

PROJECT:	LA QUINTA
STORMWATER RUN-OFF CALCULATIONS	
Formulas used:	
[1] RATIONAL METHOD: Q=Aci	
where:	Q= Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed. A= Area of watershed in acres. c= Coefficient of run-off [2]. i= Intensity of rainfall in inches per hour based on concentration time. [3]
[4] TC= $\frac{(L^{0.8}(\frac{1000}{c} - 9)^{0.7})}{(1140(s^{0.5}))}$	
where:	TC= Time of concentration= time required for rain falling at most remote point to reach discharge point. c= Site run-off coefficient based on conditions shown. s= Percent slope of overland flow.
PRIOR DEVELOPMENT 25 Year Frequency	
Q₁ = Aci	
Watertight Surfaces	0 sqft = 0.000 Acres
c(1) = 0.9	
Gravel Surface	0 sqft = 0.000 Acres
c(2) = 0.25	
Green Space	87593 sqft = 2.011 Acres
c(3) = 0.15	
Summary	87593 sqft = 2.011 Acres
c = 0.15	
Duration (D) = Time of concentration (TC)	
where	L = 232 run-off length ft Elev diff = 5 c = 0.15 run-off coef S = 2.1552 percent slope therefore TC = D = 47.70 minutes Expected rainfall intensity i = 7.66 in/hr
Q₁ =	2.310 cfs 10% reduction 0.231 cfs
POST DEVELOPMENT 25 Year Frequency	
Q₂ = Aci	
Watertight Surfaces	59630 sqft = 1.369 Acres
c(1) = 0.9	
Gravel Surface	0 sqft = 0.000 Acres
c(2) = 0.25	
Green Space	27963 sqft = 0.642 Acres
c(3) = 0.15	
Summary	87593 sqft = 2.011 Acres
c = 0.66	
Duration (D) = Time of concentration (TC)	
where	L = 171 run-off length ft Elev diff = 3 c = 0.66 run-off coef S = 1.7544 percent slope therefore TC = D = 11.91 minutes Expected rainfall intensity i = 7.66 in/hr
Q₂ =	10.175 cfs
DETENTION REQUIREMENTS	
Detention required Q ₂ -Q ₁	7.86 cfs
ONE HOUR DETENTION	28311.9 cuft
DETENTION DIMENSIONS	WIDTH 300 feet LENGTH 98 feet DEPTH 0.96 feet
DISCHARGE END AREA REQUIREMENTS 10 Year Frequency	
[5] A= $\frac{Q}{(c\sqrt{(2gh)})}$	
where:	A= Discharge Area required g= Acceleration of gravity c= Discharge coefficient h= Hydraulic head Q= Flow volume from run-off
Pipe Servicing Site Drainage	Q = 0.231 cfs h = 2.50 feet c = 0.62 coefficient A = 0.029 sqft g = 32.16 ft/sec/sec
REQUIRED CONDUIT =	2.32 inch inside diameter
References:	
1. Chen, W.F. <u>The Civil Engineering Handbook</u> , 1995. Eq.# 31.1, pg. 1036	
2. Seelye, Elwyn E. <u>Data Book for Civil Engineers</u> , Vol.1 1960. Tbl. B, pg. 18-02	
3. Seelye, Elwyn E. <u>Data Book for Civil Engineers</u> , Vol.1 1960. Fig.B, pg. 18-01	
4. Chen, W.F. <u>The Civil Engineering Handbook</u> , 1995. Tbl. 31.2 Regan Equation (n=0.013)	
5. Chen, W.F. <u>The Civil Engineering Handbook</u> , 1995. Eq.# 28.32, pg. 969	