHANGES IN THE ROADWAY ALIGNMENT MAY MAKE IT UNDESIRABLE FOR A DRIVER TO LEAVE THE ROADWAY. THE INSIDE EDGE OF THE OBJECT MARKER SHALL BE IN LINE WITH THE INNER EDGE OF THE OBSTRUCTION, WHENEVER POSSIBLE. OBJECT MARKERS SHALL HAVE ALTERNATING BLACK AND RETROREFLECTORIZED YELLOW STRIPES. (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS).

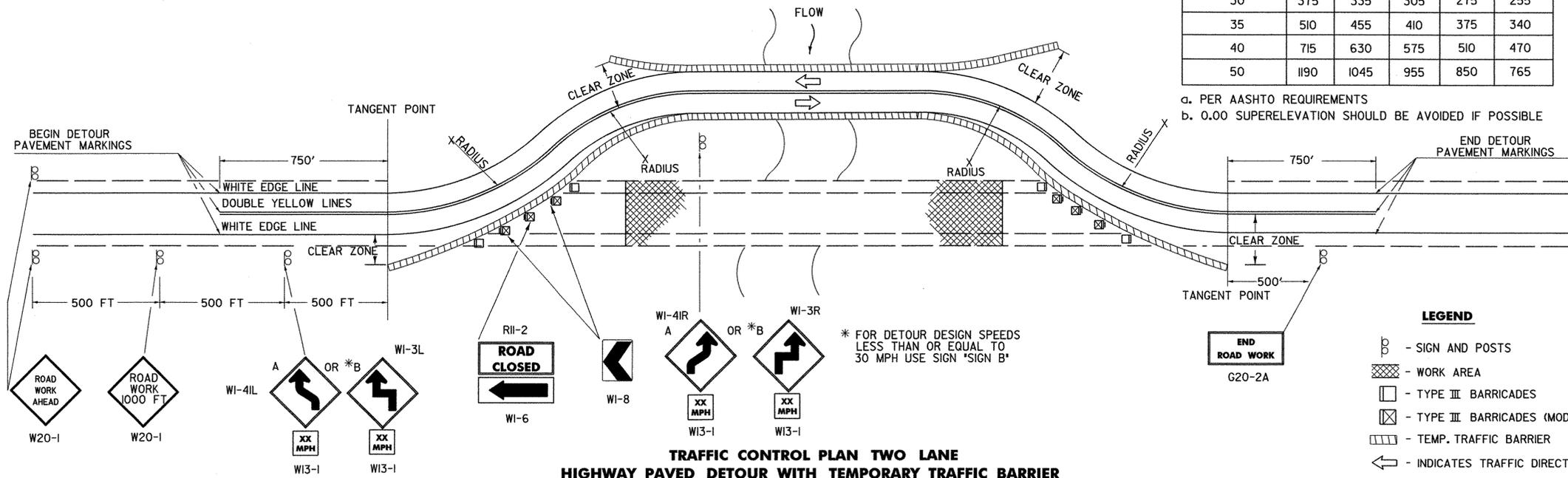


**VERTICAL PANEL**

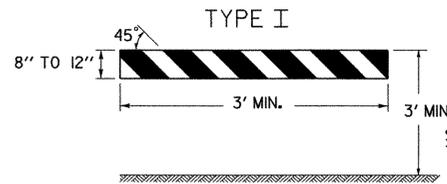
VERTICAL PANELS SHALL HAVE ALTERNATING ORANGE AND WHITE RETROREFLECTORIZED STRIPES (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS). THESE DEVICES MAY BE USED FOR TRAFFIC SEPARATION, CHANNELIZING OR BARRICADING WHERE SPACE IS AT A MINIMUM.

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

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.



**TRAFFIC CONTROL PLAN TWO LANE HIGHWAY PAVED DETOUR WITH TEMPORARY TRAFFIC BARRIER**



STRIPING IS SHOWN WITH TRAFFIC PASSING TO THE RIGHT.



A TYPE III (MODIFIED) BARRICADE SHALL CONSIST OF TYPE II RAILS MOUNTED ON A BREAKAWAY BARRICADE AS SHOWN ON STANDARD SHEET E-107A.

BARRICADE CHARACTERISTICS			
	I	II	III
WIDTH OF RAIL	8" MIN. 12" MAX.	8" MIN. 12" MAX.	8" MIN. 12" MAX.
LENGTH OF RAIL	3' MIN.	3' MIN.	4' MIN.
WIDTH OF STRIPES	6"	6"	6"
HEIGHT	3' MIN.	3' MIN.	5' MIN.
TYPE OF FRAME	SEE E-107A	SEE E-107A	SEE E-107A
FLEXIBILITY	PORTABLE	PORTABLE	PORTABLE
ANGLE OF STRIPE	45°	45°	45°
COLOR OF STRIPES	ORANGE AND WHITE	ORANGE AND WHITE	ORANGE AND WHITE

**BARRICADE CHARACTERISTICS**

DETOUR DESIGN SPEED (M.P.H.)	MINIMUM RADIUS (FT.) <sup>a</sup>				
	SUPERELEVATION (FT./FT.)				
	0.00 <sup>b</sup>	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

**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 ERRECTED 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 RETROREFLECTORIZED 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, DETAILED, 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

**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

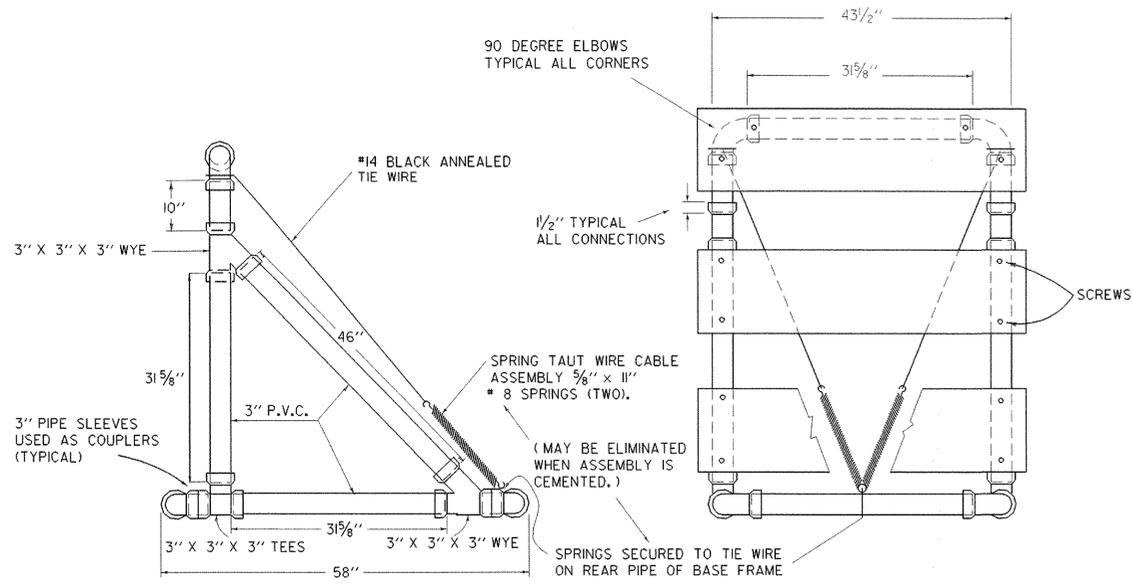
**APPROVED**

DIRECTOR OF PROGRAM DEVELOPMENT  
TRAFFIC OPERATIONS ENGINEER  
FEDERAL HIGHWAY ADMINISTRATION

**DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS**



**STANDARD E-107**

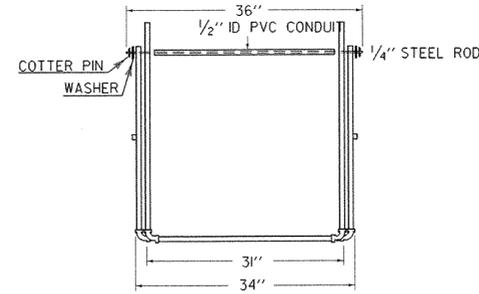
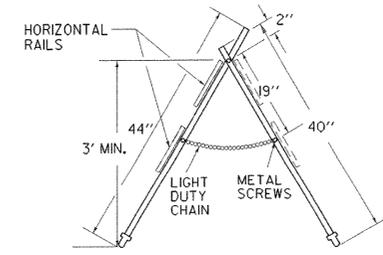


**SIDE VIEW  
TYPE III BARRICADE**

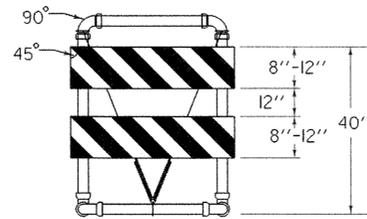
**FRONT VIEW  
TYPE III BARRICADE**

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

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



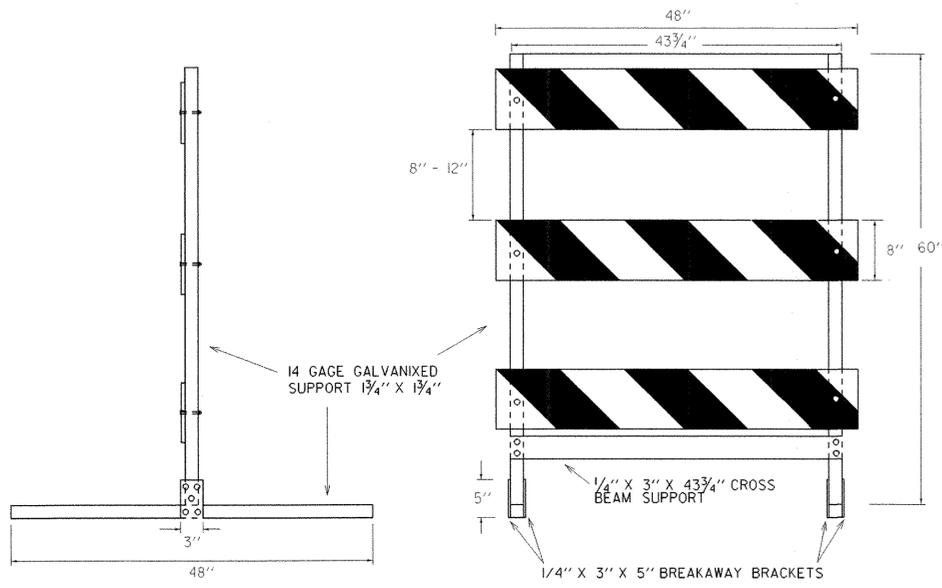
**TYPE I AND TYPE II BARRICADE**



**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. I120 OR I220 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.

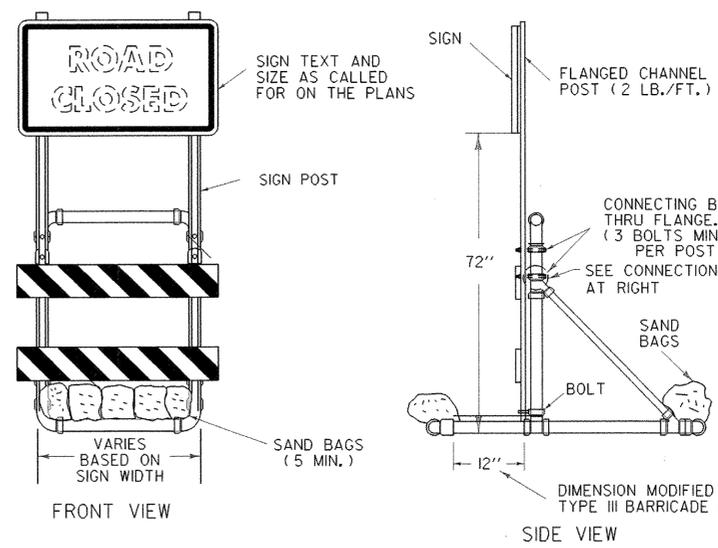
TYPE II BARRICADES SHALL BE A TYPE I BARRICADE WITH AN ADDITIONAL HORIZONTAL RAIL MOUNTED BELOW THE OTHER IN EACH DIRECTION.

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 )**

**CONNECTION DETAIL**

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

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

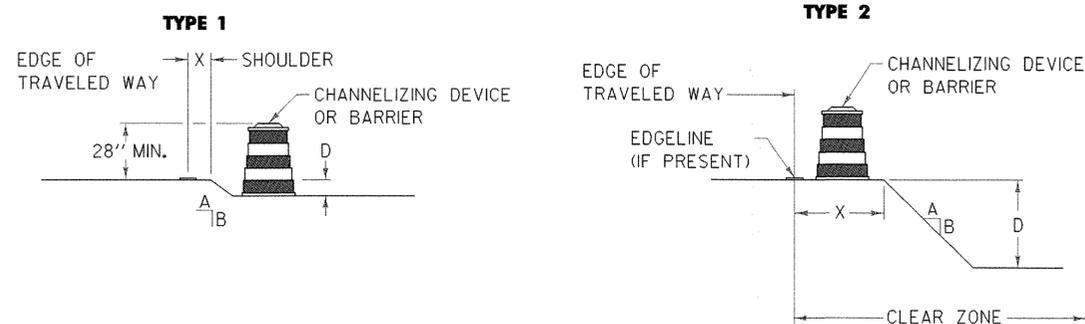
APPROVED  
*Kevin A. Marashie*  
HIGHWAY, SAFETY & DESIGN ENGINEER  
*Richard Stewart*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark D. Richter*  
FEDERAL HIGHWAY ADMINISTRATION

**BREAKAWAY BARRICADE  
DETAILS**



**STANDARD  
E-107 A**

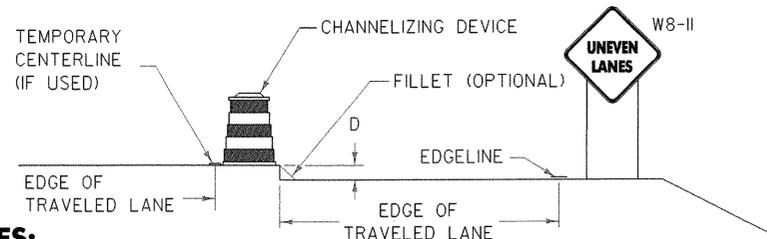
**DROP-OFF ADJACENT TO TRAVELED WAY**



**NOTES:**

- CHANNELIZING DEVICES OR BARRIER SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
- FOR SPECIFIC REQUIREMENTS USE CHART "A".
- IF THE DROP-OFF REQUIRES CHANNELIZING DEVICES TO REMAIN IN PLACE OVERNIGHT THEN "LOW SHOULDER" (W8-9) OR "SHOULDER DROP OFF" (W8-9A) SIGNS SHOULD BE INSTALLED.

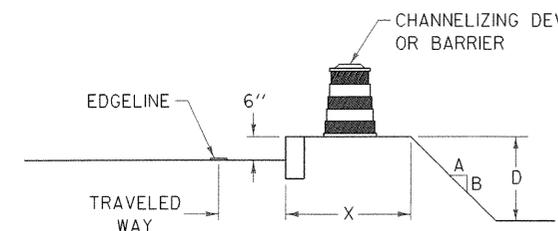
**DROP-OFF BETWEEN ADJACENT TRAVELED LANE**



**NOTES:**

- WHENEVER A LONGITUDINAL DROP-OFF BETWEEN ADJACENT TRAVELED LANES IS TO BE LEFT OVERNIGHT THEN "UNEVEN LANES" (W8-II) SIGNS AND CHANNELIZING DEVICES SHOULD BE INSTALLED.
- IF REQUIRED, THE CHANNELIZING DEVICES USED SHALL BE THOSE WHICH MAXIMIZE THE TRAVELED LANE (I.E. CONES, VERTICAL PANELS OR TUBULAR MARKERS).
- A BITUMINOUS CONCRETE FILLET WITH A 1.5:1 SLOPE MAY BE USED IN PLACE OF CHANNELIZING DEVICES, HOWEVER THE "UNEVEN LANES" (W8-II) SIGNS SHOULD BE INSTALLED REGARDLESS.
- FOR SPECIFIC REQUIREMENTS USE CHART "A".

**DROP-OFF BEYOND SHOULDER OR CURB**



**NOTES:**

- CHANNELIZING DEVICES OR BARRIER SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
- FOR SPECIFIC REQUIREMENTS USE CHART "A" OR "B" AS APPLICABLE.

**CHART "A"**

**ALL SPEEDS WITH NO CURB**

X (FEET)	DROP (D) (INCHES)	A/B SLOPE	DEVICE REQUIRED
0 TO 4'	LESS THAN 2"	ANY	NONE
	2" TO 6"	1.5:1 OR FLATTER	NONE
		STEEPER THAN 1.5:1	CHANNELIZING DEVICE
GREATER THAN 6"	3:1 OR FLATTER	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
4' TO 10'	LESS THAN 6"	ANY	NONE
	6" TO 12"	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
GREATER THAN 12"	3:1 OR FLATTER	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
10' TO CZ	LESS THAN OR EQUAL TO 12"	ANY	NONE
	GREATER THAN 12"	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER

**NOTES:**

- THE MINIMUM CLEAR ZONE FOR FREEWAYS IS TO BE DETERMINED PER THE CURRENT "AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS" (AASHTO) ROADSIDE DESIGN GUIDE. ALL OTHER HIGHWAYS WILL BE DETERMINED PER THE CURRENT "VERMONT STATE STANDARDS" BOOK.
- CHANNELIZING DEVICES MAY BE USED INSTEAD OF BARRIER FOR SHORT TERM (ONE-DAY) OPERATIONS.
- ON BORDERLINE CONDITIONS, THE ENGINEER SHOULD DETERMINE WHICH TREATMENT IS ADEQUATE FOR THE EXISTING CONDITIONS.

**CHART "B"**

**40 MPH OR LESS WITH CURB**

X (FEET)	DROP (D) (INCHES)	DEVICE REQUIRED
0-10'	LESS THAN OR EQUAL TO 12"	NONE
0-10'	GREATER THAN 12"	CHANNELIZING DEVICE
GREATER THAN 10'	ANY	NONE

**NOTES:**

- USE THIS CHART FOR DROP-OFF BEYOND SHOULDER OR CURB.
- USE THIS CHART FOR VERTICAL CURBS OF SIX INCHES OR GREATER. FOR LOWER OR MOUNTABLE CURBS USE CHART "A".
- FOR CURBED SECTIONS WITH POSTED SPEED ABOVE 40 MPH, USE CHART "A".

**GENERAL NOTES:**

- THESE CONDITIONS AND TREATMENTS ARE ONLY PART OF THE TRAFFIC CONTROL SYSTEM AND SHOULD BE USED IN ADDITION TO THE PROPER WORK ZONE SIGNING.
- THE FOLLOWING ARE ACCEPTABLE CHANNELIZING DEVICES:
  - A. VERTICAL PANEL
  - B. TYPE I OR TYPE II BARRICADE
  - C. PLASTIC DRUM
  - \* D. CONE - WHERE APPLICABLE
  - E. TUBULAR MARKERS (MUTCD)

\* IF CHANNELIZING DEVICES ARE REQUIRED TO REMAIN IN PLACE DURING NIGHTTIME HOURS, CONES SHALL BE A MINIMUM OF 36 INCHES HIGH.
- WHERE BARRIER IS CALLED FOR, EITHER CONCRETE BARRIER (JERSEY SHAPE), STEEL BEAM GUARDRAIL OR OTHER FEDERAL HIGHWAY ADMINISTRATION (FHWA) APPROVED BARRIER MAY BE USED.
 

BARRIER ENDS FACING ONCOMING TRAFFIC SHALL BE TAPERED BEYOND THE CLEAR ZONE OR PROTECTED WITH AN APPROVED END TREATMENT DESIGNED FOR THE POSTED SPEED LIMIT OF THE ROADWAY.
- CHANNELIZING DEVICE SPACING ALONG A LONGITUDINAL DROP-OFF (TANGENT) SHALL BE AS FOLLOWS:
 

TANGENT - CHANNELIZING DEVICES SHALL BE SPACED "2S" ("S" IS THE POSTED SPEED LIMIT IN FEET) APART.
- "LOW SHOULDER" (W8-9), "SHOULDER DROP OFF" (W8-9A) OR "UNEVEN LANES" (W8-II) SIGNS, WHEN USED, SHOULD BEGIN PRIOR TO THE DROP-OFF CONDITION AND SHOULD BE REPEATED EVERY 1500 FEET.
- USE CHART "A" FOR DROP OFFS CREATED BY PROJECT ACTIVITIES.

**OTHER STDS. REQUIRED: E-101, E-106, E-107, E-107A**

REVISIONS AND CORRECTIONS  
 SEPT. 20, 1993- ORIGINAL APPROVAL DATE  
 AUG. 18, 1995 - ADDED SHOULDER WARNING NOTE  
 DEC. 8, 2008 - GENERAL UPDATE  
 JUN. 8, 2009 - MINOR REVISIONS

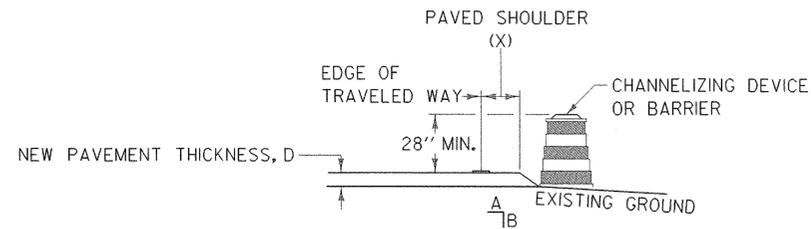
APPROVED  
*Kevin A. Klauber*  
 HIGHWAY, SAFETY & DESIGN ENGINEER  
*Richard Fehault*  
 DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark D. Richter*  
 FEDERAL HIGHWAY ADMINISTRATION

**CONSTRUCTION ZONE  
 LONGITUDINAL DROP OFFS**



**STANDARD  
 E-108**

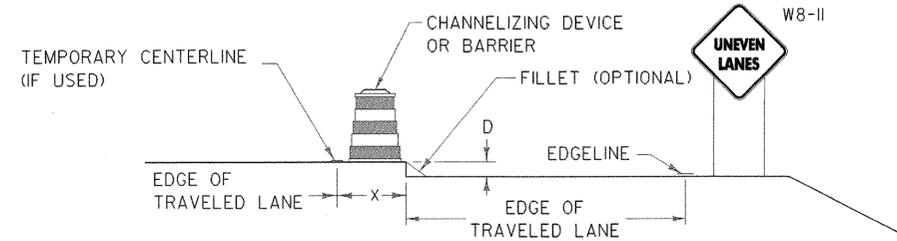
**DROP-OFF ADJACENT TO TRAVELED WAY**



**NOTES:**

1. CHANNELIZING DEVICES SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
2. FOR SPECIFIC REQUIREMENTS USE CHART "A".
3. IF THE DROP-OFF REQUIRES CHANNELIZING DEVICES TO REMAIN IN PLACE OVERNIGHT THEN "LOW SHOULDER" (W8-9) OR "SHOULDER DROP OFF" (W8-9A) SIGNS SHOULD BE INSTALLED.

**DROP-OFF BETWEEN ADJACENT TRAVELED LANE**



**NOTES:**

1. WHENEVER A LONGITUDINAL DROP-OFF BETWEEN ADJACENT TRAVELED LANES IS TO BE LEFT OVERNIGHT THEN "UNEVEN LANES" (W8-II) SIGNS SHOULD BE INSTALLED. CHANNELIZING DEVICES SHOULD BE INSTALLED IF THE REQUIREMENTS OF CHART "A" ARE MET.
2. IF REQUIRED, THE CHANNELIZING DEVICES USED SHALL BE THOSE WHICH MAXIMIZE THE WIDTH OF THE TRAVELED LANE (I.E. CONES, VERTICAL PANELS OR TUBULAR MARKERS).
3. FOR SPECIFIC REQUIREMENTS USE CHART "A".

**CHART "A"**  
**ALL SPEEDS WITH NO CURB**

X (FEET)	DROP (D) (INCHES)	A/B SLOPE	DEVICE REQUIRED
0 TO 4'	LESS THAN 2"	ANY	NONE
	2" TO 6"	1.5:1 OR FLATTER	NONE
		STEEPER THAN 1.5:1	CHANNELIZING DEVICE
GREATER THAN 6"	3:1 OR FLATTER	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
4' TO 10'	LESS THAN 6"	ANY	NONE
	6" TO 12"	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE

**GENERAL NOTES:**

1. THESE CONDITIONS AND TREATMENTS ARE ONLY PART OF THE TRAFFIC CONTROL SYSTEM AND SHOULD BE USED IN ADDITION TO THE PROPER WORK ZONE SIGNING.
2. THE FOLLOWING ARE ACCEPTABLE CHANNELIZING DEVICES:
  - A. VERTICAL PANEL
  - B. TYPE I OR TYPE II BARRICADE
  - C. PLASTIC DRUM
  - \* D. CONE - WHERE APPLICABLE
  - E. TUBULAR MARKERS (MUTCD)

\* IF CHANNELIZING DEVICES ARE REQUIRED TO REMAIN IN PLACE DURING NIGHTTIME HOURS, CONES SHALL BE A MINIMUM OF 36 INCHES HIGH.
3. WHERE BARRIER IS CALLED FOR, EITHER CONCRETE BARRIER (JERSEY SHAPE), STEEL BEAM GUARDRAIL OR OTHER FEDERAL HIGHWAY ADMINISTRATION (FHWA) APPROVED BARRIER MAY BE USED.
 

BARRIER ENDS FACING ONCOMING TRAFFIC SHALL BE TAPERED BEYOND THE CLEAR ZONE OR PROTECTED WITH AN APPROVED END TREATMENT DESIGNED FOR THE POSTED SPEED LIMIT OF THE ROADWAY.
4. CHANNELIZING DEVICE SPACING ALONG A LONGITUDINAL DROP-OFF (TANGENT) SHALL BE AS FOLLOWS:
 

TANGENT - CHANNELIZING DEVICES SHALL BE SPACED "2S" ("S" IS THE POSTED SPEED LIMIT IN FEET) APART.
5. "LOW SHOULDER" (W8-9), "SHOULDER DROP OFF" (W8-9A) OR "UNEVEN LANES" (W8-II) SIGNS, WHEN USED, SHOULD BEGIN PRIOR TO THE DROP-OFF CONDITION AND SHOULD BE REPEATED EVERY 1500 FEET.
6. USE CHART "A" FOR DROP OFFS CREATED BY PROJECT ACTIVITIES.

**OTHER STDS. REQUIRED: E-101, E-106, E-107, E-107A**

**NOTE:**

1. ON BORDERLINE CONDITIONS, THE ENGINEER SHOULD DETERMINE WHICH TREATMENT IS ADEQUATE FOR THE EXISTING CONDITIONS.

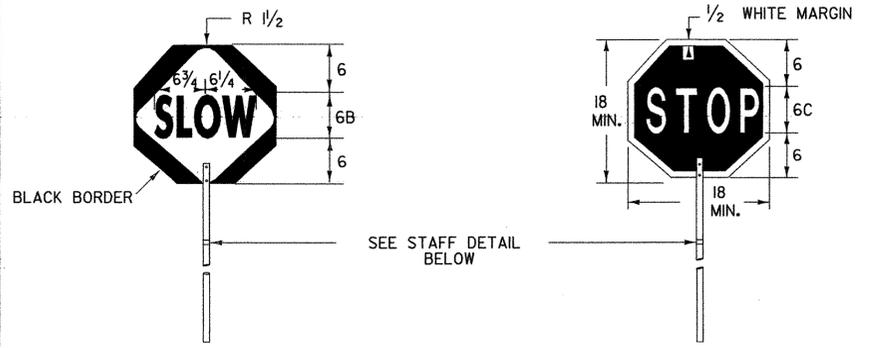
REVISIONS AND CORRECTIONS  
DEC. 8, 2008 - ORIGINAL APPROVAL DATE  
JUN. 8, 2009 - MINOR REVISIONS

APPROVED  
*Kim S. Mauldin*  
HIGHWAY, SAFETY & DESIGN ENGINEER  
*Richard J. Smith*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark D. Richter*  
FEDERAL HIGHWAY ADMINISTRATION

**CONSTRUCTION ZONE  
LONGITUDINAL DROP OFFS  
FOR PAVING**



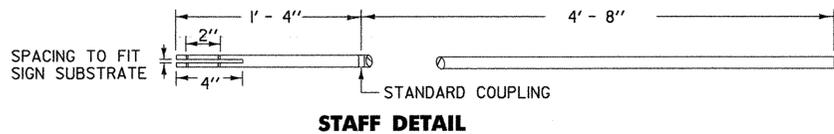
**STANDARD  
E-108 A**



**SIGN PADDLE DETAIL FOR FLAGPERSON**

**COLORS**  
ORANGE ASTM TYPE VIII  
RETROREFLECTORIZED DIAMOND  
WITH BLACK TEXT AND BORDER

**COLORS**  
RED ASTM TYPE III OR TYPE VIII  
RETROREFLECTORIZED OCTAGON  
WITH WHITE ASTM TYPE III OR TYPE VIII  
RETROREFLECTORIZED TEXT AND BORDER



**STAFF DETAIL**

**MATERIALS**

THE SIGN MATERIALS SHALL BE ALUMINUM, ABS PLASTIC OR EQUIVALENT, WITH COLORS AS INDICATED ON DETAILS. RETROREFLECTIVE SHEETING SHALL BE ASTM TYPE III OR TYPE VIII. THE STAFF MAY BE RIGID ALUMINUM TUBING, ABS PLASTIC OR WOOD.

**MOUNTING**

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

**SIGN SPACING NOTES**

**WORK DURATION**

WORK DURATION IS A MAJOR FACTOR IN DETERMINING THE NUMBER AND TYPES OF DEVICES USED IN UTILITY TRAFFIC CONTROL ZONES. THE DURATION OF A TEMPORARY TRAFFIC CONTROL ZONE IS DEFINED RELATIVE TO THE LENGTH OF TIME A WORK OPERATION OCCUPIES A SPOT LOCATION.

SHORT DURATION IS WORK THAT OCCUPIES A LOCATION UP TO 1 HOUR. SIMPLIFIED CONTROL PROCEDURES MAY BE WARRANTED FOR SHORT-DURATION WORK. ALL WORK VEHICLES SHALL BE EQUIPPED AND OPERATING ROTATING OR STROBE LIGHTS DURING SHORT-DURATION WORK. THE SUPERVISOR WILL DETERMINE IF ADDITIONAL SIGNS AND TRAFFIC CONTROL IS NECESSARY. SAFETY IN SHORT-DURATION WORK ZONES SHOULD NOT BE COMPROMISED BY USING FEWER DEVICES SIMPLY BECAUSE THE OPERATION WILL FREQUENTLY CHANGE LOCATIONS.

SHORT-TERM STATIONARY IS DAYTIME WORK THAT OCCUPIES A LOCATION FOR MORE THAN 1 HOUR BUT LESS THAN 12 HOURS (MOST MAINTENANCE AND UTILITY OPERATIONS ARE SHORT-TERM STATIONARY WORK). ADVANCE WARNING SIGNS SHALL BE PLACED TO WARN TRAVELING PUBLIC THAT WORK IS TAKING PLACE. THE NUMBER AND SPACING OF THESE WARNING DEVICES WILL DEPEND ON THE LOCATION OF THE WORKZONE.

**SIGN SPACING**

WHERE HIGHWAY CONDITIONS PERMIT, WARNING SIGNS SHOULD BE PLACED A VARYING DISTANCE IN ADVANCE OF THE WORK AREA, DEPENDING ON THE ROADWAY TYPE, CONDITION, AND SPEED. WHERE A SERIES OF TWO OR MORE WARNING SIGNS IS USED, THE CLOSEST SIGN TO THE WORK AREA SHOULD BE PLACED APPROXIMATELY 100 FT AWAY FOR LOW-SPEED URBAN STREETS, 1,000 FT AWAY OR MORE FOR EXPRESSWAYS AND FREEWAYS. SEE TABLE BELOW.

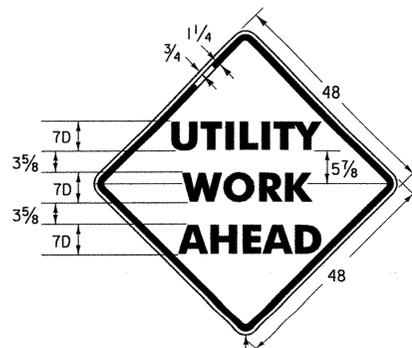
ROAD TYPE	DISTANCE BETWEEN SIGNS (FT)		
	A	B	C
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY/FREEWAY	1,000	1,500	2,640

**REVISIONS AND CORRECTIONS**

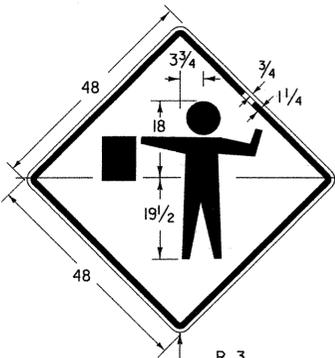
AUG 08, 1995 - SUPERSEDES STD E-9 AND UPDATED TO NEW CHAPTER VI OF MUTCD  
APRIL 18, 2002 - CHANGED REFLECTIVE SHEETING TO TYPE III  
MARCH 01, 2004 - UPDATED SIGN PACKAGES TO MEET MUTCD

**APPROVED**

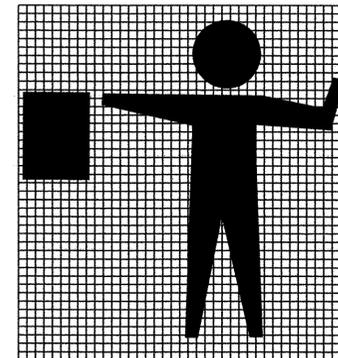
*[Signature]*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*[Signature]*  
TRAFFIC OPERATIONS ENGINEER  
*[Signature]*  
FEDERAL HIGHWAY ADMINISTRATION



**W21-7 OR W20-1**



**W20-7a**



**NOTES**

**DESIGN**

LETTERS, DIGITS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD HIGHWAYS 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 WARNING SIGNS ON THIS SHEET MAY BE OF ANY OF THE FOLLOWING WITH MINIMUM THICKNESS AS NOTED.  
FLAT SHEET ALUMINUM - 0.125 INCHES  
HIGH DENSITY OVERLAYED PLYWOOD - 5/8 INCHES  
ROLL-UP SIGN MATERIAL ASTM TYPE VI

**REFLECTORIZATION**

ALL RETROREFLECTORIZED MATERIAL SHALL CONSIST OF ASTM TYPE III, TYPE VI OR TYPE VIII RETROREFLECTIVE SHEETING. THE TEXT AND BORDERS MAY BE SILK SCREENED OR LETTERING FILM.

**COLORS**

THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT AND SYMBOLS ON A RETROREFLECTORIZED FLUORESCENT ORANGE BACKGROUND THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

**INSTALLATION**

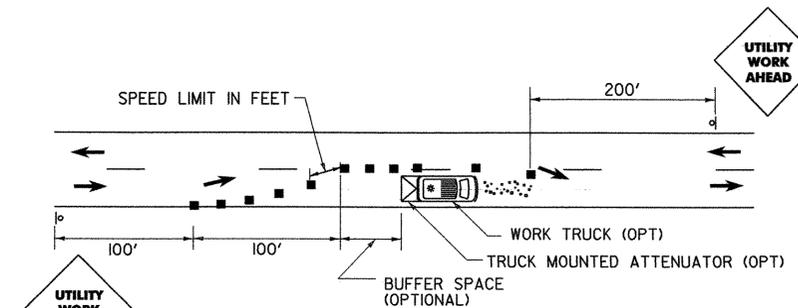
THE SIGNS SHALL BE IN-PLACE AT THE TIME THE PROJECT COMMENCES, AND WHERE APPLICABLE EACH POST MOUNTED SIGN SHALL BE ERECTED IN A NEAT AND PROFESSIONAL MANNER ON METAL POSTS SET SECURELY IN THE GROUND, UNLESS OTHERWISE NOTED ON THIS SHEET. THE BOTTOM OF A SIGN, UNLESS OTHERWISE NOTED SHALL BE AT LEAST 7 FEET ABOVE EDGE OF THE TRAVELED WAY, 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. SIGNS MOUNTED ON BARRICADES OR TEMPORARY SUPPORTS SHALL BE POSITIONED SUCH THAT THE BOTTOM OF THE SIGN IS NOT LESS THAN ONE FOOT ABOVE THE PAVEMENT ELEVATION. ALL SIGN INSTALLATIONS SHALL BE NCHRP 350 COMPLIANT FOR THE SIGN SUBSTRATE MATERIAL BEING USED. FOR MOBILE OPERATIONS REFER TO THE MUTCD PART VI (TA-17)

**SPECIFICATIONS**

WARNING SIGNS SHALL MEET THE VERMONT STATE STANDARD SPECIFICATIONS FOR CONSTRUCTION "TRAFFIC SIGNS".

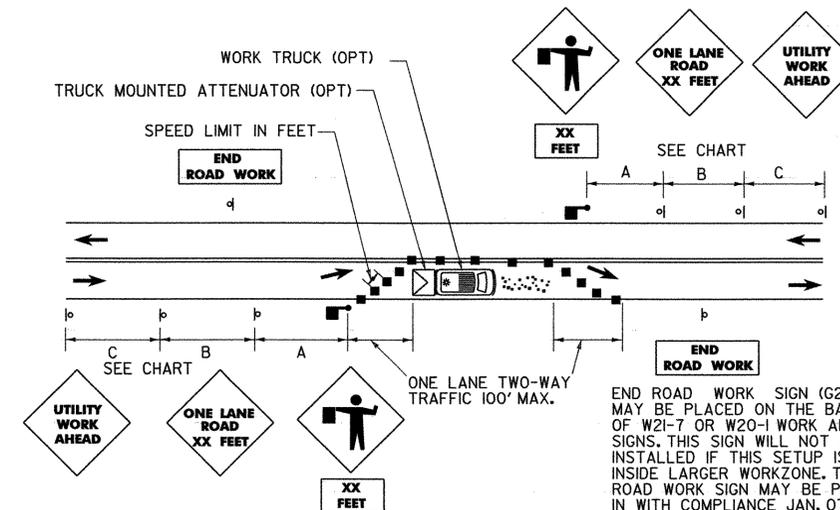
**LEGEND**

- WORK VEHICLE
- TRUCK MOUNTED ATTENUATOR
- WORK AREA
- SIGN & POSTS
- FLAGPERSON
- CHANNELIZING DEVICES (CONES OR DRUMS)



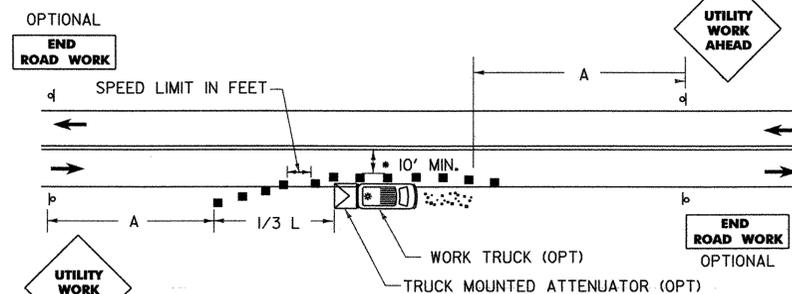
**TWO LANE RESIDENTIAL STREET LOW VOLUME TRAFFIC (TA-18)**

THIS LAYOUT SHALL ONLY BE USED ON ROADS WITH SPEED LIMITS LESS THAN 30 MPH AND WHERE SIGHT DISTANCE MEETS MINIMUM STOPPING SIGHT DISTANCES REQUIREMENTS FOR BOTH DIRECTIONS OF APPROACHING TRAFFIC.



**TWO LANE ROAD REQUIRING LANE CLOSURE (TA-10)**

SINGLE FLAGGER OPERATION MAY BE USED IF SIGHT DISTANCE IS AVAILABLE ON LOW VOLUME ROADS



**TWO LANE ROAD SHOULDER WORK AREA (TA-6)**

$L = \frac{WS^2}{60}$

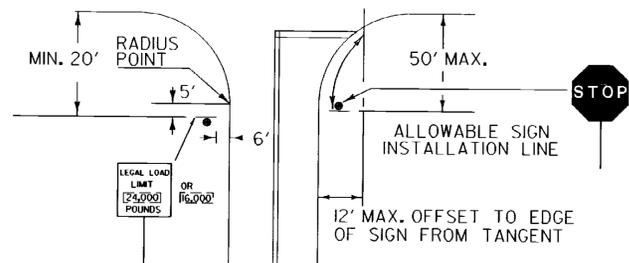
\* IF LESS THAN 10' USE THE FLAGGING OPERATION AS SHOWN ABOVE  $L = WS \geq 45$  MPH

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



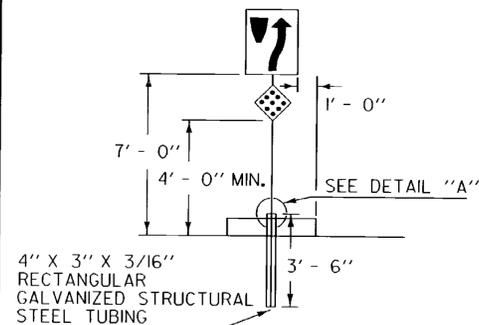
**STANDARD E-119**

**UTILITY WORK ZONE**

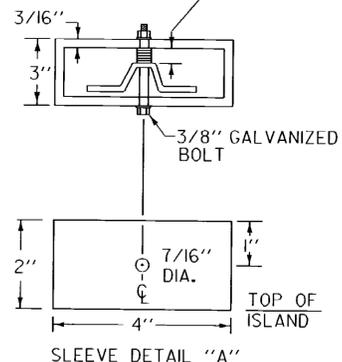


STOP SIGN SHALL BE PLACED ON DRIVERS RIGHT, MAINTAINING MAXIMUM VISIBILITY. CLEARANCE SHALL BE A MINIMUM OF 6' AND A MAXIMUM OF 50' FROM EDGE LINE OF INTERSECTING ROADWAY AND DOES NOT HAVE TO BE ADJACENT TO THE STOP BAR.

**LEGAL LOAD LIMIT AND STOP SIGNS AT INTERSECTIONS WITH TOWN HIGHWAYS**

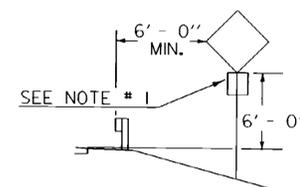
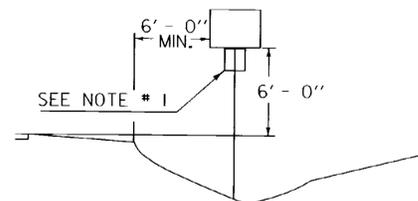
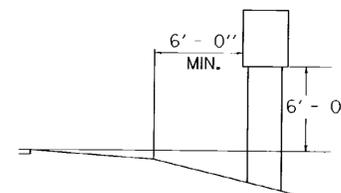


TO INSURE A TIGHT CONNECTION GALVANIZED WASHERS SHALL BE USED AS SPACERS.

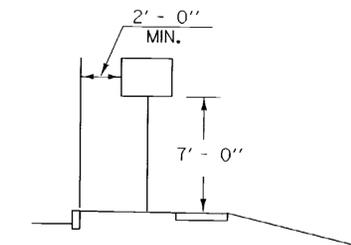
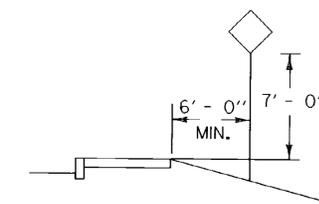


**SIGNS ON MEDIAN ISLANDS IN THE LINE OF TRAFFIC**

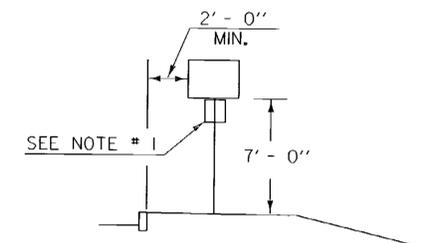
INCREASE VERTICAL CLEARANCE TO 7' IN AREAS OF FREQUENT ROADSIDE PARKING OR PEDESTRIAN ACTIVITY



**RURAL**



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



**URBAN**

**NOTES:**

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

POST REFERENCE:

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

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

**REVISIONS AND CORRECTIONS**

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

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

**APPROVED**

*Stephen B. MacArthur*  
DIRECTOR OF ENGINEERING

*Daniel A. Ross*  
TRAFFIC AND SAFETY ENGINEER

**STANDARD SIGN PLACEMENT  
CONVENTIONAL ROAD**



**STANDARD  
E-121**

**DESIGN**

LETTERS, DIGITS, ARROWS, SYMBOLS, 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 MATERIALS USED FOR THE STREET SIGNS MAY BE EITHER OF THE FOLLOWING: A - EXTRUDED ALUMINUM BLADES WITH RETROREFLECTIVE SHEETING B - FLAT ALUMINUM BLADES WITH RETROREFLECTIVE SHEETING THE MATERIAL FOR THE BLADES SHALL BE EITHER EXTRUDED ALUMINUM WITH A 0.25 INCH FLANGE THICKNESS AND A 0.090 INCH WEBB (MIN) OR FLAT SHEET ALUMINUM WITH A MINIMUM THICKNESS OF 0.125 INCH. THE PREFERRED MOUNTING METHOD FOR STREET SIGNS IS POST TOP MOUNTING BRACKETS. HARDWARE FOR MOUNTING SIGNS TO POST SHALL BE INCIDENTAL TO OTHER ITEMS. MOUNTING METHOD WILL BE AS SHOWN ON THE PLANS. MINIMUM VERTICAL CLEARANCE IS 8 FEET TO THE BOTTOM OF THE SIGN. FOR POST TOP MOUNTINGS SIGNS SHALL HAVE TEXT ON BOTH SIDES.

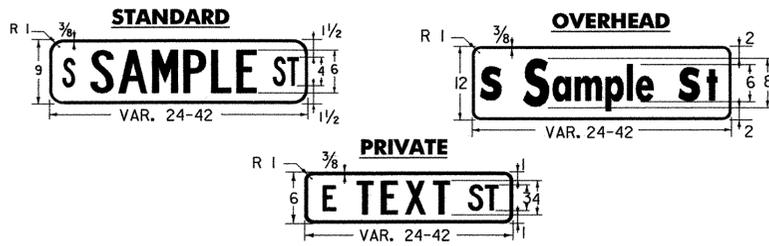
**COLORS**

THE STREET SIGNS SHOWN ON THIS SHEET SHALL HAVE WHITE RETROREFLECTIVE ASTM TYPE III TEXT, ON A GREEN RETROREFLECTIVE ASTM TYPE III BACKGROUND. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE FHWA.

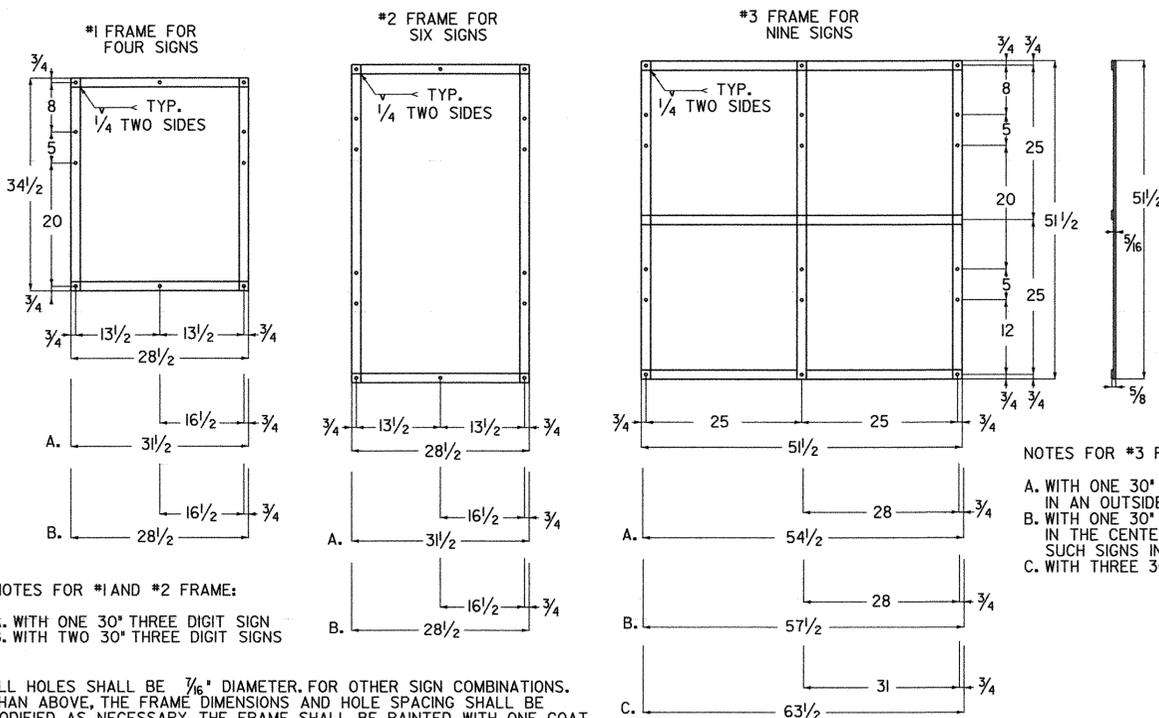
**SPECIFICATIONS**

STREET SIGNS SHALL MEET THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. STANDARD SIGNS - USE A 9 INCH HIGH BLADE WITH SERIES "B" LETTERING (MIN) WITH 6 INCH LETTERS FOR THE STREET NAME. 4 INCH LETTERS FOR OTHER TEXT. PVT. SIGNS - USE A 6 INCH HIGH BLADE WITH SERIES B LETTERING (MIN) WITH 4 INCH LETTERS FOR THE STREET NAME, 3 INCH LETTERS FOR OTHER TEXT. OVERHEAD SIGNS USE A 12 INCH HIGH BLADE WITH 8 INCH UPPER CASE AND 6 INCH LOWER CASE LETTERS. FOR ALL 6, 9, 12 INCH BLADES USE LENGTHS OF 24, 30, 36 OR 42 INCH.

**STREET NAME SIGNS NOTES**

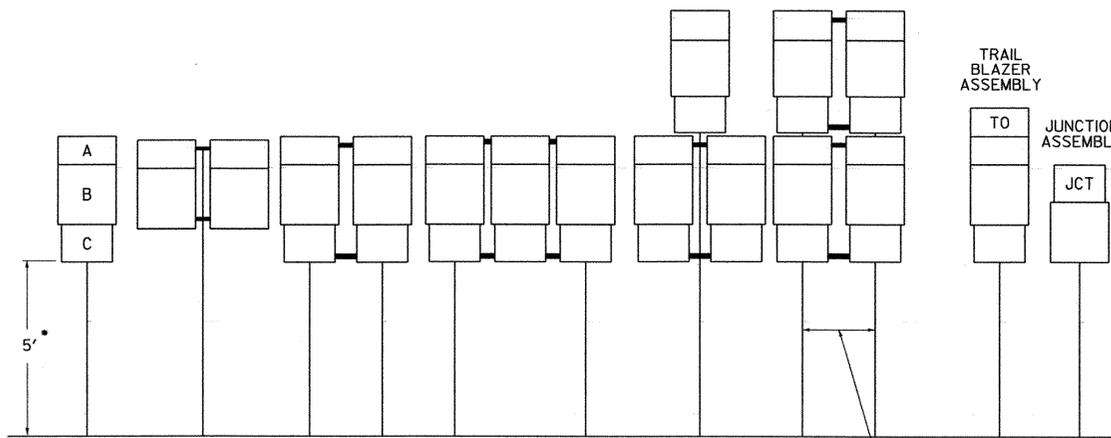


**STREET NAME SIGNS**



**ROUTE MARKER ASSEMBLY FRAMES**

**STANDARD MOUNTING OF ROUTE MARKER ASSEMBLIES**

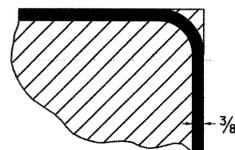


- A - CARDINAL DIRECTION MARKER
- B - ROUTE NUMBER
- C - ADVANCE TURN ARROW OR DIRECTIONAL ARROW

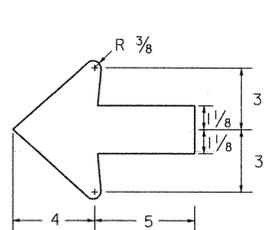
\* WHERE PARKING OR PEDESTRIAN TRAFFIC WILL OCCUR IN THE IMMEDIATE VICINITY OF THESE SIGNS MINIMUM VERTICAL CLEARANCE SHALL BE INCREASED TO 7'

**INSTALLATION SEQUENCE:**

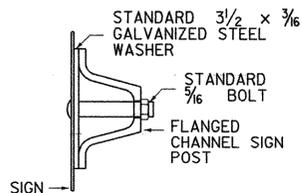
IN MULTIPLE HORIZONTAL MOUNTINGS PLACE A ROUTE MARKER ASSEMBLY INDICATING A LEFT TURN ON THE LEFT SIDE OF THE ASSEMBLY; RIGHT TURN ON THE RIGHT SIDE. FOR VERTICALLY STACKED MOUNTINGS PLACE THE STRAIGHT THROUGH MOVE INDICATION ON TOP, THE LEFT OR RIGHT TURNS AS APPROPRIATE BENEATH.



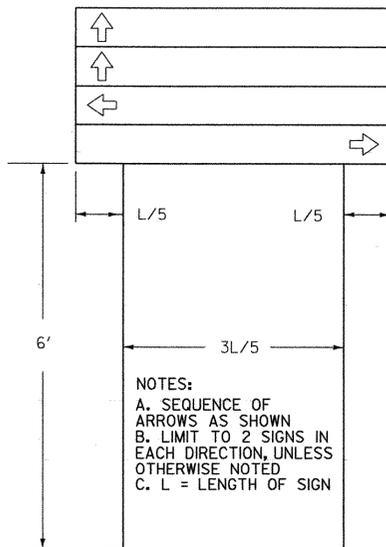
**BORDER DETAIL**



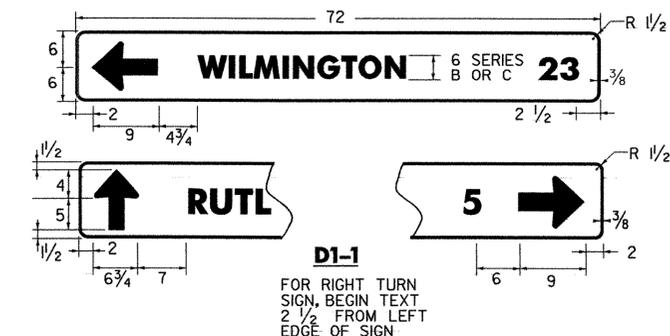
**STANDARD ARROW**



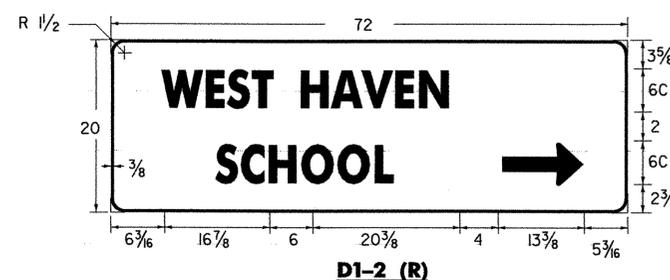
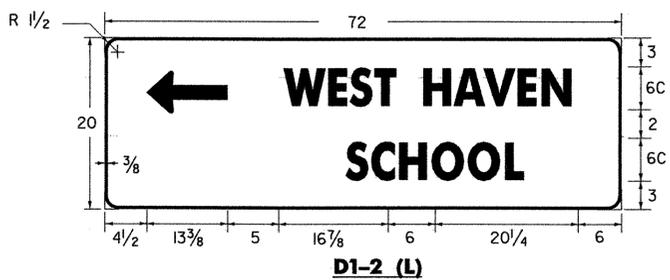
**INSTALLATION DETAIL**



**DESTINATION ASSEMBLY**



FOR RIGHT TURN SIGN, BEGIN TEXT 2 1/2 FROM LEFT EDGE OF SIGN



**STANDARD DESTINATION SIGNS**

**STANDARD DESTINATION SIGN NOTES**

**DESIGN**

LETTERS, DIGITS, ARROWS, SYMBOLS, 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 FOR STANDARD DESTINATION SIGNS SHALL BE HIGH DENSITY OVERLAYED PLYWOOD 3/8 INCH THICK OR FLAT SHEET ALUMINUM 1/8 INCH THICK.

**COLORS**

THE DESTINATION SIGNS SHOWN ON THIS SHEET SHALL HAVE WHITE RETROREFLECTIVE ASTM TYPE III TEXT, ARROWS AND BORDERS ON A GREEN RETROREFLECTIVE ASTM TYPE III BACKGROUND. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

**APPLICATION**

MULTIPLE ASSEMBLIES SHALL USE THE SAME SIZE THROUGHOUT.

**SPECIFICATIONS**

DESTINATION SIGNS SHALL MEET THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION \*TRAFFIC SIGNS\*. ALL BORDERS ARE 3/8 INCH

OTHER STDS. E-160, E-164 REQUIRED:

**REVISIONS AND CORRECTIONS**

- APR. 01, 1988 - DATE OF ORIGINAL ISSUE
- JAN. 23, 1989 - DELETED TOWN LINE INFO.
- AUG. 08, 1995 - REVISED DESTINATION SIGN DETAILS DETAILED SIGN LOCATION TYPICAL
- MARCH 16, 2004 - REVISED ROUTE MARKER ASSEMBLY FRAMES DETAIL CHANGED SIZE OF D-BOARDS

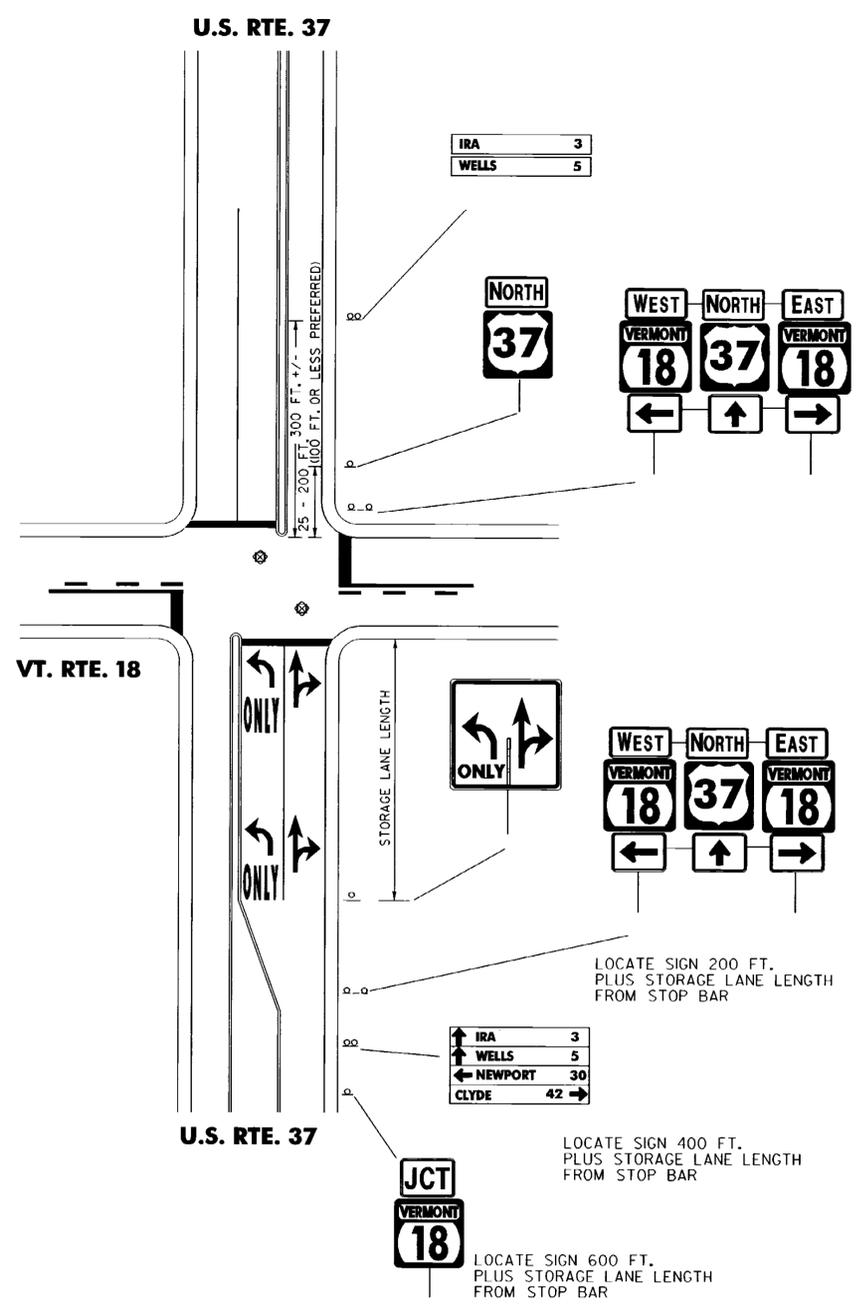
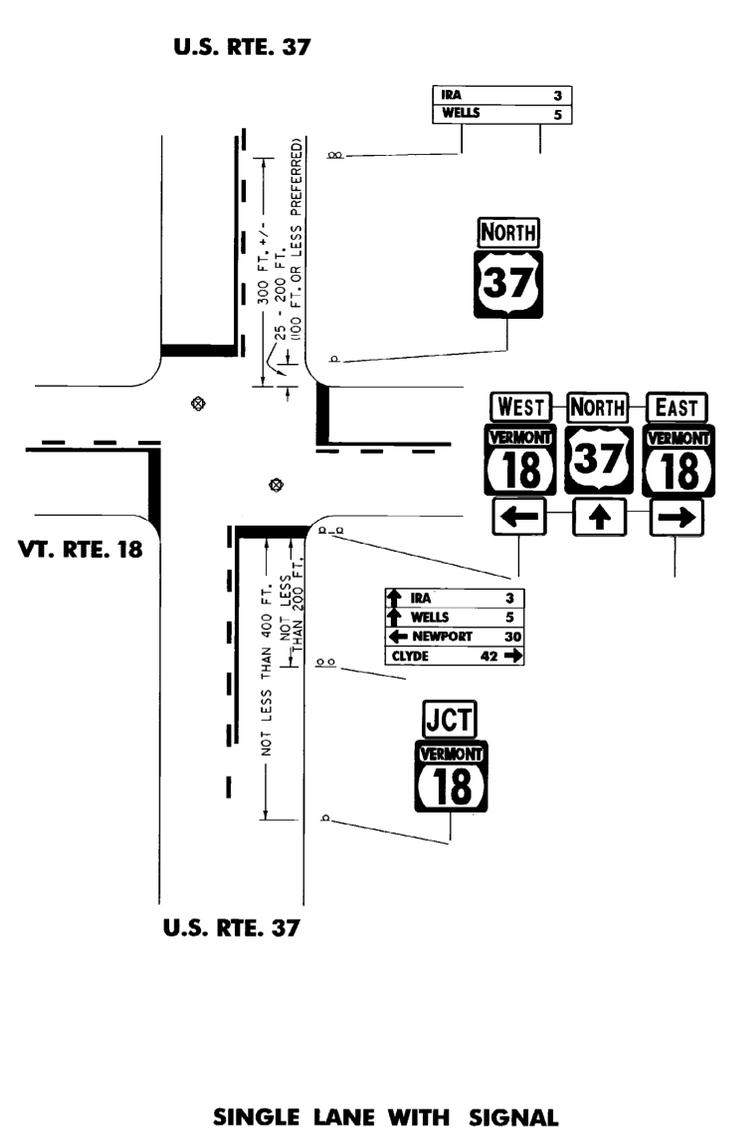
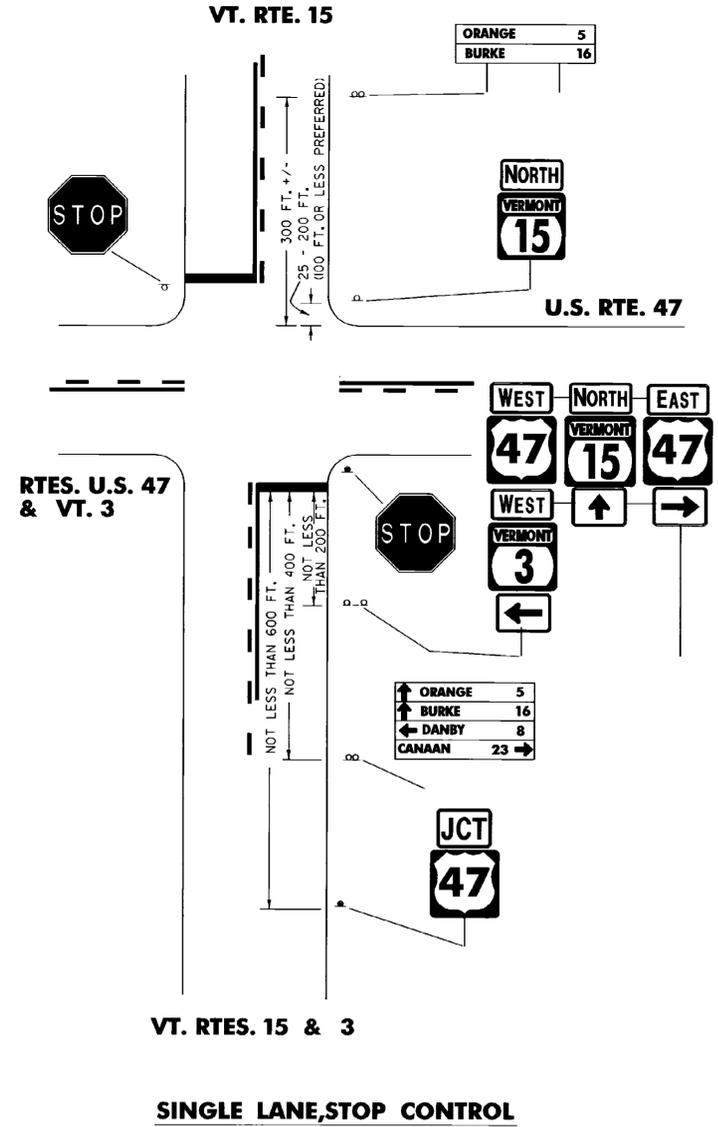
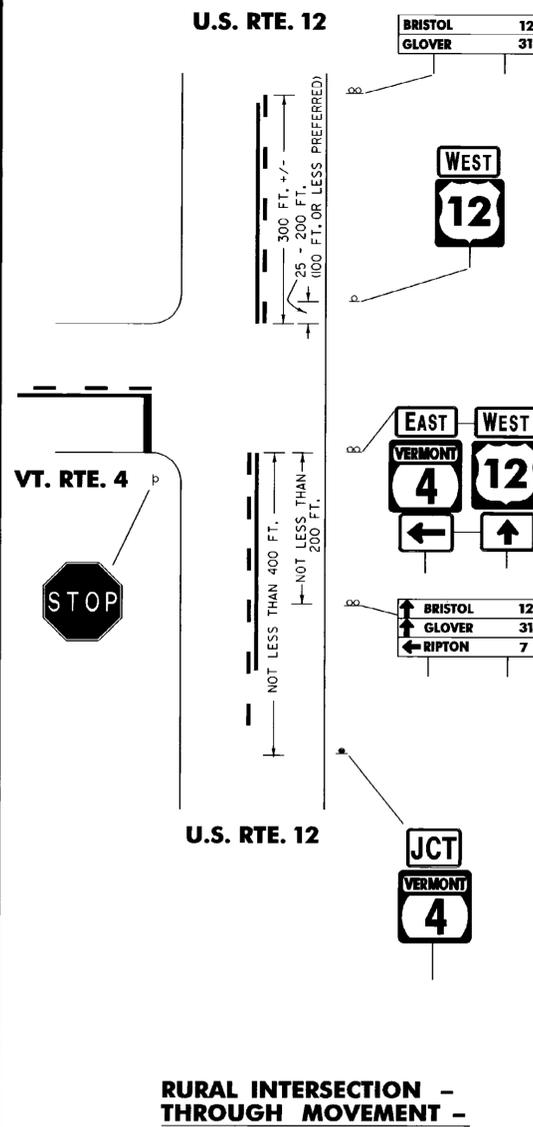
**APPROVED**

DIRECTOR OF PROGRAM DEVELOPMENT  
TRAFFIC OPERATIONS ENGINEER  
FEDERAL HIGHWAY ADMINISTRATION

**GUIDE SIGN PLACEMENT MISCELLANEOUS DETAILS**



**STANDARD E-123**



**GENERAL NOTES:**

1. RECOMMENDED SIGN SPACING AS SHOWN IS SOMETIMES NOT OBTAINABLE DUE TO COMMERCIAL CONFLICTS ETC. AT BUSY INTERSECTIONS. JUDGEMENT MUST BE USED IN THESE CASES TO PLACE SIGNS AS TO GIVE ADEQUATE NOTICE. IT IS ESPECIALLY IMPORTANT TO PLACE SIGNS CLEAR OF OBSTRUCTION BY OTHER SIGNS, POLES, FENCES, ETC.
2.  - BENT ARROWS ARE USED WHEN THE INTERSECTON CANNOT BE SEEN
3.  - STRAIGHT ARROWS ARE TO BE USED WHEN THE INTERSECTION CAN BE SEEN.
3. SIGNING SHOWN FOR ONE DIRECTION OF TRAVEL ONLY.
4. TWO DESTINATION BOARDS FOR EACH DIRECTION ARE PERMISSABLE.

**OTHER STDS. REQUIRED:**

REVISIONS AND CORRECTIONS  
 DEC. 18, 1989 - DATE OF ORIGINAL ISSUE  
 AUG. 08, 1995 - MINOR SIGN AND NOTE REVISIONS

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

APPROVED

*Stephen B. MacArthur*  
 DIRECTOR OF ENGINEERING

*David A. Ross*  
 TRAFFIC AND SAFETY ENGINEER

# ROUTE MARKINGS AT RURAL INTERSECTIONS

/traf/std/stdel27.dgn : stdel27.i

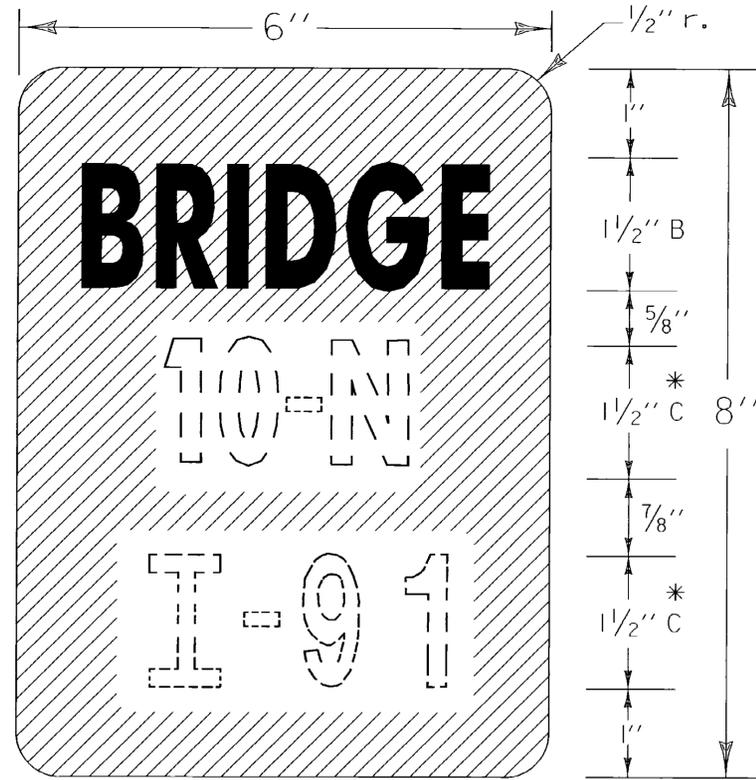
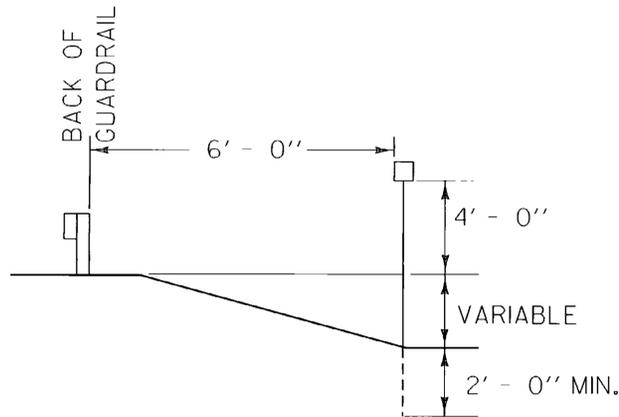
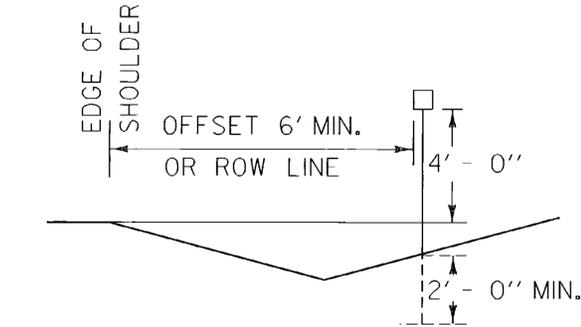


# STANDARD E-127

I-91  
 ← 2" →

**HYPHENATED WORD DETAIL**

FOR EXAMPLE, ROUTE NUMBERS  
 SHALL APPEAR AS: I-91, US5, VT22



**VD-701**

\* OPTICALLY SPACE BRIDGE  
 AND ROUTE NUMBERS.  
 SERIES B LETTERS MAY  
 BE USED TO MAINTAIN  
 VISUAL INTEGRITY.

**NOTES:**

GENERAL:  
 DOTTED LINES AND NUMERALS INDICATE TEXT THAT VARIES.

PAYMENT:  
 BRIDGE PLAQUES SHALL BE PAID AS TRAFFIC SIGNS, TYPE "A",  
 AND POSTS PAID AS FLANGED CHANNEL STEEL SIGN POSTS.

MATERIAL:  
 THE SIGN BASE MATERIAL SHALL BE 0.04" FLAT SHEET ALUMINUM.

COLORS:  
 THE SIGN SHALL HAVE A REFLECTORIZED WHITE TEXT ON REFLECTORIZED  
 GREEN BACKGROUND. THE COLORS SHALL CONFORM WITH THOSE FOUND  
 IN STANDARD COLOR TOLERANCE CHARTS AS APPROVED BY THE U.S.  
 DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

LETTERING:  
 LETTERS AND DIGITS SHALL CONFORM WITH THE STANDARD ALPHABETS  
 FOR HIGHWAY SIGNS AS PRINTED BY THE FEDERAL HIGHWAY ADMINISTRATION.

POSTS:  
 FLANGED CHANNEL STEEL 2"/FT POSTS SHALL BE USED WHEN THE POST LENGTH  
 EXCEEDS 7 FEET. FOR LENGTH OF 7 FEET OR LESS, A 1.12"/FT STEEL SIGN POST  
 SHALL BE USED.

**OTHER STDS.  
 REQUIRED:**



STANDARD  
 E-134

**REVISIONS AND CORRECTIONS**

DEC. 17, 1989 - DATE OF ORIGINAL ISSUE  
 AUG. 08, 1995 - MISC NOTE REVISIONS

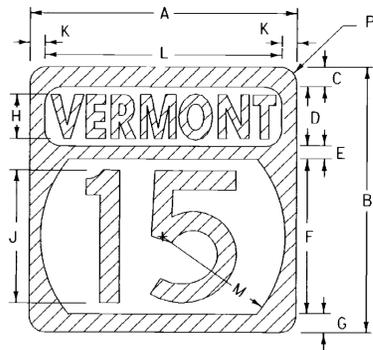
**APPROVED**

*Gordon J. MacArthur*  
 DIRECTOR OF ENGINEERING

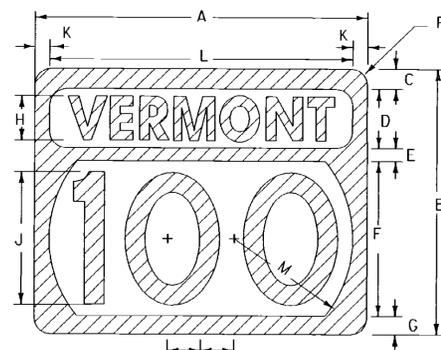
*David A. Ross*  
 TRAFFIC AND SAFETY ENGINEER

**BRIDGE NUMBER PLAQUE**

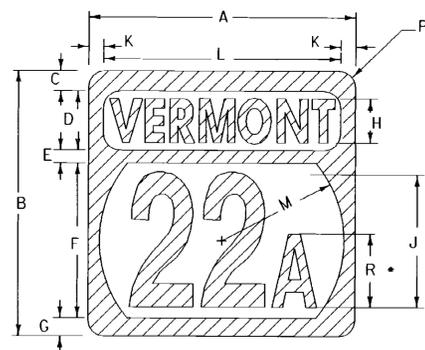
APPROVED FOR THIS PROJECT  
 AND/OR DESIGN IMPLEMENTATION.  
 FHWA FINAL APPROVAL PENDING.



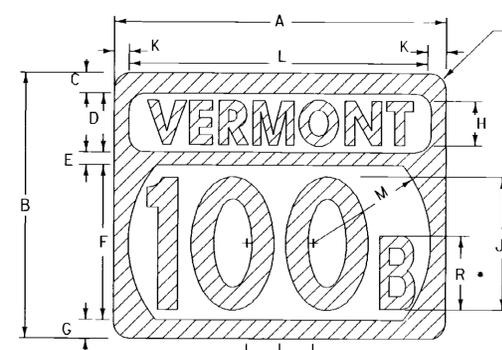
1 OR 2 DIGIT  
STATE ROUTE MARKER



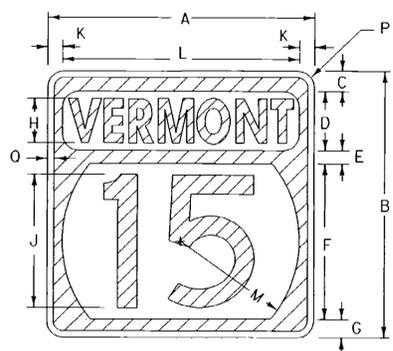
3 DIGIT  
STATE ROUTE MARKER



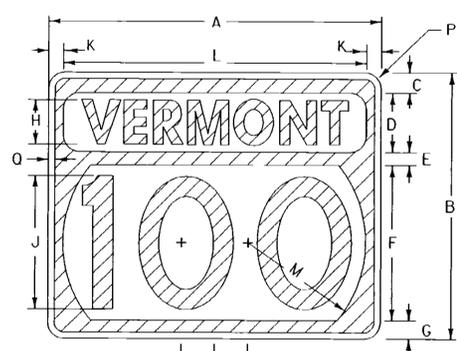
1 OR 2 DIGIT  
ALTERNATE STATE  
ROUTE MARKER



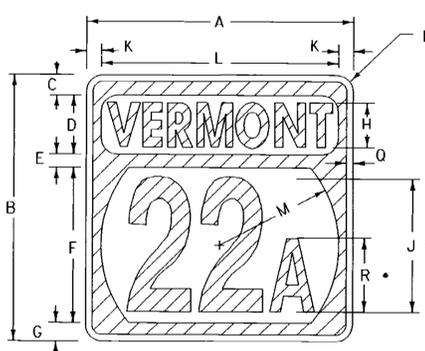
3 DIGIT  
ALTERNATE STATE  
ROUTE MARKER



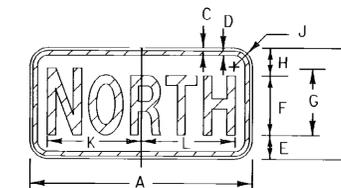
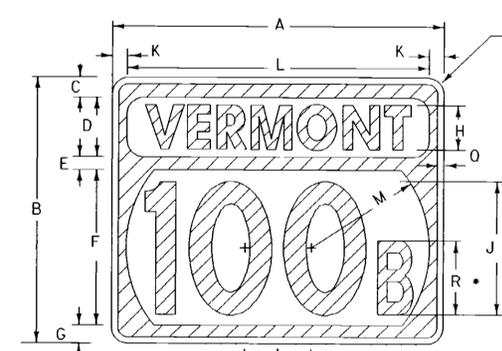
STATE ROUTE MARKER  
FOR GUIDE SIGN USE.  
(INTERSTATE TYPICAL)



• ALTERNATE ROUTE SIGNS:  
OPTICALLY SPACE NUMERALS  
ABOUT VERTICAL CENTER-  
LINE AND REDUCE SPACING AS  
NECESSARY FOR EACH ROUTE



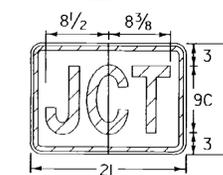
ALTERNATE STATE ROUTE MARKER  
FOR GUIDE SIGN USE.  
(INTERSTATE TYPICAL)



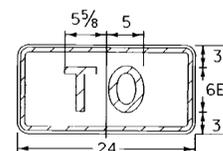
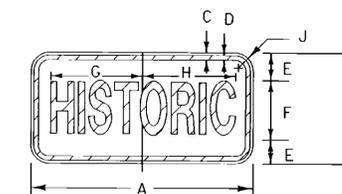
M3-1 M3-3 M3-2 M3-4

SIGN	DIMENSIONS (INCHES)										NORTH	SOUTH	EAST	WEST		
	A	B	C	D	E	F	G	H	J	K	L	K	L	K	L	
MIN. & STD.	24	12	3/8	5/8	2 1/4	6C	7C	3/4	1 1/2	10 1/4	10 1/4	10 1/4	9 1/8	7 1/8	8 3/4	8 3/4
SPECIAL	30	15	3/8	5/8	3 1/4	8C	9C	3 3/4	1 1/2	12 1/8	12 1/8	12 1/8	12 1/2	10 3/8	11 1/8	11 5/8

M2-1



CARDINAL DIRECTION MARKER



M4-5  
TRAILBLAZER

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
MIN. & STD.	24	12	3/8	5/8	3 1/2	5B	10 1/8	9 7/8	1 1/2	
SPECIAL	30	15	3/8	5/8	4	7B*	12 3/8	12 5/8	1 1/2	

\* REDUCE SPACING 35%

**MATERIALS**

THE SIGN BASE MATERIAL MAY BE ANY OF THE FOLLOWING, WITH THE MINIMUM THICKNESSES AS NOTED:

FLAT SHEET ALUMINUM  
LESS THAN 24" X 24" 0.060"  
WHEN USED ON GUIDE SIGNS 0.060"  
24" X 24", 30" X 24" 0.080"  
36" X 36", 45" X 36" 0.100"

GALVANIZED FLAT SHEET STEEL  
LESS THAN 24" X 24" 18 GAGE  
WHEN USED ON GUIDE SIGNS 18 GAGE  
24" X 24", 30" X 24" 16 GAGE  
36" X 36", 45" X 36" 14 GAGE

THE REFLECTIVE MATERIAL SHALL BE WHITE REFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND. THE TEXTS MAY BE LETTERING FILM, SILK SCREENED, OR HAND PAINTED.

**COLORS**

COLORS FOR GUIDE USE: TEXT AND SHIELD - GREEN (REFL.) BACKGROUND AND BORDER - WHITE (REFL.)  
STATE ROUTE MARKERS SHALL HAVE REFLECTIVE GREEN TEXT AND BORDERS ON REFLECTORIZED WHITE BACKGROUNDS.  
GREEN AREAS ARE INDICATED BY SINGLE LINE CROSSHATCHING

**LETTERING**

LETTERS AND DIGITS SHALL CONFORM WITH THE "STANDARD ALPHABET FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" ADOPTED BY THE U.S. DEPARTMENT OF TRANSPORTATION AND FHWA.

**SPECIFICATIONS**

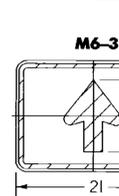
STATE ROUTE MARKERS AND AUXILIARY ROUTE MARKERS SHALL MEET THE STANDARD STATE SPECIFICATIONS FOR TRAFFIC SIGNS.

**DESIGNS**

THE DESIGNS OF STATE ROUTE MARKERS AND AUXILIARY MARKERS SHALL CONFORM WITH THE REQUIREMENTS SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" ADOPTED BY THE U.S. DEPARTMENT OF TRANSPORTATION AND FHWA.

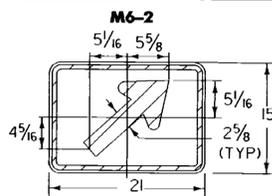
**OTHER STDS. REQUIRED:**

SIGN	DIMENSIONS (INCHES)															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
1,2-digits	24	24	1 1/2	6	1	14	1 1/2	4C	12D	1	22	11	-	1 1/2	1/2	7B
1,2-digits	36	36	2 5/8	8	1 3/4	21	2 5/8	6C	18D	2	32	16 1/2	-	2 1/4	3/8	10B
3.-digits	30	24	1 1/2	6	1	14	1 1/2	4D	12D	1	28	11	3	1 1/2	1/2	7B
3.-digits	45	36	2 5/8	8	1 3/4	21	2 5/8	6D	18D	2	41	16 1/2	4 1/2	2 1/4	3/8	10B

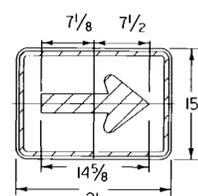


M6-1

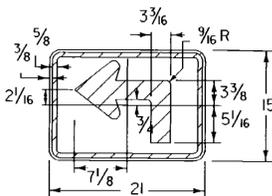
DIRECTION ARROW OR ADVANCE TURN ARROWS



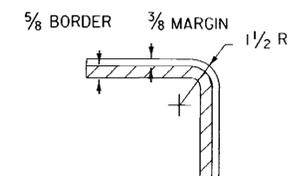
M6-2



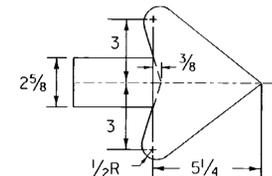
M6-3



M5-1



TYPICAL RADIUS DETAIL



TYPICAL ARROW DETAIL

(ALL DIMENSIONS IN INCHES)

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

APPROVED

*Stephen S. MacArthur*  
DIRECTOR OF ENGINEERING

*David A. Ross*  
TRAFFIC AND SAFETY ENGINEER

STATE ROUTE MARKER  
SIGN DETAILS



STANDARD  
E-136 B

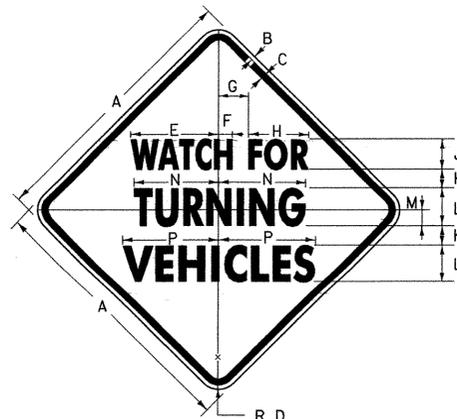
APPROVED FOR THIS PROJECT  
AND/OR DESIGN IMPLEMENTATION.  
FHWA FINAL APPROVAL PENDING.



**W5-1**

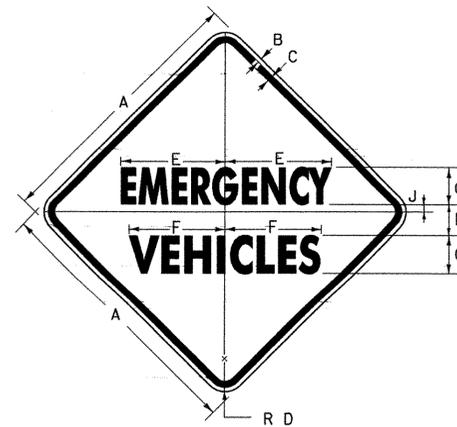
• REDUCE SPACING 25%

SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
MIN.	30	1/2	3/4	5D	3	1 3/4	7 7/8	8 5/8	14 3/4	15 1/8	1 7/8
STD.	36	5/8	7/8	6D	3 1/2	2	9 1/2	10 9/16	17 5/8	18 1/4	2 1/4
SPECIAL	48	3/4	1 1/4	8D	4	3	12 1/16	13 3/4	23 1/2	23 3/8	3



**VW-205**

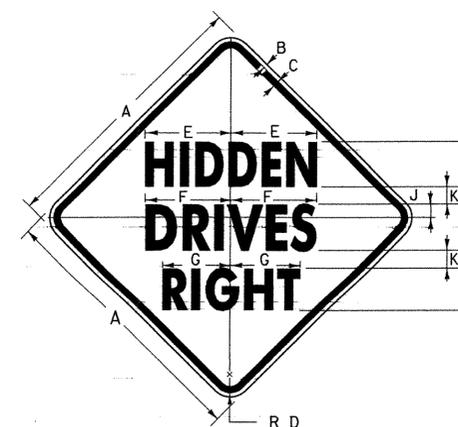
SIGN	DIMENSIONS (INCHES)														
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
MIN.	30	1/2	3/4	1 7/8	9 5/8	1 1/2	3 3/8	6 3/8	4B	2	5B	2	9 1/4	10 1/4	
STD.	36	5/8	7/8	2 1/4	11 3/4	1 7/8	4	8	4C	2 1/2	5C	2	11 1/2	12 7/8	
SPECIAL	48	3/4	1 1/4	3	14 3/4	2 3/8	5 3/8	10	5C	3 3/8	8B	2 5/8	14 9/16	16 7/16	



**VW-544**

• REDUCE SPACING 50%

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
MIN.	30	1/2	3/4	1 7/8	12 3/4	9 1/16	4C*	3 3/8	7/8	
STD.	36	5/8	7/8	2 1/4	14 3/16	11 7/16	5C*	4	1	
SPECIAL	48	3/4	1 1/4	3	19 1/8	15 7/16	6C	5 3/8	1 3/8	



**VW-054**

SIGN	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L	M	
PATH	18	3/8	5/8	1 3/8	5 5/8	5 5/8	4 7/16	3C	7/8	1 13/16	4 9/16	3 5/16	
MIN.	24	3/8	5/8	1 1/2	7 1/16	7 5/8	6 3/16	4C	1 3/16	2	6 3/16	4 7/8	
STD.	30	1/2	3/4	1 7/8	9 9/16	9 1/2	7 11/16	5C	1 1/2	2	7 3/4	6 1/8	
EXPWY.	36	5/8	7/8	2 1/4	11 7/16	11 7/16	9 3/16	6C	1 3/4	2 3/8	9 5/16	7 3/8	
SPECIAL	48	3/4	1 1/4	3	15 3/8	15 1/4	12 5/16	8C	2 3/8	3 3/8	12 3/8	9 3/16	

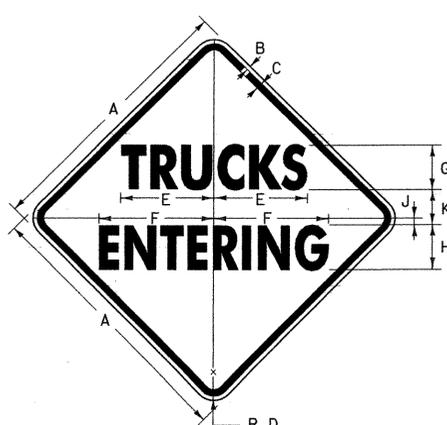
**DRIVE  
LEFT**  
VW-133



**W5-2**

• REDUCE SPACING 20%

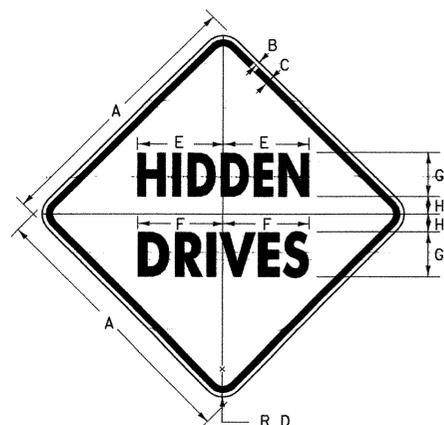
SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
PATH	18	3/8	5/8	3D	1/4	1 3/8	7 5/8	6 1/4	1 3/8	
MIN.	24	3/8	5/8	4D	1/4	2	10 7/16	8 3/4	1 1/2	
STD.	30	1/2	3/4	5D	1/2	2 1/2	13 1/16	10 7/16	1 7/8	
SPECIAL	36	5/8	7/8	6D	3/4	3	15 1/16	13 1/16	2 1/4	



**VW-202**

SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	
MIN.	30	1/2	3/4	1 7/8	14 7/16	6 1/16	5C	5C	3/4	4	
STD.	36	5/8	7/8	2 1/4	17 3/8	8	6C	6C	7/8	4 3/16	
SPECIAL	48	3/4	1 1/4	3	23 1/8	10 1/16	8B	8C	1 3/16	6 3/8	

(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)



**VW-060**

SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
PATH	18	3/8	1/2	1 1/8	5 3/4	5 1/2	3C	1 1/8
MIN.	24	3/8	5/8	1 1/2	7 1/16	7 5/8	4C	2
STD.	30	1/2	3/4	1 7/8	9 9/16	9 1/2	5C	2
EXPWY.	36	5/8	7/8	2 1/4	11 7/16	11 7/16	6C	2 3/8
SPECIAL	48	3/4	1 1/4	3	15 3/8	15 1/4	8C	3 3/16



**VW-622**

• REDUCE SPACING 50%

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
MIN.	24	3/8	5/8	1 1/2	11 9/16	5 5/16	2 1/16	3 3/16	4C	
STD.	30	1/2	3/4	1 7/8	14 7/16	6 1/16	3 3/16	4 3/16	5C	
SPECIAL	36	5/8	7/8	2 1/4	17 3/8	8	4	5	6C	

**NOTES**

**DESIGN**  
LETTERS, DIGITS, ARROWS, SYMBOLS, SPACINGS AND TEXT 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 MATERIALS USED FOR THE WARNING SIGNS SHOWN ON THIS SHEET MAY BE ANY OF THE FOLLOWING, OF THE MINIMUM THICKNESS NOTED:

	18" x 18"	24" x 24" 30" x 30"	36" x 36"	48" x 48"
FLAT SHEET ALUMINUM	0.060"	0.080"	0.100"	0.125"

**REFLECTORIZATION**  
THE BACKGROUND RETROREFLECTIVE MATERIAL SHALL BE ASTM TYPE III, TYPE VIII, OR TYPE IX RETROREFLECTIVE SHEETING APPLIED TO THE ENTIRE SIGN. THE TEXT, BORDER, AND SYMBOLS SHALL BE LETTERING FILM OR SILK SCREENED.

**COLORS**  
ALL OF THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT AND SYMBOLS ON RETROREFLECTORIZED YELLOW BACKGROUND, UNLESS OTHERWISE NOTED. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

**SPECIFICATIONS**  
WARNING SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION "TRAFFIC SIGNS".

**OTHER STANDARDS REQUIRED:**

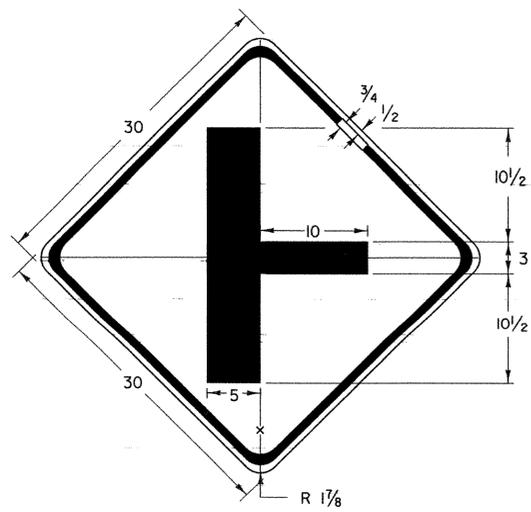
REVISIONS AND CORRECTIONS  
AUG. 08, 1995 - DATE OF ORIGINAL ISSUE  
MAY 01, 2004 - CHANGED REFLECTIVE SHEETING TO TYPE III  
MINOR NOTE CHANGES ADDED PATH DIMENSIONS

APPROVED  
DIRECTOR OF PROGRAM DEVELOPMENT  
*John A. Kelly*  
TRAFFIC OPERATIONS ENGINEER  
*Michael J. ...*  
FEDERAL HIGHWAY ADMINISTRATION

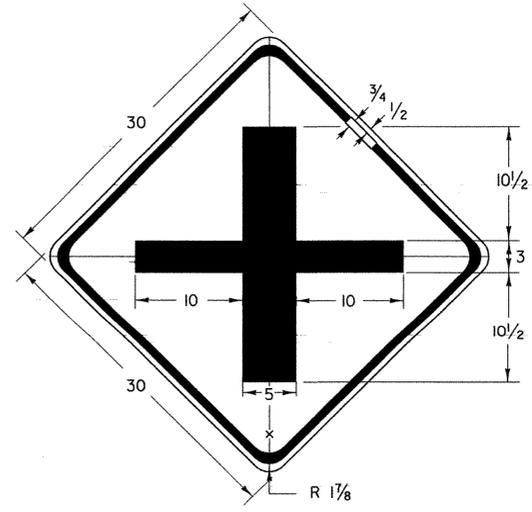
WARNING SIGN  
DETAILS



STANDARD  
E-154

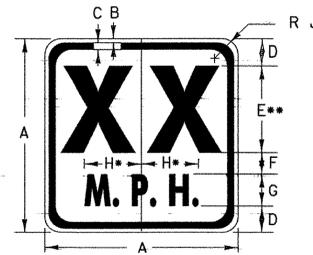


W2-2M



W2-1M

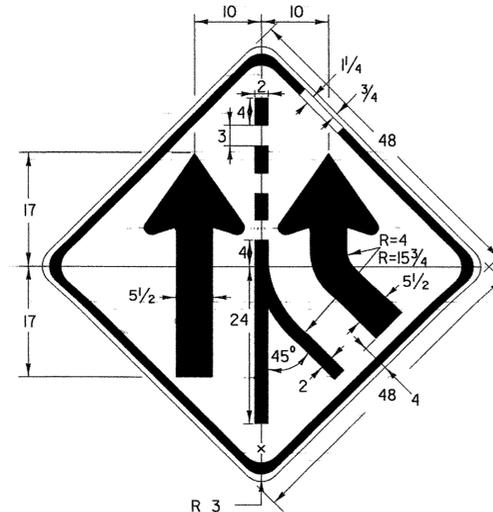
STATE ROUTE /MINOR TOWN HIGHWAY INTERSECTION SIGNS (TYP.)



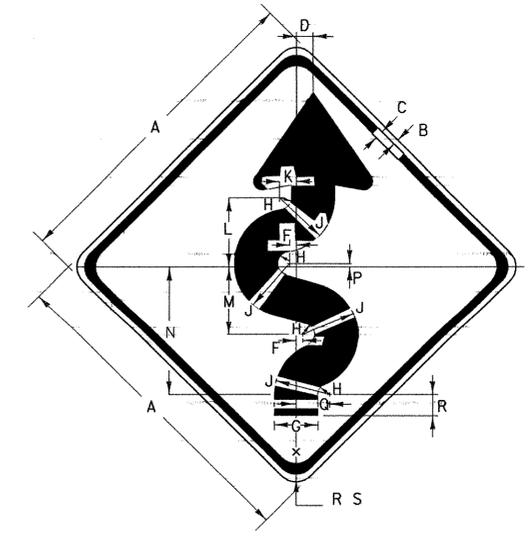
W13-1

- \* INCREASE SPACING 100%
- \*\* OPTICALLY SPACE NUMERALS ABOUT VERTICAL CENTERLINE

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
STD.	18	3/8	5/8	2 1/2	8E	2	3E	5 5/16	1 1/2	
SPECIAL	24	3/8	5/8	3 5/8	10E	2 3/4	4E	7 1/16	1 1/2	



W4-3



W1-5

SIGN	DIMENSIONS (INCHES)																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
PATH	18	3/8	5/8	1	9 5/8	3/8	2 1/2	5/8	3	1	4	4	8 5/8	1/4	2	1 1/4	1 1/2
MIN.	24	3/8	5/8	1 1/4	12 3/4	1/2	3 1/4	7/8	4 1/8	1 1/4	5 3/16	5 1/4	11 3/8	1/4	2 1/2	1 9/32	1 1/2
STD.	30	1/2	3/4	1 9/16	15 5/16	5/8	4 1/16	1 1/32	5 3/32	1 1/16	6 3/16	6 9/16	14 1/32	5/16	3 1/8	2	1 7/8
EXPWY.	36	5/8	7/8	1 7/8	19 1/8	3/4	4 1/8	1 1/16	6 7/16	1 1/8	7 5/16	7 7/16	17 1/16	3/8	3 3/4	2 9/32	2 1/4
SPECIAL	48	3/4	1 1/4	2 1/2	25 1/2	1	6 1/2	1 3/4	8 1/4	2 1/2	10 3/8	10 1/2	22 3/4	1/2	5	3 3/16	3

NOTES

DESIGN

LETTERS, DIGITS, ARROWS, SYMBOLS, SPACINGS, 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). SEE STANDARD SHEET E-151 FOR ARROWHEAD DETAILS.

MATERIALS

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

24"X24"	30"X30"	36"X36"	48"X48"
0.060"	0.080"	0.100"	0.125"

REFLECTORIZATION

THE BACKGROUND RETROREFLECTIVE MATERIAL SHALL BE ASTM TYPE III, TYPE VIII OR TYPE IX RETROREFLECTIVE SHEETING APPLIED TO THE ENTIRE SIGN. THE TEXT, BORDER AND SYMBOLS SHALL BE LETTERING FILM OR SILK SCREENED.

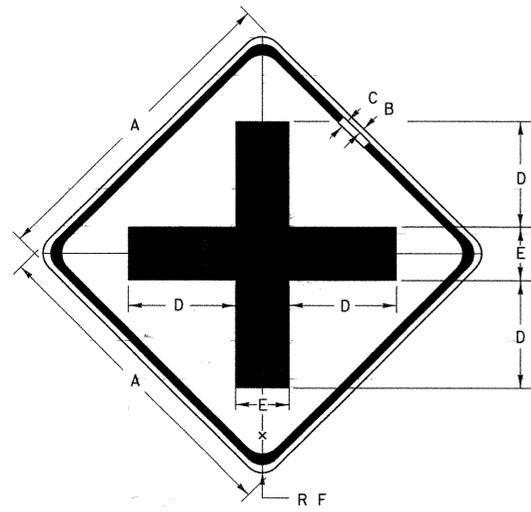
COLORS

ALL THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT AND SYMBOLS ON RETROREFLECTORIZED YELLOW BACKGROUND UNLESS OTHERWISE NOTED. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

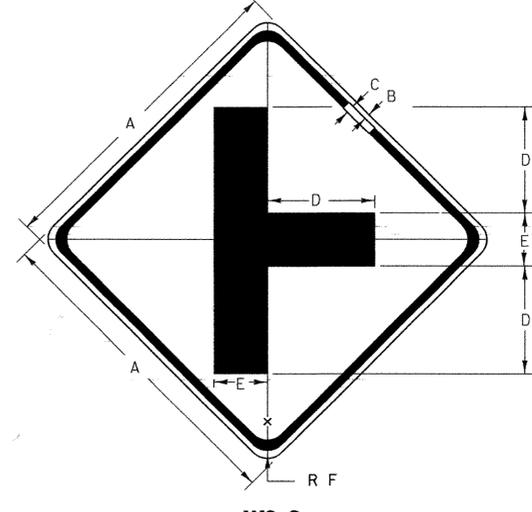
SPECIFICATIONS

WARNING SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION \*TRAFFIC SIGNS\*.

OTHER STDS. E-151 REQUIRED:



W2-1

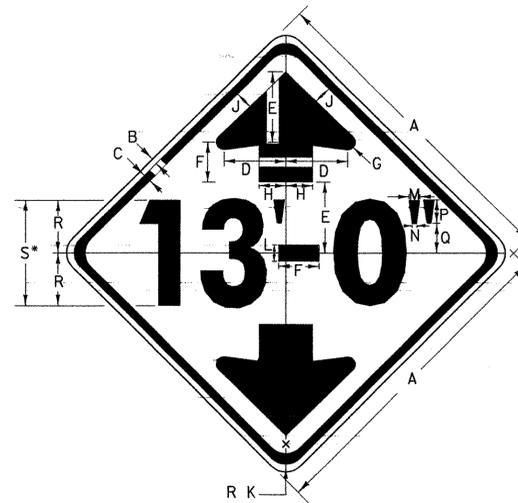


W2-2

SIGN	DIMENSIONS (INCHES)					
	A	B	C	D	E	F
PATH	18	3/8	5/8	6	3	1 1/2
MIN.	24	3/8	5/8	8	4	1 1/2
STD.	30	1/2	3/4	10	5	1 7/8
EXPWY.	36	5/8	7/8	12	6	2 1/4
SPECIAL	48	3/4	1 1/4	16	8	3

SIGN	DIMENSIONS (INCHES)					
	A	B	C	D	E	F
PATH	18	3/8	5/8	6	3	1 1/2
MIN.	24	3/8	5/8	8	4	1 1/2
STD.	30	1/2	3/4	10	5	1 7/8
EXPWY.	36	5/8	7/8	12	6	2 1/4
SPECIAL	48	3/4	1 1/4	16	8	3

STATE ROUTE /STATE ROUTE OR MAJOR TOWN HIGHWAY INTERSECTION SIGNS (TYP.)



W12-2

- \* OPTICALLY SPACE VERTICAL CLEARANCE ABOUT VERTICAL CENTERLINE (WHERE 10" IS USED IN VERT. CLEARANCE, USE SERIES C NUMERALS)

SIGN	DIMENSIONS (INCHES)																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
MIN.	30	1/2	3/4	5 3/4	6 5/8	3 3/4	3/4	2 1/2	1 1/16	1 7/8	1 9/16	1	7/16	2 1/4	3 5/16	5	10D
STD. & EXPWY.	36	5/8	7/8	6 7/8	8	4 1/2	1	3	2	2 1/4	1 7/8	1 1/4	1/2	2 3/4	4	6	12D
FWY.	48	3/4	1 1/4	9 3/8	10 5/8	5 7/8	1 1/16	4	2 5/8	3	2 7/16	1 5/8	5/8	3 5/8	5 1/2	8	16D

(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)

WARNING SIGN DETAILS

REVISIONS AND CORRECTIONS

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

APPROVED

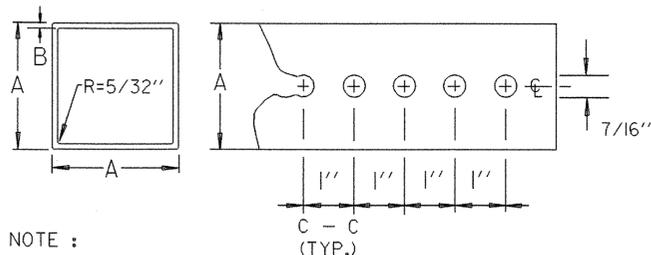
*John A. Lee*  
DIRECTOR OF PROGRAM DEVELOPMENT  
TRAFFIC OPERATIONS ENGINEER  
FEDERAL HIGHWAY ADMINISTRATION



STANDARD E-155

GUARDRAIL DEFLECTION CHART (PER AASHTO - ROADSIDE DESIGN GUIDE - LATEST EDITION)		
TYPE	GR POST SPACING	DEFLECTION
THREE CABLE W/STEEL POSTS	16' - 0"	11" - 6"
W/WOODEN POSTS	12' - 6"	11" - 6"
W-BEAM W/STRONG POST	6' - 3"	3'
BOX BEAM	6' - 0"	5'
THRIE BEAM W/STRONG POST	6' - 3"	2'

THIS CHART LISTS THE THEORETICAL MAXIMUM DEFLECTION DISTANCE, UPON IMPACT, OF DIFFERENT TYPES OF GUARDRAIL AND VARIOUS POST SPACINGS.



NOTE :

THE POSTS SHALL BE CAREFULLY FORMED OF STEEL WITH A MINIMUM YIELD OF 55,000 PSI, INTO A SIZE AND SHAPE WITH CORNERS INDUCTION WELDED IN SUCH A MANNER THAT NEITHER FLASH NOR WELD SHALL INTERFERE WITH THE TELESCOPING PROPERTIES, NOR DAMAGE THE GALVANIZING.

\* THE WALL THICKNESS TOLERANCES SHALL BE +.005" AND -.010" FOR THE 12 GAUGE.

\* THE WALL THICKNESS TOLERANCES SHALL BE +.002" AND -.008" FOR THE 14 GAUGE.

### DIMENSION DETAILS AND POST SELECTION CHART

POST SELECTION CHART								
SIGN AREA ( FT <sup>2</sup> ) X H ( FT ) ≤ SV ( SELECTION VALUE )								
POST SIZE LBS./FT.	DIMENSIONS			SECTION MODULUS IN <sup>3</sup>	ONE POST S <sub>v</sub>	TWO POST S <sub>v</sub>	THREE POST S <sub>v</sub>	NUMBER PERMITTED IN 8' PATH
	A	*B	GAUGE					
1.88	1-3/4"	.083	14	0.230	46	92	138	TWO
2.42	2"	.083	12	0.380	77	154	231	TWO
3.35	2-1/2"	.105	12	0.642	130	260	390	ONE

DESIGN CRITERIA:

WIND SPEED = 70 MPH (10 -YEAR MEAN RECURRENCE INTERVAL)  
WIND PRESSURE = 19 PSF  
STEEL MINIMUM YIELD = 55,000 PSI  
ALLOWABLE STRESS = (1.4) 0.60 FY

REVISIONS AND CORRECTIONS  
APR. 27, 1994 - ORIGINAL APPROVAL DATE  
JUL. 21, 1994 - REVISED POST GAUGES  
AUG. 18, 1995 - ADDED TWO PIECE ANCHOR DETAIL  
MAR. 26, 1996 - REVISED POST SELECTION CHART  
MAY 20, 1999 - REPLACE LOST ORIGINAL  
JUN. 08, 2009 - POST SELECTION REVISIONS

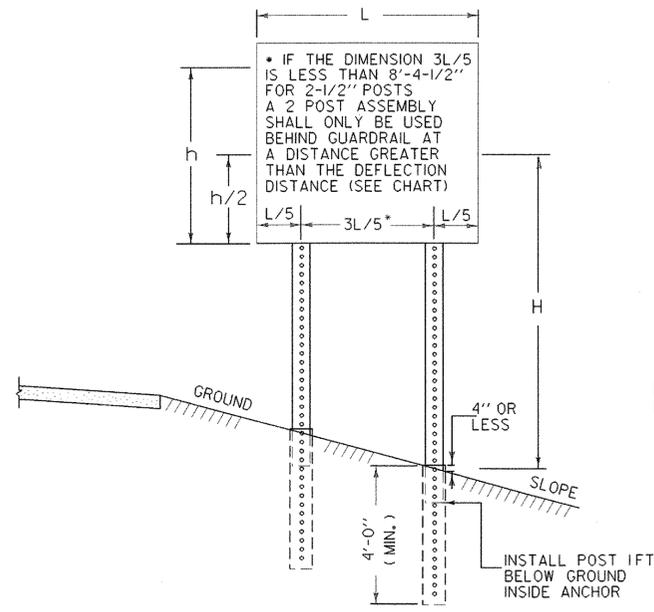
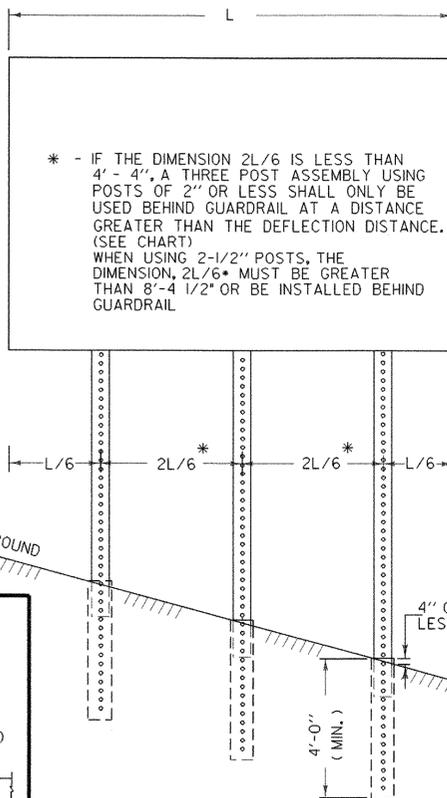
APPROVED

*Kevin S. Masbie*  
HIGHWAY, SAFETY & DESIGN ENGINEER  
*Richard J. Peterson*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark B. Riedler*  
FEDERAL HIGHWAY ADMINISTRATION

# SQUARE STEEL SIGN POST

/traf/english/std/e164.dgn

### MULTI-POST INSTALLATIONS



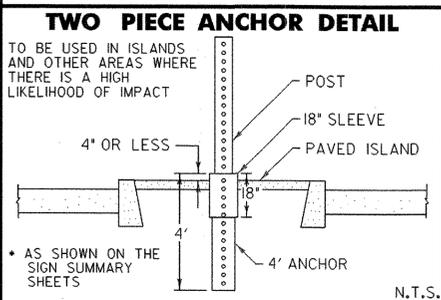
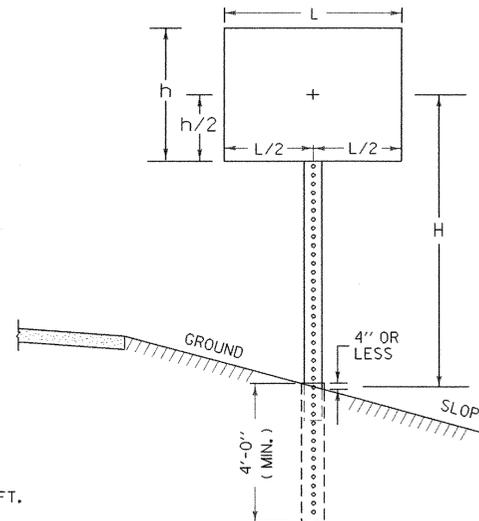
### POST SPACING DETAILS

### GENERAL NOTES

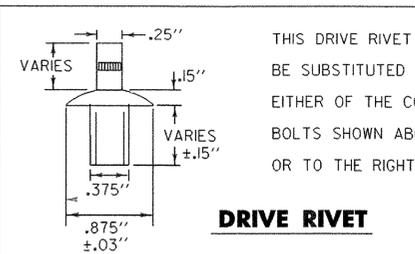
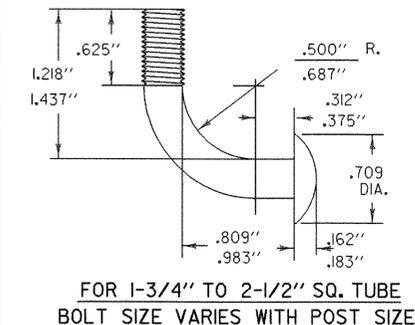
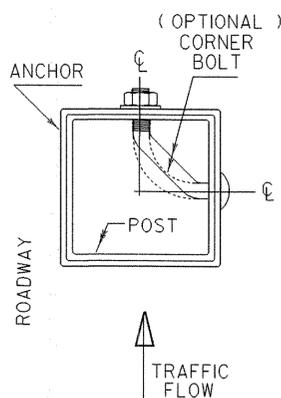
CONSTRUCTION METHODS - POSTS MAY BE DRIVEN OR SET IN A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION SHALL BE USED IN AREAS OF POOR SOIL CONDITIONS OR AS DIRECTED BY THE RESIDENT ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE RESIDENT ENGINEER.

SIGN CLEARANCES - HORIZONTAL AND VERTICAL SIGN CLEARANCES SHALL BE SHOWN ON THE PLANS OR THE APPROPRIATE STD. SHEETS.

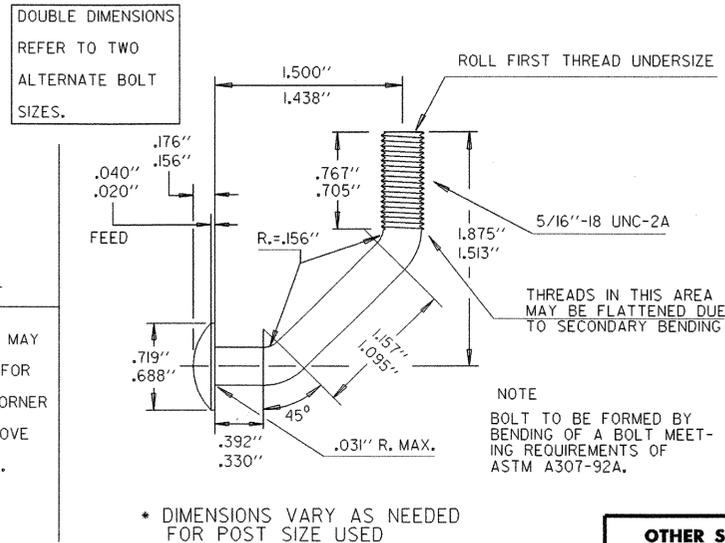
SINGLE POST INSTALLATIONS SHALL BE LIMITED TO A SIGN AREA OF 20 SQ. FT. OR LESS



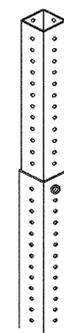
### TOP VIEW OF ANCHOR, POST AND BOLT



### OPTIONAL CORNER BOLT DETAILS



### CONNECTION DETAIL

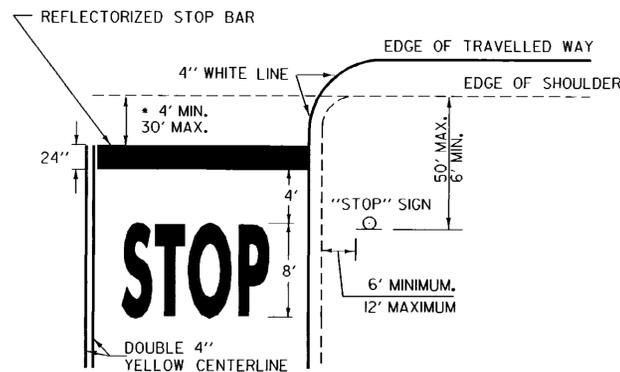


(SEE DETAIL LEFT FOR BOLT PLACEMENT)

OTHER STDS. E-120, E-160 REQUIRED

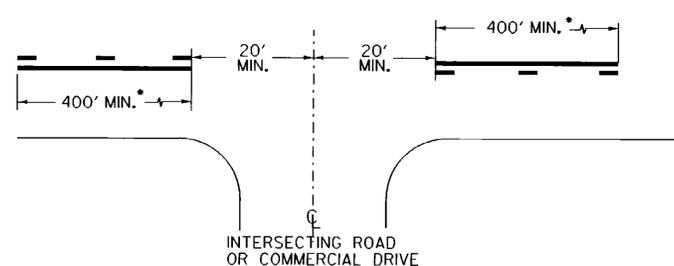


# STANDARD E-164



\* THE "DESIRED STOPPING POINT" IS THE LOCATION BASED ON SITE CONDITIONS THAT BEST ALLOWS THE STOPPED VEHICLE TO VIEW THE APPROACHING TRAFFIC.

**STOP BAR LAYOUT**

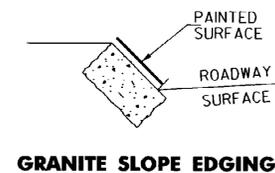


\* THE SOLID LINE SHALL BE PAIRED WITH EITHER A SOLID OR DASHED LINE DEPENDING ON SIGHT DISTANCE AVAILABILITY IN THE OPPOSING DIRECTION. ADJUSTMENTS TO THE 40 FOOT CENTERLINE OPENING MAY BE MADE TO ACCOMMODATE SKEWED INTERSECTIONS.

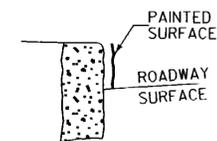
CENTERLINE BREAKS:

- A. AT ALL STATE HIGHWAYS AND TOWN HIGHWAYS, INCLUDING CLASS 4 TH'S, THAT HAVE STOP AND LEGAL LOAD LIMIT SIGNS INSTALLED
- B. COMMERCIAL DRIVES:
  1. WHERE A SEPERATE TURN LANE EXISTS ON THE MAIN LINE (LT. OR RT.)
  2. SIGNIFICANT TRAFFIC VOLUMES EXISTS.
  3. IF MOTORISTS NEED ASSISTANCE TO DEFINE ENTRANCE POINTS.

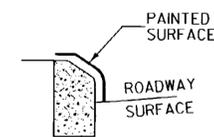
**CENTERLINE LAYOUT**



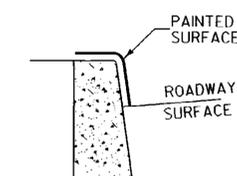
**GRANITE SLOPE EDGING**



**VERTICAL GRANITE CURB**

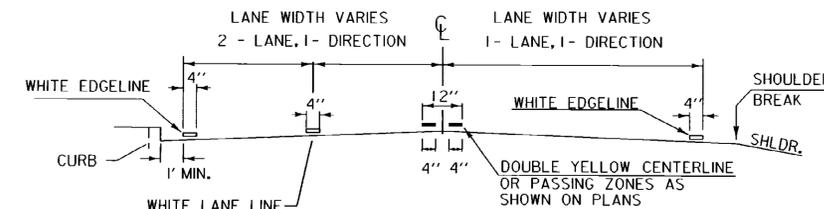


**TYPE A (CONCRETE)**

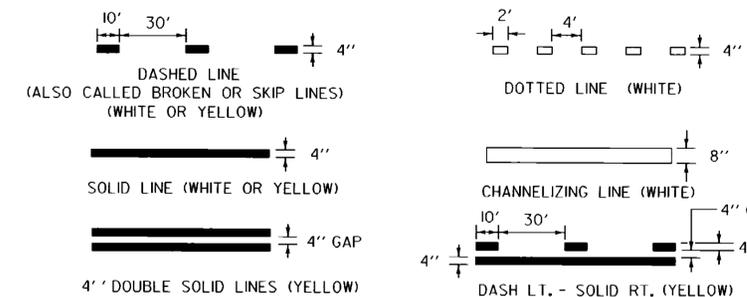


**TYPE B (CONCRETE)**

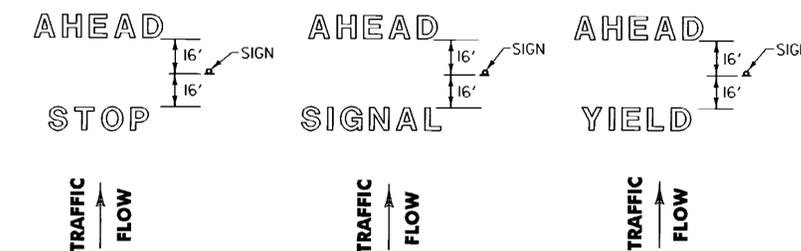
**PAINTED CURB**



**PAVEMENT MARKING PLACEMENT DETAIL**

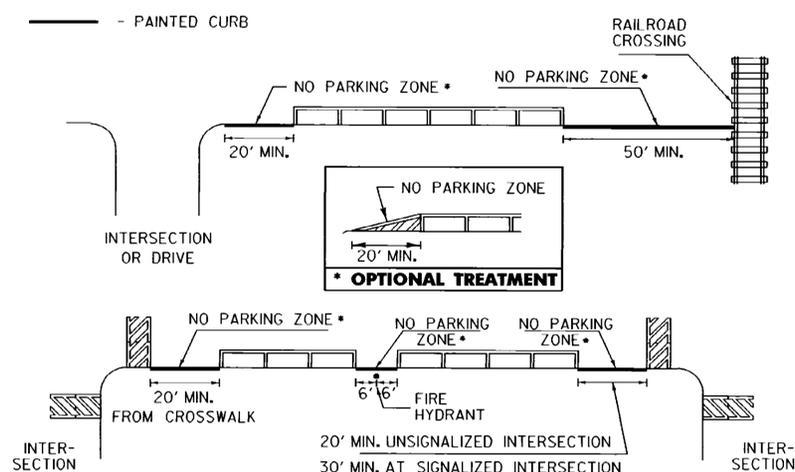


**PAVEMENT MARKING LINE DETAILS**

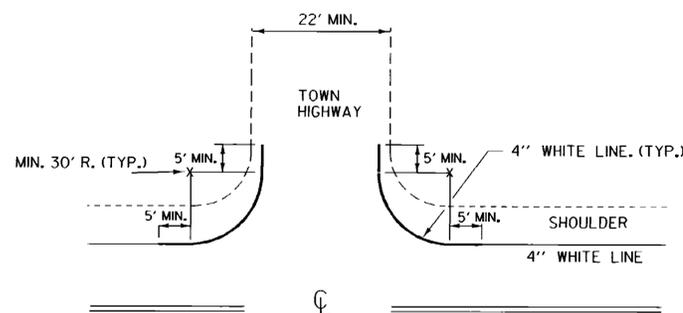


**LETTER IN WORD MARKING SPACING DETAIL**

NOTE: SINGLE WORDS CENTERED ON SIGN ie: SCHOOL OR YIELD



**NO PARKING LAYOUT DETAILS**

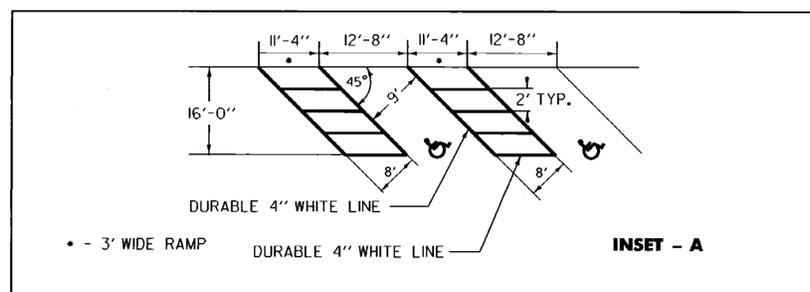


EDGE LINES SHALL BE APPLIED TO ALL STATE HIGHWAYS AND SHOULD BE MAINTAINED AT A CONSTANT DISTANCE FROM THE CENTERLINE UNLESS PAVEMENT WIDTH INCREASES TO ALLOW WIDER LANES.

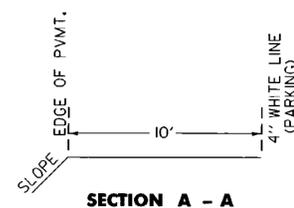
APPLY EDGE LINE AS DETAILED ON ALL PAVED CLASS 1 & CLASS 2 TOWN HIGHWAYS AND ANY CLASS 3 TOWN HIGHWAY 22 FEET OR MORE IN WIDTH.

IF MIN. 30 FOOT RADIUS CANNOT BE OBTAINED, OR THE TOWN HIGHWAY IS NOT PAVED, BREAK THE EDGE LINE USING AN 80 FOOT GAP AT INTERSECTION.

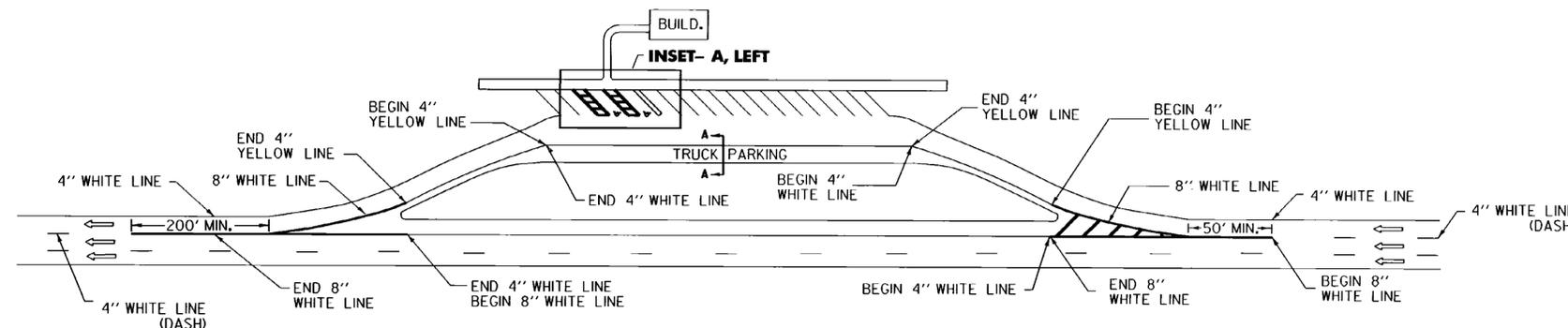
**EDGE LINE LAYOUTS**



NOTE:  
SEE STANDARD SHEET E-191 FOR  
HANDICAP SYMBOL POSITIONING AND DETAIL.



**TRUCK PARKING DETAIL**



**REST AREA PARKING DETAILS**

THIS SHEET IS  
NOT TO SCALE

OTHER STDS. E - 191, E - 192  
REQUIRED

**REVISIONS AND CORRECTIONS**

AUG. 18, 1995 - DATE OF ORIGINAL ISSUE

APPROVED

*Stephen S. McArthur*  
DIRECTOR OF ENGINEERING

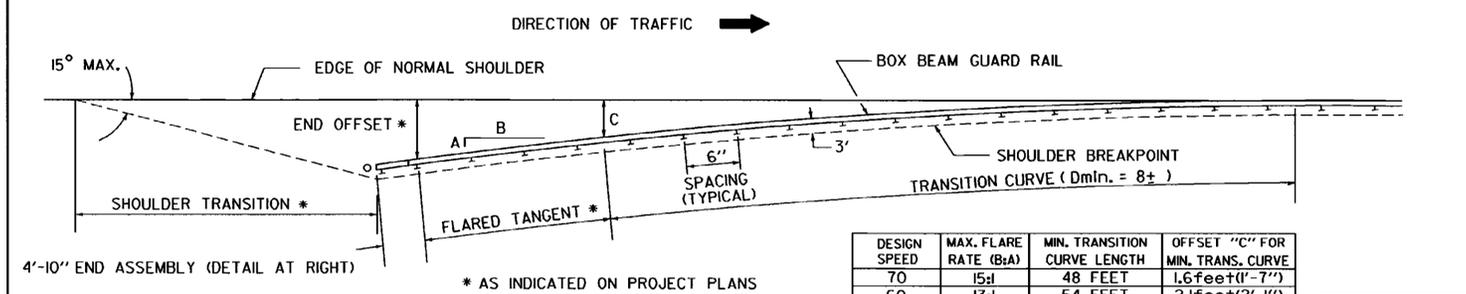
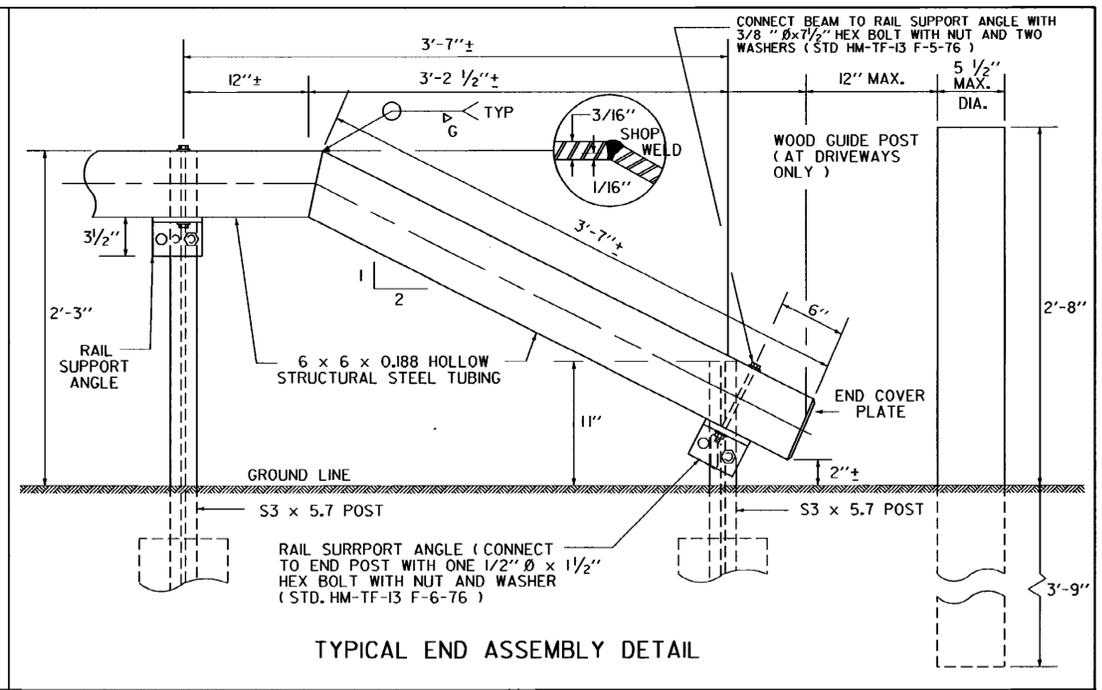
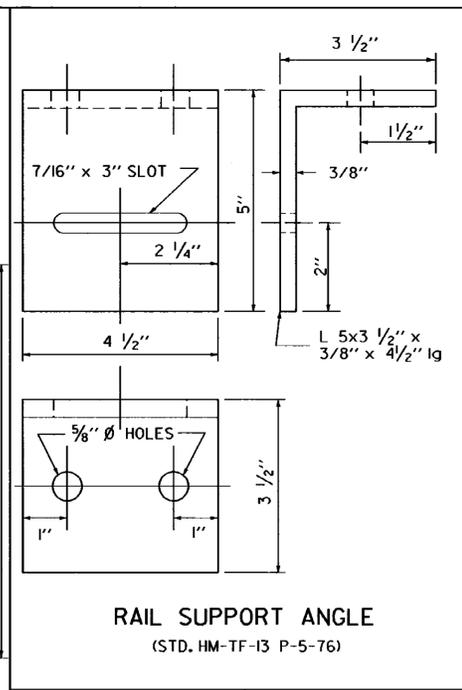
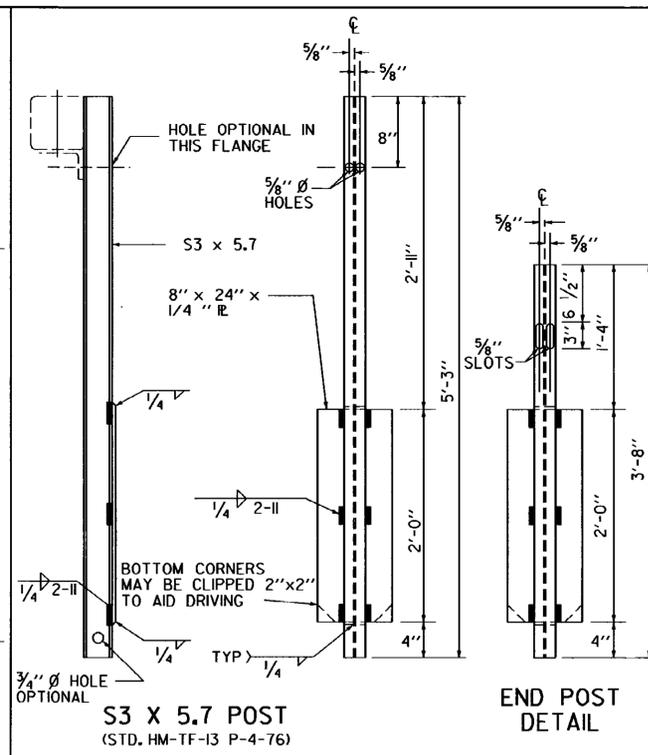
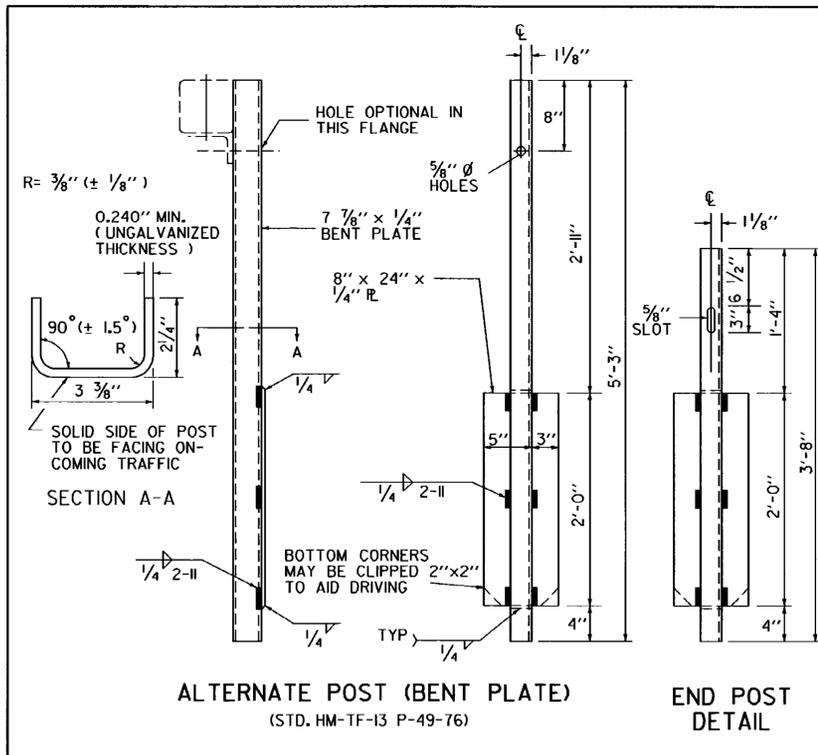
*Daniel A. Ross*  
TRAFFIC AND SAFETY ENGINEER

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

**PAVEMENT MARKING DETAILS**

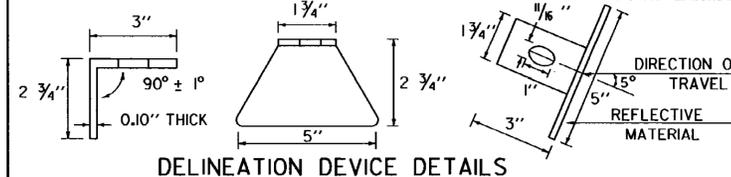


STANDARD  
E-193



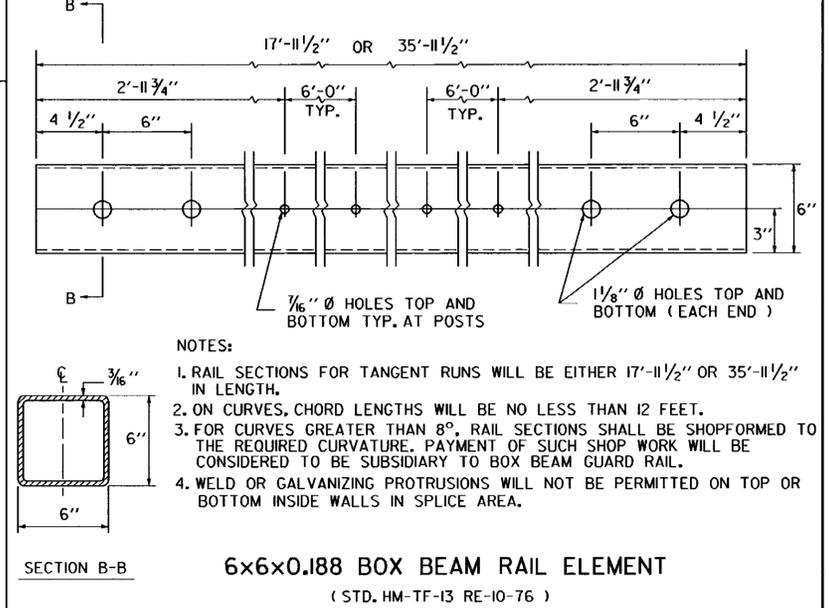
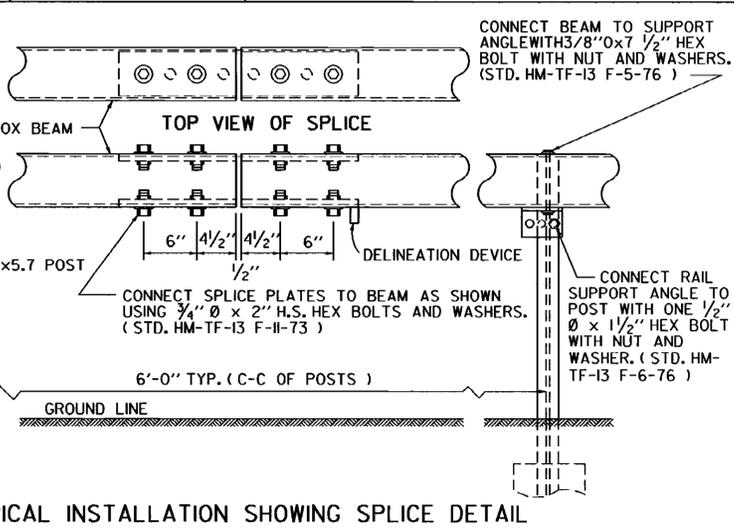
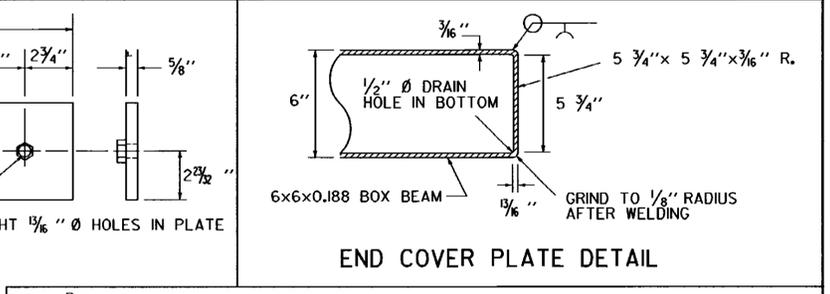
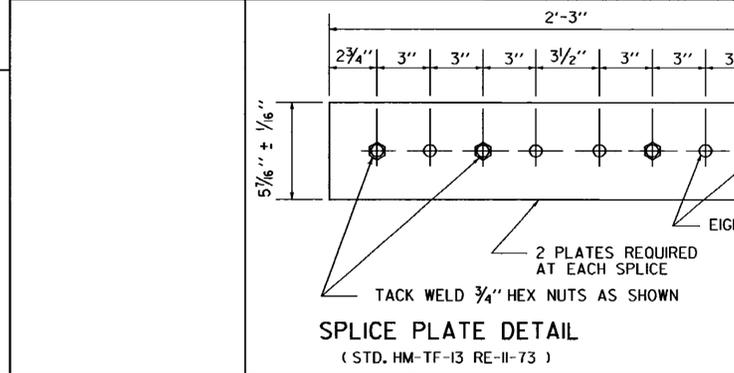
DESIGN SPEED	MAX. FLARE RATE (ft/ft)	MIN. TRANSITION CURVE LENGTH	OFFSET "C" FOR MIN. TRANS. CURVE
70	15:1	48 FEET	1.6 feet (1'-7")
60	13:1	54 FEET	2.1 feet (2'-1")
50	11:1	66 FEET	3.0 feet (3'-0")
40	9:1	78 FEET	4.3 feet (4'-4")

- GENERAL NOTES**
1. THE DESIRED APPROACH END OFFSET SHOULD BE AT LEAST 8' FROM THE EDGE OF NORMAL SHOULDER WHERE SPACE PERMITS; IN SPECIAL CASES, THE END OFFSET MAY BE REDUCED. IN NO CASE, HOWEVER, WILL THE END OFFSET BE LESS THAN 4'.
  2. POST SPACING WILL BE 6'-0" C-C, EXCEPT IN THE VICINITY OF THE JUNCTION OF BOX BEAM GUARD RAIL AND BRIDGE RAILING, AND AT OTHER LOCATIONS INDICATED ON THE PLANS. AT BRIDGE APPROACHES, THE 50' SECTION ADJACENT TO THE BRIDGE RAILING WILL HAVE A POST SPACING OF 4'-0" C-C.
  3. FOR MATERIAL REQUIREMENTS AND CONSTRUCTION DETAILS SEE SPECIFICATIONS FOR BOX BEAM GUARD RAIL.
  4. RAIL ALIGNMENT TO BE STRAIGHT AT SPLICES. NO LATERAL BENDS PERMITTED WITHIN THE SPLICE. THIS DOES NOT PRECLUDE THE SHOP FABRICATION OF BENT SPLICES.
  5. THE LINE OF BOX BEAM GUARD RAIL WHEN COMPLETED SHALL PRESENT A SMOOTH AND PLEASING GRADE LINE IN BOTH HORIZONTAL AND VERTICAL PLANES.
  6. ALL POSTS IN A GIVEN RUN TO BE OF THE SAME TYPE.



THIS REFLECTORIZED ALUMINUM DELINEATION DEVICE IS TO BE ERRECTED EVERY 36 FEET, AT SPLICES. DELINEATOR SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052-H32.

REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER. AMBER IS TO BE INSTALLED ON THE LEFT OR MEDIAN SIDE OF INTERSTATE ROADWAYS OR RAMPS.



- REVISIONS AND CORRECTIONS**
- OCT. 17, 1979- ORIGINAL APPROVAL DATE
  - JULY 23, 1980- CHANGED DIAMETER OF GUIDE POST
  - DEC. 16, 1980- INCREASED SHOULDER WIDENING FOR GUARD RAIL
  - JUNE 17, 1984- DELINEATOR DEVICE ADDED
  - DEC. 21, 1984- HEIGHT OF RAIL LOWERED FROM 2'-6" TO 2'-3"
  - OCT. 31, 1985- REVISED TO CONFORM TO 1986 SPECIFICATIONS
  - JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

**APPROVED**

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

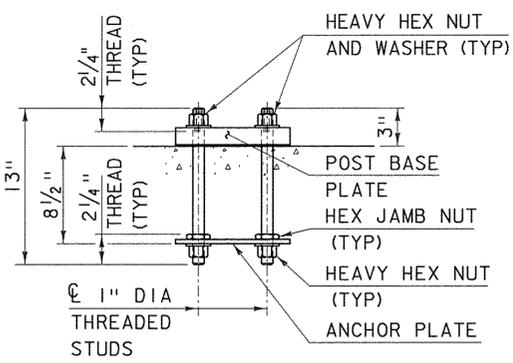
*Stephen D. MacArthur, P.E.*  
DIRECTOR OF ENGINEERING

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

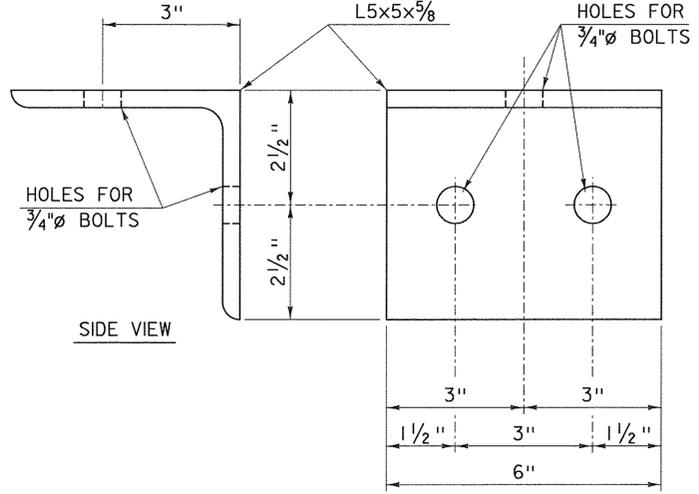
# BOX BEAM GUARD RAIL

VERMONT AGENCY OF TRANSPORTATION

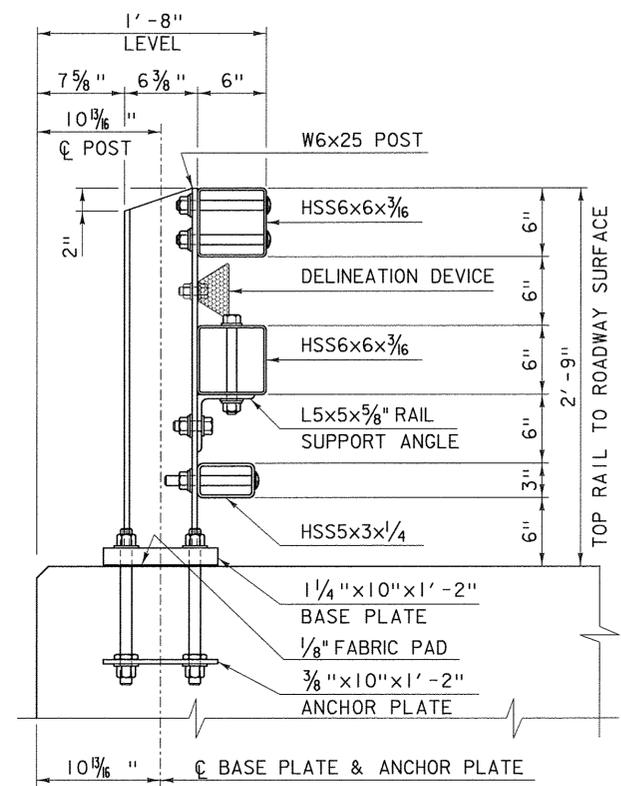
**STANDARD G-1b**



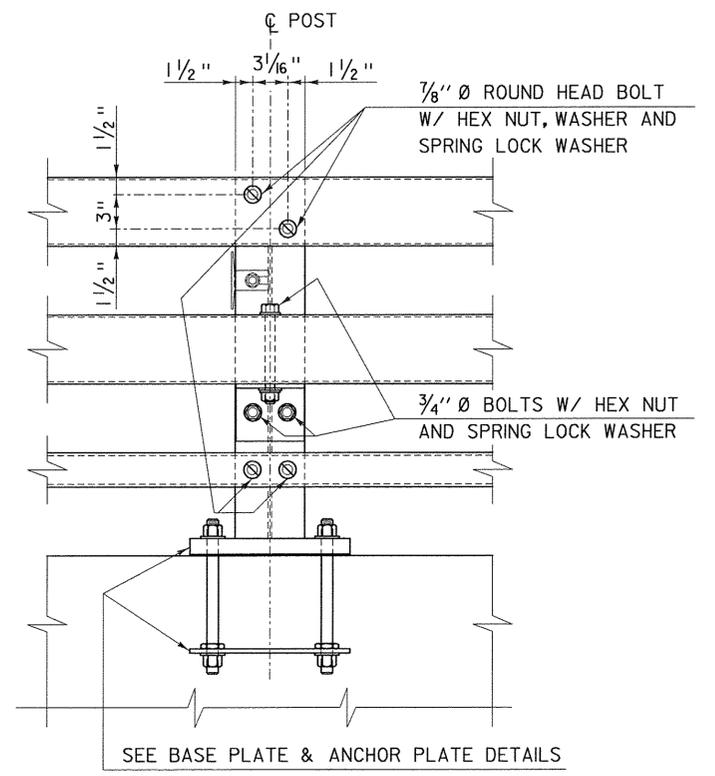
RAILING POST ANCHORAGE



ELEVATION VIEW  
RAILING ANGLE DETAILS

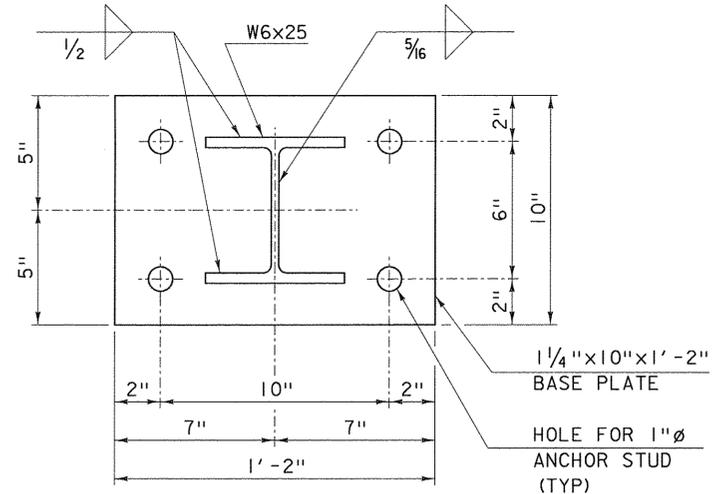


RAILING SECTION

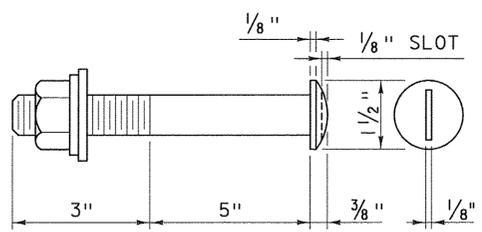


RAILING ELEVATION

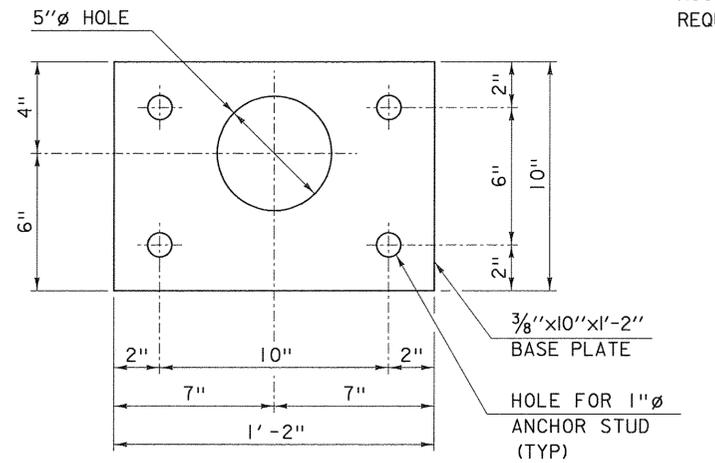
- NOTES:
1. ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
  2. PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".
  3. ALL POSTS SHALL BE SET NORMAL TO GRADE. THE MAXIMUM CENTER TO CENTER SPACING OF BRIDGE RAIL POSTS IS 8'-3".
  4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE POSTS AND PREFERABLY TO AT LEAST 4 POSTS.
  5. RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING THE END OF AN INTEGRAL ABUTMENT BRIDGE AND AT ALL SUPERSTRUCTURE EXPANSION JOINTS. EXPANSION JOINT WIDTH SHALL BE 4" @ 68°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
  6. HOLES IN RAILS FOR TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.
  7. BOLTS SHALL BE TORQUED SNUG TIGHT (APPROXIMATELY 100 FT-LB).
  8. SEE STANDARD DRAWING G-1B FOR DETAILS OF DELINEATORS. A DELINEATOR SHALL BE INSTALLED AT 30 FOOT SPACING OR THE NEAREST POST. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. FOR ONE WAY BRIDGES, YELLOW IS TO BE INSTALLED ON THE DRIVER'S LEFT. PAYMENT SHALL BE INCIDENTAL TO OTHER ITEMS.
  9. ANY BENDING OF RAIL SHALL BE DONE AT THE FABRICATION PLANT ACCORDING TO A PROCEDURE PROVIDED BY THE FABRICATOR.
  10. THE MINIMUM DISTANCE FROM THE POST TO AN EXPANSION JOINT SHALL BE DETERMINED BY THE MINIMUM EDGE DISTANCE OF 5" FROM ANY ANCHOR STUD TO THE END OF THE SLAB, OR TO THE EXPANSION JOINT RECESS POUR, IF ONE IS USED.
  11. THIS RAILING MEETS THE REQUIREMENTS FOR A TL-4 SERVICE LEVEL.



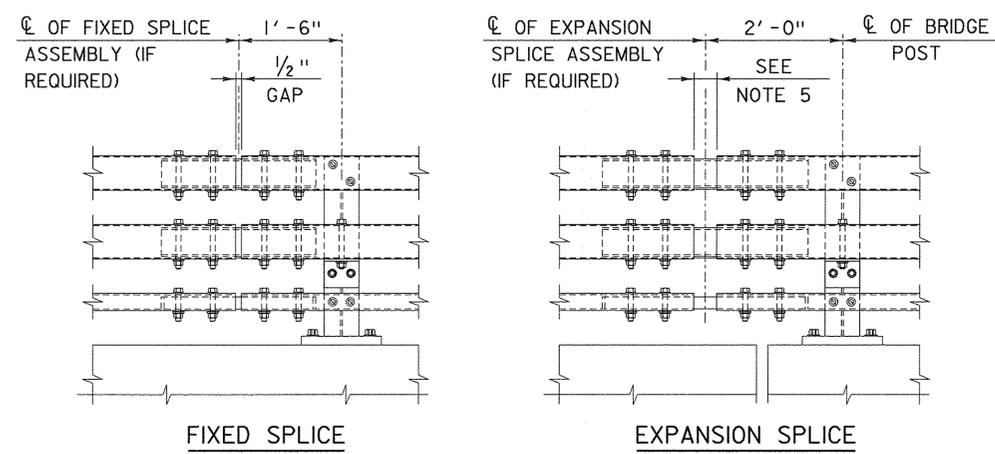
BASE PLATE DETAIL



ROUND HEAD BOLT DETAIL  
A449 (TYPE 1)



ANCHOR PLATE DETAIL



RAILING SPLICE DETAIL ELEVATION

A RAILING EXPANSION SPLICE IS REQUIRED IN ANY POST SPACING THAT CONTAINS A SUPERSTRUCTURE EXPANSION JOINT

OTHER STDS. REQUIRED: **G-1B, S-364C**

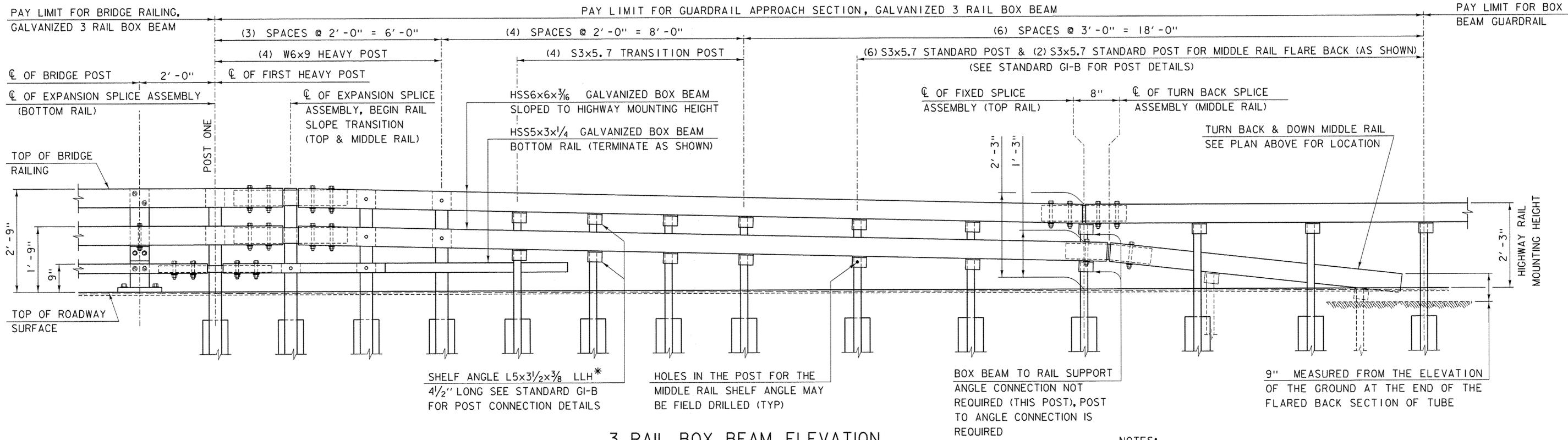
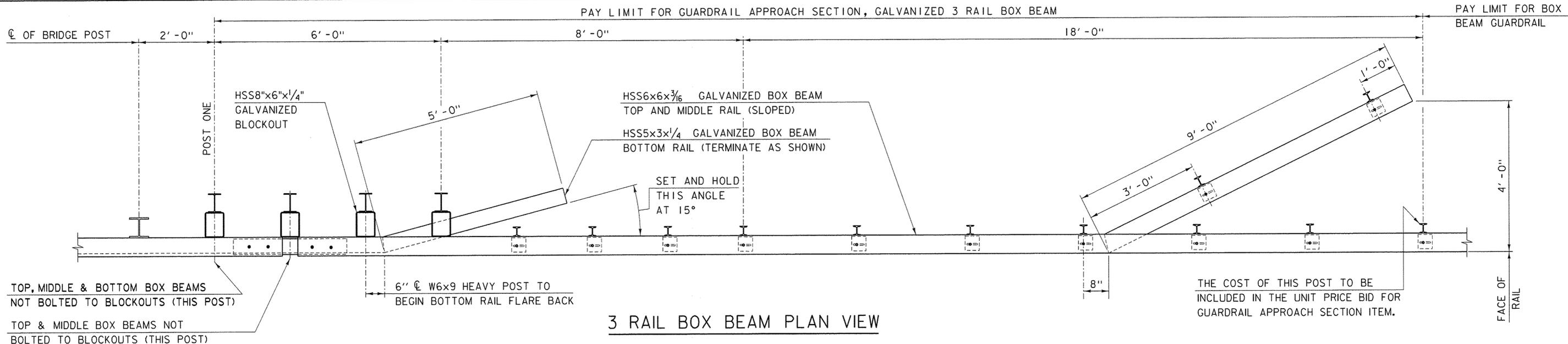
REVISIONS AND CORRECTIONS  
AUGUST 9, 2010 - ORIGINAL APPROVAL  
APRIL 23, 2012 - GENERAL UPDATE 2012

APPROVED  
*Wm. Michael Hedger*  
STRUCTURES PROGRAM MANAGER  
*Richard F. Schaub*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark D. Richter*  
FEDERAL HIGHWAY ADMINISTRATION

# BRIDGE RAILING, GALVANIZED 3 RAIL BOX BEAM



# STANDARD S-364A



\* LONG LEG HORIZONTAL

NOTES:

- BOX BEAM TUBE AND STEEL POST MATERIALS, DIMENSION SIZES AND NOTES SHALL BE THE SAME AS THOSE OF THE BRIDGE RAIL, UNLESS OTHERWISE NOTED.

OTHER STDS. REQUIRED: **G-1B, S-364A**

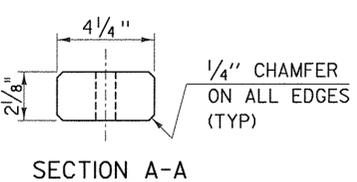
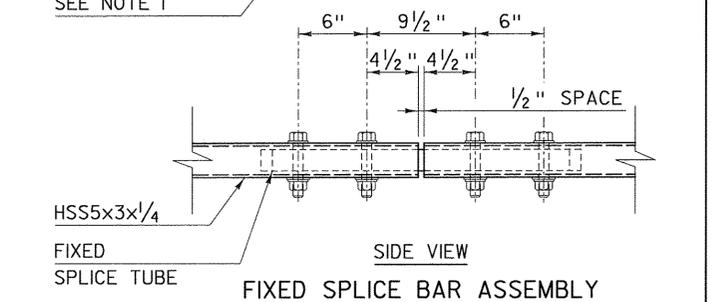
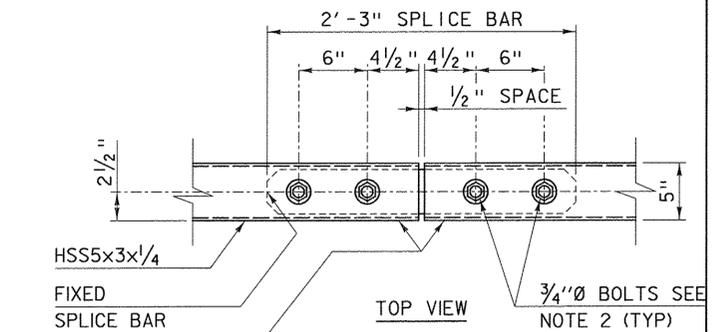
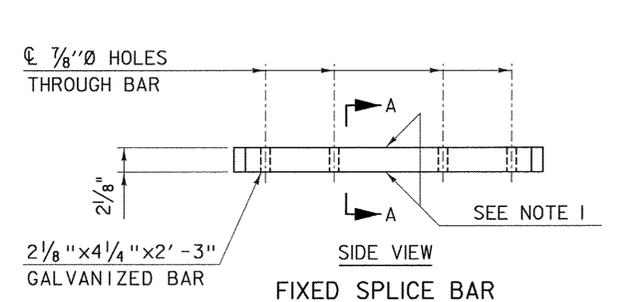
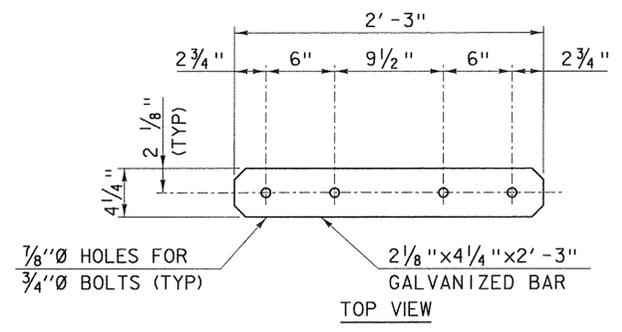
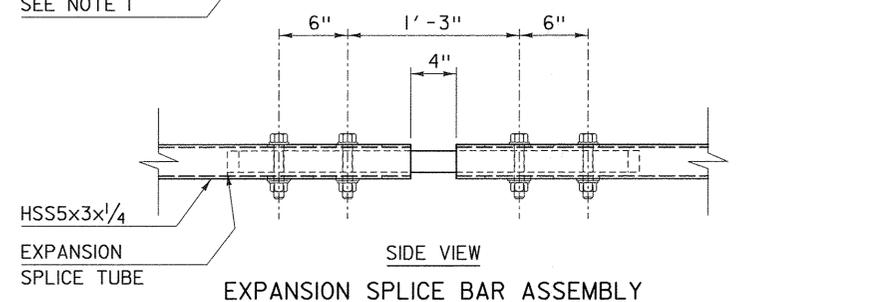
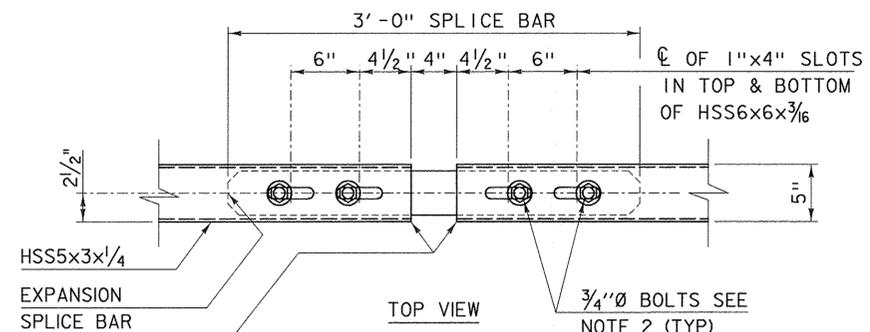
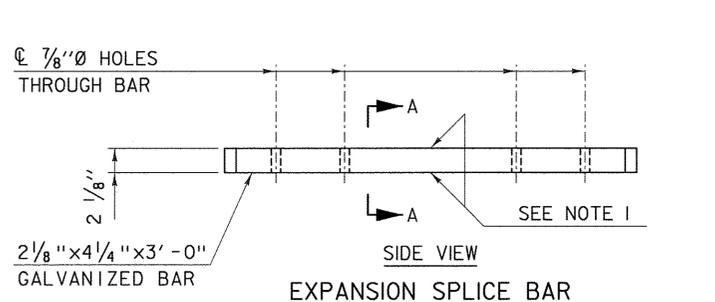
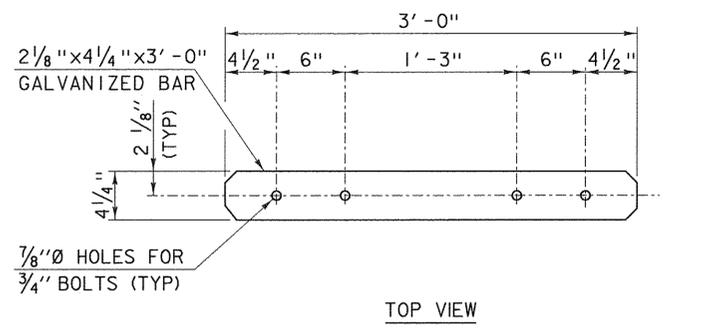
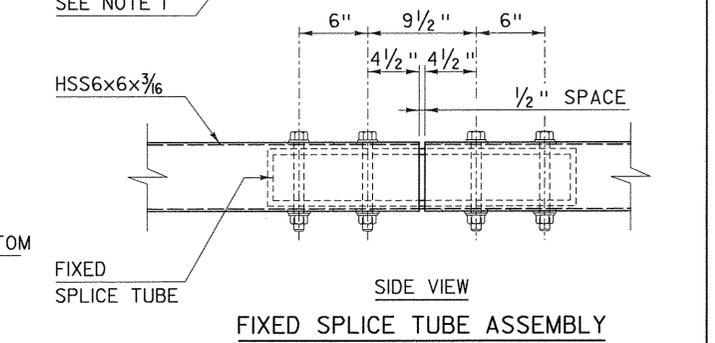
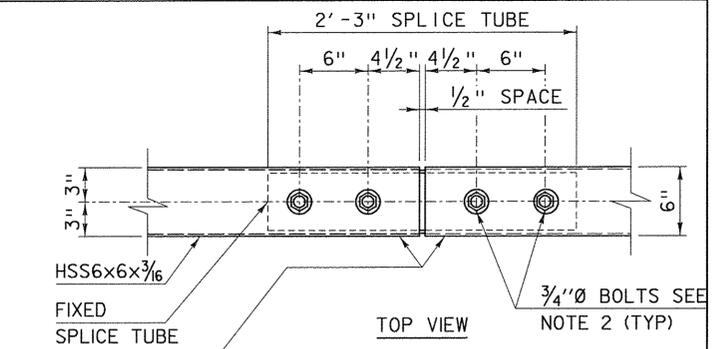
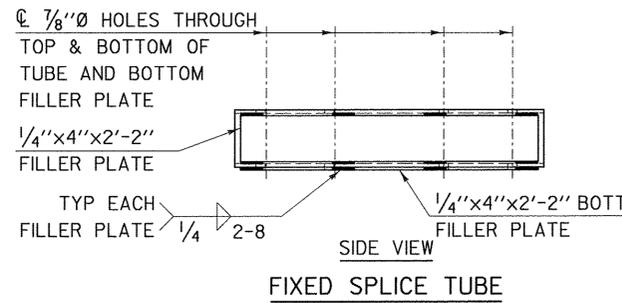
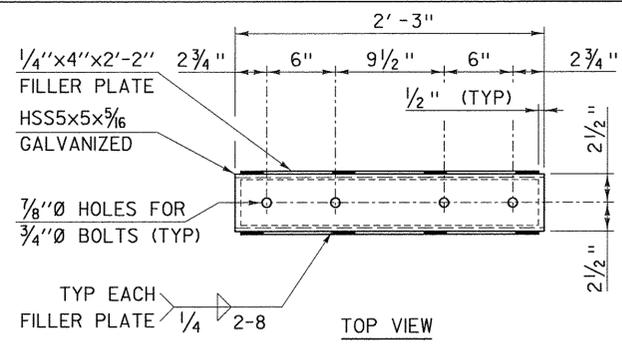
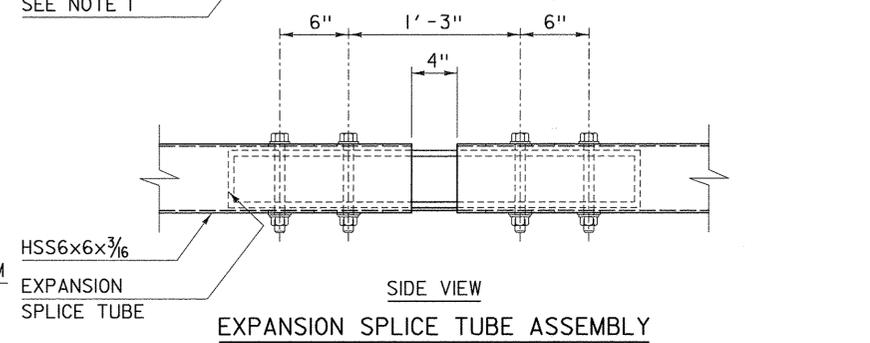
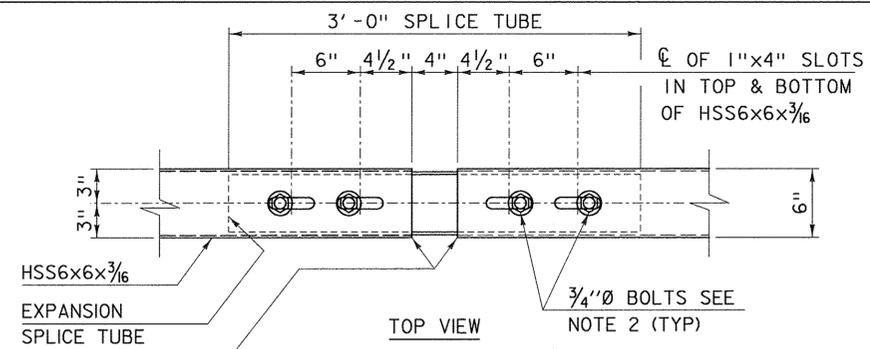
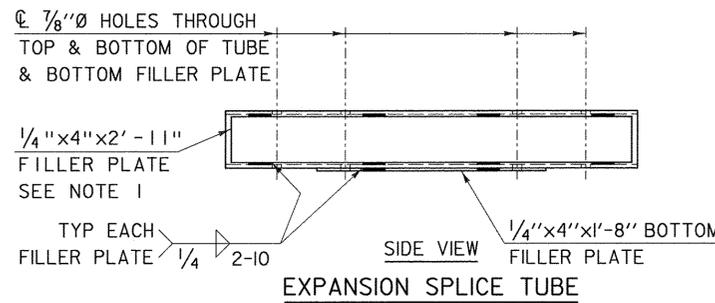
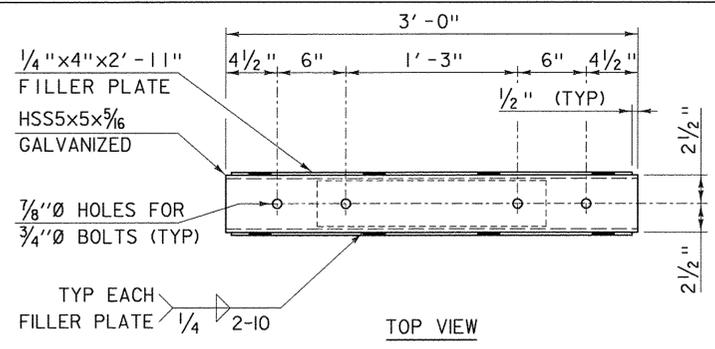
REVISIONS AND CORRECTIONS  
AUGUST 9, 2010 - ORIGINAL APPROVAL  
APRIL 23, 2012 - GENERAL UPDATE 2012

APPROVED  
*Don. Michel Hodges*  
STRUCTURES PROGRAM MANAGER  
*Ruthan Tibbatts*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark D. Kistler*  
FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM



STANDARD S-364B



NOTES:

1. PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
2. FOUR (4) 3/4" DIAMETER FULLY THREADED BOLTS, 7 1/2" LONG WITH TWO (2) WASHERS AND A HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT AND THE FIRST THREAD BELOW THE NUT TO BE BURRED TO PREVENT DISLODGING. FOUR (4) BOLTS AT EACH SPLICE.

REVISIONS AND CORRECTIONS  
 AUGUST 9, 2010 - ORIGINAL APPROVAL  
 APRIL 23, 2012 - GENERAL UPDATE 2012

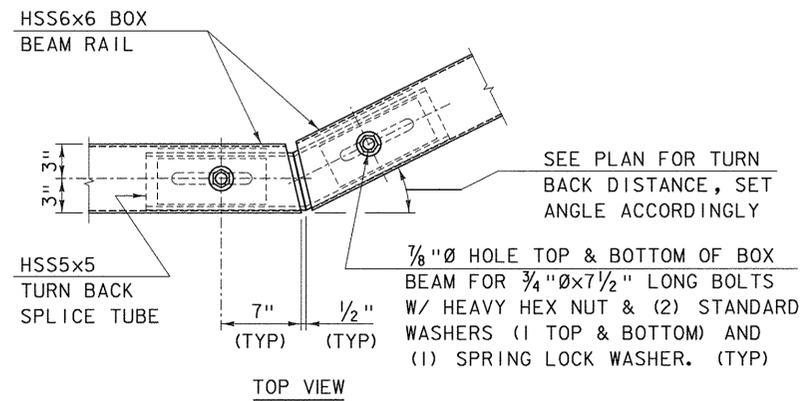
APPROVED  
*Jim Michael Hedger*  
 STRUCTURES PROGRAM MANAGER  
*Richard J. Farnsworth*  
 DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark D. Richter*  
 FEDERAL HIGHWAY ADMINISTRATION

# GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM

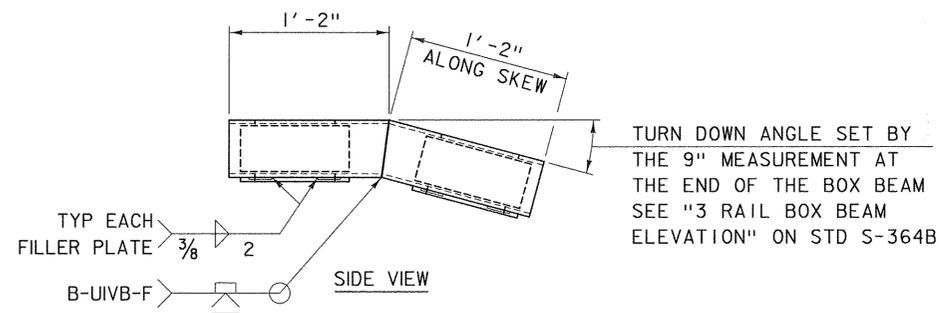
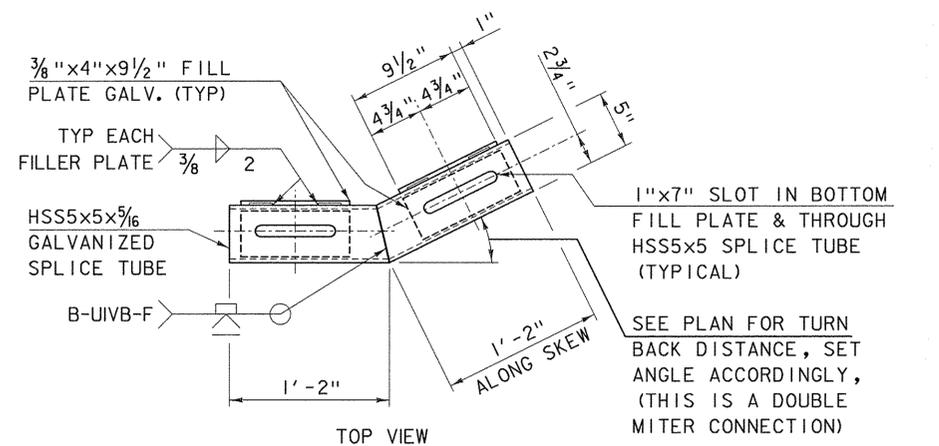
OTHER STDS. REQUIRED:



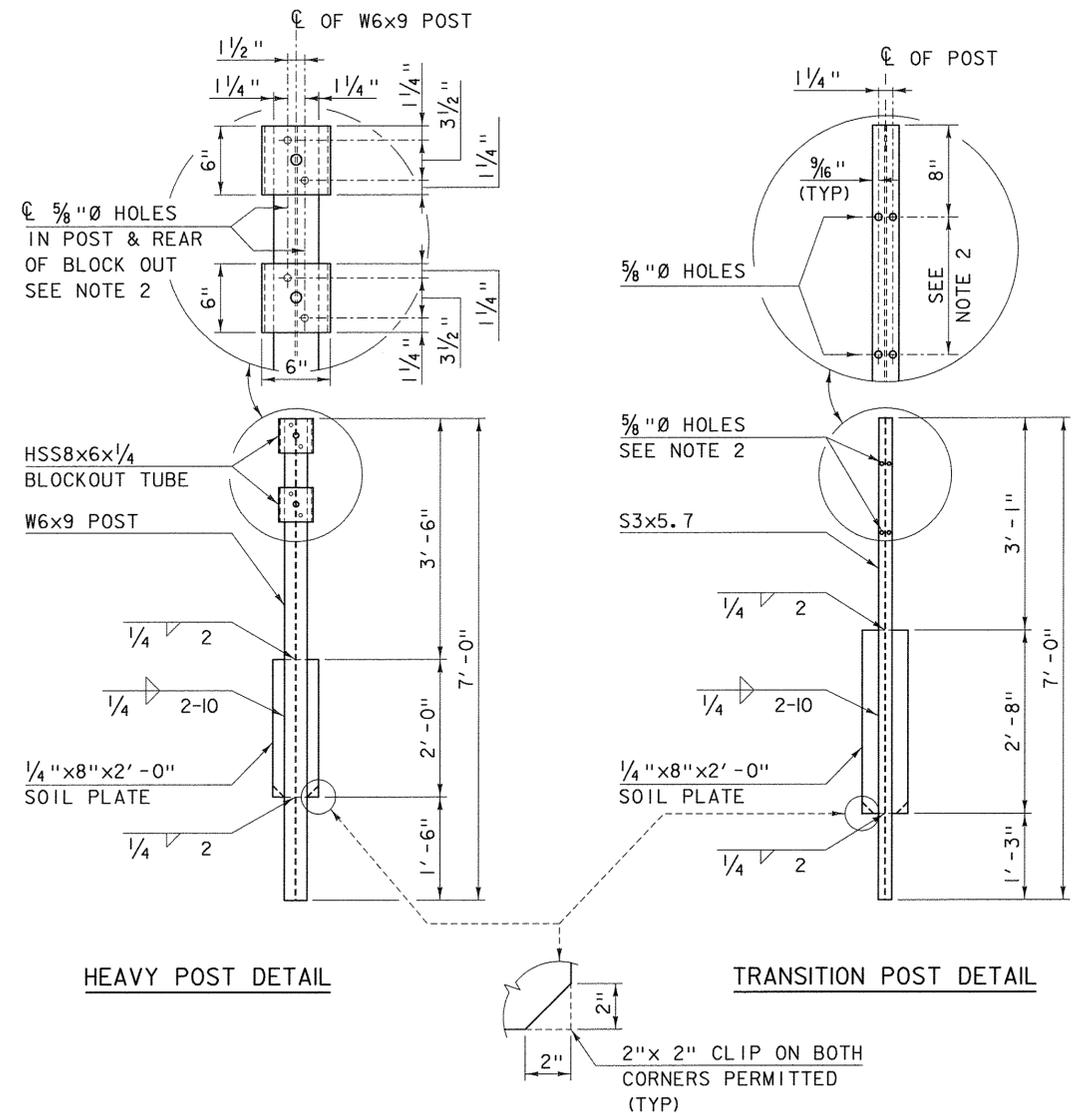
# STANDARD S-364C



TURN BACK SPLICE TUBE ASSEMBLY



TURN BACK SPLICE TUBE DETAIL  
TURN BACK & TURN DOWN TUBE JOINT



NOTES:

- PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
- HOLES IN THE POST FOR THE LOWER RAIL MAY BE LOCATED AND DRILLED IN THE FIELD. IF SO, THE GALVANIZING SHALL BE REPAIRED IN ACCORDANCE WITH SPECIFICATION SECTION 525.

OTHER STDS. REQUIRED:

REVISIONS AND CORRECTIONS  
AUGUST 9, 2010 - ORIGINAL APPROVAL  
APRIL 23, 2012 - GENERAL UPDATE 2012

APPROVED

*Wm. Michael Hedge*  
STRUCTURES PROGRAM MANAGER

*Richard Fetsch*  
DIRECTOR OF PROGRAM DEVELOPMENT

*Mark D. Richter*  
FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH  
SECTION, GALVANIZED  
3 RAIL BOX BEAM



STANDARD  
S-364D