

**Form C Attachment A-2
Tables and Calculations**

TABLE I – DISCHARGE POINT INFORMATION & DISCHARGE QUANTITY

Discharge Point	Location	Latitude	Longitude	Class	C (weighted)	I (in/hr)	A (Acres)	Q (cfs)
1	Kalihi Stream	21.3530D	157.8592D	2	0.72	4.725	0.16	0.54
2	Kalihi Stream	21.3539D	157.8588D	2	0.95	4.725	0.69	3.11
3	Kalihi Stream	21.3561D	157.8552D	2	0.95	4.725	0.52	2.32
4	Kalihi Stream	21.3595D	157.8539D	2	0.95	4.725	0.31	1.39
5	Kalihi Stream	21.3597D	157.8529D	2	0.95	4.725	0.26	1.15
6	Kalihi Stream	21.3608D	157.8513D	2	0.95	4.725	0.64	2.86
8	Kalihi Stream	21.3620D	157.8495D	2	0.95	4.725	0.51	2.29
9	Kalihi Stream	21.3621D	157.8470D	2	0.95	4.725	0.24	1.07
10	Kalihi Stream	21.3636D	157.8450D	2	0.95	4.725	0.52	2.34
12	Kalihi Stream	21.3664D	157.8395D	2	0.95	4.725	0.98	4.40
13	Kalihi Stream	21.3661D	157.8381D	2	0.95	4.725	0.18	0.80
14	Kalihi Stream	21.3663D	157.8373D	2	0.95	4.725	0.27	1.20
15	Kalihi Stream	21.3665D	157.8357D	1	0.95	4.725	0.31	1.40
16	Kalihi Stream	21.3676D	157.8331D	1	0.95	4.725	0.23	1.01
17	Kalihi Stream	21.3683D	157.8308D	1	0.95	4.725	0.66	2.95
18	Kalihi Stream	21.3697D	157.8290D	1	0.95	4.725	0.19	0.85
19	Kalihi Stream	21.3704D	157.8276D	1	0.95	4.725	0.31	1.40
20	Kalihi Stream	21.3709D	157.8267D	1	0.95	4.725	0.06	0.29
21	Kalihi Stream	21.3713D	157.8259D	1	0.95	4.725	0.30	1.33
22	Kalihi Stream	21.3716D	157.8249D	1	0.95	4.725	0.03	0.14
23	Kalihi Stream	21.3721D	157.8245D	1	0.95	4.725	0.17	0.75
24	Kalihi Stream	21.3729D	157.8234D	1	0.95	4.725	0.40	1.82
25	Kalihi Stream	21.3755D	157.8209D	1	0.95	4.725	0.31	1.38
26	Kalihi Stream	21.3761D	157.8166D	1	0.95	4.725	0.32	1.46
27	Piho Stream	21.3813D	157.8069D	2	0.81	4.725	0.62	2.37
28	Kuou Stream	21.3836D	157.8147D	2	0.78	4.725	0.23	0.83
29	Kuou Stream	21.3836D	157.8149D	2	0.95	4.725	0.37	1.68
30	Kuou Stream	21.3865D	157.8111D	2	0.78	4.725	0.27	0.98
31	Kuou Stream	21.3883D	157.8116D	2	0.89	4.725	0.45	1.88
32	Kuou Stream	21.3887D	157.8152D	2	0.95	4.725	0.05	0.22
33	Kuou Stream	21.3884D	157.8162D	2	0.95	4.725	0.15	0.69
34	Luluku Stream	21.3916D	157.8150D	2	0.95	4.725	0.26	1.15
35	Luluku Stream	21.3915D	157.8161D	2	0.95	4.725	0.35	1.56
36	Luluku Stream	21.3918D	157.8159D	2	0.30	4.725	0.02	0.03
38	Luluku Stream	21.3914D	157.8150D	2	0.95	4.725	0.24	1.07
39	Luluku Stream	21.3916D	157.8134D	2	0.95	4.725	0.25	1.10
40	Kaneohe Stream	21.4030D	157.8061D	2	0.95	4.725	3.92	17.61
41	Kaneohe Stream	21.4036D	157.8062D	2	0.95	4.725	0.25	1.13

RUNOFF CALCULATIONS

Given:

Area Disturbed 1	= 0.16 Acres
Area Disturbed 2	= 0.69 Acres
Area Disturbed 3	= 0.52 Acres
Area Disturbed 4	= 0.31 Acres
Area Disturbed 5	= 0.26 Acres
Area Disturbed 6	= 0.64 Acres
Area Disturbed 8	= 0.51 Acres
Area Disturbed 9	= 0.24 Acres
Area Disturbed 10	= 0.52 Acres
Area Disturbed 12	= 0.98 Acres
Area Disturbed 13	= 0.18 Acres
Area Disturbed 14	= 0.27 Acres
Area Disturbed 15	= 0.31 Acres
Area Disturbed 16	= 0.23 Acres
Area Disturbed 17	= 0.66 Acres
Area Disturbed 18	= 0.19 Acres
Area Disturbed 19	= 0.31 Acres
Area Disturbed 20	= 0.06 Acres
Area Disturbed 21	= 0.30 Acres
Area Disturbed 22	= 0.03 Acres
Area Disturbed 23	= 0.17 Acres
Area Disturbed 24	= 0.40 Acres
Area Disturbed 25	= 0.31 Acres
Area Disturbed 26	= 0.32 Acres
Area Disturbed 27	= 0.62 Acres
Area Disturbed 28	= 0.23 Acres
Area Disturbed 29	= 0.37 Acres
Area Disturbed 30	= 0.27 Acres
Area Disturbed 31	= 0.45 Acres
Area Disturbed 32	= 0.05 Acres
Area Disturbed 33	= 0.15 Acres
Area Disturbed 34	= 0.26 Acres
Area Disturbed 35	= 0.35 Acres
Area Disturbed 36	= 0.02 Acres
Area Disturbed 38	= 0.24 Acres
Area Disturbed 39	= 0.25 Acres
Area Disturbed 40	= 3.92 Acres
Area Disturbed 41	= 0.25 Acres

C = 0.95 (AC Pavement)
C = 0.50 (Dirt Areas)
C = 0.30 (Grassed Areas)

i = (2-yr, 1-hr event) = 2.10 in/hr

t_{C(All Areas)} = 10 min (minimum)

C_{f(All Areas)} = 2.25

I = i x C_f

I = 2.10 in/hr x 2.25 = 4.725 in/hr

Total project area is less than 100 acres resulting in using the Rational Method to calculate the potential runoff.

Find: Runoff for a 2-yr, 1-hr rainfall event (Q).

Solution: $Q = C \times I \times A$

Q₁ = (0.72) x (4.725 in/hr) x (0.16 Acs)

Q₁ = 0.54 cfs

Q₂ = (0.95) x (4.725 in/hr) x (0.69 Acs)

Q₂ = 3.11 cfs

Q₃ = (0.95) x (4.725 in/hr) x (0.52 Acs)

Q₃ = 2.32 cfs

Q₄ = (0.95) x (4.725 in/hr) x (0.31 Acs)

Q₄ = 1.39 cfs

Q₅ = (0.95) x (4.725 in/hr) x (0.26 Acs)

Q₅ = 1.15 cfs

Q₆ = (0.95) x (4.725 in/hr) x (0.64 Acs)

Q₆ = 2.86 cfs

Q₈ = (0.95) x (4.725 in/hr) x (0.51 Acs)

Q₈ = 2.29 cfs

Q₉ = (0.95) x (4.725 in/hr) x (0.24 Acs)

Q₉ = 1.07 cfs

Q₁₀ = (0.95) x (4.725 in/hr) x (0.52 Acs)

Q₁₀ = 2.34 cfs

Q₁₂ = (0.95) x (4.725 in/hr) x (0.98 Acs)

Q₁₂ = 4.40 cfs

Q₁₃ = (0.95) x (4.725 in/hr) x (0.18 Acs)

Q₁₃ = 0.80 cfs

Q₁₄ = (0.95) x (4.725 in/hr) x (0.27 Acs)

Q₁₄ = 1.20 cfs

Q₁₅ = (0.95) x (4.725 in/hr) x (0.31 Acs)

Q₁₅ = 1.40 cfs

$$Q_{16} = (0.95) \times (4.725 \text{ in/hr}) \times (0.23 \text{ Acs})$$

$$\mathbf{Q_{16} = 1.01 \text{ cfs}}$$

$$Q_{17} = (0.95) \times (4.725 \text{ in/hr}) \times (0.66 \text{ Acs})$$

$$\mathbf{Q_{17} = 2.95 \text{ cfs}}$$

$$Q_{18} = (0.95) \times (4.725 \text{ in/hr}) \times (0.19 \text{ Acs})$$

$$\mathbf{Q_{18} = 0.85 \text{ cfs}}$$

$$Q_{19} = (0.95) \times (4.725 \text{ in/hr}) \times (0.31 \text{ Acs})$$

$$\mathbf{Q_{19} = 1.40 \text{ cfs}}$$

$$Q_{20} = (0.95) \times (4.725 \text{ in/hr}) \times (0.06 \text{ Acs})$$

$$\mathbf{Q_{20} = 0.29 \text{ cfs}}$$

$$Q_{21} = (0.95) \times (4.725 \text{ in/hr}) \times (0.30 \text{ Acs})$$

$$\mathbf{Q_{21} = 1.33 \text{ cfs}}$$

$$Q_{22} = (0.95) \times (4.725 \text{ in/hr}) \times (0.03 \text{ Acs})$$

$$\mathbf{Q_{22} = 0.14 \text{ cfs}}$$

$$Q_{23} = (0.95) \times (4.725 \text{ in/hr}) \times (0.17 \text{ Acs})$$

$$\mathbf{Q_{23} = 0.75 \text{ cfs}}$$

$$Q_{24} = (0.95) \times (4.725 \text{ in/hr}) \times (0.40 \text{ Acs})$$

$$\mathbf{Q_{24} = 1.82 \text{ cfs}}$$

$$Q_{25} = (0.95) \times (4.725 \text{ in/hr}) \times (0.31 \text{ Acs})$$

$$\mathbf{Q_{25} = 1.38 \text{ cfs}}$$

$$Q_{26} = (0.95) \times (4.725 \text{ in/hr}) \times (0.32 \text{ Acs})$$

$$\mathbf{Q_{26} = 1.46 \text{ cfs}}$$

$$Q_{27} = (0.81) \times (4.725 \text{ in/hr}) \times (0.62 \text{ Acs})$$

$$\mathbf{Q_{27} = 2.37 \text{ cfs}}$$

$$Q_{28} = (0.78) \times (4.725 \text{ in/hr}) \times (0.23 \text{ Acs})$$

$$\mathbf{Q_{28} = 0.83 \text{ cfs}}$$

$$Q_{29} = (0.95) \times (4.725 \text{ in/hr}) \times (0.37 \text{ Acs})$$

$$\mathbf{Q_{29} = 1.68 \text{ cfs}}$$

$$Q_{30} = (0.78) \times (4.725 \text{ in/hr}) \times (0.27 \text{ Acs})$$

$$\mathbf{Q_{30} = 0.98 \text{ cfs}}$$

$$Q_{31} = (0.89) \times (4.725 \text{ in/hr}) \times (0.45 \text{ Acs})$$

$$\mathbf{Q_{31} = 1.88 \text{ cfs}}$$

$$Q_{32} = (0.95) \times (4.725 \text{ in/hr}) \times (0.05 \text{ Acs})$$

$$\mathbf{Q_{32} = 0.22 \text{ cfs}}$$

$$Q_{33} = (0.95) \times (4.725 \text{ in/hr}) \times (0.15 \text{ Acs})$$

$$\mathbf{Q_{33} = 0.69 \text{ cfs}}$$

$$Q_{34} = (0.95) \times (4.725 \text{ in/hr}) \times (0.26 \text{ Acs})$$

$$\mathbf{Q_{34} = 1.15 \text{ cfs}}$$

$$Q_{35} = (0.95) \times (4.725 \text{ in/hr}) \times (0.35 \text{ Acs})$$

$$\mathbf{Q_{35} = 1.56 \text{ cfs}}$$

$$Q_{36} = (0.30) \times (4.725 \text{ in/hr}) \times (0.02 \text{ Acs})$$

$$\mathbf{Q_{36} = 0.03 \text{ cfs}}$$

$$Q_{38} = (0.95) \times (4.725 \text{ in/hr}) \times (0.24 \text{ Acs})$$

$$\mathbf{Q_{38} = 1.07 \text{ cfs}}$$

$$Q_{39} = (0.95) \times (4.725 \text{ in/hr}) \times (0.25 \text{ Acs})$$

$$\mathbf{Q_{39} = 1.10 \text{ cfs}}$$

$$Q_{40} = (0.95) \times (4.725 \text{ in/hr}) \times (3.92 \text{ Acs})$$

$$\mathbf{Q_{40} = 17.61 \text{ cfs}}$$

$$Q_{41} = (0.95) \times (4.725 \text{ in/hr}) \times (0.25 \text{ Acs})$$

$$\mathbf{Q_{41} = 1.13 \text{ cfs}}$$

AREA DISTURBED – DISCHARGE QUANTITY						
Drainage Area	Size (sf)	Size (Acres)	C (weighted)	I (in/hr)	A (Acres)	Q (cfs)
1-1	6975	0.16	0.72	4.725	0.16	0.54
2-1	7425	0.17	0.95	4.725	0.17	0.77
2-2	3255	0.07	0.95	4.725	0.07	0.34
2-3	9661	0.22	0.95	4.725	0.22	1.00
2-4	2924	0.07	0.95	4.725	0.07	0.30
2-5	6932	0.16	0.95	4.725	0.16	0.71
3-1	3071	0.07	0.95	4.725	0.07	0.32
3-2	6844	0.16	0.95	4.725	0.16	0.71
3-3	2737	0.06	0.95	4.725	0.06	0.28
3-4	6697	0.15	0.95	4.725	0.15	0.69
3-5	3205	0.07	0.95	4.725	0.07	0.33
4-1	4092	0.09	0.95	4.725	0.09	0.42
4-2	5548	0.13	0.95	4.725	0.13	0.57
4-3	3857	0.09	0.95	4.725	0.09	0.40
5-1	4055	0.09	0.95	4.725	0.09	0.42
5-2	7058	0.16	0.95	4.725	0.16	0.73
6-1	3963	0.09	0.95	4.725	0.09	0.41
6-2	2952	0.07	0.95	4.725	0.07	0.30
6-3	4903	0.11	0.95	4.725	0.11	0.51
6-4	3264	0.07	0.95	4.725	0.07	0.34
6-5	5383	0.12	0.95	4.725	0.12	0.55
6-6	7304	0.17	0.95	4.725	0.17	0.75
8-1	2650	0.06	0.95	4.725	0.06	0.27
8-2	5317	0.12	0.95	4.725	0.12	0.55
8-3	14233	0.33	0.95	4.725	0.33	1.47
9-1	10363	0.24	0.95	4.725	0.24	1.07
10-1	3595	0.08	0.95	4.725	0.08	0.37
10-2	3949	0.09	0.95	4.725	0.09	0.41
10-3	6054	0.14	0.95	4.725	0.14	0.62
10-4	9066	0.21	0.95	4.725	0.21	0.93
12-1	12850	0.29	0.95	4.725	0.29	1.32
12-2	13310	0.31	0.95	4.725	0.31	1.37
12-3	8639	0.20	0.95	4.725	0.20	0.89
12-4	7908	0.18	0.95	4.725	0.18	0.81
13-1	3358	0.08	0.95	4.725	0.08	0.35
13-2	4405	0.10	0.95	4.725	0.10	0.45
14-1	5241	0.12	0.95	4.725	0.12	0.54
14-2	6360	0.15	0.95	4.725	0.15	0.66
15-1	4380	0.10	0.95	4.725	0.10	0.45
15-2	9247	0.21	0.95	4.725	0.21	0.95
16-1	6380	0.15	0.95	4.725	0.15	0.66
16-2	3452	0.08	0.95	4.725	0.08	0.36
17-1	6292	0.14	0.95	4.725	0.14	0.65

AREA DISTURBED – DISCHARGE QUANTITY						
Drainage Area	Size (sf)	Size (Acres)	C (weighted)	I (in/hr)	A (Acres)	Q (cfs)
17-2	3017	0.07	0.95	4.725	0.07	0.31
17-3	2092	0.05	0.95	4.725	0.05	0.22
17-4	10543	0.24	0.95	4.725	0.24	1.09
17-5	6710	0.15	0.95	4.725	0.15	0.69
18-1	5027	0.12	0.95	4.725	0.12	0.52
18-2	3174	0.07	0.95	4.725	0.07	0.33
19-1	3146	0.07	0.95	4.725	0.07	0.32
19-2	4867	0.11	0.95	4.725	0.11	0.50
19-3	5548	0.13	0.95	4.725	0.13	0.57
20-1	2779	0.06	0.95	4.725	0.06	0.29
21-1	5404	0.12	0.95	4.725	0.12	0.56
21-2	7519	0.17	0.95	4.725	0.17	0.77
22-1	1404	0.03	0.95	4.725	0.03	0.14
23-1	3147	0.07	0.95	4.725	0.07	0.32
23-2	4127	0.09	0.95	4.725	0.09	0.43
24-1	8681	0.20	0.95	4.725	0.20	0.89
24-2	8945	0.21	0.95	4.725	0.21	0.92
25-1	6406	0.15	0.95	4.725	0.15	0.66
25-2	5500	0.13	0.95	4.725	0.13	0.57
25-3	1456	0.03	0.95	4.725	0.03	0.15
26-1	1025	0.02	0.95	4.725	0.02	0.11
26-2	834	0.02	0.95	4.725	0.02	0.09
26-3	465	0.01	0.95	4.725	0.01	0.05
26-4	551	0.01	0.95	4.725	0.01	0.06
26-5	1205	0.03	0.95	4.725	0.03	0.12
26-6	2396	0.06	0.95	4.725	0.06	0.25
26-7	2527	0.06	0.95	4.725	0.06	0.26
26-8	4688	0.11	0.95	4.725	0.11	0.48
26-9	452	0.01	0.95	4.725	0.01	0.05
27-1	7689	0.18	0.81	4.725	0.18	0.68
27-2	9477	0.22	0.81	4.725	0.22	0.83
27-3	4038	0.09	0.81	4.725	0.09	0.35
27-4	5655	0.13	0.81	4.725	0.13	0.50
28-1	9883	0.23	0.78	4.725	0.23	0.84
29-1	10049	0.23	0.95	4.725	0.23	1.04
29-2	1735	0.04	0.95	4.725	0.04	0.18
29-3	4484	0.10	0.95	4.725	0.10	0.46
30-1	4852	0.11	0.78	4.725	0.11	0.41
30-2	6796	0.16	0.78	4.725	0.16	0.57
31-1	9328	0.21	0.89	4.725	0.21	0.90
31-2	10166	0.23	0.89	4.725	0.23	0.98
32-1	2138	0.05	0.95	4.725	0.05	0.22
33-1	5219	0.12	0.95	4.725	0.12	0.54

AREA DISTURBED – DISCHARGE QUANTITY						
Drainage Area	Size (sf)	Size (Acres)	C (weighted)	I (in/hr)	A (Acres)	Q (cfs)
33-2	1458	0.03	0.95	4.725	0.03	0.15
34-1	6466	0.15	0.95	4.725	0.15	0.67
34-2	4735	0.11	0.95	4.725	0.11	0.49
35-1	7323	0.17	0.95	4.725	0.17	0.75
35-2	7794	0.18	0.95	4.725	0.18	0.80
36-1	1065	0.02	0.30	4.725	0.02	0.03
38-1	6380	0.15	0.95	4.725	0.15	0.66
38-2	4052	0.09	0.95	4.725	0.09	0.42
39-1	2702	0.06	0.95	4.725	0.06	0.28
39-2	3746	0.09	0.95	4.725	0.09	0.39
39-3	2066	0.05	0.95	4.725	0.05	0.21
39-4	2198	0.05	0.95	4.725	0.05	0.23
40-1	2553	0.06	0.95	4.725	0.06	0.26
40-2	3023	0.07	0.95	4.725	0.07	0.31
40-3	2726	0.06	0.95	4.725	0.06	0.28
40-4	3397	0.08	0.95	4.725	0.08	0.35
40-5	3413	0.08	0.95	4.725	0.08	0.35
40-6	3743	0.09	0.95	4.725	0.09	0.39
40-7	3052	0.07	0.95	4.725	0.07	0.31
40-8	3950	0.09	0.95	4.725	0.09	0.41
40-9	3442	0.08	0.95	4.725	0.08	0.35
40-10	4189	0.10	0.95	4.725	0.10	0.43
40-11	3117	0.07	0.95	4.725	0.07	0.32
40-12	3773	0.09	0.95	4.725	0.09	0.39
40-13	2783	0.06	0.95	4.725	0.06	0.29
40-14	3534	0.08	0.95	4.725	0.08	0.36
40-15	3555	0.08	0.95	4.725	0.08	0.37
40-16	3994	0.09	0.95	4.725	0.09	0.41
40-17	3196	0.07	0.95	4.725	0.07	0.33
40-18	2265	0.05	0.95	4.725	0.05	0.23
40-19	2042	0.05	0.95	4.725	0.05	0.21
40-20	1941	0.04	0.95	4.725	0.04	0.20
40-21	3106	0.07	0.95	4.725	0.07	0.32
40-22	13186	0.30	0.95	4.725	0.30	1.36
40-23	11374	0.26	0.95	4.725	0.26	1.17
40-24	4922	0.11	0.95	4.725	0.11	0.51
40-25	3578	0.08	0.95	4.725	0.08	0.37
40-26	4631	0.11	0.95	4.725	0.11	0.48
40-27	3194	0.07	0.95	4.725	0.07	0.33
40-28	5121	0.12	0.95	4.725	0.12	0.53
40-29	3172	0.07	0.95	4.725	0.07	0.33
40-30	4957	0.11	0.95	4.725	0.11	0.51
40-31	3149	0.07	0.95	4.725	0.07	0.32

AREA DISTURBED – DISCHARGE QUANTITY						
Drainage Area	Size (sf)	Size (Acres)	C (weighted)	I (in/hr)	A (Acres)	Q (cfs)
40-32	6218	0.14	0.95	4.725	0.14	0.64
40-33	3559	0.08	0.95	4.725	0.08	0.37
40-34	4972	0.11	0.95	4.725	0.11	0.51
40-35	3354	0.08	0.95	4.725	0.08	0.35
40-36	4984	0.11	0.95	4.725	0.11	0.51
40-37	3856	0.09	0.95	4.725	0.09	0.40
40-38	4109	0.09	0.95	4.725	0.09	0.42
40-39	2948	0.07	0.95	4.725	0.07	0.30
40-40	2089	0.05	0.95	4.725	0.05	0.22
40-41	3392	0.08	0.95	4.725	0.08	0.35
40-42	7330	0.17	0.95	4.725	0.17	0.76
41-1	10926	0.25	0.95	4.725	0.25	1.13