

### STANDARD SYMBOLS

- Location  $\mathbb{B}$ ..... Alignment on which the proposed right-of-way and construction is based.
- Standard Pavement ..... The typical pavement section to be shown on the road plans.
- P.C. .... Point of beginning of baseline circular curve.
- P.T. .... Point of ending of baseline circular curve.
- P.C.C. .... Point of baseline compound curvature.
- P.R.C. .... Point of baseline reverse curvature.
- T.S. .... Point of change from tangent to transition curve. (Tangent to Spiral)
- S.C. .... Point of change from transition curve to circular curve. (Spiral to Circular)
- C.S. .... Point of change from circular curve to transition curve. (Circular to Spiral)
- S.T. .... Point of change from transition curve to tangent. (Spiral to Tangent)
- Radius ..... Radius of baseline circular curve.
- DV ..... Approximate maximum safe speed in kilometers per hour using standard rate of superelevation.
- NC ..... Approximate maximum safe speed in kilometers per hour with no superelevation. Factors apply only to Urban Low Speed Conditions.
- LS ..... Length of transition curve measured along baseline. Where no transition curve is applied LS is length of superelevation transition.
- W or PW ..... Width of standard pavement.
- ZT ..... Distance from transitioned baseline to edges of transitioned pavement. ( $\frac{W}{2} + \frac{w}{2}$ )
- w ..... Maximum pavement widening (2ZT-W).
- E ..... Rate of superelevation in meters per meter of pavement width.
- F ..... Safe side friction factor.
- S ..... Amount of superelevation to be applied to the baseline grade to obtain the elevations of the edges of transitioned pavement.
- C ..... Standard pavement crown (difference in elevation between center and edges).
- Ct ..... Standard pavement crown transition.
- CP ..... Chord point (1/10 increments of transition curve).

All distances (horizontal and vertical) are measured in meters.

### TRANSITION CURVES FOR RURAL AND URBAN HIGHWAYS AND STREET CONDITIONS

## URBAN CONDITION

Urban conditions apply to Urban street systems and any other road with present or future Urban street operating conditions.

These tables contain superelevation rates and transition lengths for standard urban pavement widths through a range of curves and design velocities considered most likely to be used in urban road design.

On Sheet 801.01 are found the standard symbols used throughout these tables.

Sheets 801.18 and 801.19 are summaries of the range of standard pavement widths (W), transition lengths (LS), and radii of curves covered herein, together with the superelevation rate (E), and the approximate safe speeds (DV) afforded thereby.

A table for "Low Speed Urban" designs is on Sheet 801.18 with a range of standard pavement widths (W), transition lengths (LS), and radii of curve when superelevated by an amount equal to the normal crown and the approximate maximum safe speeds (DV) afforded thereby. Values in this table can be used on streets with operating speeds less than or equal to 70 km/h. Also shown are the approximate maximum safe speeds (NC) with no superelevation. Values for (NC) can be used on Urban Arterial, Collector, and Local streets.

For design factors for various design speeds for Urban conditions see Sheets 801.19 thru 801.25

When Urban conditions apply there will be no baseline transition or pavement widening. The length of transition (LS) determines the length of superelevation transition through which the outer edge of pavement is raised above the normal edge of pavement section to a maximum of  $E(\frac{W}{2})$ . See Sheet 801.07 for a graphical illustration of the application of this correction.

For odd radii curves use the corrections for the nearest smaller radii curve found in these tables.

For curves sharper than 35 m the tabulated values for 35 m curves shall be used.

LS should be shown on the plans for all curves.

E should be shown on the plans for all curves with Urban street conditions.

For graphical illustration of Design Superelevation Rates for Urban conditions see Sheet 801.16.

For additional general instructions (both Urban and Rural) see Sheet 801.04.

## EXPLANATION OF TABLES AND INSTRUCTIONS FOR USE URBAN CONDITION

RURAL CONDITION

TC-5

Rural conditions apply to Interstate, Arterial, Primary and Secondary Systems or to any other road with rural type design and operating conditions.

These tables contain superelevation and widening corrections for standard rural pavement widths through a range of radii and design velocities considered most likely to be used in rural highway design.

On Sheet 801.01 are found standard symbols used throughout these tables.

On Sheet 801.20 is shown a summary for Rural conditions of the range of standard pavement widths (W), transition lengths (LS), and radii of curve covered herein, together with the superelevation rate (E), and the approximate maximum safe speed (DV) afforded thereby.

On Sheet 801.28 thru Sheet 801.34 is shown design factors for various speeds for Rural conditions.

On curves with greater than 850 m radius there will be no spiral transition or pavement widening. Pavement will be superelevated by an amount equal to the rate shown in the tables. See Sheet 801.06 for a graphical illustration of the application of this correction.

For odd radius curves use the transitions and corrections for the next smaller radius curve found in the tables.

For curves sharper than 35 m the tabulated values for 35 m curves shall be used.

It should be noted that no transition can be longer than the curve to which it is applied. The standard shift (ZT) should be considered for its effect on horizontal clearance.

LS and E should be shown on the plans for all curves when other than maximum values are used.

For graphical illustration of Design Superelevation Rates for Rural conditions see Sheet 801.17.

For additional general instructions (both Urban and Rural) see Sheet 801.04.

EXPLANATION OF TABLES AND INSTRUCTIONS FOR USE  
RURAL CONDITION

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS  
ON THIS SHEET ARE IN MILLIMETERS

801.03

TC-5

### GENERAL CONDITION

All original cross sections shall be taken from the baseline at stations, 20 meter interval for rural projects, and 10 meter interval for urban projects, and unusual breaks in the ground as on tangent alignment.

Where a part or all of a superelevation transition curve falls on a vertical curve, elevations on the vertical curve should be computed for the positions given on Sheet 801.14 for Urban projects and Sheet 801.15 for Rural projects. These elevations and pluses should be shown on the plans for the convenience of the survey party in staking out the project. Throughout these sections of the grade, elevations at even stations and 10 or 20 meter intervals should be omitted.

Slope stakes should be set at the positions on the transition given on Sheet 801.14 and 801.15 and ground cross sections taken at these positions omitting the stations and 10 or 20 meter intervals throughout the transition. If unusual breaks in the ground occur, additional sections should, of course, be taken. Additional sections should also be taken where location is through rock cut in anticipation of unusual breakage which may occur during construction.

After rough grading has been done, fine grading (blue top) and form stakes should be set at the positions given on Sheet 801.14 for Urban projects or as given on Sheet 801.15 for Rural projects.

Final cross sections should, of course, be taken at those positions at which the slope stake sections were taken. Where unusual breakage in rock occurs and this was not anticipated, additional final sections should be taken and original ground sections interpolated.

Baseline stakes should be set at all P.C.'s, P.T.'s, T.S.'s, S.T.'s, S.C.'s, and C.S.'s in staking out alignment but slope stakes need not be set nor cross sections taken at P.C.'s or P.T.'s except where called for in the accompanying tables. The transition will take its form from the positions given on Sheet 801.14 and 801.15.

The right of way shall, in all cases, be referenced from the baseline.

The designer should avoid situations necessitating reverse curves and curves with overlapping transitions where possible.

Maximum LS and Superelevations shown on Sheets 801.18, 801.19 and 801.20 are to be used on all curves unless conditions determine that the maximum is not feasible.

A design exception is not required when using values from Sheets 801.21 thru 801.34 since these tables were derived within AASHTO guidelines.

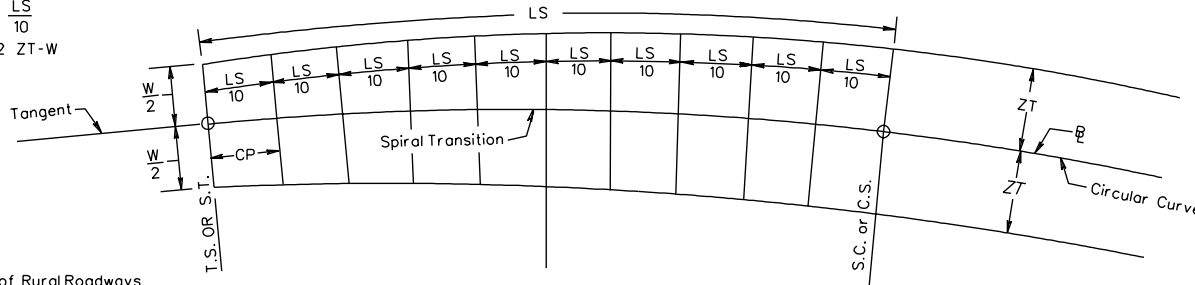
The elevation differential between normal crown and maximum superelevation, relative to the baseline profile, shall not exceed one meter in 200 m. That is, the longitudinal difference between the grades of the baseline profile and the edge of pavement profile (LS) should not exceed 0.5 percent (1:200). Additional information may be obtained from A Policy on Geometric Design of Highways and Streets (AASHTO) book, Chapter III - Elements of Design (Superelevation Runoff)

### EXPLANATION OF TABLES AND INSTRUCTIONS FOR USE GENERAL CONDITION

801.04 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

Chord Points (CP) =  $\frac{LS}{10}$   
 Total widening (W) =  $2 ZT - W$

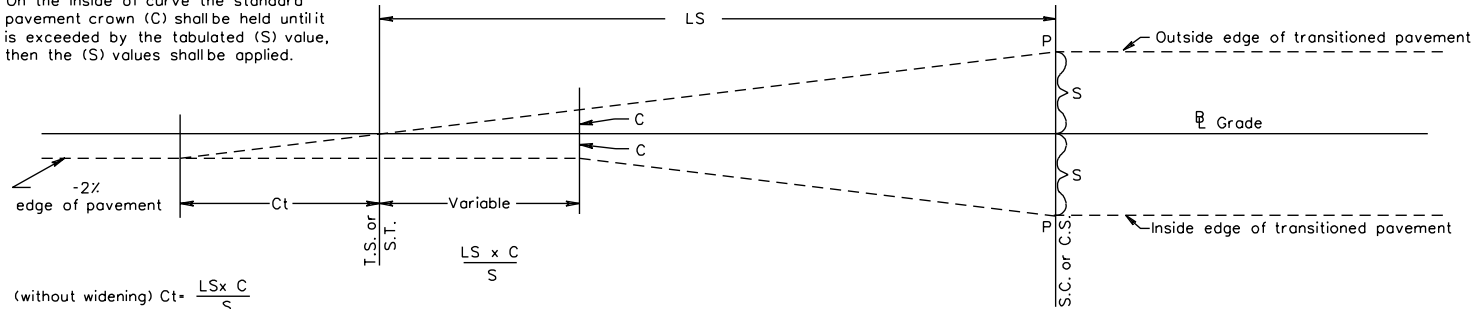


NOTE:  
 Pavement widening of Rural Roadways will be achieved by equal widening of both edges of pavement over the LS (length of spiral) transition.

PLAN OF TRANSITION

$ZT = \frac{W+w}{2}$

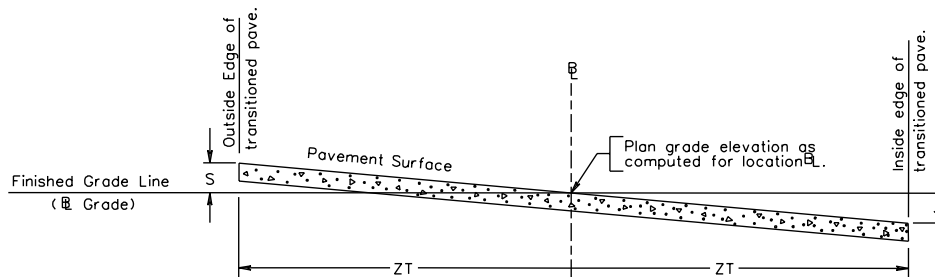
NOTE:  
 On the inside of curve the standard pavement crown (C) shall be held until it is exceeded by the tabulated (S) value, then the (S) values shall be applied.



(without widening)  $Ct = \frac{LS \times C}{S}$   
 (with widening)  $Ct = LS \times \frac{\text{normal } E}{\text{max. } E} \times \frac{W}{W + w}$

PROFILE OF TRANSITION

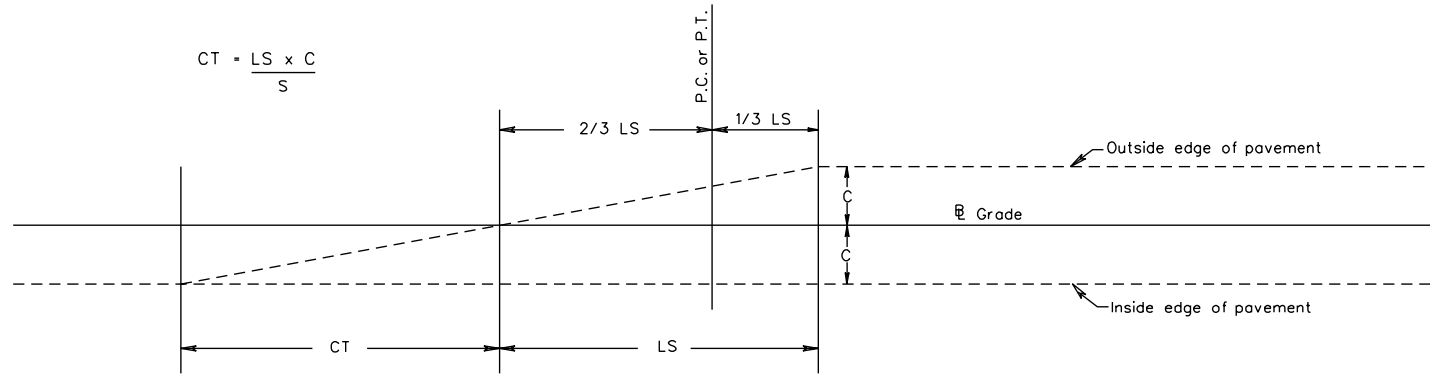
NOTE: Short vertical curves should be inserted by eye at points (P) if considered necessary.



CROSS SECTION THRU TRANSITION

DETAILS FOR TRANSITIONED L (RURAL CONDITION ONLY) (R < 850 m)

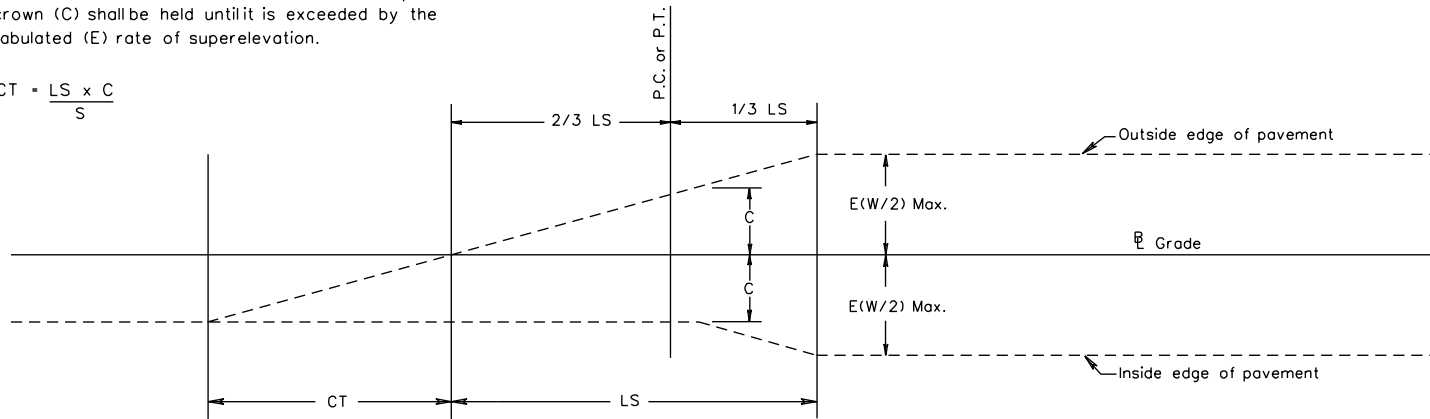
TC-5



SUPERELEVATED BY AN AMOUNT EQUAL TO THE STANDARD PAVEMENT CROWN

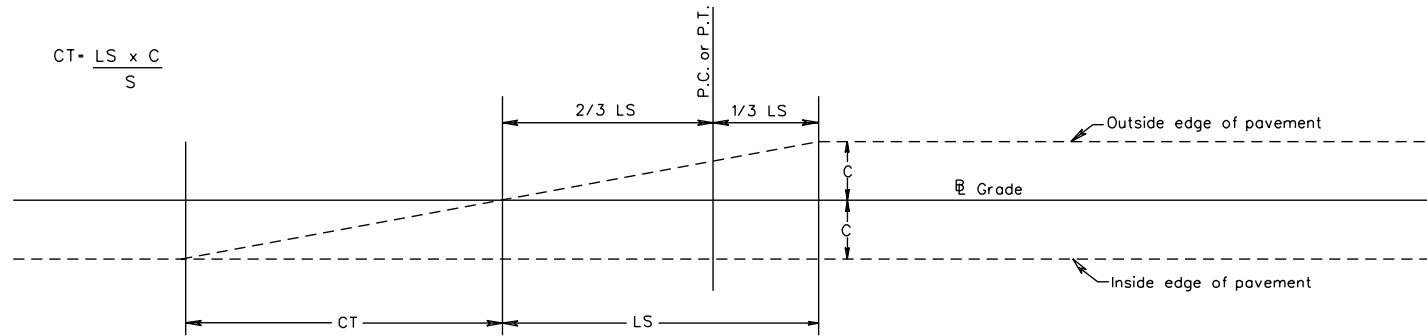
NOTE : On the inside of curve the standard pavement crown (C) shall be held until it is exceeded by the tabulated (E) rate of superelevation.

$CT = \frac{LS \times C}{S}$



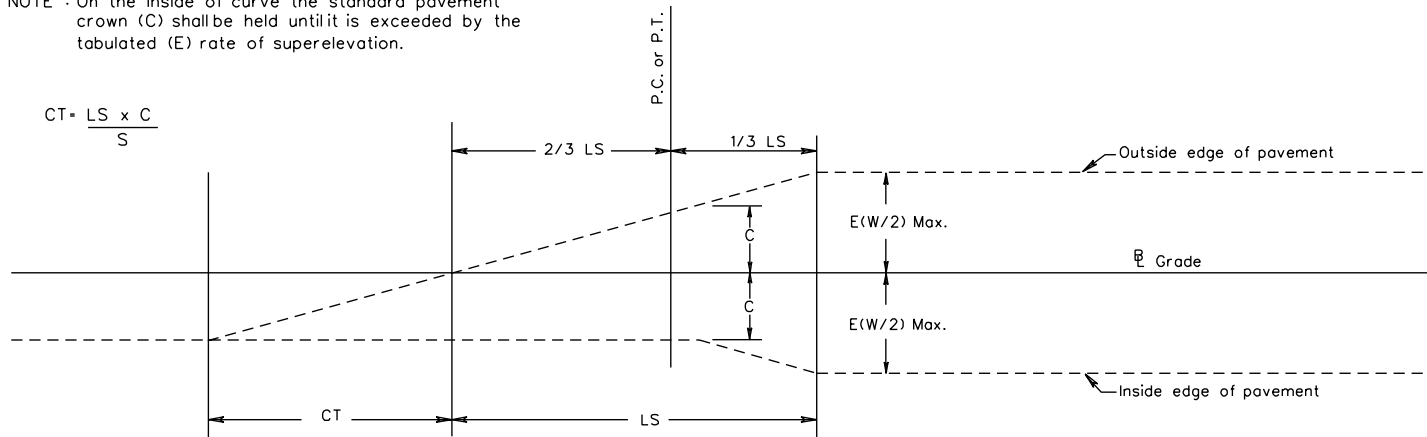
SUPERELEVATED BY AN AMOUNT EXCEEDING THE STANDARD PAVEMENT CROWN

PROFILE OF TRANSITION  
FOR NON-TRANSITIONED  $\mathbb{E}$  (RURAL CONDITION ONLY) (R>850 m)



SUPERELEVATED BY AN AMOUNT EQUAL TO THE STANDARD PAVEMENT CROWN

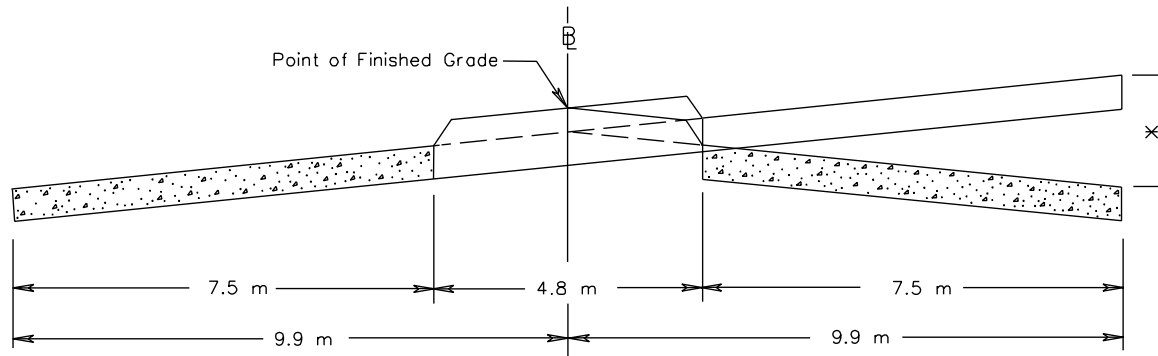
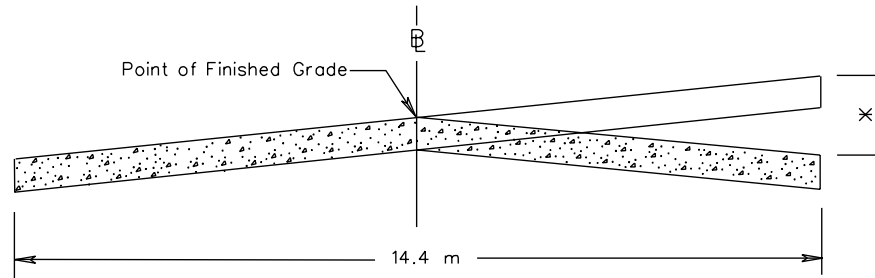
NOTE : On the inside of curve the standard pavement crown (C) shall be held until it is exceeded by the tabulated (E) rate of superelevation.



SUPERELEVATED BY AN AMOUNT EXCEEDING THE STANDARD PAVEMENT CROWN

PROFILE OF TRANSITION  
FOR NON-TRANSITIONED  $\mathbb{E}$  (URBAN CONDITIONS ONLY)

TC-5

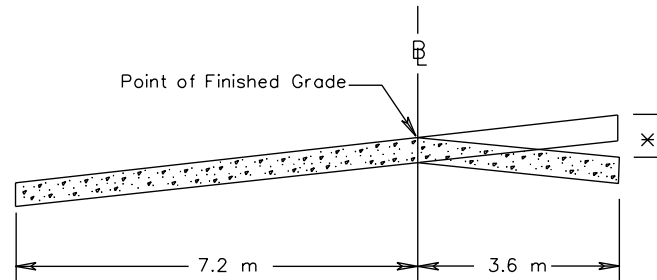


× The elevation differential between normal crown and maximum superelevation, relative to the baseline profile, shall not exceed one meter in 200 meters. That is, the longitudinal difference between the grades of the baseline profile and the edge of pavement profile should not exceed 0.5 percent (1:200). Additional information may be obtained from A Policy on Geometric Design of Highways and Streets (AASHTO) Book, Chapter III - Elements of Design (Superelevation Runoff).

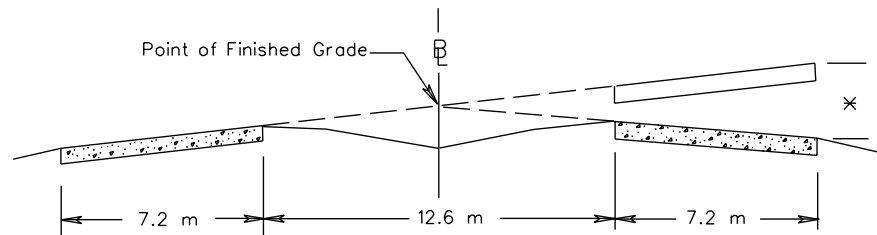
On Standard TC-5ULS (Metric), TC-5U (Metric), and TC-5R (Metric) ( $R > 850$  m) superelevated curves, position the LS two thirds (2/3) on the tangent and one third (1/3) into the curve. Stations and elevations for these transitions will need to be computed for all chord points and shown on the profiles.

## DETAILS OF SUPERELEVATION ABOUT BASELINE





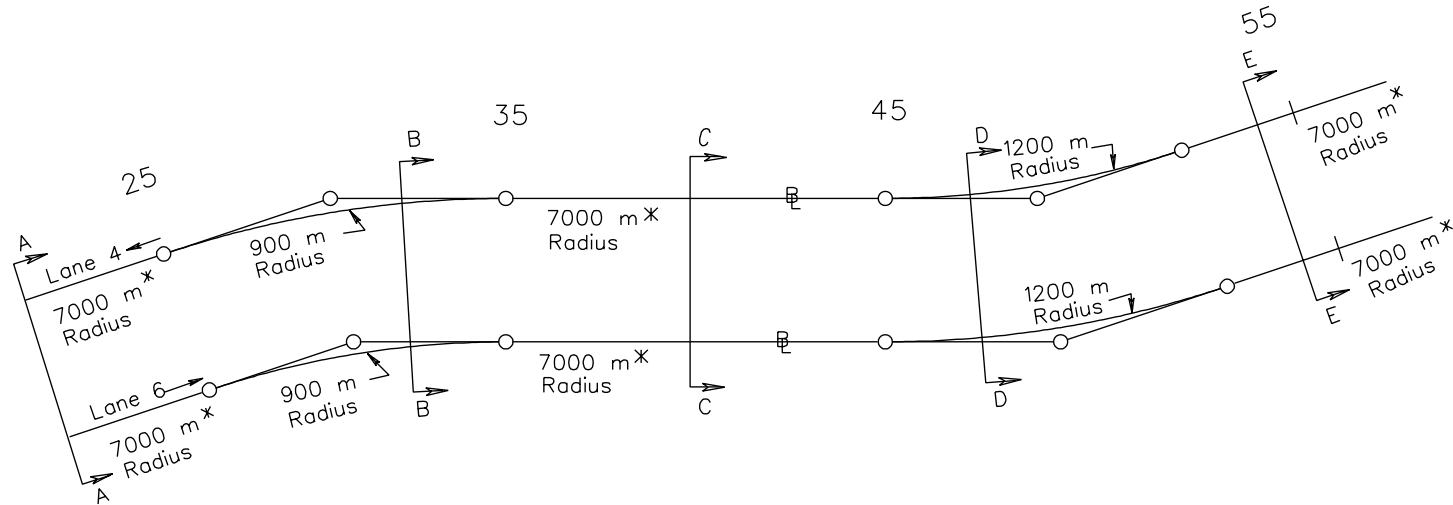
The Pavement Widths shown in the Standard TC-5 (Metric) Tables on Sheet 801.18 through 801.34 represent twice the distance from the crownline to the edge of pavement on the high side.



✕ The elevation differential between normal crown and maximum superelevation, relative to the baseline profile, shall not exceed one meter in 200 meters. That is, the longitudinal difference between the grades of the baseline profile and the edge of pavement profile should not exceed 0.5 percent (1:200). Additional information may be obtained from A Policy on Geometric Design of Highways and Streets (AASHTO) Book, Chapter III- Elements of Design (Superelevation Runoff).

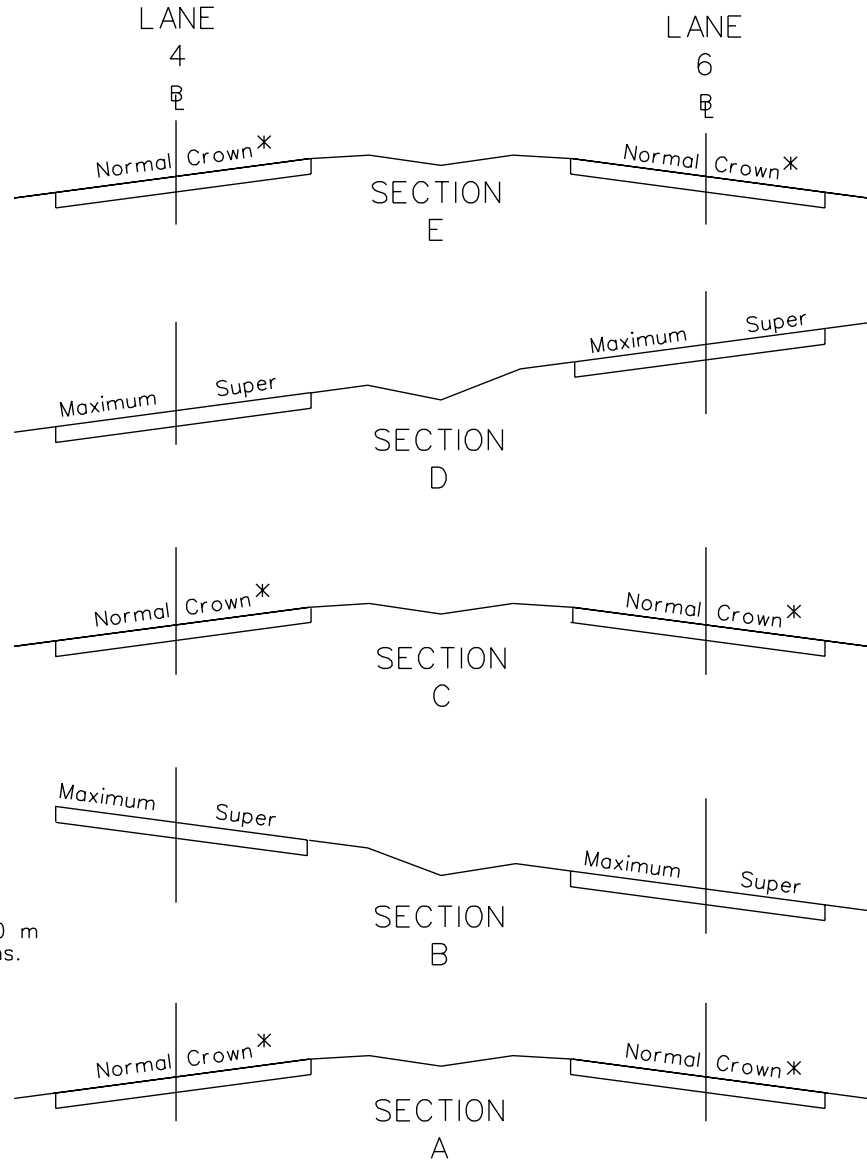
Projects in which lanes may be added in the future in the median area should be designed with the construction baseline and point of finished grade located in the middle of the median. Superelevation is to be rotated from this baseline point. This will prevent uneven pavement problems (when additional lanes are added in the median area) such as crossover grades as well as the need for retaining walls, median barriers and special design drainage structures. Additional right of way or easements, in most situations, will not be required.

## DETAILS OF SUPERELEVATION ABOUT BASELINE



\* NOTE: When  $\overline{B}$  (Crownline) is in the center of the roadway,  
Tangent Sections are to be coded as 7000 m radius curves  
( Lane 4 to the Left, Lane 6 to the Right ).  
When  $\overline{B}$  (Crownline) is on the inside edge of pavement,  
tangent sections are to be coded as straight.

### EXAMPLE FOR FOUR LANE ROADWAYS



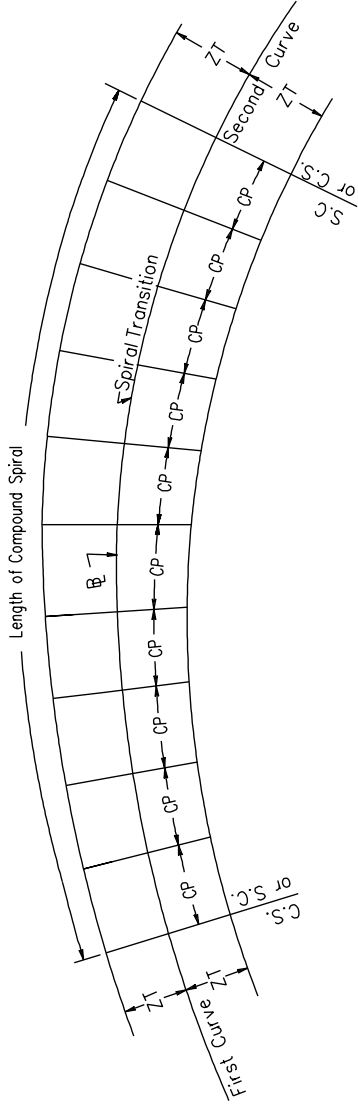
\* Tangent Sections are coded as 7000 m radius curves to obtain normalcrowns.

### CROSS SECTION - FOUR LANE ROADWAY

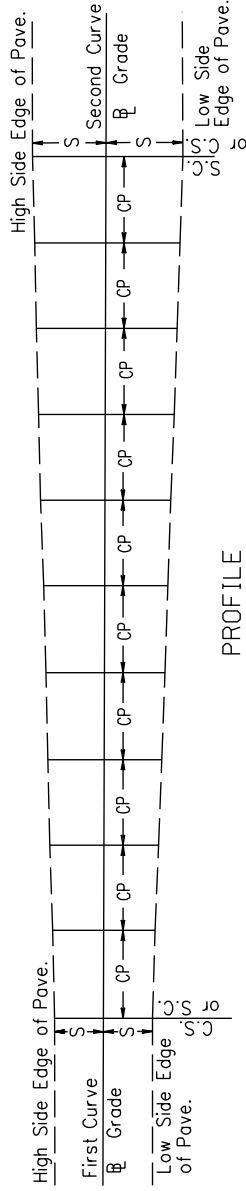
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

Chord Point (CP) -  $\frac{\text{Length of Compound Spiral}}{\text{Divided by ten (10)}}$



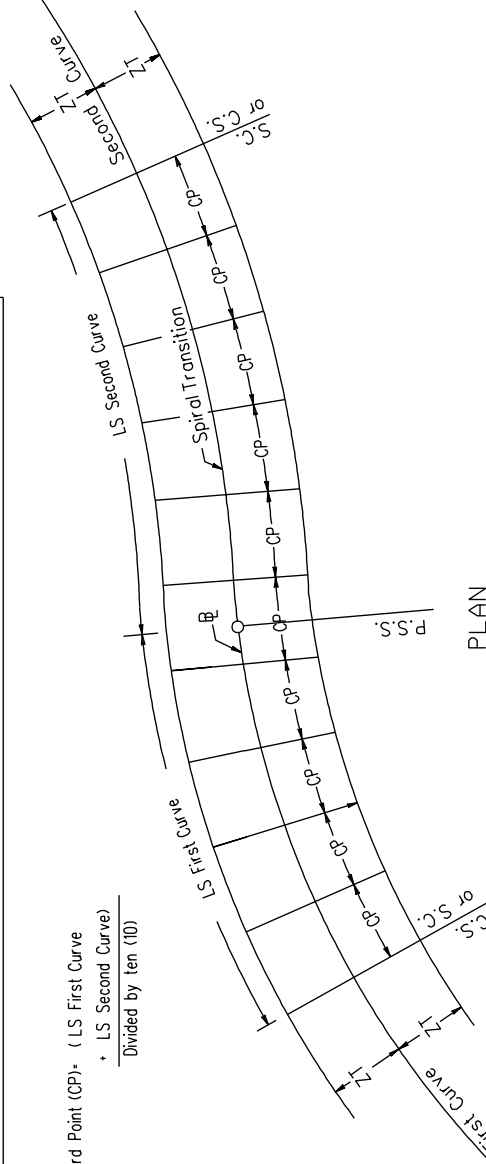
PLAN



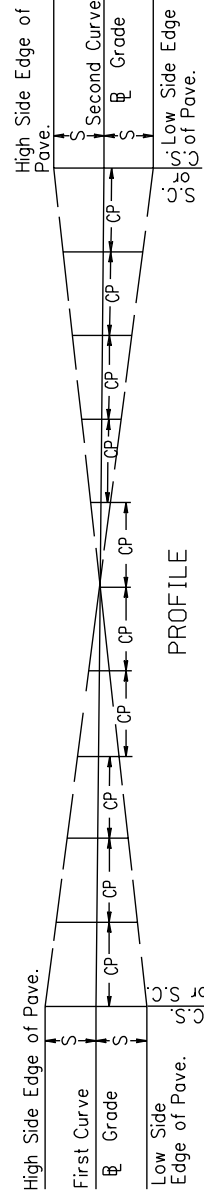
PROFILE

Compute straight line widening and superlevation transition from maximum of first curve to maximum of second curve.

Chord Point (CP) -  $\frac{(\text{LS First Curve} + \text{LS Second Curve})}{\text{Divided by ten (10)}}$



PLAN



PROFILE

# METHOD OF APPLYING TC-5 ON COMPOUND AND REVERSE CURVES (RURAL CONDITION ONLY) ( $R < 850$ m)

THIS SHEET INTENTIONALLY LEFT BLANK

URBAN CONDITIONS  
RURAL CONDITIONS (R > 850 m)

FOR USE WITH FLEXIBLE AND CONCRETE PAVEMENT  
(LS POSITIONED 2/3± ON TANGENT, 1/3± ON CURVE)

LENGTH OF TRANSITION	T.S. OR S.T.	DISTANCE IN METERS FROM P.C. OR P.T. ON TANGENT						P.C. OR P.T.	DISTANCE IN METERS FROM P.C. OR P.T. ON CURVE			S.C. OR C.S.
		1	2	3	4	5	6		7	8	9	
150	100	85	70	55	40	25	10	STAKE	5	20	35	50
145	96.5	82	67.5	53	38.5	24	9.5	STAKE	5	19.5	34	48.5
140	93.5	79.5	65.5	51.5	37.5	23.5	9.5	STAKE	4.5	18.5	32.5	46.5
135	90	76.5	63	49.5	36	22.5	9	STAKE	4.5	18	31.5	45
130	87	74	61	48	35	22	9	STAKE	4	17	30	43
125	83.5	71	56.5	46	33.5	21	8.5	STAKE	4	16.5	29	41.5
120	80	68	56	44	32	20	8	STAKE	4	16	28	40
115	76.5	65	53.5	42	30.5	19	7.5	STAKE	4	15.5	27	38.5
110	73.5	62.5	51.5	40.5	29.5	18.5	7.5	STAKE	3.5	14.5	25.5	36.5
105	70	59.5	49	38.5	28	17.5	7	STAKE	3.5	14	24.5	35
100	67	57	47	37	27	17	7	STAKE	3	13	23	33
95	63.5	54	44.5	35	25.5	16	6.5	STAKE	3	12.5	22	31.5
90	60	51	42	33	24	15	6	STAKE	3	12	21	30
85	56.5	48	39.5	31	22.5	14	5.5	STAKE	3	11.5	20	28.5
80	53.5	45.5*	37.5	29.5*	21.5	13.5*	5.5	STAKE*	2.5	10.5*	18.5	26.5
75	50	42.5*	35	27.5*	20	12.5*	5.0	STAKE*	2.5	10	17.5	25
70	46.5	39.5*	32.5	25.5*	18.5	11.5*	4.5	STAKE*	2.5	9.5*	16.5	23.5
65	43.5	37*	30.5	24*	17.5	11*	4.5	STAKE*	2	8.5*	15	21.5
60	40	34*	28	22*	16	10*	4	STAKE*	2	8	14	20

## NOTE :

Table giving positions on Curves at which slope stakes should be set, construction and final cross-sections taken, fine grading stakes (blue top) set, and form stakes set (concrete pavement only).

\* Denotes additional staking positions for use with concrete pavement only.

TABLE I

## RURAL CONDITIONS ( $R \leq 850$ m)

FOR USE WITH FLEXIBLE AND CONCRETE PAVEMENT

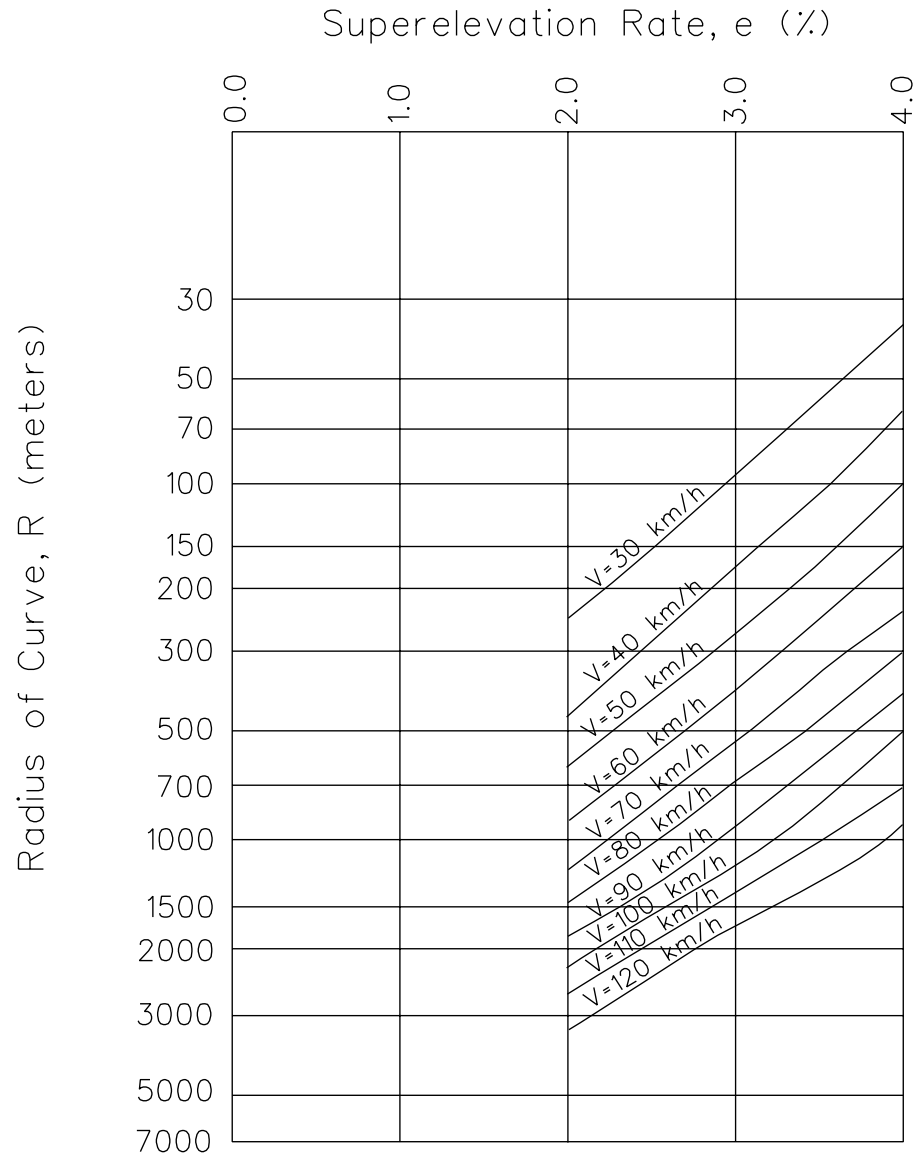
LENGTH OF TRANSITION	T.S. OR S.T.	DISTANCE IN METERS FROM T.S. OR S.T. ALONG SPIRAL TRANSITION									S.C. OR C.S.
		1	2	3	4	5	6	7	8	9	
150	0	15	30	45	60	75	90	105	120	135	150
145	0	14.5	29	43.5	58	72.5	87	101.5	115	130.5	145
140	0	14	28	42	56	70	84	98	112	126	140
135	0	13.5	27	40.5	54	67.5	81	94.5	108	121.5	135
130	0	13	26	39	52	65	78	91	104	117	130
125	0	12.5	25	37.5	50	62.5	75	87.5	100	112.5	125
120	0	12	24	36	48	60	72	84	96	108	120
115	0	11.5	23	34.5	46	57.5	69	80.5	92	103.5	115
110	0	11	22	33	44	55	66	77	88	99	110
105	0	10.5	21	31.5	42	52.5	63	73.5	84	94.5	105
100	0	10	20	30	40	50	60	70	80	90	100
95	0	9.5	19	28.5	38	47.5	57	66.5	76	85.5	95
90	0	9	18	27	36	45	54	63	72	81	90
85	0	8.5	17	25.5	34	42.5	51	59.5	68	76.5	85
80	0	8*	16	24*	32	40*	48	56*	64	72*	80
75	0	7.5*	15	22.5*	30	37.5*	45	52.5*	60	67.5*	75
70	0	7*	14	21*	28	35*	42	49*	56	63*	70
65	0	6.5*	13	19.5*	26	32.5*	39	45.5*	52	58.5*	65
60	0	6*	12	18*	24	30*	36	42*	48	54*	60
55	0	5.5*	11	16.5*	22	27.5*	33	38.5*	44	49.5*	55
50	0	5*	10	15*	20	25*	30	36*	40	45*	50
45	0	4.5*	9	13.5*	18	22.5*	27	31.5*	36	40.5*	45

NOTE :

Table giving positions on Transition Curves at which slope stakes should be set, construction and final cross-sections taken, fine grading stakes (blue top) set, and form stakes set (concrete pavement only).

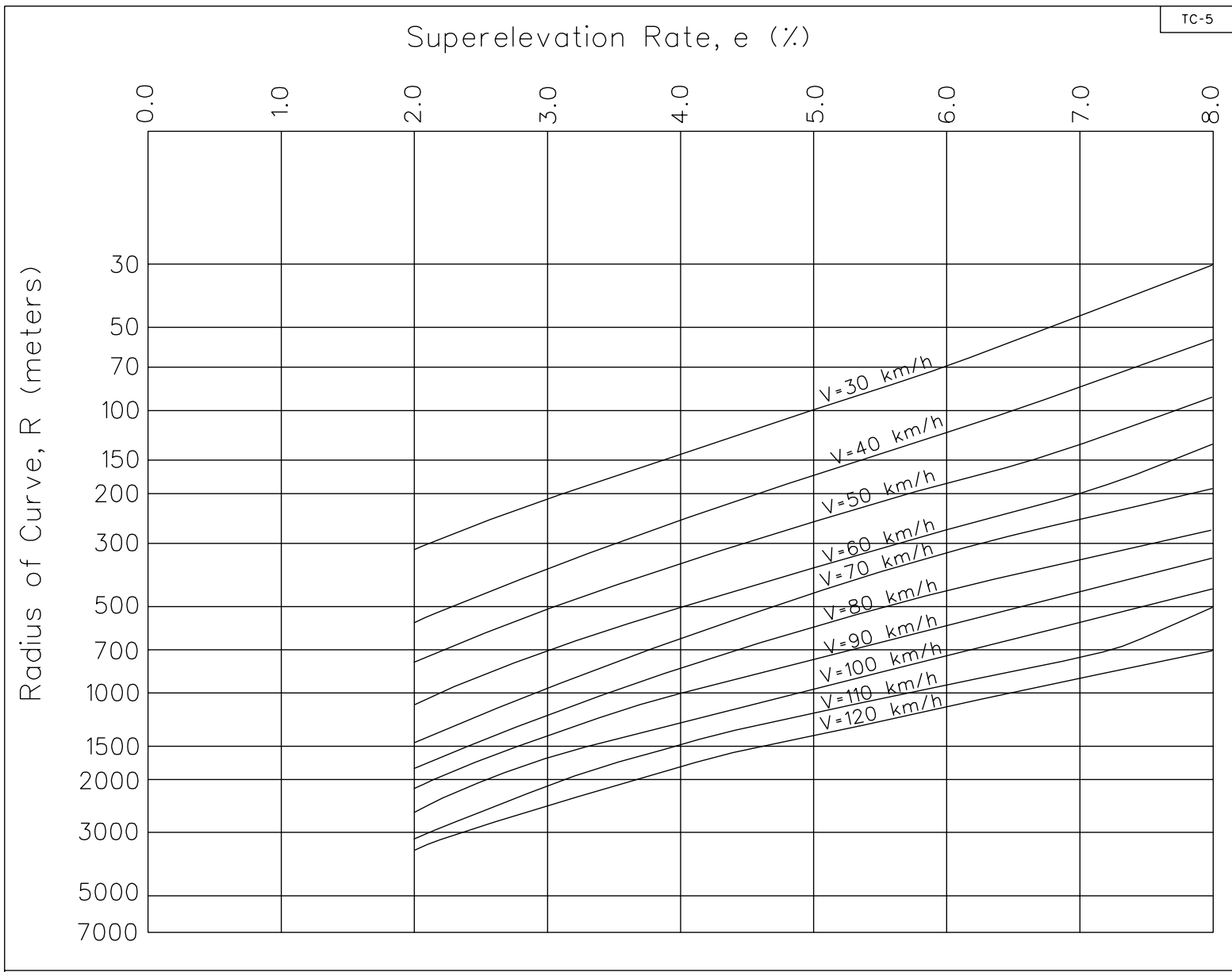
\* Denotes additional staking positions for use with concrete pavement only.

### TABLE 2



DESIGN SUPERELEVATION RATES  
URBAN CONDITIONS





DESIGN SUPERELEVATION RATES  
RURAL CONDITIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS  
ON THIS SHEET ARE IN MILLIMETERS

TC-5

RADIUS (Meters)	E (%)	F	DV (km/h)	NC (km/h)	PAVEMENT WIDTH	
					W ≤ 21.6 m	W > 21.6 m
					LS (Meters)	
≥ 265	2.0	.167	70	70	40	<p>Note: For pavement widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.</p>
250	2.0	.167	70	68	40	
230	2.0	.167	70	66	40	
215	2.0	.167	70	65	40	
200	2.0	.168	69	63	40	
190	2.0	.172	67	62	40	
180	2.0	.174	66	61	40	
170	2.0	.176	65	60	40	
160	2.0	.181	63	58	35	
150	2.0	.188	62	57	35	
140	2.0	.188	60	56	35	
130	2.0	.192	58	54	35	
120	2.0	.194	57	53	35	
110	2.0	.200	55	51	35	
100	2.0	.204	53	49	30	
95	2.0	.207	52	48	30	
90	2.0	.210	51	47	30	
85	2.0	.213	50	46	30	
80	2.0	.216	49	45	30	
75	2.0	.222	47	44	30	
70	2.0	.225	46	43	30	
65	2.0	.229	45	42	30	
60	2.0	.232	44	41	30	
55	2.0	.240	42	40	30	
50	2.0	.244	41	38	30	
45	2.0	.252	39	37	30	
40	2.0	.262	37	35	30	
35	2.0	.272	35	34	30	
30	2.0	.284	33	32	30	
25	2.0	.308	31	30	30	

SUMMARY OF STD. TC-5ULS (URBAN-LOW SPEED) DESIGN FACTORS

801.18 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 30 KM/H (URBAN) USING E= 4% MAX.

RADIUS (Meters)	E (%)	PAVEMENT WIDTH						LS (Meters)
		7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m	
		LS (Meters)						
7000	2.0	30	30	30	30	30	30	Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.
5000	2.0	30	30	30	30	30	30	
3000	2.0	30	30	30	30	30	30	
2000	2.0	30	30	30	30	30	30	
1500	2.0	30	30	30	30	30	30	
1250	2.0	30	30	30	30	30	30	
1000	2.0	30	30	30	30	30	30	
850	2.0	30	30	30	30	30	30	
700	2.0	30	30	30	30	30	30	
600	2.0	30	30	30	30	30	30	
550	2.0	30	30	30	30	30	30	
500	2.0	30	30	30	30	30	30	
450	2.0	30	30	30	30	30	30	
400	2.0	30	30	30	30	30	30	
350	2.0	30	30	60	30	30	30	
325	2.0	30	30	30	30	30	30	
300	2.0	30	30	30	30	30	30	
275	2.0	30	30	30	30	30	30	
250	2.1	30	30	30	30	30	30	
230	2.2	30	30	30	30	30	30	
215	2.2	30	30	30	30	30	30	
200	2.3	30	30	30	30	30	30	
190	2.4	30	30	30	30	30	30	
180	2.4	30	30	30	30	30	30	
170	2.5	30	30	30	30	30	30	
160	2.5	30	30	30	30	30	30	
150	2.6	30	30	30	30	30	30	
140	2.6	30	30	30	30	30	30	
130	2.7	30	30	30	30	30	30	
120	2.8	30	30	30	30	30	30	
110	2.9	30	30	30	30	30	30	
100	3.0	30	30	30	30	30	30	
95	3.0	30	30	30	30	30	30	
90	3.1	30	30	30	30	30	30	
85	3.1	30	30	30	30	30	30	
80	3.2	30	30	30	35	35	35	
75	3.3	30	30	30	35	35	35	
70	3.4	30	30	30	35	35	35	
65	3.5	30	30	30	35	35	35	
60	3.6	30	30	30	35	35	35	
55	3.7	30	30	30	35	35	35	
50	3.8	30	30	30	40	40	40	
45	3.9	30	30	30	40	40	40	
40	4.0	30	30	30	40	40	40	
35	4.0	30	30	30	40	40	40	

REVISED 8/97

TC-5								
DESIGN FACTORS FOR A DESIGN SPEED OF 40 KM/H (URBAN) USING E= 4% MAX.								
RADIUS (Meters)	E (%)	PAVEMENT WIDTH						LS (Meters)
		7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m	
7000	2.0	30	30	30	30	30	30	Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.
5000	2.0	30	30	30	30	30	30	
3000	2.0	30	30	30	30	30	30	
2000	2.0	30	30	30	30	30	30	
1500	2.0	30	30	30	30	30	30	
1250	2.0	30	30	30	30	30	30	
1000	2.0	30	30	30	30	30	30	
850	2.0	30	30	30	30	30	30	
700	2.0	30	30	30	30	30	30	
600	2.0	30	30	30	30	30	30	
550	2.0	30	30	30	30	30	30	
500	2.0	30	30	30	30	30	30	
450	2.1	30	30	30	30	30	30	
400	2.2	30	30	30	30	30	30	
350	2.3	30	30	30	30	30	30	
325	2.4	30	30	30	30	30	30	
300	2.5	30	30	30	30	30	30	
275	2.5	30	30	30	30	30	30	
250	2.6	30	30	30	30	30	30	
230	2.7	30	30	30	30	30	30	
215	2.8	30	30	30	30	30	30	
200	2.9	30	30	30	30	30	30	
190	2.9	30	30	30	30	30	30	
180	3.0	30	30	30	35	35	35	
170	3.0	30	30	30	35	35	35	
160	3.1	30	30	30	35	35	35	
150	3.2	30	30	30	35	35	35	
140	3.3	30	30	30	35	35	35	
130	3.4	30	30	30	35	35	35	
120	3.5	30	30	30	40	40	40	
110	3.6	30	30	30	40	40	40	
100	3.7	30	30	30	40	40	40	
95	3.7	30	30	30	40	40	40	
90	3.8	30	30	30	40	40	40	
85	3.9	30	30	30	40	40	40	
80	3.9	30	30	30	40	40	40	
75	4.0	30	35	35	45	45	45	
70	4.0	30	35	35	45	45	45	
65	4.0	30	35	35	45	45	45	
60	4.0	30	35	35	45	45	45	
VIRGINIA DEPARTMENT OF TRANSPORTATION								
801.20	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS							

REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 50 KM/H (URBAN) USING E=4% MAX.

RADIUS (Meters)	E (%)	PAVEMENT WIDTH					
		7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m
		LS (Meters)					
7000	2.0	30	30	30	30	30	30
5000	2.0	30	30	30	30	30	30
3000	2.0	30	30	30	30	30	30
2000	2.0	30	30	30	30	30	30
1500	2.0	30	30	30	30	30	30
1250	2.0	30	30	30	30	30	30
1000	2.0	60	60	60	60	30	30
850	2.0	30	30	30	30	30	30
700	2.0	30	30	30	30	30	30
600	2.1	30	30	30	30	30	30
550	2.2	30	30	30	30	30	30
500	2.4	30	30	30	30	30	30
450	2.5	30	30	30	30	30	30
400	2.6	30	30	30	30	30	30
350	2.7	30	30	30	30	30	30
325	2.8	30	30	30	35	35	35
300	2.9	30	30	30	35	35	35
275	3.0	30	30	30	35	35	35
250	3.1	30	30	30	35	35	35
230	3.2	30	30	30	35	35	35
215	3.3	30	30	30	40	40	40
200	3.4	30	30	30	40	40	40
190	3.5	30	30	30	40	40	40
180	3.5	30	30	30	40	40	40
170	3.6	30	30	30	40	40	40
160	3.7	30	35	35	45	45	45
150	3.7	30	35	35	45	45	45
140	3.8	30	35	35	45	45	45
130	3.9	30	35	35	45	45	45
120	4.0	30	35	35	45	45	45
110	4.0	30	35	35	45	45	45
100	4.0	30	35	35	45	45	45

Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.

REVISED 8/97

TC-5		DESIGN FACTORS FOR A DESIGN SPEED OF 60 KM/H (URBAN) USING E= 4% MAX.							
RADIUS (Meters)	E (%)	PAVEMENT WIDTH							
		7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m	LS (Meters)	
7000	2.0	35	35	35	35	35	35	Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.	
5000	2.0	35	35	35	35	35	35		
3000	2.0	35	35	35	35	35	35		
2000	2.0	35	35	35	35	35	35		
1500	2.0	35	35	35	35	35	35		
1250	2.0	35	35	35	35	35	35		
1000	2.0	35	35	35	35	35	35		
850	2.1	35	35	35	35	35	35		
700	2.4	35	35	35	35	35	35		
600	2.5	35	35	35	35	35	35		
550	2.6	35	35	35	35	35	35		
500	2.7	35	35	35	35	35	35		
450	2.8	35	35	35	35	35	35		
400	3.0	35	35	35	40	40	40		
350	3.2	35	35	35	40	40	40		
325	3.2	35	35	35	40	40	40		
300	3.4	35	35	35	40	40	40		
275	3.5	35	35	35	45	45	45		
250	3.6	35	35	35	45	45	45		
230	3.7	35	35	35	45	45	45		
215	3.8	35	35	35	45	45	45		
200	3.9	35	35	35	50	50	50		
190	3.9	35	35	35	50	50	50		
180	4.0	35	40	40	50	50	50		
170	4.0	35	40	40	50	50	50		
160	4.0	35	40	40	50	50	50		
150	4.0	35	40	40	50	50	50		
VIRGINIA DEPARTMENT OF TRANSPORTATION									
801.22	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS								

REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 70 KM/H (URBAN) USING E= 4 % MAX.

RADIUS (Meters)	E (%)	PAVEMENT WIDTH					
		7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m
		LS (Meters)					
7000	2.0	40	40	40	40	40	40
5000	2.0	40	40	40	40	40	40
3000	2.0	40	40	40	40	40	40
2000	2.0	40	40	40	40	40	40
1500	2.0	40	40	40	40	40	40
1250	2.0	40	40	40	40	40	40
1000	2.3	40	40	40	40	40	40
850	2.5	40	40	40	40	40	40
700	2.7	40	40	40	40	40	40
600	2.9	40	40	40	40	40	40
550	3.0	40	40	40	40	40	40
500	3.1	40	40	40	45	45	45
450	3.3	40	40	40	45	45	45
400	3.4	40	40	40	45	45	45
350	3.6	40	40	40	50	50	50
325	3.7	40	40	40	50	50	50
300	3.8	40	40	40	50	50	50
275	3.9	40	40	40	55	55	55
250	4.0	40	40	40	55	55	55
230	4.0	40	40	40	55	55	55
215	4.0	40	40	40	55	55	55

Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS

801.23

REVISED 8/97

TC-5								
DESIGN FACTORS FOR A DESIGN SPEED OF 80 KM/H (URBAN) USING E= 4% MAX.								
RADIUS (Meters)	PAVEMENT WIDTH							Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.
	E (%)	7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m	
LS (Meters)								
7000	2.0	45	45	45	45	45	45	
5000	2.0	45	45	45	45	45	45	
3000	2.0	45	45	45	45	45	45	
2000	2.0	45	45	45	45	45	45	
1500	2.0	45	45	45	45	45	45	
1250	2.3	45	45	45	45	45	45	
1000	2.6	45	45	45	45	45	45	
850	2.8	45	45	45	45	45	45	
700	3.0	45	45	45	45	45	45	
600	3.2	45	45	45	50	50	50	
550	3.4	45	45	45	50	50	50	
500	3.5	45	45	45	50	50	50	
450	3.6	45	45	45	55	55	55	
400	3.8	45	45	45	55	55	55	
350	3.9	45	45	45	60	60	60	
325	4.0	45	45	45	60	60	60	
300	4.0	45	45	45	60	60	60	
801.24	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS				VIRGINIA DEPARTMENT OF TRANSPORTATION			



REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 90 KM/H (URBAN) USING E= 4 % MAX.

RADIUS (Meters)	E (%)	PAVEMENT WIDTH					
		7.6 m	10.8 m	14.4 m	18.0 m	19.8 m	21.6 m
		LS (Meters)					
7000	2.0	50	50	50	50	50	50
5000	2.0	50	50	50	50	50	50
3000	2.0	50	50	50	50	50	50
2000	2.0	50	50	50	50	50	50
1500	2.3	50	50	50	50	50	50
1250	2.6	50	50	50	50	50	50
1000	2.9	50	50	50	50	50	50
850	3.1	50	50	50	50	50	50
700	3.4	50	50	50	55	55	55
600	3.6	50	50	50	55	55	55
550	3.8	50	50	50	60	60	60
500	3.9	50	50	50	60	60	60
450	4.0	50	50	50	60	60	60
400	4.0	50	50	50	65	65	65
350	4.0	50	50	50	65	65	65

Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS with an absolute minimum of 30 meters.

REVISED 8/97

TC-5													
DESIGN FACTORS FOR A DESIGN SPEED OF 30 KM/H (RURAL) USING E= 8% MAX.													
DESIGN VELOCITY=30		WIDTH=4.8 m		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
5000	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
3000	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
2000	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
1500	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
1250	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
1000	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
850	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
700	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
600	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
550	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
500	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
450	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
400	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
350	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
325	2.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
300	2.2	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
275	2.3	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
250	2.5	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
230	2.7	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0
215	2.9	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	25	0.0
200	3.1	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	25	0.0
190	3.2	20	0.0	20	0.0	20	0.0	20	0.0	20	0.0	25	0.0
180	3.3	20	0.6	20	0.6	20	0.6	20	0.0	20	0.0	25	0.0
170	3.5	20	0.7	20	0.7	20	0.7	20	0.0	20	0.0	25	0.0
160	3.6	20	0.7	20	0.7	20	0.7	20	0.7	20	0.0	30	0.0
150	3.8	20	0.7	20	0.7	20	0.7	20	0.7	20	0.0	30	0.0
140	4.0	20	0.8	20	0.8	20	0.8	20	0.7	20	0.0	30	0.0
130	4.2	20	0.9	20	0.9	20	0.9	25	0.8	25	0.0	35	0.0
120	4.5	20	0.9	20	0.9	25	1.1	25	0.8	25	0.0	35	0.0
110	4.7	25	1.6	25	1.4	25	1.1	25	0.8	25	0.0	35	0.0
100	5.0	25	1.7	25	1.5	25	1.2	25	0.9	30	0.0	40	1.2
95	5.1	25	1.8	25	1.5	25	1.2	30	0.9	30	0.0	40	1.2
90	5.3	25	1.9	25	1.6	30	1.3	30	1.0	30	0.7	45	1.4
85	5.4	25	1.9	30	1.6	30	1.3	30	1.0	30	0.7	45	1.4
80	5.6	30	2.0	30	1.7	30	1.4	30	1.1	30	0.8	45	1.6
75	5.8	30	2.0	30	1.7	30	1.4	30	1.1	35	0.8	50	1.6
70	5.9	30	2.1	30	1.8	30	1.5	35	1.2	35	0.9	50	1.8
65	6.2	30	2.1	30	1.8	35	1.5	35	1.2	35	0.9	50	1.8
60	6.4	30	2.2	35	1.9	35	1.6	35	1.3	35	1.0	55	2.0
55	6.6	35	2.3	35	2.0	35	1.7	40	1.4	40	1.1	55	2.2
50	6.9	35	2.4	35	2.1	40	1.8	40	1.5	40	1.2	60	2.4
45	7.2	35	2.5	40	2.2	40	1.9	40	1.6	45	1.3	65	2.6
40	7.5	40	2.7	40	2.4	45	2.1	45	1.8	45	1.5	70	3.0
35	7.8	40	2.9	45	2.6	45	2.3	45	2.0	50	1.7	70	3.4
30	8.0	45	3.1	45	2.8	50	2.5	50	2.2	50	1.9	75	3.8

REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 40 KM/H (RURAL) USING E= 8% MAX.

DESIGN VELOCITY=40		WIDTH=4.8 m		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
5000	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
3000	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
2000	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
1500	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
1250	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
1000	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
850	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
700	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
600	2.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
550	2.1	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
500	2.3	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
450	2.5	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
400	2.8	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
350	3.1	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
325	3.3	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
300	3.5	25	0.0	25	0.0	25	0.0	25	0.0	25	0.0	30	0.0
275	3.7	25	0.6	25	0.6	25	0.6	25	0.0	25	0.0	30	0.0
250	4.0	25	0.7	25	0.7	25	0.7	25	0.0	25	0.0	35	0.0
230	4.3	25	0.8	25	0.8	25	0.8	25	0.0	25	0.0	35	0.0
215	4.5	25	0.8	25	0.8	25	0.8	25	0.0	25	0.0	35	0.0
200	4.7	25	0.9	25	0.9	25	0.9	25	0.7	25	0.0	40	0.0
190	4.8	25	0.9	25	0.9	25	0.9	25	0.7	25	0.0	40	0.0
180	5.0	25	1.0	25	1.0	25	1.0	30	0.7	30	0.0	40	0.0
170	5.1	25	1.0	25	1.0	30	1.0	30	0.7	30	0.0	40	0.0
160	5.3	25	1.1	30	1.3	30	1.0	30	0.7	30	0.0	45	0.0
150	5.5	30	1.7	30	1.4	30	1.1	30	0.8	30	0.0	45	0.0
140	5.7	30	1.7	30	1.4	30	1.1	30	0.8	30	0.0	45	0.0
130	5.9	30	1.7	30	1.4	30	1.1	35	0.8	30	0.0	45	0.0
120	6.1	30	1.8	30	1.5	35	1.2	35	0.9	35	0.0	55	1.2
110	6.4	30	1.8	35	1.5	35	1.2	35	0.9	40	0.0	55	1.2
100	6.6	35	1.9	35	1.6	35	1.3	40	1.0	40	0.7	60	1.4
95	6.8	35	1.9	35	1.6	40	1.3	40	1.0	40	0.7	60	1.4
90	6.9	35	2.0	35	1.7	40	1.4	40	1.1	40	0.8	60	1.6
85	7.1	35	2.0	40	1.7	40	1.4	40	1.1	45	0.8	65	1.6
80	7.3	40	2.1	40	1.8	40	1.5	45	1.2	45	0.9	65	1.8
75	7.5	40	2.1	40	1.8	40	1.5	45	1.2	45	0.9	65	1.8
70	7.6	40	2.2	40	1.9	45	1.6	45	1.3	45	1.0	70	2.0
65	7.8	40	2.2	45	1.9	45	1.6	45	1.3	50	1.0	70	2.0
60	7.9	40	2.3	45	2.0	45	1.7	45	1.4	50	1.1	75	2.2
55	8.0	45	2.4	45	2.1	45	1.8	50	1.5	50	1.2	75	2.4
50	8.0	45	2.5	45	2.2	50	1.9	50	1.6	50	1.3	75	2.6

REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 50 KM/H (RURAL) USING E= 8% MAX.

DESIGN VELOCITY=50		WIDTH=4.8 m		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
5000	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
3000	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
2000	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
1500	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
1250	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
1000	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
850	2.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
700	2.3	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
600	2.6	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
550	2.8	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
500	3.1	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
450	3.3	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
400	3.7	30	0.6	30	0.6	30	0.6	30	0.0	30	0.0	30	0.0
350	4.1	30	0.7	30	0.7	30	0.7	30	0.0	30	0.0	35	0.0
325	4.3	30	0.8	30	0.8	30	0.8	30	0.0	30	0.0	40	0.0
300	4.5	30	0.8	30	0.8	30	0.8	30	0.0	30	0.0	40	0.0
275	4.8	30	0.9	30	0.9	30	0.9	30	0.0	30	0.0	40	0.0
250	5.1	30	1.0	30	1.0	30	0.9	30	0.0	30	0.0	45	0.0
230	5.4	30	1.1	30	1.1	30	1.0	30	0.7	30	0.0	45	0.0
215	5.6	30	1.2	30	1.2	30	1.0	35	0.7	35	0.0	50	0.0
200	5.8	30	1.3	30	1.3	35	1.0	35	0.7	35	0.0	50	0.0
190	6.0	30	1.3	35	1.4	35	1.1	35	0.8	35	0.0	50	0.0
180	6.1	35	1.7	35	1.4	35	1.1	35	0.8	35	0.0	55	0.0
170	6.3	35	1.7	35	1.4	35	1.1	40	0.8	35	0.0	55	0.0
160	6.5	35	1.7	35	1.4	40	1.1	40	0.8	40	0.0	55	0.0
150	6.7	35	1.8	40	1.5	40	1.2	40	0.9	45	0.0	65	1.2
140	6.9	40	1.8	40	1.5	40	1.2	40	0.9	45	0.0	65	1.2
130	7.2	40	1.8	40	1.5	40	1.2	45	0.9	45	0.0	65	1.2
120	7.4	40	1.9	40	1.6	45	1.3	45	1.0	45	0.7	70	1.4
110	7.6	40	1.9	45	1.6	45	1.3	45	1.0	50	0.7	70	1.4
100	7.8	45	2.0	45	1.7	45	1.4	50	1.1	50	0.8	75	1.6
95	7.9	45	2.0	45	1.7	45	1.4	50	1.1	50	0.8	75	1.6
90	8.0	45	2.1	45	1.8	50	1.5	50	1.2	50	0.9	75	1.8
85	8.0	45	2.1	45	1.8	50	1.5	50	1.2	50	0.9	75	1.8
80	8.0	45	2.2	45	1.9	50	1.6	50	1.3	55	1.0	80	2.0

VIRGINIA DEPARTMENT OF TRANSPORTATION

801.28 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS

DESIGN FACTORS FOR A DESIGN SPEED OF 60 KM/H (RURAL) USING E= 8% MAX.

DESIGN VELOCITY=60		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m		WIDTH=21.6 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
5000	2.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
3000	2.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
2000	2.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
1500	2.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
1250	2.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
1000	2.2	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
850	2.6	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
700	3.0	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	40	0.0
600	3.4	35	0.0	35	0.0	35	0.0	35	0.0	35	0.0	45	0.0
550	3.7	35	0.6	35	0.6	35	0.0	35	0.0	35	0.0	45	0.0
500	4.0	35	0.7	35	0.7	35	0.0	35	0.0	40	0.0	50	0.0
450	4.3	35	0.8	35	0.8	35	0.0	35	0.0	40	0.0	55	0.0
400	4.7	35	0.9	35	0.9	35	0.0	35	0.0	45	0.0	60	0.0
350	5.1	35	1.0	35	0.9	35	0.0	35	0.0	50	0.0	65	0.0
325	5.4	35	1.0	35	0.9	35	0.0	35	0.0	50	0.0	65	0.0
300	5.6	35	1.1	35	0.9	35	0.0	35	0.0	55	0.0	70	0.0
275	5.9	35	1.2	35	1.0	40	0.7	40	0.0	55	0.0	75	0.0
250	6.3	35	1.3	40	1.0	40	0.7	40	0.0	60	0.0	75	0.0
230	6.5	40	1.3	40	1.0	40	0.7	40	0.0	60	0.0	80	0.0
215	6.8	40	1.4	40	1.1	45	0.8	45	0.0	65	0.0	85	0.0
200	7.0	40	1.4	45	1.1	45	0.8	45	0.0	65	0.0	85	0.0
190	7.2	45	1.4	45	1.1	45	0.8	45	0.0	65	0.0	90	0.0
180	7.3	45	1.4	45	1.1	45	0.8	45	0.0	70	0.0	90	0.0
170	7.5	45	1.5	45	1.2	50	0.9	50	0.0	70	0.0	90	0.0
160	7.7	45	1.5	50	1.2	50	0.9	50	0.0	70	0.0	95	0.0
150	7.8	45	1.5	50	1.2	50	0.9	55	0.0	75	0.0	95	0.0
140	7.9	50	1.6	50	1.3	50	1.0	55	0.7	80	1.4	105	2.1
130	8.0	50	1.6	50	1.3	55	1.0	55	0.7	80	1.4	110	2.1

Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS.

REVISED 8/97

TC-5		DESIGN FACTORS FOR A DESIGN SPEED OF 70 KM/H (RURAL) USING E= 8% MAX.												
DESIGN VELOCITY=70		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m		WIDTH=21.6 m		
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	
7000	2.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	Note: For pavement widths greater than 21.6 meters use LS values developed by IGRDS.
5000	2.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	
3000	2.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	
2000	2.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	
1500	2.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	
1250	2.3	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	
1000	2.8	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	
850	3.2	40	0.0	40	0.0	40	0.0	40	0.0	40	0.0	45	0.0	
700	3.8	40	0.6	40	0.6	40	0.0	40	0.0	40	0.0	50	0.0	
600	4.3	40	0.7	40	0.7	40	0.0	40	0.0	45	0.0	60	0.0	
550	4.6	40	0.8	40	0.8	40	0.0	40	0.0	45	0.0	60	0.0	
500	4.9	40	0.9	40	0.9	40	0.0	40	0.0	50	0.0	65	0.0	
450	5.3	40	1.0	40	0.9	40	0.0	40	0.0	55	0.0	70	0.0	
400	5.7	40	1.1	40	0.9	40	0.0	40	0.0	60	0.0	75	0.0	
350	6.2	40	1.3	40	1.0	45	0.7	45	0.0	65	0.0	85	0.0	
325	6.4	40	1.3	45	1.0	45	0.7	45	0.0	65	0.0	85	0.0	
300	6.7	45	1.3	45	1.0	45	0.7	45	0.0	70	0.0	90	0.0	
275	7.0	45	1.3	45	1.0	50	0.7	50	0.0	70	0.0	95	0.0	
250	7.3	45	1.4	50	1.1	50	0.8	50	0.0	75	0.0	100	0.0	
230	7.6	50	1.4	50	1.1	55	0.8	50	0.0	75	0.0	100	0.0	
215	7.7	50	1.4	50	1.1	55	0.8	55	0.0	80	0.0	105	0.0	
200	7.9	50	1.5	55	1.2	55	0.9	60	0.0	80	0.0	105	0.0	
190	8.0	50	1.5	55	1.2	55	0.9	60	0.0	80	0.0	105	0.0	
180	8.0	55	1.5	55	1.2	55	0.9	60	0.0	80	0.0	105	0.0	
801.30	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS					VIRGINIA DEPARTMENT OF TRANSPORTATION								

DESIGN FACTORS FOR A DESIGN SPEED OF 80 KM/H (RURAL) USING E= 8% MAX.

DESIGN VELOCITY=80		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m		WIDTH=21.6 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
5000	2.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
3000	2.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
2000	2.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
1500	2.4	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
1250	2.8	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
1000	3.4	45	0.0	45	0.0	45	0.0	45	0.0	45	0.0	50	0.0
850	3.9	45	0.7	45	0.7	45	0.0	45	0.0	45	0.0	60	0.0
700	4.6	45	0.8	45	0.8	45	0.0	45	0.0	50	0.0	65	0.0
600	5.1	45	0.9	45	0.9	45	0.0	45	0.0	55	0.0	75	0.0
550	5.4	45	1.0	45	0.9	45	0.0	45	0.0	60	0.0	80	0.0
500	5.8	45	1.1	45	0.9	45	0.0	45	0.0	65	0.0	85	0.0
450	6.2	45	1.2	45	0.9	45	0.0	45	0.0	70	0.0	90	0.0
400	6.6	45	1.3	50	1.0	50	0.7	50	0.0	75	0.0	95	0.0
350	7.1	50	1.3	50	1.0	55	0.7	55	0.0	80	0.0	105	0.0
325	7.4	50	1.3	55	1.0	55	0.7	55	0.0	80	0.0	110	0.0
300	7.6	55	1.4	55	1.1	60	0.7	55	0.0	85	0.0	110	0.0
275	7.8	55	1.4	60	1.1	60	0.8	60	0.0	85	0.0	115	0.0
250	8.0	55	1.4	60	1.1	60	0.8	60	0.0	90	0.0	115	0.0
230	8.0	60	1.5	60	1.2	60	0.9	65	0.0	90	0.0	115	0.0

Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS.

REVISED 8/97

TC-5		DESIGN FACTORS FOR A DESIGN SPEED OF 90 KM/H (RURAL) USING E= 8% MAX.													
DESIGN VELOCITY=90		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m		WIDTH=21.6 m		Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS.	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)		
7000	2.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0		
5000	2.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0		
3000	2.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0		
2000	2.2	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0		
1500	2.9	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0		
1250	3.4	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	55	0.0		
1000	4.1	50	0.0	50	0.0	50	0.0	50	0.0	50	0.0	65	0.0		
850	4.6	50	0.8	50	0.8	50	0.0	50	0.0	55	0.0	70	0.0		
700	5.4	50	1.0	50	0.9	50	0.0	50	0.0	65	0.0	85	0.0		
600	6.0	50	1.2	50	0.9	50	0.0	50	0.0	70	0.0	95	0.0		
550	6.4	50	1.2	50	0.9	50	0.0	50	0.0	75	0.0	100	0.0		
500	6.8	50	1.2	50	0.9	55	0.0	55	0.0	80	0.0	105	0.0		
450	7.2	55	1.3	55	1.0	55	0.7	55	0.0	85	0.0	110	0.0		
400	7.6	55	1.3	60	1.0	60	0.7	60	0.0	90	0.0	115	0.0		
350	7.9	60	1.4	60	1.1	65	0.7	60	0.0	90	0.0	120	0.0		
325	8.0	60	1.4	60	1.1	65	0.7	65	0.0	95	0.0	125	0.0		
VIRGINIA DEPARTMENT OF TRANSPORTATION															
801.32	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS														



REVISED 8/97

TC-5

DESIGN FACTORS FOR A DESIGN SPEED OF 100 KM/H (RURAL) USING E = 8% MAX.

DESIGN VELOCITY=100		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m		WIDTH=21.6 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0
5000	2.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0
3000	2.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0
2000	2.7	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0
1500	3.4	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0
1250	4.0	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	65	0.0
1000	4.8	60	0.0	60	0.0	60	0.0	60	0.0	60	0.0	80	0.0
850	5.5	60	1.1	60	0.8	60	0.0	60	0.0	70	0.0	90	0.0
700	6.4	60	1.2	60	0.9	60	0.0	60	0.0	80	0.0	105	0.0
600	7.0	60	1.2	60	0.9	60	0.0	60	0.0	85	0.0	115	0.0
550	7.4	60	1.3	60	1.0	60	0.7	60	0.0	90	0.0	120	0.0
500	7.7	60	1.3	60	1.0	65	0.7	65	0.0	95	0.0	125	0.0
450	7.9	60	1.3	65	1.0	65	0.7	65	0.0	95	0.0	130	0.0
400	8.0	65	1.4	65	1.1	65	0.7	65	0.0	100	0.0	130	0.0

Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS.

REVISED 8/97

TC-5													
DESIGN FACTORS FOR A DESIGN SPEED OF 110 KM/H (RURAL) USING E= 8% MAX.													
DESIGN VELOCITY=110		WIDTH=5.4 m		WIDTH=6.0 m		WIDTH=6.6 m		WIDTH=7.2 m		WIDTH=14.4 m		WIDTH=21.6 m	
RADIUS(m)	E(%)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)	LS(m)	W(m)
7000	2.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0
5000	2.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0
3000	2.1	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0
2000	3.1	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0
1500	4.0	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0	70	0.0
1250	4.6	65	0.0	65	0.0	65	0.0	65	0.0	65	0.0	80	0.0
1000	5.6	65	0.0	65	0.0	65	0.0	65	0.0	75	0.0	95	0.0
850	6.4	65	1.2	65	0.9	65	0.0	65	0.0	85	0.0	110	0.0
700	7.3	65	1.2	65	0.9	65	0.0	65	0.0	95	0.0	125	0.0
600	7.8	65	1.3	65	1.0	70	0.7	70	0.0	100	0.0	135	0.0
550	8.0	65	1.3	70	1.0	70	0.7	70	0.0	105	0.0	135	0.0
500	8.0	65	1.3	70	1.0	70	0.7	70	0.0	105	0.0	140	0.0
Note: For pavements widths greater than 21.6 meters use LS values developed by IGRDS.													
VIRGINIA DEPARTMENT OF TRANSPORTATION													
801.34	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN METERS												

PAGE 801.35 TITLED “IGRDS METHODOLOGIES FOR  
CALCULATING TC-5 VALUES” ADDED 8/97

PAGE 801.36 TITLED “CALCULATED TC-5 EXAMPLES  
USING IGRDS METHODOLOGIES” ADDED 8/97