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Through: Wallis Lee   **Date:** 9/14/2012

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Subject: Hydraulic Study: 54 Peralta Development Gutter Flow

A new development at 54 Peralta Avenue proposed to create a driveway curb cut in front of an existing retaining wall. There was some concern that the runoff flowing in the gutter might over top the curb cut and damage surrounding properties.

Under the existing conditions, there appears to be no potential for overland flow from upstream blocks to contribute to the gutter flow on this portion of Peralta. This means the only tributary area is the area shown below in figure 1. This area was selected because the median wall divides the catchment boundary.

Conclusion: Expected street capacity of 20 cfs is greater than expected 100-year flow of 1 cfs.
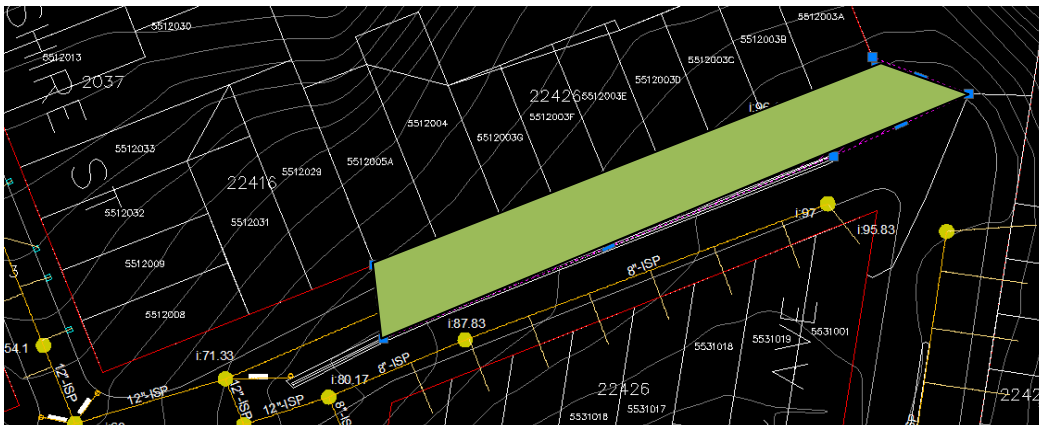

Fig 1: Tributary Area

Calculations:

Using the rational method (fig 2) to calculate the runoff from this area, the 100-year flow is about 1 cfs.

A (sq ft)	8082
A (acres)	0.186
t(minutes)	5
i(in/hr)	4.8
c	1.0
Q (cfs) = c * I * A =	0.9

SF Rainfall Table

Rainfall Intensities (inches per hour)

RETURN PERIOD (YRS)	DURATION							
	5 MIN	10 MIN	15 MIN	30 MIN	1 HRS	2 HRS	3 HRS	6 HRS
100	4.8000	3.4200	2.8000	1.8800	1.2800	0.8800	0.6933	0.4800

Fig 2: Runoff Calculation

A lidar ground model was reviewed to estimate the cross sectional area of Peralta Ave. Three cross sections were drawn in front of 54 Peralta (fig 3). The street cross sections created from this data appear somewhat rough. To be conservative, an assumed street cross section of 10 ft wide x 0.2 ft high was used for the flow calculation, which seemed to fit below the top of curb according to the lidar data. Street slope was estimated at 8%, also based on the lidar data.
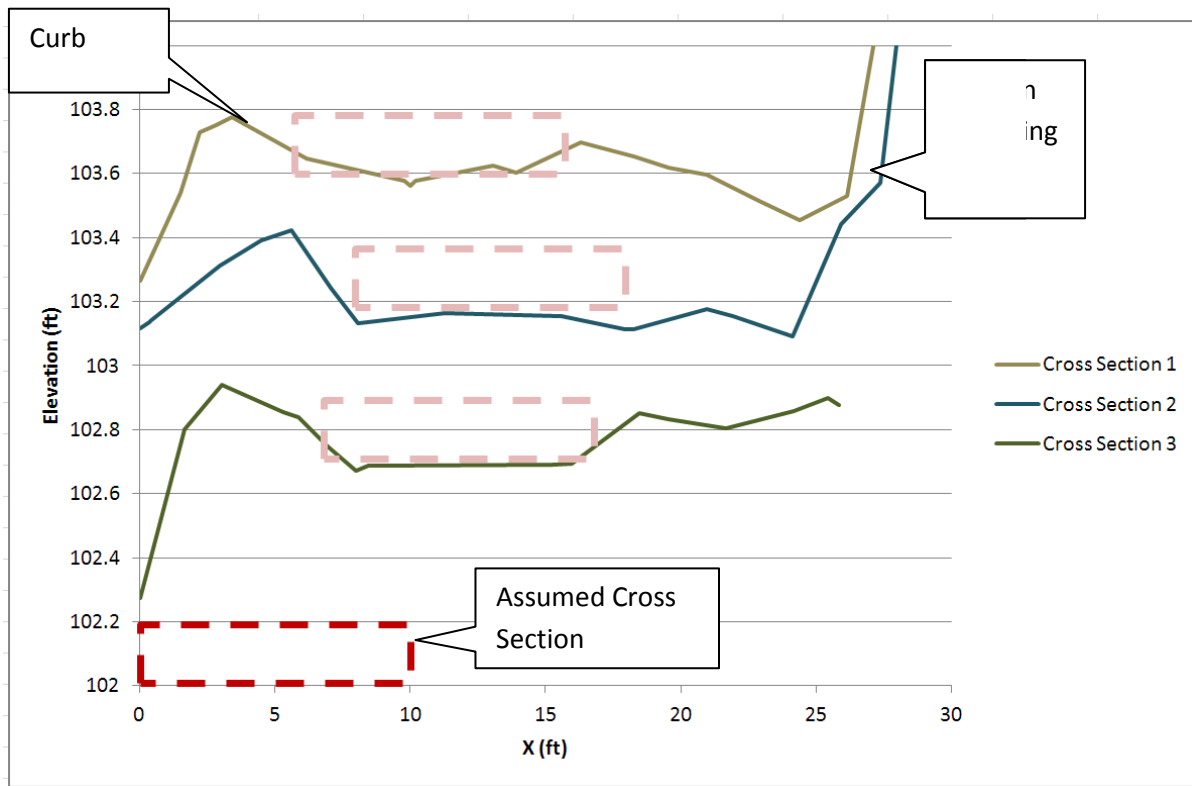
Figure 3: Cross sections – Lidar and Assumed

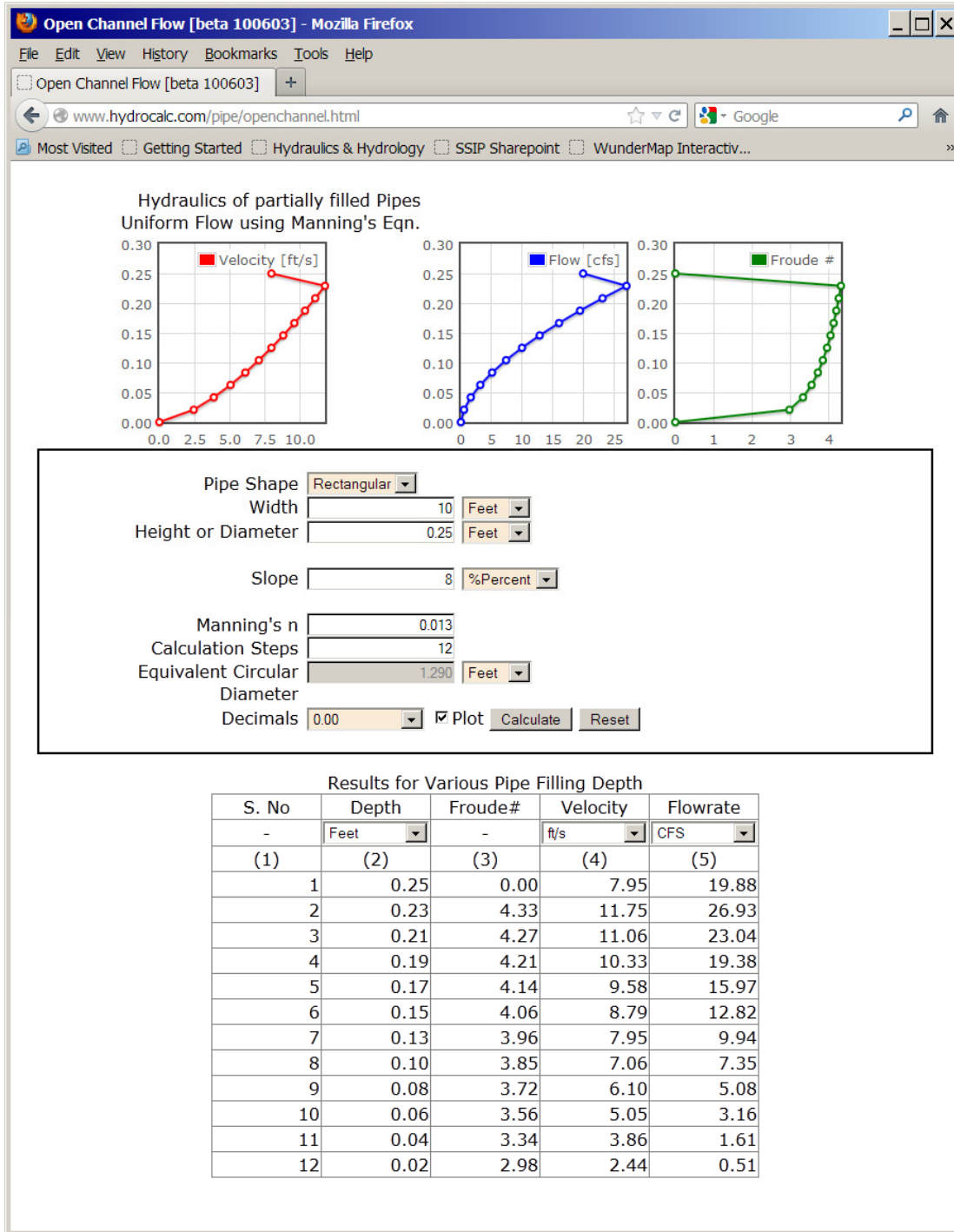With the assumed 10 ft x 0.2 ft rectangular cross section, 8% longitudinal slope, and n = .013, the street capacity is about 20 cfs.

Figure 4: Flow Calculation