

RURAL EXAMPLE

6.0 m PAVEMENT WIDTH
(DESIGN SOFTWARE - 1 LANE AT 3.0 m)

$$V_D = 80 \text{ km/h} \quad R = 375 \text{ m}$$

$$W_n = 3.0 \text{ m} \quad rg = 0.50$$

$$E = 6.9 \text{ (PER 802.39)}$$

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

$$U = 2.4 + 375 - \sqrt{(375)^2 - (6.1)^2}$$

$$U = 2.4496$$

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

$$F_A = \sqrt{(375)^2 + 1.2[2(6.1+1.2)]} - 375$$

$$F_A = .0214$$

$$Z = .1(V_D / \sqrt{R})$$

$$Z = .1(80 / \sqrt{375})$$

$$Z = .4131$$

$$W_c = N(U + C) + F_A + Z$$

$$W_c = 2(2.4496 + .6) + 0.214 + .4131$$

$$W_c = 6.5337$$

$$w = W_c - 2W_n = 6.5337 - 2(3.0) = .5337 \text{ (ROUND TO .6)}$$

(R<850 & w>.6 THEREFORE WIDENING IS REQUIRED)

$$L_r = [E n (W + w/2) / rg] b_w$$

$$L_r = [(6.9)(1)(3.0 + .6/2) / 0.50] 1$$

$$L_r = 6.9(3.3)/.5$$

$$L_r = 45.54 \text{ (ROUND TO 46)}$$

RURAL EXAMPLE

2.16 m PAVEMENT WIDTH
(DESIGN SOFTWARE - 3 LANES AT 3.6 m)

$$V_D = 70 \text{ km/h} \quad R = 200 \text{ m}$$

$$W_n = 3.6 \text{ m} \quad rg = 0.55$$

$$E = 7.9 \text{ (PER PAGE 802.38)}$$

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

$$U = 2.4 + 200 - \sqrt{(200)^2 - (6.1)^2}$$

$$U = 2.4930$$

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

$$F_A = \sqrt{(200)^2 + 1.2[2(6.1+1.2)]} - 200$$

$$F_A = .0402$$

$$Z = .1(V_D / \sqrt{R})$$

$$Z = .1(70 / \sqrt{200})$$

$$Z = .4950$$

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

$$W_c = 2(2.4930 + .9) + .0402 + .4950$$

$$W_c = 7.3212$$

$$w = W_c - 2W_n = 7.3212 - 2(3.6) = .121 \text{ (ROUND TO .2)}$$

FOR 21.6 m PAVEMENT WIDTH

$$w = 3(.2) = .6$$

(R<230 & w>.6 THEREFORE WIDENING IS REQUIRED)

$$L_r = [E n (W + W/3) / rg] b_w$$

$$L_r = [7.9(3)(3.6 + 6/3) / 0.55] 0.6667$$

$$L_r = (90/0.55) 0.6667$$

$$L_r = 109.1691 \text{ (ROUND TO 110)}$$

OR

$$L_r = M[E(W + w/N) / rg]$$

$$L_r = 2[7.9(3.6 + 6/3) / 0.55]$$

$$L_r = 2(30.02/0.55)$$

$$L_r = 109.1636$$

URBAN EXAMPLES

7.2 m PAVEMENT WIDTH
(DESIGN SOFTWARE - 1 LANE AT 3.6 m)

$$V_D = 60 \text{ km/h} \quad R = 175 \text{ m}$$

$$W_n = 3.6 \text{ m} \quad rg = 0.60$$

$$E = 4.0 \text{ (PER PAGE 802.29)}$$

$$L_r = (W_n E / rg) b_w$$

$$L_r = [3.6(1)(4.0) / 0.6](1)$$

$$L_r = 14.4 / .6$$

$$L_r = 24$$

19.8 m PAVEMENT WIDTH
(DESIGN SOFTWARE - 3 LANES AT 3.3 m)

$$V_D = 60 \text{ km/h} \quad R = 175 \text{ m}$$

$$W_n = 3.3 \text{ m} \quad rg = 0.60$$

$$E = 4.0 \text{ (PER PAGE 801.29)}$$

$$L_r = b_w (W_n E / rg)$$

$$L_r = 0.6667[3.3(3)(4) / .6]$$

$$L_r = 0.6667 (39.6 / 0.6)$$

$$L_r = 44.0022$$

OR

$$L_r = m (E W_n / rg)$$

$$L_r = 2[4(3.3) / 0.6]$$

$$L_r = 2(13.2 / 0.6)$$

$$L_r = 44.0000$$

SPECIFICATION
REFERENCE

CALCULATED TC-5.01 EXAMPLES

VIRGINIA DEPARTMENT OF TRANSPORTATION

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