Mulvaney Equation

The Mulvaney Equation was proposed by the Irish engineer Thomas James Mulvaney (1822-1892). The equation was first published in 1851. The model predicts the peak discharge \$Q\$ as a function of an empirical constant \$C\$, the average rainfall intensity of the catchment \$I\$ and the area of the catchment \$A\$:

 $Q [m^3/s] = C \left[\frac{1E+6}{1E+3*3.6E+3}\right] * I \left[\frac{mm}{4mm}\right] * A [km^2]$

The intensity being given in \$mm/hour\$ and the area in \$km^2\$, the constant \$C\$ accounts for the transformation of units from \$mm/hour\$ and \$km^2\$ to \$m^3/s\$. This equation is only valid for small catchments in which storage and losses are not significant! This rather the case in urban (small) catchments:

This equation in commonly used units reads:

 $\$ $Q_{peak} = 0.278 * C * I * A$

where

\$Q_{peak}\$ = peak discharge in cubic meters per second

\$I\$ = Intensity of rainfall in mm/hour

\$A\$ = Area in square kilometers

\$C\$ is a runoff coefficient.

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