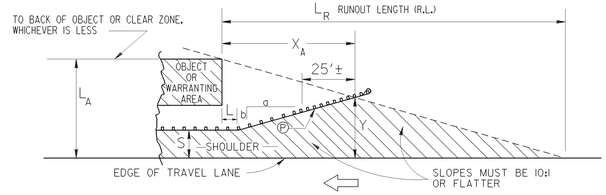
RELEASED FOR CONSTRUCTION 12/02/10

GUARDRAIL LENGTHS OF ADVANCEMENT AT FIXED OBJECTS OR AT WARRANTING FILL SLOPES TYPICAL

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			

(FLARED)



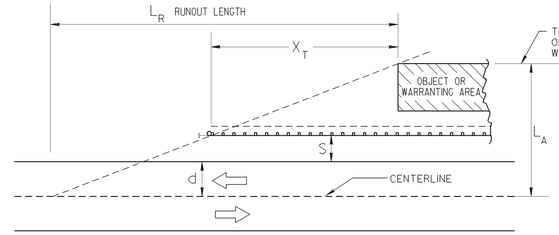
S = USUABLE SHOULDER WIDTH PLUS 2 FT. (TYP.)

$$X_A = \frac{L_A + (b/a)L - S}{b/a + (L_A/L_R)}$$

$$Y = L_A - \frac{L_A}{L_R}(X_A)$$

DESIGN SPEED (MPH)	FLARE RATE a:b
70	15:1
60	14:1
55	12:1
50	11:1
45	10:1
40	8:1
30	7:1

(STANDARD)

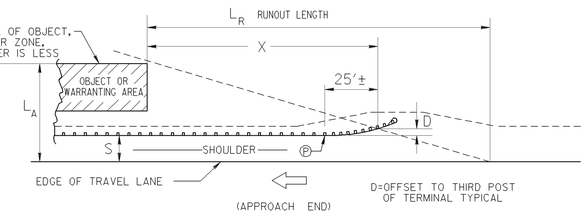


DESIGN SPEED (MPH)	L_R Runout Length in feet			
	OVER 6000 (A.D.T.)	2000-6000 (A.D.T.)	800-2000 (A.D.T.)	UNDER 800 (A.D.T.)
70	475	445	395	360
60	425	400	345	330
55	360	345	315	280
50	330	300	260	245
45	260	245	215	200
40	230	200	180	165
30	165	165	150	130

$$X_T = L_R \times \frac{L_A - (S+d)}{L_A}$$

(TRAILING END)

S = USUABLE SHOULDER WIDTH PLUS 2 FT. (TYP.)

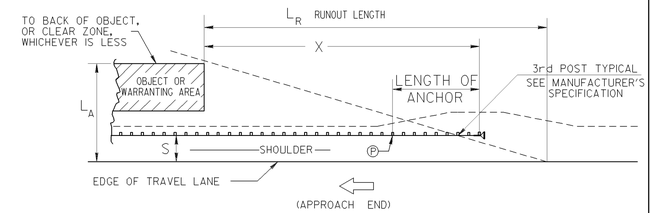


D=OFFSET TO THIRD POST OF TERMINAL TYPICAL

Ⓟ = POINT OF BEGINNING TERMINAL (TYP.)

$$X = L_R \times \frac{L_A - (S+D)}{L_A}$$

D=FLARE OF TERMINAL
D=0 FOR NON-FLARED TERMINALS



CLEAR ZONE DISTANCES

CLEAR ZONE DISTANCES (FT) CHART

DESIGN SPEED	DESIGN ADT	FORESLOPES			BACKSLOPES		
		1V:6H OR FLATTER	1V:5H TO 1V:4H	1V:3H	1V:3H	1V:5H TO 1V:4H	1V:6H OR FLATTER
40 M.P.H. OR LESS	UNDER 750	7-10	7-10	* *	7-10	7-10	7-10
	750-1500	10-12	12-14	* *	10-12	10-12	10-12
	1500-6000	12-14	14-16	* *	12-14	12-14	12-14
	OVER 6000	14-16	16-18	* *	14-16	14-16	14-16
45-50 M.P.H.	UNDER 750	10-12	12-14	* *	8-10	8-10	10-12
	750-1500	14-16	16-20	* *	10-12	12-14	14-16
	1500-6000	16-18	20-26	* *	12-14	14-16	16-18
	OVER 6000	20-22	24-28	* *	14-16	18-20	20-22
55 M.P.H.	UNDER 750	12-14	14-18	* *	8-10	10-12	10-12
	750-1500	16-18	20-24	* *	10-12	14-16	16-18
	1500-6000	20-22	24-30	* *	14-16	16-18	20-22
	OVER 6000	22-24	26-32*	* *	16-18	20-22	22-24
60 M.P.H.	UNDER 750	16-18	20-24	* *	10-12	12-14	14-16
	750-1500	20-24	26-32*	* *	12-14	16-18	20-22
	1500-6000	26-30	32-40*	* *	14-18	18-22	24-26
	OVER 6000	30-32*	36-44*	* *	20-22	24-26	26-28
65-70 M.P.H.	UNDER 750	18-20	20-26	* *	10-12	14-16	14-16
	750-1500	24-26	28-36*	* *	12-16	18-20	20-22
	1500-6000	28-32*	34-42*	* *	16-20	22-24	26-28
	OVER 6000	30-34*	38-46*	* *	22-24	26-30	28-30

* WHERE A SITE SPECIFIC INVESTIGATION INDICATES A HIGH PROBABILITY OF CONTINUING CRASHES, OR SUCH OCCURRENCES ARE INDICATED BY CRASH HISTORY, THE DESIGNER MAY PROVIDE CLEAR-ZONE DISTANCES GREATER THAN THE CLEAR-ZONE SHOWN ABOVE. CLEAR ZONES MAY BE LIMIT TO 30 FT. FOR PRACTICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLETE IF PREVIOUS EXPERIENCE WITH SIMILAR PROJECTS OR DESIGNS INDICATES SATISFACTORY PERFORMANCE.

* * SINCE RECOVERY IS LESS LIKELY ON THE UNSHIELDED, TRAVERSABLE 1V:3H SLOPES, FIXED OBJECTS SHOULD NOT BE PRESENT IN THE VICINITY OF THE TOE OF THESE SLOPES. RECOVERY OF HIGH-SPEED VEHICLES THAT ENCROACH BEYOND THE EDGE OF THE SHOULDER MAY BE EXPECTED TO OCCUR BEYOND THE TOE OF SLOPE. DETERMINATION OF THE WIDTH OF RECOVERY AREA AT THE TOE OF SLOPE SHOULD TAKE INTO CONSIDERATION RIGHT-OF-WAY AVAILABILITY, ENVIRONMENTAL CONCERNS, ECONOMIC FACTORS, SAFETY NEEDS AND CRASH HISTORIES. ALSO, THE DISTANCE BETWEEN THE EDGE OF THE THROUGH TRAVELED LANE AND THE BEGINNING OF THE 1V:3H SLOPE SHOULD INFLUENCE THE RECOVERY AREA PROVIDED AT THE TOE OF THE SLOPE.

HORIZONTAL CURVE ADJUSTMENTS

RADIUS (FEET)	K_{CZ} (CURVE CORRECTION FACTOR) DESIGN SPEED (MPH)						
	40	45	50	55	60	65	70
2860	1.1	1.1	1.1	1.2	1.2	1.2	1.3
2290	1.1	1.1	1.2	1.2	1.2	1.3	1.3
1910	1.1	1.2	1.2	1.2	1.3	1.3	1.4
1640	1.1	1.2	1.2	1.3	1.3	1.4	1.5
1430	1.2	1.2	1.3	1.3	1.4	1.4	
1270	1.2	1.2	1.3	1.3	1.4	1.5	
1150	1.2	1.2	1.3	1.4	1.5		
950	1.2	1.3	1.4	1.5	1.5		
820	1.3	1.3	1.4	1.5			
720	1.3	1.4	1.5				
640	1.3	1.4	1.5				
570	1.4	1.5					
380	1.5						

$CZ_C = (L_C)(K_{CZ})$

Where:

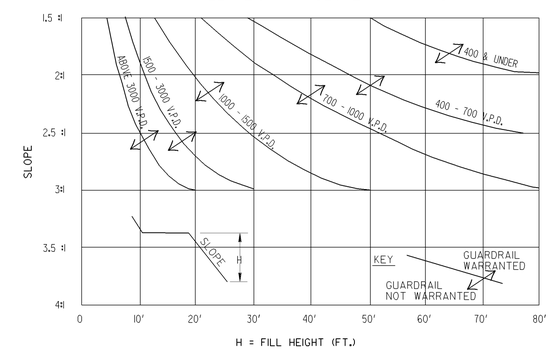
CZ_C = CLEAR ZONE ON OUTSIDE OF CURVATURE, FEET

L_C = CLEAR ZONES ON TANGENTS, FEET (SEE CHART AT LEFT)

K_{CZ} = CURVE CORRECTION FACTOR

NOTE:
THE CURVE CORRECTION FACTOR IS APPLIED TO THE OUTSIDE OF CURVES ONLY. CURVES FLATTER THAN 2860 FEET DO NOT REQUIRE AN ADJUSTED CLEAR ZONE.

FILL HEIGHT / SLOPE WARRANTS



NOTE:
FILL HEIGHT/SLOPE EXTRAPOLATIONS WHICH FALL ABOVE AND TO THE RIGHT OF CURVE INDICATES GUARDRAIL IS WARRANTED FOR THE FILL EMBANKMENT.

REVISED GUARDRAIL AND CLEAR ZONE	REVISION	DATE 9-4-07
G.L.O.	BY DES. DRW. TRA. CHK.	(SUBMITTED) STATE ROAD & AIRPORT DESIGN ENGINEER (APPROVED) CHIEF ENGINEER

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

STANDARD

GUARDRAIL WARRANT GUIDES
LENGTHS OF ADVANCEMENT
CLEAR ZONE DISTANCES
FILL HEIGHT EMBANKMENTS

NOT TO SCALE — DEC., 1999

NUMBER 4000W

THE LPA GROUP
TRANSPORTATION CONSULTANTS
A UNIT OF MICHAEL BAKER CORPORATION
3595 ENGINEERING DRIVE
NORCROSS, GEORGIA 30092
(770) 263-9118

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: INNOVATIVE PROGRAM DELIVERY
GEORGIA STANDARDS

DRAWING No. 41-014