

PRESTIGE FITNESS CLUB	
4422 Kalani Dr	
Diamond Head MS	

Drainage Calculations - Modified Rational Method, LDOTD Hydraulics Manual
Predevelopment Condition
100 Year Frequency

Q= CIA			Factor	Area, sf	Total
	Undeveloped Area		0.2	83,055	16611.04
	Building/ Paving		0.95	0	0
				83,055	16611.04
C	Weighted C Factor		0.20		
L	Hydraulic Length, L	425	feet		
	Slope, in %, S	2.8235			0.028235
	Runoff Coefficient, C	0.20			
	Time of Concentration	Tc	37.8	minutes	
		10.70385	6.172558	0.8138	
i	I, intensity from Region 1		5.64		
	Time to Peak	D	0.630787	hrs	
		a	5.487		
		b	0.334		
		c	-0.759		
A	Area, Acres	1.907			
	Q10 Flow, cfs	C*I*A	2.15	cfs	

Q100 Predev Flow	2.15 cfs
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Postdevelopment Condition
100 Year Frequency

Q= CIA			Factor	Area, sf	Total
	Undeveloped Green Area		0.2	17,541	3508.20
	Building/ Paving		0.95	65,514	62238.30
				83,055	65746.50
C	Weighted C Factor		0.792		
L	Hydraulic Length, L	452.7	feet		
	Slope, in %, S	1.9881			0.019881
	Runoff Coefficient, C	0.792			
	Time of Concentration	Tc	8.8	minutes	
		10.97188	1.302503	0.872492	
i	I, intensity from Region 1		9.57		
	D	0.146279			
	a	5.487			
	b	0.334			
	c	-0.759			
A	Area, Acres	1.907			
	Q100 Flow, cfs	C*I*A	14.45	cfs	

Q100 Postdev Flow 14.45 cfs

Q100 Allowable Flow- Undeveloped Flow = 2.15 cfs

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Storage Requirements for a 100 Year Frequency Storm Event

$$i = a(D + b)^c$$

$$q = CiA$$

$$\text{Max Storage Volume} = (D \times q) - (.5 \times Q10)$$

$$\text{Allowable Flow} \times (D + Tc)$$

Storm Duration (D)	Time	i	q, cfs	Max. Storage Volume, cf	Max. Storage Volume, ac-ft
10	min	9.28	14.00	7,190	0.165
20	min	7.46	11.26	11,653	0.268
30	min	6.30	9.51	14,608	0.335
40	min	5.48	8.28	16,720	0.384
50	min	4.88	7.36	18,301	0.420
60	min	4.41	6.65	19,521	0.448
70	min	4.03	6.09	20,479	0.470
80	min	3.72	5.62	21,242	0.488
90	min	3.46	5.23	21,851	0.502
100	min	3.24	4.89	22,338	0.513
110	min	3.05	4.60	22,726	0.522
120	min	2.88	4.35	23,031	0.529
130	min	2.74	4.13	23,266	0.534
140	min	2.61	3.93	23,441	0.538
150	min	2.49	3.76	23,564	0.541
160	min	2.38	3.60	23,642	0.543
170	min	2.29	3.45	23,681	0.544
180	min	2.20	3.32	23,684	0.544
190	min	2.12	3.20	23,655	0.543
200	min	2.05	3.09	23,598	0.542
210	min	1.98	2.99	23515.17	1
220	min	1.92	2.89	23409.12	1

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Discharge End Area Calculations $Q = cA(2gh)^{1/2}$

Allowable Run Off, Q	2.15 CFS	per pipe
Friction Factor, c	0.98	
Acceleration, g	32.2 ft/ft/sec	
Height above Invert, H ft	0.26 ft	
End Area, Sq ft	0.54	
Square Inches	77.21 "	
Diameter, Inches	9.92 "	

Use 10" Diameter Orifice Plate in Terminal CB