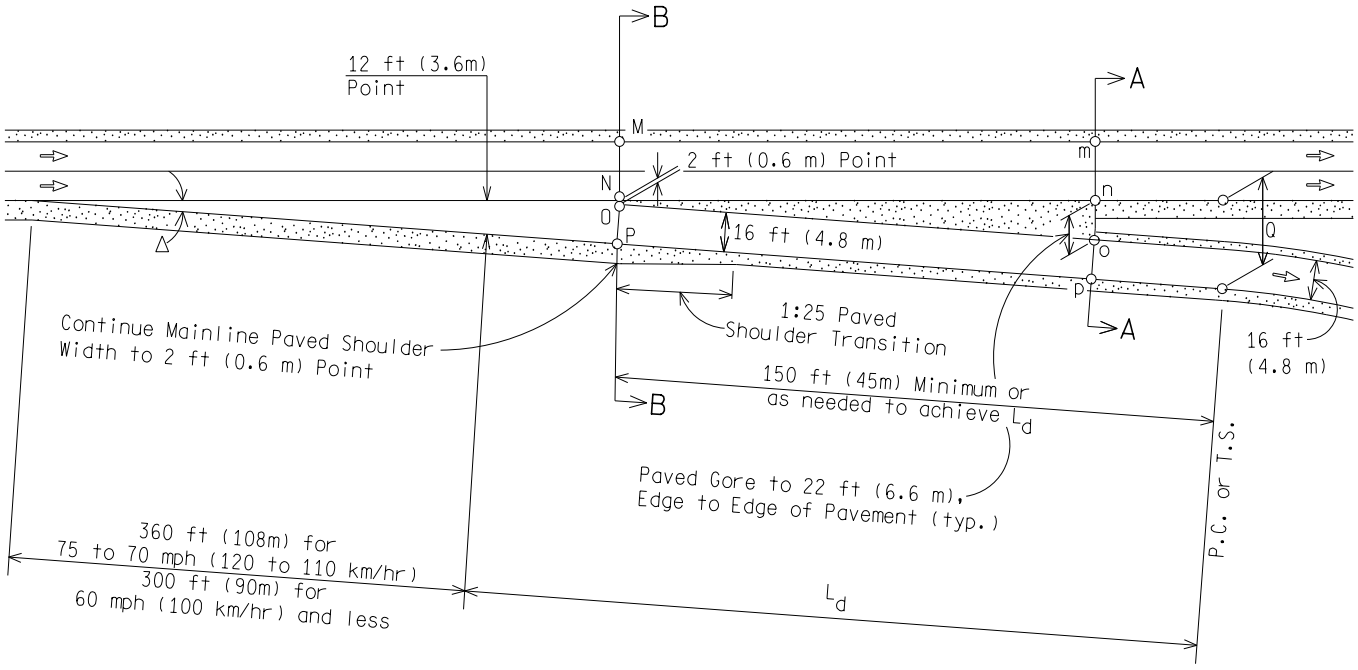
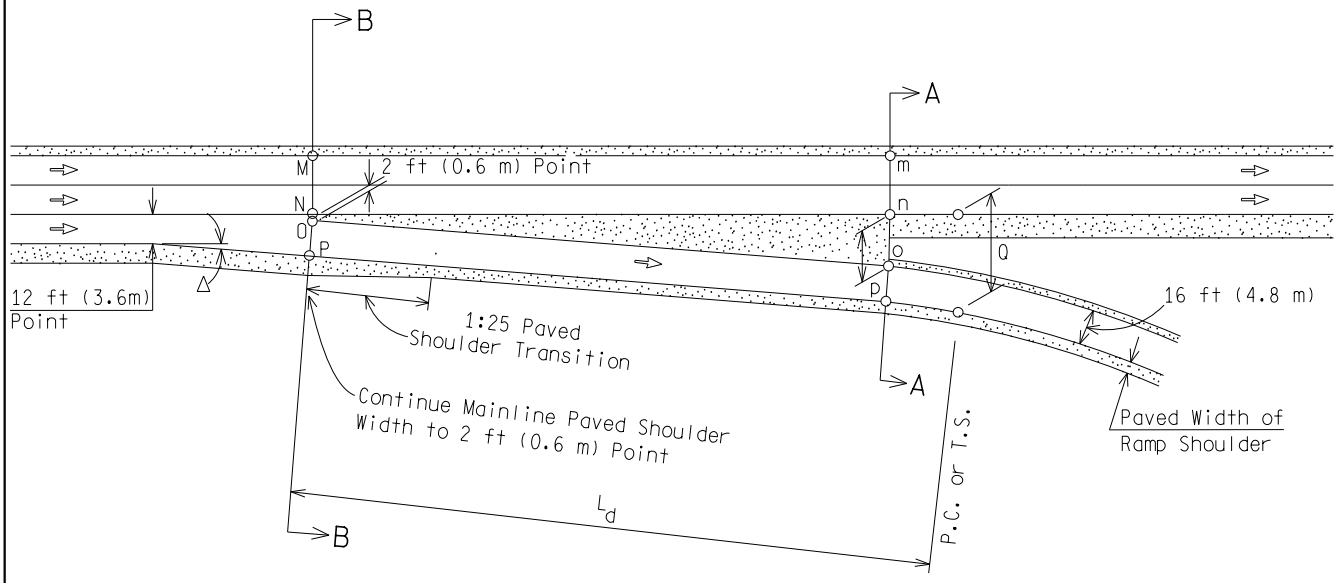
CASE I



CASE II

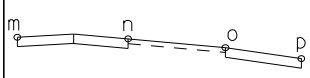
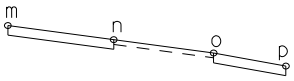
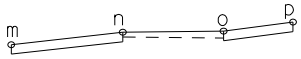
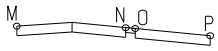
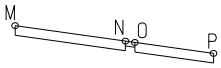
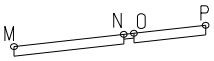
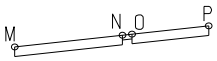
Use on ramps in weave sections.



NOT TO SCALE

MDOT Michigan Department of Transportation TRAFFIC AND SAFETY	BY: John C. Friend ENGINEER OF DELIVERY	GEOMETRIC DESIGN GUIDE FOR ONE-LANE TAPERED EXIT RAMP	
DRAWN BY: ECH CHECKED BY: IRG/JAT	BY: ENGINEER OF DEVELOPMENT	08/07/2008 PLAN DATE:	GEO-130-D
FILE:PW: Geometrics/mdot traffic GEO-130-D.dgn	REV. 09/14/2016 MS		SHEET 1 OF 5

EDGE OF PAVEMENT ELEVATION RELATIONSHIPS

WHEN THE THRU LANES ARE NOT SUPERELEVATED	WHEN THE THRU LANES ARE SUPERELEVATED AND N IS LOWER THAN M	WHEN THE THRU LANES ARE SUPERELEVATED AND N IS HIGHER THAN M	
		RAMP AND THRU LANE SUPERELEVATED IN SAME DIRECTION	RAMP AND THRU LANE SUPERELEVATED IN OPPOSITE DIRECTION
SECTION A-A			
 POINTS n, o & p SHOULD BE PROGRESSIVELY LOWER.	 POINTS m, n, o & p SHOULD BE PROGRESSIVELY LOWER.	 POINT o SHOULD BE HIGHER THAN POINT n.	 POINT o SHOULD BE EQUAL TO OR LOWER THAN POINT n.
SECTION B-B			
 POINTS N, O & P SHOULD BE IN THE SAME PLANE.	 POINTS M, N, O & P SHOULD BE IN THE SAME PLANE.	 POINTS M, N, O & P SHOULD BE IN THE SAME PLANE.	 POINTS M, N, O & P SHOULD BE IN THE SAME PLANE.

NOTE: Maximum algebraic difference in pavement cross slope between mainline and ramp auxiliary lane should not exceed 5%.

NOT TO SCALE

MINIMUM ENGLISH LENGTHS FOR TAPERED EXIT RAMPS

RAMP DESIGN SPEED (MPH)	PERCENT GRADE OF THROUGH ROADWAY	TAPER=30:1 Δ=1°54′33″ ROADWAY DESIGN SPEED = 75 MPH L_d min = 330		TAPER=30:1 Δ=1°54′33″ ROADWAY DESIGN SPEED = 70 MPH L_d min = 330		TAPER=25:1 Δ=2°17′26″ ROADWAY DESIGN SPEED = 60 MPH L_d min = 300		TAPER=25:1 Δ=2°17′26″ ROADWAY DESIGN SPEED = 55 MPH TO 50 MPH L_d min = 300		TAPER=25:1 Δ=2°17′26″ ROADWAY DESIGN SPEED = 45 MPH OR LESS L_d min = 300	
		L_d (FT)	Q (FT)	L_d (FT)	Q (FT)	L_d (FT)	Q (FT)	L_d (FT)	Q (FT)	L_d (FT)	Q (FT)
20	-3 TO LESS THAN -5	744	36.8	684	34.8	576	35.1	528	33.2	390	27.6
	BETWEEN -3 AND +3	620	32.7	570	31.0	480	31.2	440	29.6	325	25.0
	+3 TO LESS THAN +5	558	30.6	513	29.1	432	29.3	396	27.9	300	24.0
25	-3 TO LESS THAN -5	720	36.0	660	34.0	552	34.1	492	31.7	354	26.2
	BETWEEN -3 AND +3	600	32.0	550	30.4	460	30.4	410	28.4	300	24.0
	+3 TO LESS THAN +5	540	30.0	495	28.5	414	28.6	369	26.8	300	24.0
30	-3 TO LESS THAN -5	690	35.0	624	32.8	516	32.7	456	30.3	300	24.0
	BETWEEN -3 AND +3	575	31.2	520	29.4	430	29.2	380	27.2	300	24.0
	+3 TO LESS THAN +5	518	29.3	468	27.6	387	27.5	342	25.7	300	24.0
35	-3 TO LESS THAN -5	642	33.4	588	31.6	486	31.5	420	28.8	300	24.0
	BETWEEN -3 AND +3	535	29.9	490	28.4	405	28.2	350	26.0	300	24.0
	+3 TO LESS THAN +5	482	28.1	441	26.7	365	26.6	315	24.6	300	24.0
40	-3 TO LESS THAN -5	588	31.6	528	29.6	420	28.8	342	25.7	300	24.0
	BETWEEN -3 AND +3	490	28.4	440	26.7	350	26.0	300	24.0	300	24.0
	+3 TO LESS THAN +5	441	26.7	396	25.2	315	24.6	300	24.0	300	24.0
45	-3 TO LESS THAN -5	528	29.6	468	27.6	360	26.4	300	24.0	300	24.0
	BETWEEN -3 AND +3	440	26.7	390	25.0	300	24.0	300	24.0	300	24.0
	+3 TO LESS THAN +5	396	25.2	351	23.7	300	24.0	300	24.0	300	24.0
50	-3 TO LESS THAN -5	468	27.6	432	26.4	300	24.0	300	24.0		
	BETWEEN -3 AND +3	390	25.0	360	24.0	300	24.0	300	24.0		
	+3 TO LESS THAN +5	351	23.7	330	23.0	300	24.0	300	24.0		
55	-3 TO LESS THAN -5	468	27.6	432	26.4	300	24.0	300	24.0		
	BETWEEN -3 AND +3	390	25.0	360	24.0	300	24.0	300	24.0		
	+3 TO LESS THAN +5	351	23.7	330	23.0	300	24.0	300	24.0		
60	-3 TO LESS THAN -5	468	27.6	432	26.4	300	24.0				
	BETWEEN -3 AND +3	390	25.0	360	24.0	300	24.0				
	+3 TO LESS THAN +5	351	23.7	330	23.0	300	24.0				
65	-3 TO LESS THAN -5	468	27.6	432	26.4						
	BETWEEN -3 AND +3	390	25.0	360	24.0						
	+3 TO LESS THAN +5	351	23.7	330	23.0						
70	-3 TO LESS THAN -5	468	27.6	432	26.4						
	BETWEEN -3 AND +3	390	25.0	360	24.0						
	+3 TO LESS THAN +5	351	23.7	330	23.0						
75	-3 TO LESS THAN -5	468	27.6								
	BETWEEN -3 AND +3	390	25.0								
	+3 TO LESS THAN +5	351	23.7								

NOT TO SCALE

MINIMUM METRIC LENGTHS FOR TAPERED EXIT RAMPS

RAMP DESIGN SPEED (km/hr)	PERCENT GRADE OF THROUGH ROADWAY	TAPER=30:1 Δ=1°54'33" ROADWAY DESIGN SPEED = 120 Km/Hr L_d min = 100		TAPER=30:1 Δ=1°54'33" ROADWAY DESIGN SPEED = 110 Km/Hr L_d min = 100		TAPER=25:1 Δ=2°17'26" ROADWAY DESIGN SPEED = 100 Km/Hr L_d min = 90		TAPER=25:1 Δ=2°17'26" ROADWAY DESIGN SPEED = 90 Km/Hr to 80 Km/Hr L_d min = 90		TAPER=25:1 Δ=2°17'26" ROADWAY DESIGN SPEED = 70 Km/Hr OR LESS L_d min = 90	
		L_d (m)	Q (m)	L_d (m)	Q (m)	L_d (m)	Q (m)	L_d (m)	Q (m)	L_d (m)	Q (m)
30	-3 TO LESS THAN -5	222	11.0	204	10.4	186	11.0	162	10.1	114	8.2
	BETWEEN -3 AND +3	185	9.8	170	9.3	155	9.8	135	9.0	95	7.4
	+3 TO LESS THAN +5	167	9.2	153	8.7	140	9.2	122	8.5	90	7.2
40	-3 TO LESS THAN -5	210	10.6	192	10.0	174	10.6	144	9.4	109	8.0
	BETWEEN -3 AND +3	175	9.4	160	8.9	145	9.4	120	8.4	90	7.2
	+3 TO LESS THAN +5	158	8.9	144	8.4	131	8.8	108	7.9	90	7.2
50	-3 TO LESS THAN -5	204	10.4	180	9.6	162	10.1	132	8.9	90	7.2
	BETWEEN -3 AND +3	170	9.3	150	8.6	135	9.0	110	8.0	90	7.2
	+3 TO LESS THAN +5	153	8.7	135	8.1	122	8.5	99	7.6	90	7.2
60	-3 TO LESS THAN -5	186	9.8	168	9.2	144	9.4	120	8.4	90	7.2
	BETWEEN -3 AND +3	155	8.8	140	8.3	120	8.4	100	7.6	90	7.2
	+3 TO LESS THAN +5	140	8.3	126	7.8	108	7.9	90	7.2	90	7.2
70	-3 TO LESS THAN -5	168	9.2	144	8.4	120	8.4	90	7.2	90	7.2
	BETWEEN -3 AND +3	140	8.3	120	7.6	100	7.6	90	7.2	90	7.2
	+3 TO LESS THAN +5	126	7.8	108	7.2	90	7.2	90	7.2	90	7.2
80	-3 TO LESS THAN -5	144	8.4	126	7.8	109	8.0	90	7.2		
	BETWEEN -3 AND +3	120	7.6	105	7.1	90	7.2	90	7.2		
	+3 TO LESS THAN +5	108	7.2	100	6.9	90	7.2	90	7.2		
90	-3 TO LESS THAN -5	144	8.4	126	7.8	109	8.0	90	7.2		
	BETWEEN -3 AND +3	120	7.6	105	7.1	90	7.2	90	7.2		
	+3 TO LESS THAN +5	108	7.2	100	6.9	90	7.2	90	7.2		
100	-3 TO LESS THAN -5	144	8.4	126	7.8	109	8.0				
	BETWEEN -3 AND +3	120	7.6	105	7.1	90	7.2				
	+3 TO LESS THAN +5	108	7.2	100	6.9	90	7.2				
110	-3 TO LESS THAN -5	144	8.4	126	7.8						
	BETWEEN -3 AND +3	120	7.6	105	7.1						
	+3 TO LESS THAN +5	108	7.2	100	6.9						
120	-3 TO LESS THAN -5	144	8.4								
	BETWEEN -3 AND +3	120	7.6								
	+3 TO LESS THAN +5	108	7.2								

NOT TO SCALE

NOTES:

1. The designer has the flexibility to choose the taper type ramp or the parallel type ramp. However, the same type of entrance and exit ramp should be used within an interchange and corridor. Uniformity in design is needed to aid driver expectancy. On sharp curves, it may be preferable to use parallel type ramp.

2. Select design speed based on a combination of the superelevation rate and the radius of the curve. See also chapter 3 of the MDOT Road Design Manual.

3. If an additional through lane is provided or the exit ramp leaves the mainline on the high side (outside) of the curve, use GEO-131-Series.

4. If the through pavement is curved, plot offsets for taper and connect with the appropriate curve.

5. Prepared detail grades and profiles from Section B-B through Section A-A.

6. Spirals transitions should be used on new ramp alignments based on the design speed of the curve and the radius as shown in the table of the Road Standard Plan R-107-Series. The table gives the maximum radius in which a spiral should be used.

7. The maximum algebraic difference in pavement cross slope between the mainline and the ramp auxiliary lane should not exceed 5%.

8. The cross slope in the gore area between the 2 ft (0.6m) point and the 22 ft (6.6 m) point should not exceed 8%, with a 6% maximum algebraic difference in cross slope between the gore and the adjacent paved lane. This algebraic difference also applies within crowned gores.

9. The design speed of the ramp vertical alignment should meet or exceed the design speed of the ramp horizontal alignment.

10. The mainline shoulder width should extend along the ramp to where the gore is 2 ft (0.6 m) wide. Use a 1:25 taper transition where it joins the ramp shoulder paving.

11. Each ramp will be carefully studied to provide maximum vision at its merge points. See Geometric Design Guide Geo-300-Series.

12. Caution must be used in positioning a taper type deceleration lane on a left turning highway. The exit should begin before or after the P.C. or S.T. to avoid having the appearance of an extension of the mainline to the motorist. Consider using a parallel type deceleration lane.

13. The sight distance in advance of the exit ramp gore should be at least 25% longer than the minimum stopping sight distance for the design speed of the mainline.

14. These design concepts are for new construction. Where modification may be needed for retrofitting to existing road features, consult with the Geometric Design Unit of Lansing Traffic and Safety.

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