

**My Garage @ Northcrest Center
RipRap Design Calculation**

Station	Description	Riprap or Boulder	Straight or Curved Section	Flow Velocity	Channel Slope	Velocity for Calc	Rock Sizing Parameter		Calculated Riprap Type	
	Cobble Swale along Const	Riprap	Straight	2.2ft/sec	1.50%	2.2ft/sec	0.8		VL	
							Rock Sizing Parameter		Riprap Type	D50
							0.00	3.29	VL	3" Cobble
							3.30	3.99	L	9 inches
							4.00	4.59	M	12 inches
							4.60	5.59	H	18 inches
							5.60	6.40	VH	24 inches

Equations:

$$\text{Rock Sizing Parameter} = VS^{0.17} / (G_s - 1)^{0.66}$$

V = Mean channel flow velocity for Riprap Sizing

V = Critical Velocity for Grouted Boulder Sizing

S = Longitudinal channel slope

G_s = Specific Gravity of stone (minimum G_s = 2.50)

G_s = 2.55 (UDFCD Recommended) (2'x3' is about 1 ton, able to be moved by skid steer)

G_s = 2.55

Equations taken from UDFCD USDCM (Eqn MD-13 & HS-9) and City of Colorado Springs
Drainage Criteria Manual (2014)

Straight	Boulder
Curve	Riprap