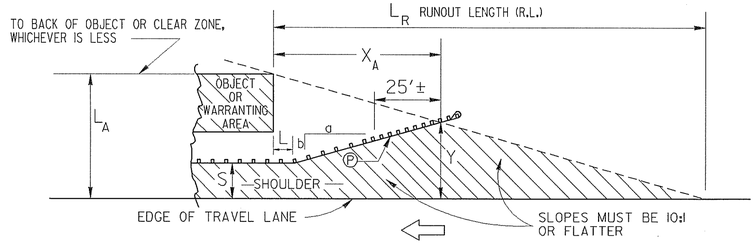
| STATE | PROJECT NUMBER | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| GA. | | 85 | 114 |

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

## (FLARED)



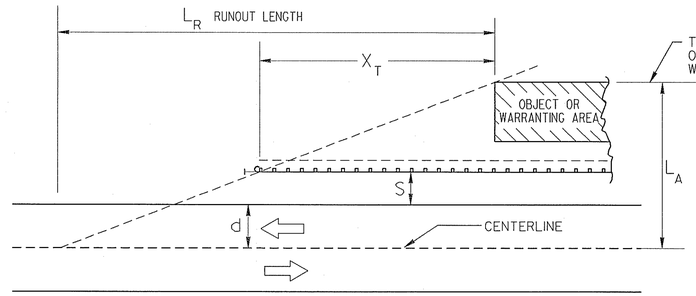

S = USUABLE SHOULDER WIDTH PLUS 2 FT. (TYP.)

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

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

| 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 |

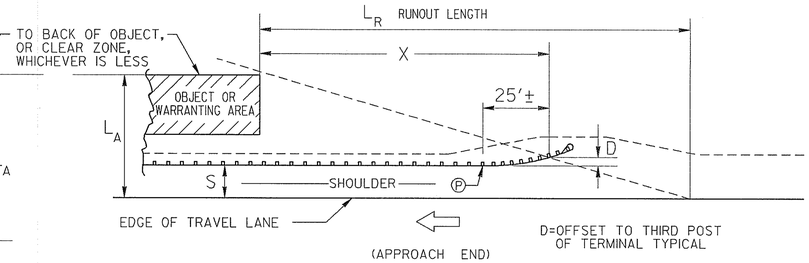
## (STANDARD)




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

(TRAILING END)

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

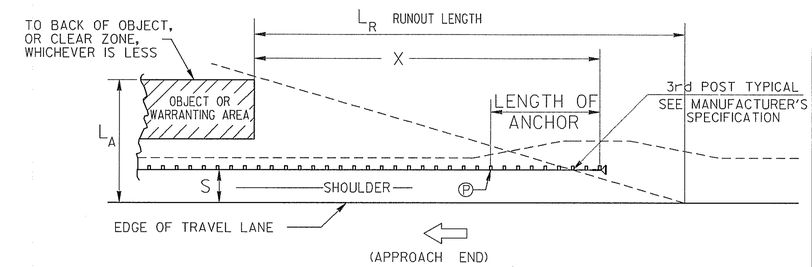



D=OFFSET TO THIRD POST OF TERMINAL TYPICAL

Ⓟ = 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




| 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 |

# CLEAR ZONE DISTANCES

## CLEAR ZONE DISTANCES (FT) CHART

| DESIGN SPEED | DESIGN ADT | FORESLOPES | | | BACKSLOPES | | |
|---|---|---|---|---|---|---|---|
| | | IV:6H OR FLATTER | IV:5H TO IV:4H | IV:3H | IV:3H | IV:5H TO IV:4H | IV: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 LIMITED TO 30 FT. FOR PRACITICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLATE IF PREVIOUS EXPERIENCE WITH SIMILAR PROJECTS OR DESIGNS INDICATES SATISFACTORY PERFORMANCE.

* * SINCE RECOVERY IS LESS LIKELY ON THE UNSHIELDED, TRAVERSABLE IV: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 IV: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:

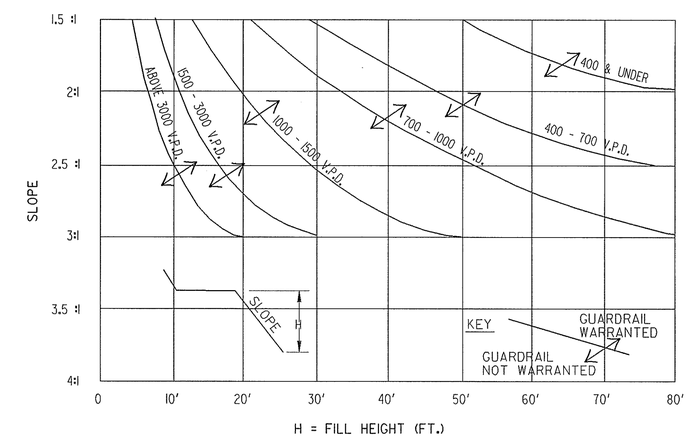
$CZ_C$ = CLEAR ZONE ON OUTSIDE OF CURVATURE, FEET

$L_C$ = 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.

| G.L.O. | BY | REVISION | DATE |
|---|---|---|---|
| | | REVISED GUARDRAIL AND CLEAR ZONE | 9-4-07 |

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

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

NOT TO SCALE — DEC., 1999

DES. ____ DRW. ____ TRA. ____ CHK. ____

(SUBMITTED) STATE ROAD & AIRPORT DESIGN ENGINEER

(APPROVED) CHIEF ENGINEER

NUMBER 4000W