SBFCA FRWLP Superelevation Calc 4/4/13

Superelevation: $\Delta y = C \frac{V^2 W}{gr}$ [EM 1110-2-1601 Eq. 2-31]

where: Δy = rise in water due to superelevation
C = Coefficient
V = Mean channel velocity
W = Channel width
g = acceleration of gravity
r = radius of channel

For location upstream of Gridley Road Bridge (Cross Section 51.04)

Radius = $\frac{H}{2} + \frac{W^2}{8H}$ where w = width of Arc [Radius of Arc Definition]

H = Height of Arc

Radius = $\frac{650}{2} + \frac{(1840)^2}{8(650)}$ = 975 ft.

200-yr Velocity at XSEC 51.04 = 3.8 ft/s

200-yr Velocity at XSEC 50.84 = 6.7 ft/s

200-yr Average Channel Velocity = 5.25 ft/s

Width of channel = ~550 ft.

C = 0.5 [per Table 2-4, EM 1110-2-1601]

$\Delta y = (0.5)\frac{(5.25^2)(550)}{(32.2)(975)}$ = .24 ft.