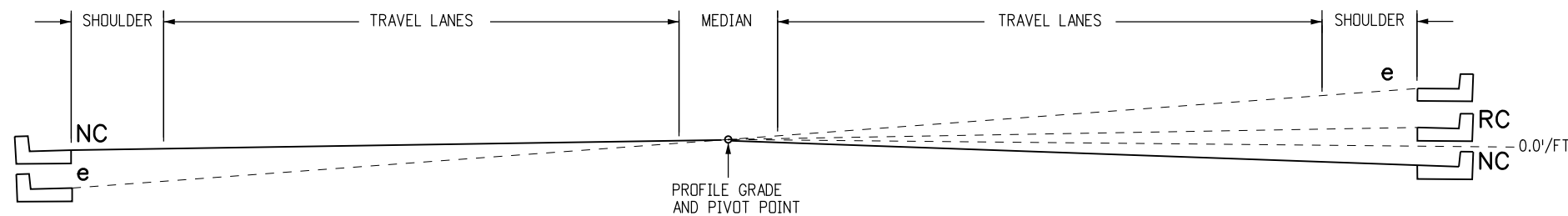
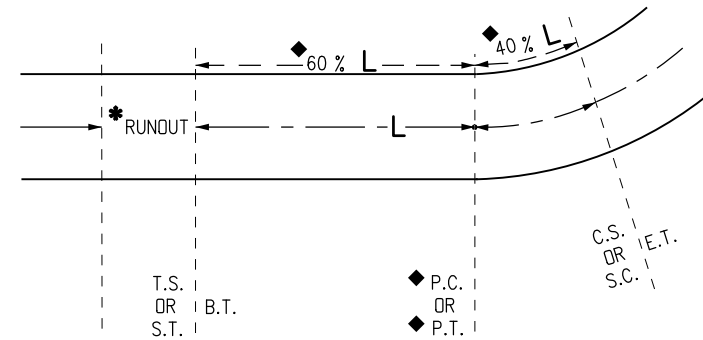


VC - TO OBTAIN SMOOTH PROFILES ON PAVEMENT EDGES, VERTICAL CURVES MAY BE INSERTED AT THE ANGULAR BREAK POINTS. UNLESS RESTRAINING CONDITIONS EXIST, THE LENGTH OF VERTICAL CURVE SELECTED, IN FEET, SHOULD BE AT LEAST NUMERICALLY EQUAL TO THE DESIGN SPEED, AND NO MORE THAN $.04L/e$.



SUPERELEVATION DIAGRAMS

$e_{max} = 4\%$

IF THE CALCULATED RADIUS FALLS BETWEEN TWO RADII, GO TO THE NEXT LOWEST RADIUS VALUE.

e (%)	V _d = 15 mph			V _d = 20 mph			V _d = 25 mph			V _d = 30 mph			V _d = 35 mph			V _d = 40 mph			V _d = 45 mph			V _d = 50 mph			V _d = 55 mph			V _d = 60 mph			e (%)
	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	R (FT.)	1 LN	2 LNS	
2.0	506-796	31	46	902-1410	32	49	1340-2050	34	51	1880-2830	36	55	2490-3730	39	58	3220-4770	41	62	4040-5930	44	67	4940-7220	48	72	5950-8650	51	77	7080-10300	53	80	2.0
2.2	399-506	34	51	723-902	36	54	1110-1340	38	57	1580-1880	40	60	2120-2490	43	64	2760-3220	46	68	3480-4040	49	73	4280-4940	53	79	5180-5950	56	84	6190-7080	59	88	2.2
2.4	271-399	37	55	513-723	39	58	838-1110	41	62	1270-1580	44	65	1760-2120	46	70	2340-2760	50	74	2980-3480	53	80	3690-4280	58	86	4500-5180	61	92	5410-6190	64	96	2.4
2.6	201-271	40	60	388-513	42	63	650-838	45	67	1000-1270	47	71	1420-1760	50	75	1930-2340	54	81	2490-2980	58	87	3130-3690	62	94	3870-4500	66	100	4700-5410	69	104	2.6
2.8	157-201	43	65	308-388	45	68	524-650	48	72	817-1000	51	76	1170-1420	54	81	1620-1930	58	87	2100-2490	62	93	2660-3130	67	101	3310-3870	71	107	4060-4700	75	112	2.8
3.0	127-157	46	69	251-308	49	73	433-524	51	77	681-817	55	82	982-1170	58	87	1370-1620	62	93	1800-2100	67	100	2290-2660	72	108	2860-3310	77	115	3530-4060	80	120	3.0
3.2	105-127	49	74	209-251	52	78	363-433	55	82	576-681	58	87	835-982	62	93	1180-1370	66	99	1550-1800	71	107	1980-2290	77	115	2490-2860	82	123	3090-3530	85	128	3.2
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3.6	73-88	55	83	147-175	58	88	259-307	62	93	416-490	65	98	610-714	70	105	865-1010	74	112	1150-1340	80	120	1480-1720	86	130	1880-2170	92	138	2350-2700	96	144	3.6
3.8	61-73	58	88	122-147	62	92	215-259	65	98	348-416	69	104	512-610	74	110	730-865	79	118	970-1150	84	127	1260-1480	91	137	1600-1880	97	146	2010-2350	101	152	3.8
4.0	42-61	62	92	86-122	65	97	154-215	69	103	250-348	73	109	371-512	77	116	533-730	83	124	711-970	89	133	926-1260	96	144	1190-1600	102	153	1500-2010	107	160	4.0

- o = PIVOT
- ◆ = WHEN CURVE IS NOT SPIRALLED.
- e = MAXIMUM RATE OF SUPERELEVATION IN FEET (PER FOOT OF WIDTH) FOR THE GIVEN RADIUS OF CURVE AND DESIGN SPEED.
- * RUNOUT LENGTH SHOULD USUALLY BE $.02L/e$ WHEN CONDITIONS ARE SUCH THAT THIS LENGTH IS NOT SUITABLE, THE DESIGNER SHALL CHOOSE ANOTHER LENGTH TO SUIT CONDITIONS.

- R - RADIUS OF CURVE
- V_d - ASSUMED DESIGN SPEED
- L - LENGTH OF SUPERELEVATION RUNOFF OR SPIRAL LENGTH
- NC - NORMAL CROWN SECTION
- RC - REMOVE ADVERSE CROWN, SUPERELEVATE AT NORMAL CROWN SLOPE
- LN - TRAVEL LANE
- VC - VERTICAL CURVE
- BT - BEGINNING OF TRANSITION
- ET - ENDING OF TRANSITION
- TS - TANGENT TO SPIRAL
- ST - SPIRAL TO TANGENT
- PC - POINT OF CURVATURE
- PI - POINT OF INTERSECTION
- PT - POINT OF TANGENT
- CS - CURVE TO SPIRAL
- SC - SPIRAL TO CURVE

SUPERELEVATION NOTES

1. THIS STANDARD PLAN SHOWS THE REQUIRED RATES OF SUPERELEVATION FOR THE VARIOUS RADIUS LENGTHS AT DIFFERENT DESIGN SPEEDS FOR THE MAXIMUM SUPERELEVATION RATE OF 4%. ALTERNATIVE MAXIMUM RATE OF SUPERELEVATION SHALL BE USED FOR STREETS WHEN SPECIFIED ON THE PLANS.
2. USE OF $e_{max} = 4\%$ SHOULD BE LIMITED TO URBAN CONDITIONS.
3. VALUES ARE FOR DESIGN ELEMENTS RELATED TO DESIGN SPEED AND HORIZONTAL CURVATURE FOR TWO LANE AND FOUR LANE STREETS.
4. WHERE SIDE STREETS OR ROADS INTERSECT, THE RATE OF SUPERELEVATION MAY BE REDUCED TO FACILITATE A SMOOTH INTERSECTION OF THE PROFILE GRADES.
5. NUMBER OF LANES ROTATED:
 - A. ONE LANE ROTATED IS TYPICAL FOR A TWO-LANE HIGHWAY.
 - B. TWO LANES ROTATED ARE TYPICAL FOR A FOUR-LANE HIGHWAY.
6. SPIRALS ARE RECOMMENDED BELOW THE HEAVY LINE IN THE TABLES. SPIRALS ARE PERMISSIBLE BUT NOT RECOMMENDED ABOVE THE HEAVY LINES. SPIRAL LENGTHS MAY BE ROUNDED TO MULTIPLES OF 50 FEET FOR CALCULATION CONVENIENCE.

Computer File Information	
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CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)

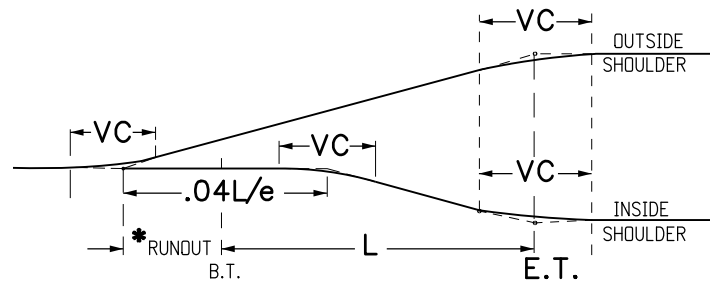
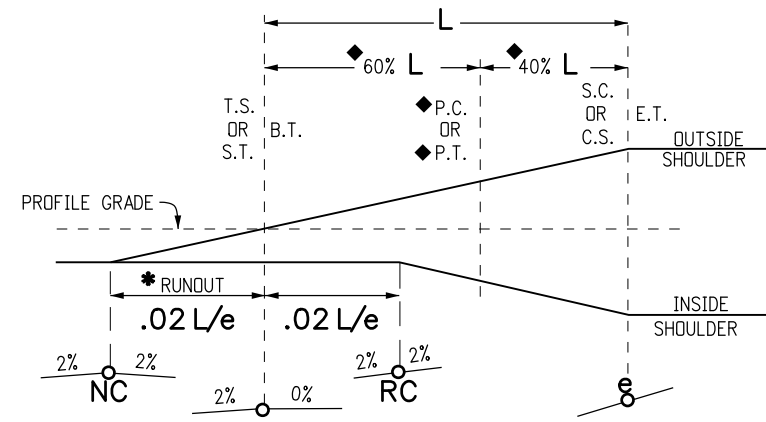
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Date:	Comments

Colorado Department of Transportation
 2829 West Howard Place
 CDDT HQ, 3rd Floor
 Denver, CO 80204
 Phone: 303-757-9021 FAX: 303-757-9868
 Project Development Branch JBK

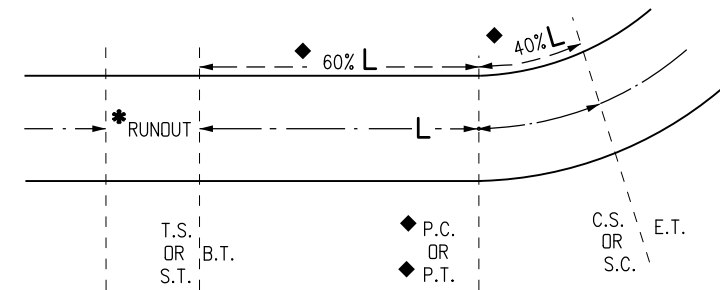
SUPERELEVATION STREETS

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-203-12
Standard Sheet No. 1 of 2
Project Sheet Number:

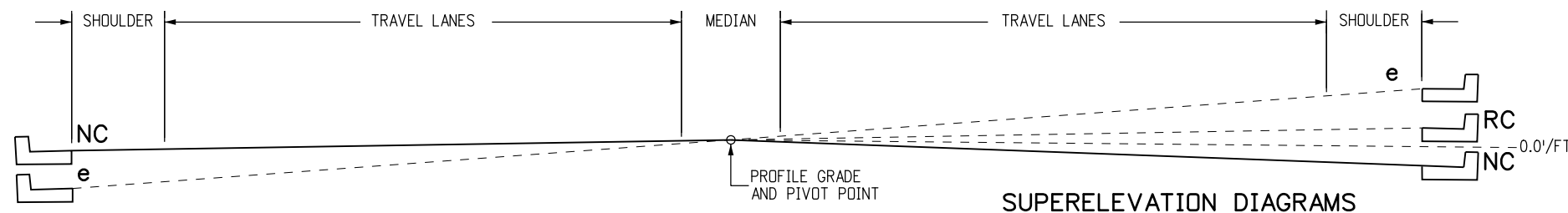


VC - TO OBTAIN SMOOTH PROFILES ON PAVEMENT EDGES, VERTICAL CURVES MAY BE INSERTED AT THE ANGULAR BREAK POINTS. UNLESS RESTRAINING CONDITIONS EXIST, THE LENGTH OF VERTICAL CURVE SELECTED, IN FEET, SHOULD BE NO LESS THAN NUMERICALLY EQUAL TO THE DESIGN SPEED, AND NO MORE THAN $.04 L/e$.



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SUPERELEVATION DIAGRAMS

e_{max} = 6%

e (%)	V _d = 15 mph		V _d = 20 mph		V _d = 25 mph		V _d = 30 mph		V _d = 35 mph		V _d = 40 mph		V _d = 45 mph		V _d = 50 mph		V _d = 55 mph		V _d = 60 mph		e (%)
	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	R (FT.)	L (FT.)	
2.0	614-868	31 46	1120-1580	32 49	1630-2290	34 51	2240-3130	36 55	2950-4100	39 58	3770-5230	41 62	4680-6480	44 67	5700-7870	48 72	6820-9410	51 77	8060-11100	53 80	2.0
2.2	543-614	34 51	991-1120	36 54	1450-1630	38 57	2000-2240	40 60	2630-2950	43 64	3370-3770	46 68	4190-4680	49 73	5100-5700	53 79	6110-6820	56 84	7230-8060	59 88	2.2
2.4	482-543	37 55	884-991	39 58	1300-1450	41 62	1790-2000	44 65	2360-2630	46 70	3030-3370	50 74	3770-4190	53 80	4600-5100	58 86	5520-6110	61 92	6540-7230	64 96	2.4
2.6	430-482	40 60	791-884	42 63	1170-1300	45 67	1610-1790	47 71	2130-2360	50 75	2740-3030	54 81	3420-3770	58 87	4170-4600	62 94	5020-5520	66 100	5950-6540	69 104	2.6
2.8	384-430	43 65	709-791	45 68	1050-1170	48 72	1460-1610	51 76	1930-2130	54 81	2490-2740	58 87	3110-3420	62 93	3800-4170	67 101	4580-5020	71 107	5440-5950	75 112	2.8
3.0	341-384	46 69	635-709	49 73	944-1050	51 77	1320-1460	55 82	1760-1930	58 87	2270-2490	62 93	2840-3110	67 100	3480-3800	72 108	4200-4580	77 115	4990-5440	80 120	3.0
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3.6	209-256	55 83	422-498	58 88	673-761	62 93	972-1080	65 98	1320-1460	70 105	1740-1900	74 112	2190-2390	80 120	2710-2940	86 130	3290-3560	92 138	3940-4250	96 144	3.6
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6.0	39-51	92 138	81-106	97 146	144-186	103 154	231-296	109 164	340-431	116 174	485-611	124 186	643-806	133 200	833-1040	144 216	1060-1320	153 230	1330-1650	160 240	6.0

SUPERELEVATION NOTES

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Colorado Department of Transportation
 2829 West Howard Place
 CDDT HQ, 3rd Floor
 Denver, CO 80204
 Phone: 303-757-9021 FAX: 303-757-9868
 Project Development Branch JBK

**SUPERELEVATION
STREETS**
 Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
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 Standard Sheet No. 2 of 2
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