

**NOTES**

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF EXISTING GUARDRAIL WHICH MUST BE REMOVED TO ACCOMMODATE THE LAYOUT OF THE CROSSOVER. WHEN TRAFFIC IS REQUIRED TO TRAVEL "AGAINST" THE OVERLAP OF THE EXISTING GUARDRAIL, THE RAIL SHALL BE REMOVED AND REASSEMBLED WITH THE LAP CHANGE TO GO "WITH" THE FLOW OF TRAFFIC. IT SHALL BE RETURNED TO ITS ORIGINAL LAP WHEN THE LANE IS AGAIN OPENED TO THE ORIGINAL DIRECTION OF TRAVEL. COST TO DO THIS WORK SHALL BE CONSIDERED A PART OF "TRAFFIC CONTROL" UNLESS OTHERWISE NOTED ON THE PLANS.
2. THE DETOUR SHALL BE PAVED TO A DEPTH OF 2" AND A WIDTH OF 16". PAVEMENT SHALL BE PAID UNDER "BITUMINOUS CONCRETE PAVEMENT". ALL OTHER COSTS ASSOCIATED WITH THE CONSTRUCTION AND MAINTENANCE OF THE CROSSOVER, INCLUDING FILL MATERIAL AND RESTORING THE AREA TO ITS ORIGINAL CONDITION, SHALL BE CONSIDERED A PART OF "TRAFFIC CONTROL". THE MATERIAL USED FOR FILL SHALL BE SUITABLE FOR THE ADEQUATE SUPPORT OF TRAFFIC AND SHALL BE APPROVED BY THE RESIDENT ENGINEER PRIOR TO PLACEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE TO PATCH, FILL AND REPAIR ANY POT HOLES, RUTS, CRACKS, ETC. WHICH MAY OCCUR IN THE CROSSOVER SURFACE DURING ITS USE.
3. SIGNING, FLASHING ARROW PANELS, DRUMS, DELINEATORS, TYPE III BARRICADES AND CROSSOVER CONSTRUCTION AS OUTLINED ON THIS SHEET AND STD. E-103 SHALL BE CONSIDERED A PART OF "TRAFFIC CONTROL".
4. ADDITIONAL CONCRETE MEDIAN BARRIER WILL BE REQUIRED FOR THE DETOUR CROSSOVER BASED ON FIELD CONDITIONS TO PROTECT MOTORISTS FROM FIXED OBJECTS, SUCH AS LEDGE OUTCROPPINGS, WITHIN A 30 FOOT CLEAR ZONE.
5. ALL SIGNS SHALL BE IN LIKE NEW CONDITION, AS DETERMINED BY THE RESIDENT ENGINEER, AND GROUND MOUNTED ON YIELDING SUPPORTS PER APPROPRIATE STANDARDS.
6. SIDE SLOPES ON THE CROSSOVER SHALL BE NO GREATER THAN 1 ON 4.
7. REFER TO STD. E-104A FOR DETAILS ON THE REMOVAL AND REPLACEMENT OF PAVEMENT MARKINGS AND RAISED PAVEMENT MARKINGS (RPM'S) AND THE METHODS OF PAYMENT FOR THESE ITEMS.
8. ALL DISTANCES ARE DESIRABLE MINIMUMS. FIELD CONDITION SHALL CONTROL THE ACTUAL PLACEMENT.
9. THE NUMBER OF CHANNELIZING DEVICES, TYPE III BARRICADES AND OTHER TRAFFIC CONTROL DEVICES SHOWN ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE ACTUAL NUMBER REQUIRED ARE TO BE DETERMINED BASED ON INDIVIDUAL DETOUR CONDITIONS (TAPERS, SPEED LIMITS, LENGTH OF DETOUR, CURVE, ETC.).
10. CROSSOVERS SHALL MEET ALL VERTICAL REQUIREMENTS PER AASHTO'S POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS.

**LEGEND**

- ☐ - TYPE III BARRICADES.
- ⚡ - FLASHING ARROW PANEL
- ▬ - CONCRETE MEDIAN BARRIER
- ### - PAVEMENT MARKING REMOVAL
- - REFLECTORIZED PLASTIC DRUM
- - TYPE I DELINEATOR (YELLOW)
- - TYPE I DELINEATOR (WHITE)
- ➔ - FLOW OF TRAFFIC

**MERGING AND SHIFTING TAPER LENGTHS FOR WIDTHS OTHER THAN SHOWN IN THE TABLE**

POSTED SPEED OR 85 <sup>TH</sup> PERCENTILE MPH	MERGING TAPER (2' LANE) (L)	TANGENT SECTION (1/2 L)	SHIFTING TAPER (W = 16' (1/2 L))	SHOULDER TAPER (W = 10' (1/3 L))	RADIUS (NO SUPERELEVATION) (PER AASHTO STD.)	BARRIER TAPER RATE
40	320'	160'	215'	90'	710'	9 TO 1
45	540'	270'	360'	150'	930'	-
50	600'	300'	400'	170'	1200'	11 TO 1
55	660'	330'	440'	190'	1500'	-
60	720'	360'	480'	200'	1900'	13 TO 1
65	780'	390'	520'	220'	2300'	-

TAPER FORMULA :

$L = S \times W$  FOR SPEEDS OF 45 OR MORE.

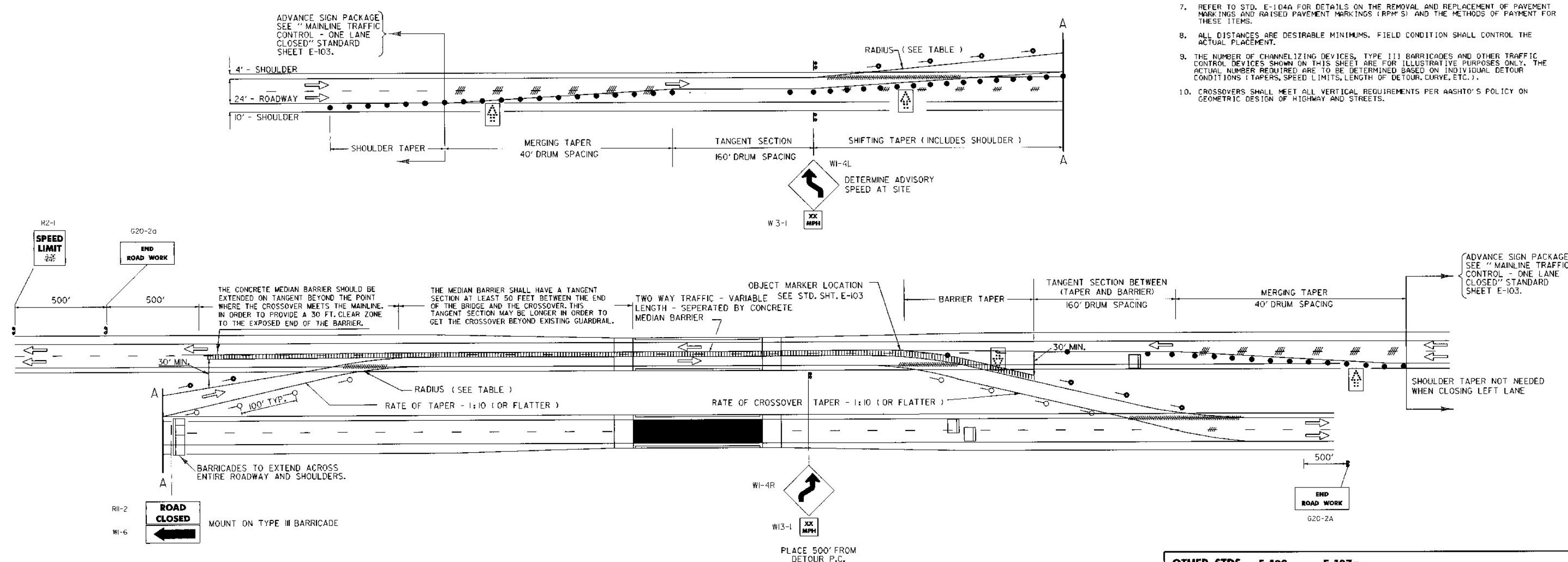
$L = \frac{WS^2}{60}$  FOR SPEEDS AT 40 OR LESS.

WHERE :

L = MINIMUM LENGTH OF TAPER

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK OR 85<sup>TH</sup> PERCENTILE SPEED.

W = WIDTH OF OFFSET.



**REVISIONS AND CORRECTIONS**

OCT. 30, 1987 - DATE OF ORIGINAL ISSUE

JAN. 23, 1989 - CREATED STD. E-104A FOR PM AND RPM'S, CHANGE TO 65 M.P.H. TAPER RATES.

OCT. 21, 1992 - ADDED TAPER RATE TABLE & REVISED TITLE BLOCK

AUG. 08, 1995 - REVISED SHIFTING TAPER PER M.U.T.C.D. - REV. 3 1993

**APPROVED**

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**MAINLINE TRAFFIC CONTROL  
DIVIDED HIGHWAY ONE  
ROADWAY CLOSED**

**OTHER STDS. REQUIRED:** E-103, E-104a, E-107a

**STANDARD  
E-104**

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