

Manning's Roughness in a Bioswale

Calculate Velocity * Radius

where:

Velocity is in feet per second

Hydraulic Radius (= Area / Perimeter) is in feet

Condition	Manning's N
For Depth equal to or less than 5 inches	0.250
For Depth greater than 5 inches	
if $V * R < 0.15$	0.200
if $0.15 < V * R < .4$	0.150
if $0.4 < V * R < .75$	0.100
if $0.75 < V * R < 1$	0.080
if $1 < V * R < 2$	0.060
if $2 < V * R$	0.050

Manning's Roughness for a grass-lined channel / bioswale.

The velocity and Hydraulic Radius vary with roughness. An iterative process is needed to solve for depth and hydraulic roughness.

Valid for grasses 6" high and less. If a grass is used that will grow taller than 6", a higher roughness should be used.