

RURAL EXAMPLE

20 FT PAVEMENT WIDTH
(IGRDS - 1 LANE AT 10 FT)

$$V_D = 50 \text{ MPH} \quad R = 1000 \text{ FT}$$

$$W_n = 10 \text{ FT} \quad rg = 0.50$$

$$E = 0.076 \text{ (7.6\% CALCULATED PER AASHTO METHOD 5)}$$

$$U = u + R - \sqrt{R^2 - L^2}$$

$$U = 8.5 + 1000 - \sqrt{(1000)^2 - (20)^2}$$

$$U = 8.70002$$

$$F_A = \sqrt{R^2 + A(2L + A)} - R$$

$$F_A = \sqrt{(1000)^2 + 4[2(20) + 4]} - 1000$$

$$F_A = .087996$$

$$Z = (V_D / \sqrt{R})$$

$$Z = (50 / \sqrt{1000})$$

$$Z = 1.58$$

$$W_C = 2(U + C) + F_A + Z$$

$$W_C = 2(8.70002 + 2) + 0.08996 + 1.58$$

$$W_C = 23.0692$$

$$w = W_C - 2W_n = 23.069 - 2(10) = 3.069$$

($R < 2865$ & $w > 2$ THEREFORE WIDENING IS REQUIRED)

$$LS = [100(W + w/2)E] / rg$$

$$LS = [100(10 + 3.068/2)0.076] / 0.50$$

$$LS = 175.56 \text{ (180 ROUNDED)}$$

RURAL EXAMPLE

72 FT PAVEMENT WIDTH
(IGRDS - 3 LANES AT 12 FT)

$$V_D = 40 \text{ MPH} \quad R = 600 \text{ FT}$$

$$W_n = 24 \text{ FT} \quad rg = 0.58$$

$$E = 0.077 \text{ (7.7\% CALCULATED PER AASHTO METHOD 5)}$$

COMPUTE FOR 24' PAVEMENT WIDTH (IGRDS 1 @ 12')

$$U = u + R - \sqrt{R^2 - L^2}$$

$$U = 8.5 + 600 - \sqrt{(600)^2 - (20)^2}$$

$$U = 8.8334$$

$$F_A = \sqrt{R^2 + A(2L + A)} - R$$

$$F_A = \sqrt{(600)^2 + 4[2(20) + 4]} - 600$$

$$F_A = .14665$$

$$Z = (V_D / \sqrt{R})$$

$$Z = (40 / \sqrt{600})$$

$$Z = 1.6329$$

$$W_C = 2(U + C) + F_A + Z$$

$$W_C = 2(8.8334 + 3.0) + .14665 + 1.632$$

$$W_C = 25.4464$$

$$w = W_C - 2W_n = 25.4455 - 2(12) = 1.4464(1.5)$$

FOR 72' PAVEMENT WIDTH
 $w = 3(1.5) = 4.5$

($R < 881$ & $w > 2$ THEREFORE WIDENING IS REQUIRED)

$$LS = M[100(Pw/N + w/N)E]/rg$$

$$LS = 2[100(72/6 + 4.5/6)0.077]/0.58$$

$$LS = 2[100(12.75)0.77]/0.58$$

$$LS = 2(98.175/0.58)$$

$$LS = 2(169.2672414)$$

$$LS = 338.5344828 \text{ (ROUNDED TO 340)}$$

URBAN EXAMPLES

24 FT PAVEMENT WIDTH
(IGRDS - 1 LANE AT 12 FT)

$$V_D = 40 \text{ MPH} \quad R = 600 \text{ FT}$$

$$W_n = 12 \text{ FT} \quad rg = 0.58$$

$$E = 0.04 \text{ (4\% PER PAGE 801.25)}$$

$$LS = (100WE) / rg \text{ (NO WIDENING REQUIRED)}$$

$$LS = [100(12)(0.04)] / 0.58$$

$$LS = 82.759 < 120 \text{ (MIN. LS) THEREFORE}$$

$$LS = 120$$

66 FT PAVEMENT WIDTH
(IGRDS - 3 LANES AT 11 FT)

$$V_D = 40 \text{ MPH} \quad R = 600 \text{ FT}$$

$$W_n = 22 \text{ FT} \quad rg = 0.58$$

$$E = 0.04 \text{ (4\% PER PAGE 801.25)}$$

$$LS = (100WE) / rg \text{ (NO WIDENING REQUIRED)}$$

$$LS = [100(22)(0.04)] / 0.58$$

$$LS = 151.72 \text{ (ROUND TO 160)} > 120 \text{ (MIN. LS)}$$

$$LS = 160$$

CALCULATED TC-5 EXAMPLES