The capacity of a culvert flowing full with a partially submerged outlet shall be governed by the following equation when the approach velocity is considered zero. Outlet velocity is based on critical depth if TW depth is less than critical depth. If TW depth is greater than critical depth, outlet velocity is based on TW depth.

 $HW = H + P - S_0L$

HW = Headwater Depth above the invert of the upstream end of the culvert. Headwater depth must be greater than 1.2D for entrance to be submerged.

- H = Head for culverts flowing full.
- P = Pressure line height = $\frac{d_c + D}{2}$
- $d_c =$ Critical depth in feet.
- D = Diameter or height of structure in feet.
- $S_0 =$ Slope of culvert in feet per foot.
- L = Length of culvert in feet.

EXHIBIT C LIST OF FIGURES (In Sequential Order in Exhibit C)

Figure No.	Title
C-1	Rainfall Intensity-Duration Frequency Curves, Rural
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C-3	Discharge of Pipes - Manning's Formula, n = 0.025
C-4	Depth of Gutter Flow vs. Discharge: 32'-0" Residential, 4" Parabolic Crown
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C-5	Losses in Hydraulic Systems
C-6	Culvert Losses
C-7	Computation of Composition Roughness Coefficients for Excavated and Natural Channels



FIGURE C-1







4" PARABOLIC CROWN



FIGURE C-4

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DEPTH OF GUTTER FLOW VS. VELOCITY

FIGURE C-5

WIDTH OF SPREAD, ft.

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DEPTH OF GUTTER FLOW VS. DISCHARGE ALL STREETS WITH 2 % CROSS SLOPE

FIGURE C-6

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DEPTH OF GUTTER FLOW VS. VELOCITY

FIGURE C-7

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RAINFALL INTENSITY - DURATION FREQUENCY CURVES



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FIGURE C-6

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