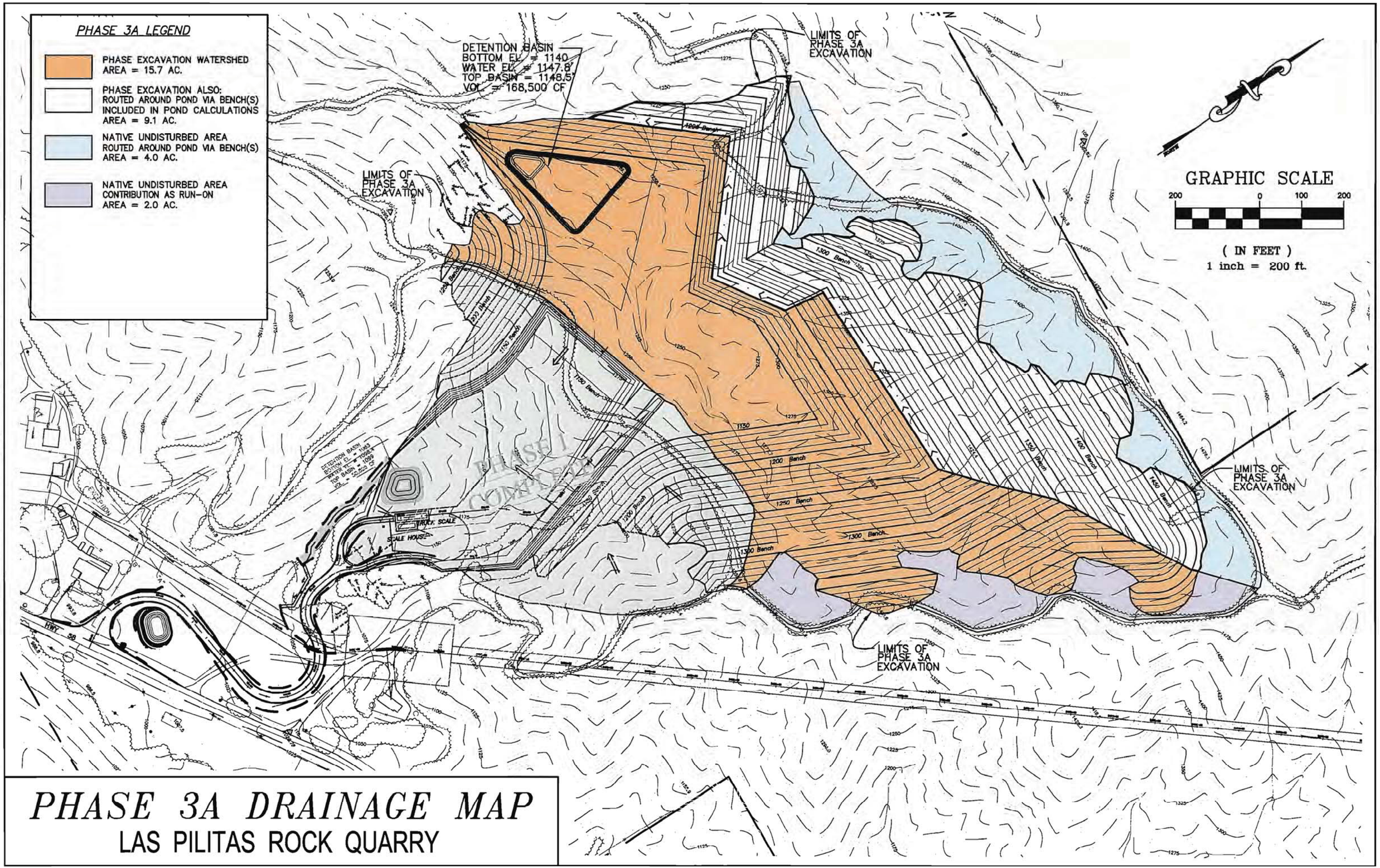


PHASE 3A DRAINAGE MAP

LAS PILITAS ROCK QUARRY

TARTAGLIA ENGINEERING
Civil Engineers
P.O. Box 1930
ATASCADERO, CA 93423
(805) 466-5660
FAX (805) 466-5471

JOB 08-23
SHEET NO. ____ OF ____
CALCULATED BY SAK DATE 9/18/09 (Rev)
CHECKED BY ____ DATE ____
SCALE PHASE 3A (Rev)

— PHASE 3A, 2 yr ALLOWABLE (REVISED)

• ALLOWABLE 2 YEAR RELEASE RATE

TOTAL AREA = 15.7 + 9.1 + 2.0 = 26.8 Ac

⊙ TIME OF CONCENTRATION = 10 min.

⊙ INTENSITY i_2 = 1.7 in/hr

⊙ RUNOFF COEFFICIENT C = 0.61 (NATIVE SITE CONDITION)

& ALLOWABLE 2yr RELEASE RATE

$\Rightarrow Q = CiA = (.61)(1.7)(26.8) = 27.8$ cfs

— PHASE 3A DEVELOPED —

(SCS Hydrograph input values)

$\Delta H = \frac{1506 - 1137}{1850} = 19.9\%$

T_c = 10 min

SOIL CURVE NUMBER (CN)

· PHASE EXCAVATION = 24.8 Ac CN = 91

· NATIVE UNDIST. AREA (RUN-ON) = 2.0 Ac CN = 57

$CN_{(w)} = \frac{(24.8)(91) + (2.0)(57)}{26.8} = 88.5$

Hydrograph Report

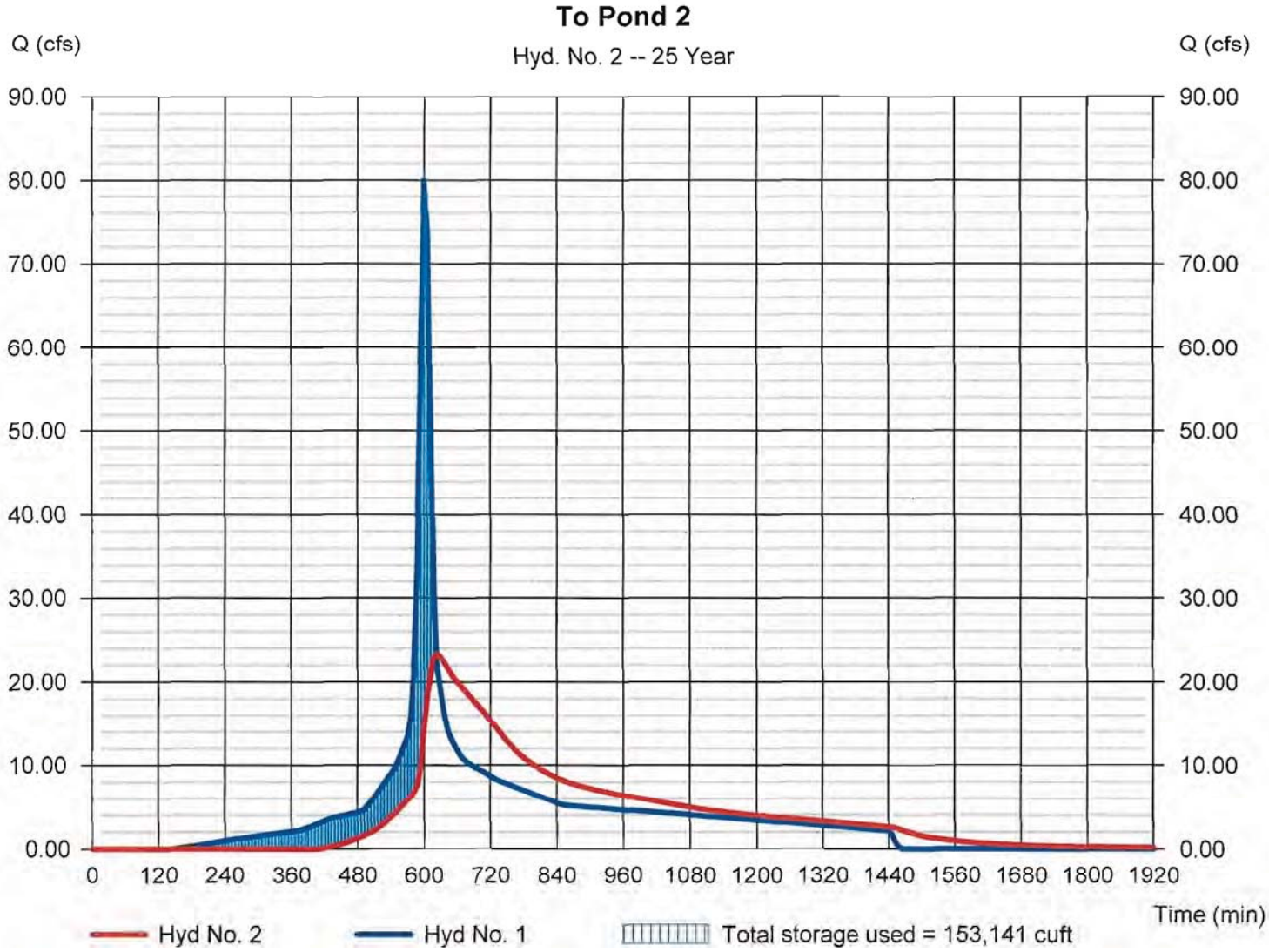
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 23.32 cfs
Storm frequency	= 25 yrs	Time to peak	= 624 min
Time interval	= 6 min	Hyd. volume	= 452,918 cuft
Inflow hyd. No.	= 1 - Phase 3A Pond	Max. Elevation	= 1147.55 ft
Reservoir name	= P 3A Pond	Max. Storage	= 153,141 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 23.32 cfs
Storm frequency	= 25 yrs	Time to peak	= 10.40 hrs
Time interval	= 6 min	Hyd. volume	= 497,250 cuft
Inflow hyd. No.	= 1 - Phase 3A Pond	Reservoir name	= P 3A Pond
Max. Elevation	= 1147.55 ft	Max. Storage	= 153,141 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 2.00% of Qp. Print interval = 3)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
7.50	3.867	1143.40	0.592	0.578	-----	-----	-----	-----	-----	-----	-----	0.578
7.80	4.121	1143.53	0.989	0.985	-----	-----	-----	-----	-----	-----	-----	0.985
8.10	4.415	1143.65	1.446	1.440	-----	-----	-----	-----	-----	-----	-----	1.440
8.40	5.591	1143.78	1.990	1.990	-----	-----	-----	-----	-----	-----	-----	1.990
8.70	7.263	1143.94	2.799	2.783	-----	-----	-----	-----	-----	-----	-----	2.783
9.00	8.969	1144.12	3.777	3.777	-----	-----	-----	-----	-----	-----	-----	3.777
9.30	11.33	1144.34	4.968	4.967	-----	-----	-----	-----	-----	-----	-----	4.967
9.60	15.84	1144.62	6.291	6.233	-----	-----	-----	-----	-----	-----	-----	6.233
9.90	58.48	1145.49	9.938	8.722	1.216	-----	-----	-----	-----	-----	-----	9.937
10.20	50.04	1147.31	21.12	9.908	9.908	-----	1.301	-----	-----	-----	-----	21.12
10.50	18.85	1147.50	22.98	9.298	9.298	-----	4.381	-----	-----	-----	-----	22.98
10.80	13.28	1147.29	21.01	9.932	9.932	-----	1.148	-----	-----	-----	-----	21.01
11.10	11.22	1147.03	19.55	9.922	9.630	-----	-----	-----	-----	-----	-----	19.55
11.40	10.11	1146.75	18.20	9.702	8.502	-----	-----	-----	-----	-----	-----	18.20
11.70	9.401	1146.48	16.81	9.509	7.297	-----	-----	-----	-----	-----	-----	16.81
12.00	8.681	1146.24	15.34	9.390	5.946	-----	-----	-----	-----	-----	-----	15.34
12.30	8.069	1146.03	13.87	9.339	4.486	-----	-----	-----	-----	-----	-----	13.83
12.60	7.612	1145.84	12.44	9.188	3.226	-----	-----	-----	-----	-----	-----	12.41
12.90	7.157	1145.68	11.32	9.001	2.228	-----	-----	-----	-----	-----	-----	11.23
13.20	6.700	1145.55	10.34	8.809	1.502	-----	-----	-----	-----	-----	-----	10.31
13.50	6.239	1145.42	9.538	8.600	0.938	-----	-----	-----	-----	-----	-----	9.538
13.80	5.777	1145.31	8.953	8.358	0.518	-----	-----	-----	-----	-----	-----	8.876
14.10	5.325	1145.20	8.318	8.101	0.216	-----	-----	-----	-----	-----	-----	8.317
14.40	5.119	1145.09	7.936	7.831	0.055	-----	-----	-----	-----	-----	-----	7.886
14.70	5.029	1145.00	7.527	7.526	-----	-----	-----	-----	-----	-----	-----	7.526
15.00	4.939	1144.91	7.231	7.231	-----	-----	-----	-----	-----	-----	-----	7.231
15.30	4.849	1144.83	6.956	6.956	-----	-----	-----	-----	-----	-----	-----	6.956
15.60	4.759	1144.75	6.701	6.701	-----	-----	-----	-----	-----	-----	-----	6.701
15.90	4.668	1144.68	6.469	6.453	-----	-----	-----	-----	-----	-----	-----	6.453
16.20	4.576	1144.62	6.267	6.203	-----	-----	-----	-----	-----	-----	-----	6.203
16.50	4.485	1144.56	6.027	5.984	-----	-----	-----	-----	-----	-----	-----	5.984
16.80	4.393	1144.50	5.786	5.784	-----	-----	-----	-----	-----	-----	-----	5.784
17.10	4.301	1144.45	5.555	5.555	-----	-----	-----	-----	-----	-----	-----	5.554
17.40	4.209	1144.41	5.346	5.346	-----	-----	-----	-----	-----	-----	-----	5.345
17.70	4.116	1144.37	5.126	5.126	-----	-----	-----	-----	-----	-----	-----	5.125
18.00	4.023	1144.33	4.925	4.924	-----	-----	-----	-----	-----	-----	-----	4.924
18.30	3.930	1144.30	4.744	4.744	-----	-----	-----	-----	-----	-----	-----	4.744
18.60	3.837	1144.27	4.579	4.579	-----	-----	-----	-----	-----	-----	-----	4.579
18.90	3.744	1144.24	4.429	4.428	-----	-----	-----	-----	-----	-----	-----	4.428
19.20	3.650	1144.22	4.288	4.288	-----	-----	-----	-----	-----	-----	-----	4.288

Continues on next page...

To Pond 2

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.50	3.556	1144.19	4.158	4.158	-----	-----	-----	-----	-----	-----	-----	4.159
19.80	3.462	1144.17	4.038	4.038	-----	-----	-----	-----	-----	-----	-----	4.038
20.10	3.368	1144.15	3.924	3.923	-----	-----	-----	-----	-----	-----	-----	3.923
20.40	3.274	1144.13	3.812	3.812	-----	-----	-----	-----	-----	-----	-----	3.811
20.70	3.180	1144.11	3.704	3.703	-----	-----	-----	-----	-----	-----	-----	3.703
21.00	3.085	1144.09	3.602	3.597	-----	-----	-----	-----	-----	-----	-----	3.597
21.30	2.991	1144.07	3.506	3.493	-----	-----	-----	-----	-----	-----	-----	3.493
21.60	2.896	1144.05	3.411	3.391	-----	-----	-----	-----	-----	-----	-----	3.391
21.90	2.801	1144.03	3.318	3.290	-----	-----	-----	-----	-----	-----	-----	3.290
22.20	2.707	1144.02	3.225	3.190	-----	-----	-----	-----	-----	-----	-----	3.190
22.50	2.612	1144.00	3.131	3.091	-----	-----	-----	-----	-----	-----	-----	3.091
22.80	2.517	1143.98	3.025	2.993	-----	-----	-----	-----	-----	-----	-----	2.993
23.10	2.421	1143.96	2.920	2.895	-----	-----	-----	-----	-----	-----	-----	2.895
23.40	2.326	1143.94	2.815	2.798	-----	-----	-----	-----	-----	-----	-----	2.798
23.70	2.231	1143.92	2.711	2.702	-----	-----	-----	-----	-----	-----	-----	2.702
24.00	2.135	1143.90	2.606	2.605	-----	-----	-----	-----	-----	-----	-----	2.605
24.30	0.279	1143.85	2.358	2.358	-----	-----	-----	-----	-----	-----	-----	2.358
24.60	0.000	1143.77	1.958	1.958	-----	-----	-----	-----	-----	-----	-----	1.958
24.90	0.000	1143.70	1.638	1.637	-----	-----	-----	-----	-----	-----	-----	1.637
25.20	0.000	1143.64	1.406	1.398	-----	-----	-----	-----	-----	-----	-----	1.398
25.50	0.000	1143.59	1.209	1.199	-----	-----	-----	-----	-----	-----	-----	1.199
25.80	0.000	1143.54	1.043	1.038	-----	-----	-----	-----	-----	-----	-----	1.038
26.10	0.000	1143.50	0.900	0.899	-----	-----	-----	-----	-----	-----	-----	0.899
26.40	0.000	1143.47	0.799	0.794	-----	-----	-----	-----	-----	-----	-----	0.794
26.70	0.000	1143.44	0.711	0.703	-----	-----	-----	-----	-----	-----	-----	0.703
27.00	0.000	1143.41	0.634	0.622	-----	-----	-----	-----	-----	-----	-----	0.622
27.30	0.000	1143.39	0.570	0.556	-----	-----	-----	-----	-----	-----	-----	0.556
27.60	0.000	1143.37	0.517	0.504	-----	-----	-----	-----	-----	-----	-----	0.504

...End

Hydrograph Report

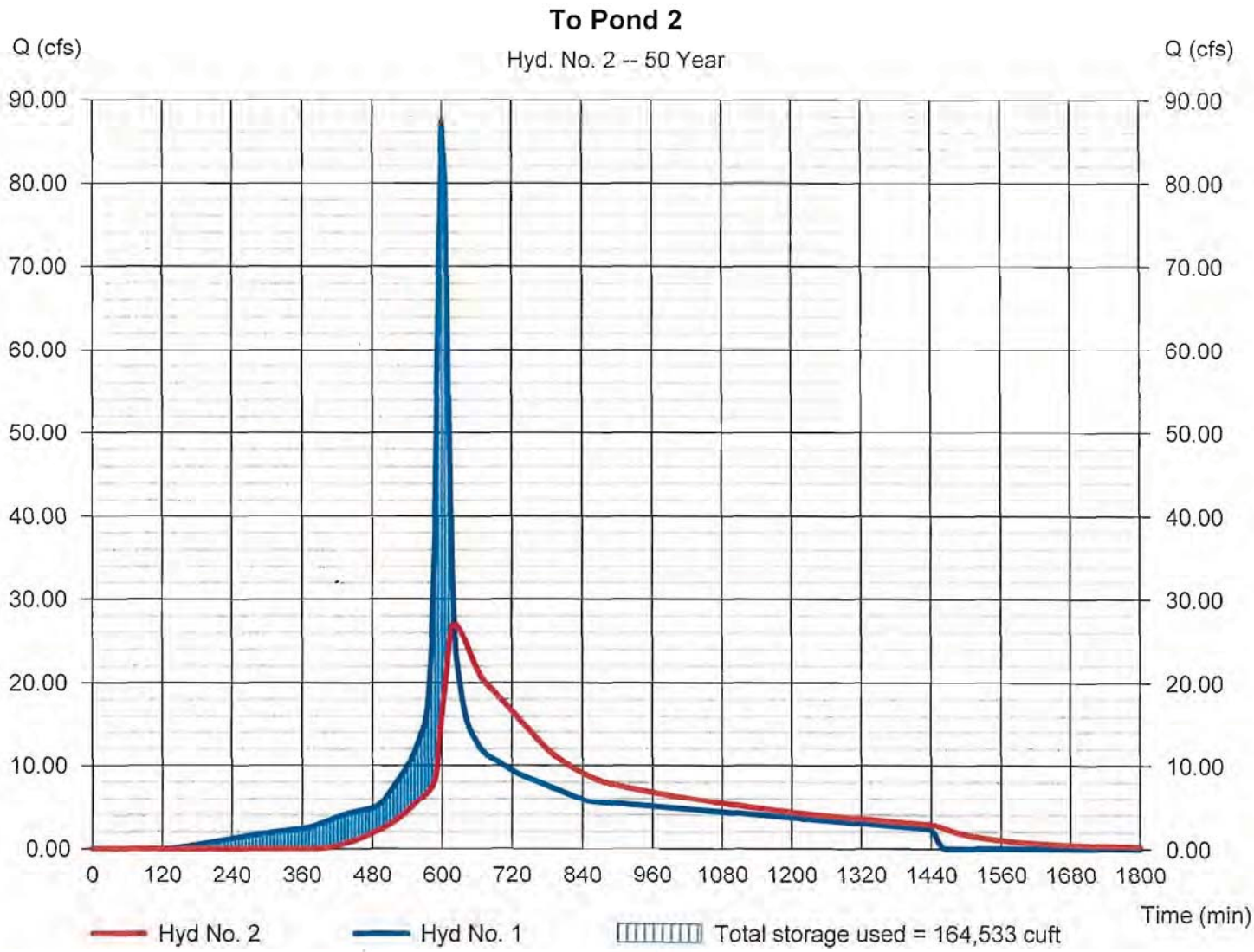
Hydraflow Hydrographs by Intelisolve v9.1 Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 27.00 cfs
Storm frequency	= 50 yrs	Time to peak	= 624 min
Time interval	= 6 min	Hyd. volume	= 497,250 cuft
Inflow hyd. No.	= 1 - Phase 3A Pond	Max. Elevation	= 1147.90 ft
Reservoir name	= P 3A Pond	Max. Storage	= 164,533 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 27.00 cfs
Storm frequency	= 50 yrs	Time to peak	= 10.40 hrs
Time interval	= 6 min	Hyd. volume	= 497,250 cuft
Inflow hyd. No.	= 1 - Phase 3A Pond	Reservoir name	= P 3A Pond
Max. Elevation	= 1147.90 ft	Max. Storage	= 164,533 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 2.00% of Qp. Print interval = 3)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
7.20	4.044	1143.41	0.625	0.613	-----	-----	-----	-----	-----	-----	-----	0.613
7.50	4.348	1143.54	1.056	1.050	-----	-----	-----	-----	-----	-----	-----	1.050
7.80	4.619	1143.67	1.539	1.535	-----	-----	-----	-----	-----	-----	-----	1.535
8.10	4.935	1143.79	2.054	2.053	-----	-----	-----	-----	-----	-----	-----	2.053
8.40	6.231	1143.91	2.674	2.668	-----	-----	-----	-----	-----	-----	-----	2.668
8.70	8.070	1144.07	3.517	3.505	-----	-----	-----	-----	-----	-----	-----	3.505
9.00	9.936	1144.26	4.538	4.538	-----	-----	-----	-----	-----	-----	-----	4.538
9.30	12.51	1144.49	5.718	5.718	-----	-----	-----	-----	-----	-----	-----	5.717
9.60	17.43	1144.80	6.863	6.862	-----	-----	-----	-----	-----	-----	-----	6.862
9.90	63.99	1145.73	11.64	9.061	2.520	-----	-----	-----	-----	-----	-----	11.58
10.20	54.51	1147.67	24.75	8.460	8.460	-----	7.827	-----	-----	-----	-----	24.75
10.50	20.48	1147.83	26.47	7.430	7.430	-----	11.60	-----	-----	-----	-----	26.47
10.80	14.42	1147.56	23.60	9.025	9.025	-----	5.549	-----	-----	-----	-----	23.60
11.10	12.17	1147.27	20.85	9.960	9.960	-----	0.927	-----	-----	-----	-----	20.85
11.40	10.97	1146.99	19.37	9.890	9.479	-----	-----	-----	-----	-----	-----	19.37
11.70	10.20	1146.71	18.03	9.675	8.351	-----	-----	-----	-----	-----	-----	18.03
12.00	9.414	1146.46	16.66	9.485	7.171	-----	-----	-----	-----	-----	-----	16.66
12.30	8.748	1146.22	15.19	9.389	5.796	-----	-----	-----	-----	-----	-----	15.18
12.60	8.250	1146.02	13.77	9.331	4.397	-----	-----	-----	-----	-----	-----	13.73
12.90	7.756	1145.84	12.39	9.183	3.193	-----	-----	-----	-----	-----	-----	12.38
13.20	7.259	1145.68	11.31	9.001	2.228	-----	-----	-----	-----	-----	-----	11.23
13.50	6.759	1145.55	10.36	8.813	1.515	-----	-----	-----	-----	-----	-----	10.33
13.80	6.257	1145.43	9.558	8.606	0.951	-----	-----	-----	-----	-----	-----	9.557
14.10	5.767	1145.31	8.965	8.364	0.526	-----	-----	-----	-----	-----	-----	8.890
14.40	5.543	1145.20	8.343	8.113	0.228	-----	-----	-----	-----	-----	-----	8.340
14.70	5.446	1145.11	7.992	7.871	0.072	-----	-----	-----	-----	-----	-----	7.943
15.00	5.348	1145.02	7.627	7.601	0.013	-----	-----	-----	-----	-----	-----	7.614
15.30	5.250	1144.94	7.338	7.337	-----	-----	-----	-----	-----	-----	-----	7.337
15.60	5.151	1144.87	7.088	7.088	-----	-----	-----	-----	-----	-----	-----	7.088
15.90	5.052	1144.80	6.854	6.853	-----	-----	-----	-----	-----	-----	-----	6.853
16.20	4.953	1144.73	6.633	6.633	-----	-----	-----	-----	-----	-----	-----	6.633
16.50	4.854	1144.67	6.435	6.411	-----	-----	-----	-----	-----	-----	-----	6.411
16.80	4.754	1144.61	6.257	6.191	-----	-----	-----	-----	-----	-----	-----	6.191
17.10	4.654	1144.56	6.042	5.996	-----	-----	-----	-----	-----	-----	-----	5.996
17.40	4.554	1144.51	5.825	5.816	-----	-----	-----	-----	-----	-----	-----	5.816
17.70	4.453	1144.47	5.615	5.614	-----	-----	-----	-----	-----	-----	-----	5.614
18.00	4.352	1144.42	5.420	5.419	-----	-----	-----	-----	-----	-----	-----	5.419
18.30	4.252	1144.38	5.226	5.225	-----	-----	-----	-----	-----	-----	-----	5.225
18.60	4.150	1144.35	5.030	5.029	-----	-----	-----	-----	-----	-----	-----	5.030
18.90	4.049	1144.32	4.854	4.853	-----	-----	-----	-----	-----	-----	-----	4.853

Continues on next page...

To Pond 2

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.20	3.948	1144.29	4.690	4.690	-----	-----	-----	-----	-----	-----	-----	4.689
19.50	3.846	1144.26	4.538	4.538	-----	-----	-----	-----	-----	-----	-----	4.538
19.80	3.744	1144.24	4.396	4.396	-----	-----	-----	-----	-----	-----	-----	4.396
20.10	3.643	1144.21	4.262	4.262	-----	-----	-----	-----	-----	-----	-----	4.261
20.40	3.541	1144.19	4.135	4.135	-----	-----	-----	-----	-----	-----	-----	4.135
20.70	3.438	1144.17	4.016	4.016	-----	-----	-----	-----	-----	-----	-----	4.016
21.00	3.336	1144.15	3.900	3.899	-----	-----	-----	-----	-----	-----	-----	3.899
21.30	3.234	1144.12	3.786	3.785	-----	-----	-----	-----	-----	-----	-----	3.785
21.60	3.131	1144.10	3.674	3.674	-----	-----	-----	-----	-----	-----	-----	3.674
21.90	3.029	1144.08	3.571	3.564	-----	-----	-----	-----	-----	-----	-----	3.563
22.20	2.926	1144.06	3.469	3.454	-----	-----	-----	-----	-----	-----	-----	3.454
22.50	2.823	1144.04	3.370	3.346	-----	-----	-----	-----	-----	-----	-----	3.346
22.80	2.720	1144.02	3.271	3.240	-----	-----	-----	-----	-----	-----	-----	3.239
23.10	2.617	1144.00	3.173	3.133	-----	-----	-----	-----	-----	-----	-----	3.133
23.40	2.515	1143.98	3.062	3.028	-----	-----	-----	-----	-----	-----	-----	3.028
23.70	2.411	1143.96	2.949	2.922	-----	-----	-----	-----	-----	-----	-----	2.922
24.00	2.308	1143.94	2.836	2.818	-----	-----	-----	-----	-----	-----	-----	2.818
24.30	0.302	1143.89	2.542	2.541	-----	-----	-----	-----	-----	-----	-----	2.541
24.60	0.000	1143.80	2.098	2.097	-----	-----	-----	-----	-----	-----	-----	2.097
24.90	0.000	1143.72	1.753	1.752	-----	-----	-----	-----	-----	-----	-----	1.752
25.20	0.000	1143.66	1.491	1.485	-----	-----	-----	-----	-----	-----	-----	1.485
25.50	0.000	1143.60	1.280	1.268	-----	-----	-----	-----	-----	-----	-----	1.268
25.80	0.000	1143.56	1.104	1.097	-----	-----	-----	-----	-----	-----	-----	1.097
26.10	0.000	1143.52	0.952	0.950	-----	-----	-----	-----	-----	-----	-----	0.950
26.40	0.000	1143.48	0.835	0.833	-----	-----	-----	-----	-----	-----	-----	0.832
26.70	0.000	1143.45	0.743	0.736	-----	-----	-----	-----	-----	-----	-----	0.736
27.00	0.000	1143.42	0.662	0.651	-----	-----	-----	-----	-----	-----	-----	0.652
27.30	0.000	1143.40	0.591	0.578	-----	-----	-----	-----	-----	-----	-----	0.578

...End

ond Report

flow Hydrographs by Intelisolve v9.1 Friday, Sep 18, 2009

d No. 1 - P 3A Pond

d Data

ours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1140.00 ft

ge / Storage Table

e (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
)	1140.00	1,600	0	0
)	1141.00	2,519	2,042	2,042
)	1142.00	3,366	2,932	4,974
)	1143.00	26,429	13,074	18,048
)	1144.00	27,868	27,143	45,191
)	1145.00	29,332	28,594	73,785
)	1146.00	30,821	30,070	103,855
)	1147.00	32,335	31,572	135,427
)	1148.00	33,875	33,099	168,526

vert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
(in)	= 24.00	18.00	18.00	0.00
(in)	= 24.00	18.00	18.00	0.00
arrels	= 1	1	1	0
t El. (ft)	= 1143.00	1143.00	1145.00	0.00
th (ft)	= 250.00	2.00	2.00	0.00
e (%)	= 1.25	1.00	1.00	n/a
ue	= .011	.024	.024	n/a
e Coeff.	= 0.60	0.60	0.60	0.60
-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.28	0.00	0.00	0.00
Crest El. (ft)	= 1147.15	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

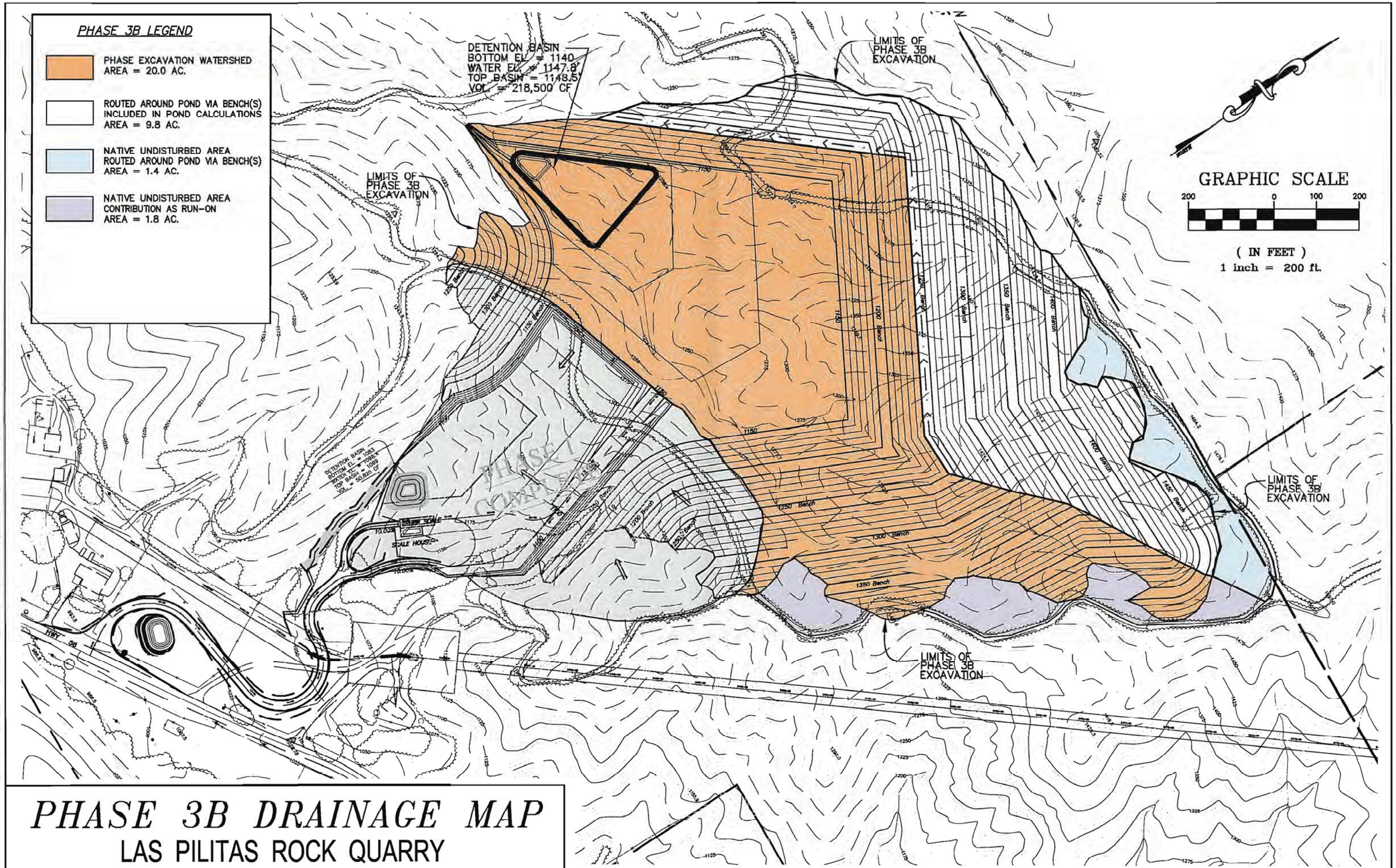
Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

ge / Storage / Discharge Table

e	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
)	0	1140.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
)	2,042	1141.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
)	4,974	1142.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
)	18,048	1143.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
)	45,191	1144.00	3.15 ic	3.11 ic	0.00	---	0.00	---	---	---	---	---	3.11
)	73,785	1145.00	7.53 ic	7.53 ic	0.00	---	0.00	---	---	---	---	---	7.53
)	103,855	1146.00	13.65 ic	9.32 ic	4.28 ic	---	0.00	---	---	---	---	---	13.60
)	135,427	1147.00	19.41 ic	9.90 ic	9.51 ic	---	0.00	---	---	---	---	---	19.41
)	168,526	1148.00	28.00 ic	6.43 ic	6.43 ic	---	15.13 s	---	---	---	---	---	28.00



PHASE 3B DRAINAGE MAP

LAS PILITAS ROCK QUARRY

TARTAGLIA ENGINEERING
Civil Engineers
P.O. Box 1930
ATASCADERO, CA 93423
(805) 466-5660
FAX (805) 466-5471

JOB 08-23
SHEET NO. ____ OF ____
CALCULATED BY SAIC DATE 9/18/2009
CHECKED BY ____ DATE ____
SCALE PHASE 3B (Rev.)

PHASE 3B (FINAL PHASE) - 2 YR. ALLOWABLE RELEASE RATE

TOTAL AREAS: 20.0 + 9.8 + 1.8 = 31.6 Acres

⊙ Time of Concentration:

✓✓ larger AREA to verify 10 min.

$\Delta H = 1506 - 1137 = 369'$

LONGEST PATH OF TRAVEL "L" = 1850' & per Co. Std. H-2

< 5 min.

∴ USE CHART MIN. T_c = 10 min

• INTENSITY:

SAME AS PREVIOUS i_2 = 1.7 in/hr

⊙ Runoff Coefficient "C"

NATIVE, UNDEV. CONDITION ⇒ C = 0.61 (Per Co. Std. H-3A)

ALLOWABLE 2-YR RELEASE RATE

$Q = CiA \Rightarrow (.61)(1.7)(31.6) = 32.8$ cfs

TARTAGLIA ENGINEERING
Civil Engineers
P.O. Box 1930
ATASCADERO, CA 93423
(805) 466-5660
FAX (805) 466-5471

JOB 08-23
SHEET NO. ____ OF ____
CALCULATED BY SAIC DATE 9/18/2009
CHECKED BY ____ DATE ____
SCALE PHASE 3B (Rev.) CONT'D

— PHASE 3B "DEVELOPED" (FINAL PHASE)

(SCS Hydrograph input VALUES)

SOIL GROUP & CURVE NUMBER DERIVATION

Soil Group "C" PER ATTACHED Soil Survey

COVER TYPE	AREA (AC)	CN
NEWLY EXCAVATED SLOPES, BENCHES & FLAT AREAS	29.8 AC.	91
· NATIVE UNDISTURBED AREA	1.8 AC	57

$$CN_{(W)} = \frac{(29.8)(91) + (1.8)(57)}{31.6} = \underline{89.0}$$

· SLOPE & PATH OF TRAVEL

$$\frac{\Delta H}{L} \Rightarrow \frac{1506 - 1137}{1850} = \underline{19.9\%}$$

& T_C REMAINS @ 10 min

Hydrograph Report

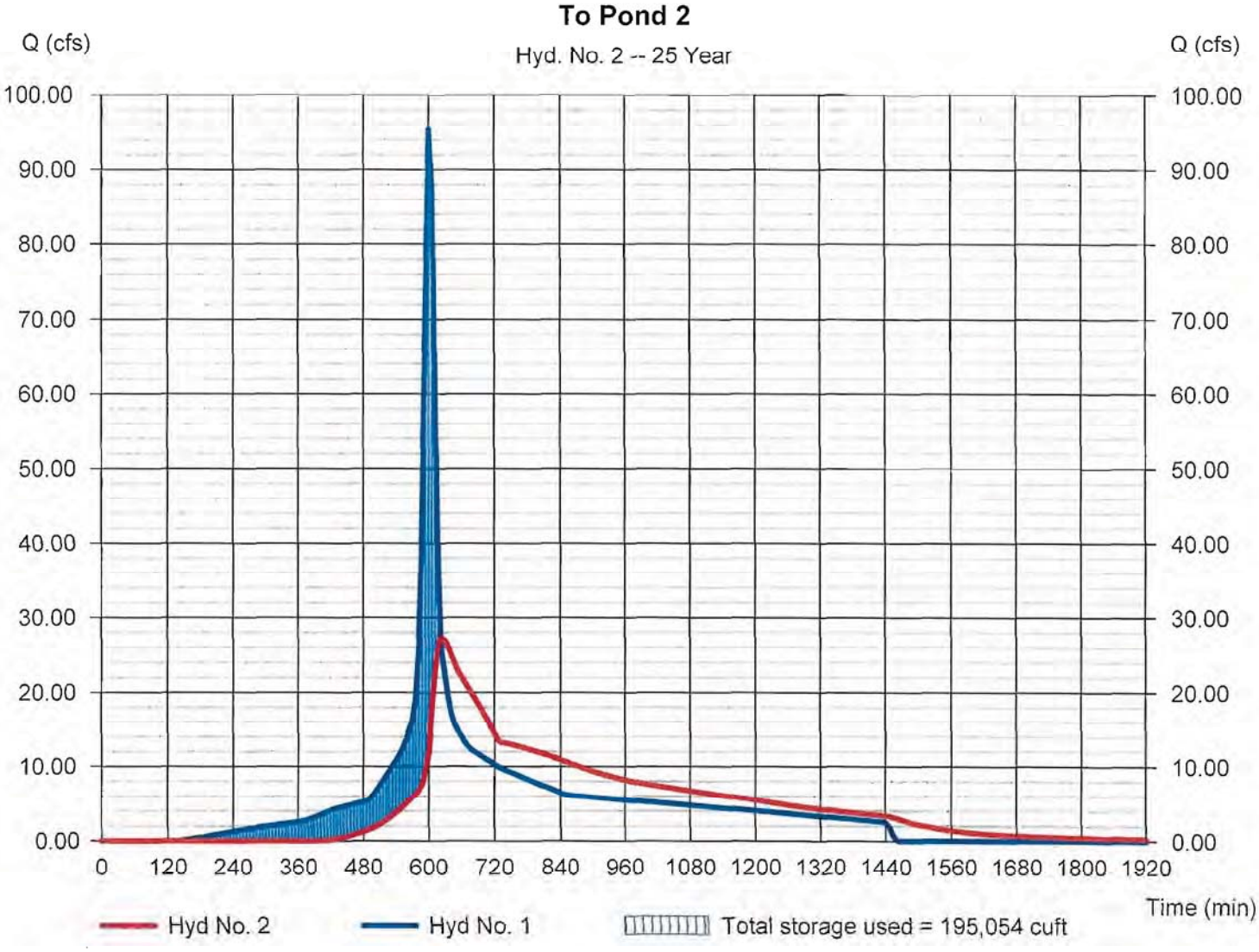
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 27.33 cfs
Storm frequency	= 25 yrs	Time to peak	= 624 min
Time interval	= 6 min	Hyd. volume	= 539,910 cuft
Inflow hyd. No.	= 1 - Phase 3B Pond	Max. Elevation	= 1147.46 ft
Reservoir name	= Pond 3B	Max. Storage	= 195,054 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 27.33 cfs
Storm frequency	= 25 yrs	Time to peak	= 10.40 hrs
Time interval	= 6 min	Hyd. volume	= 231,956 cuft
Inflow hyd. No.	= 1 - Phase 3B Pond	Reservoir name	= Pond 3B
Max. Elevation	= 1147.46 ft	Max. Storage	= 195,054 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 2.00% of Qp. Print Interval = 3)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
7.50	4.696	1143.41	0.610	0.597	-----	-----	-----	-----	-----	-----	-----	0.597
7.80	4.994	1143.53	0.989	0.986	-----	-----	-----	-----	-----	-----	-----	0.986
8.10	5.340	1143.65	1.437	1.430	-----	-----	-----	-----	-----	-----	-----	1.430
8.40	6.749	1143.77	1.977	1.977	-----	-----	-----	-----	-----	-----	-----	1.977
8.70	8.749	1143.93	2.785	2.770	-----	-----	-----	-----	-----	-----	-----	2.770
9.00	10.78	1144.12	3.780	3.780	-----	-----	-----	-----	-----	-----	-----	3.780
9.30	13.59	1144.34	5.001	5.001	-----	-----	-----	-----	-----	-----	-----	5.001
9.60	18.96	1144.63	6.326	6.275	-----	-----	-----	-----	-----	-----	-----	6.275
9.90	69.71	1145.46	8.980	8.980	0.407	-----	-----	-----	-----	-----	-----	9.386
10.20	59.47	1147.23	13.75	13.23	9.626	-----	0.515	-----	-----	-----	-----	23.37
10.50	22.36	1147.43	15.98	12.92	10.82	-----	3.060	-----	-----	-----	-----	26.81
10.80	15.75	1147.26	13.99	13.22	9.789	-----	0.768	-----	-----	-----	-----	23.78
11.10	13.30	1147.05	12.99	12.97	8.415	-----	-----	-----	-----	-----	-----	21.38
11.40	11.99	1146.85	12.55	12.52	6.755	-----	-----	-----	-----	-----	-----	19.27
11.70	11.14	1146.68	12.14	12.13	4.903	-----	-----	-----	-----	-----	-----	17.03
12.00	10.28	1146.54	11.82	11.82	2.577	-----	-----	-----	-----	-----	-----	14.39
12.30	9.558	1146.45	11.58	11.58	1.558	-----	-----	-----	-----	-----	-----	13.14
12.60	9.015	1146.35	11.38	11.34	1.503	-----	-----	-----	-----	-----	-----	12.85
12.90	8.476	1146.25	11.15	11.09	1.411	-----	-----	-----	-----	-----	-----	12.50
13.20	7.933	1146.14	10.85	10.83	1.295	-----	-----	-----	-----	-----	-----	12.12
13.50	7.387	1146.03	10.54	10.54	1.160	-----	-----	-----	-----	-----	-----	11.70
13.80	6.839	1145.91	10.22	10.22	1.005	-----	-----	-----	-----	-----	-----	11.22
14.10	6.303	1145.79	9.964	9.893	0.842	-----	-----	-----	-----	-----	-----	10.74
14.40	6.059	1145.67	9.601	9.576	0.680	-----	-----	-----	-----	-----	-----	10.26
14.70	5.952	1145.56	9.267	9.267	0.531	-----	-----	-----	-----	-----	-----	9.798
15.00	5.846	1145.46	8.966	8.966	0.401	-----	-----	-----	-----	-----	-----	9.367
15.30	5.738	1145.37	8.685	8.684	0.288	-----	-----	-----	-----	-----	-----	8.973
15.60	5.631	1145.28	8.423	8.422	0.194	-----	-----	-----	-----	-----	-----	8.616
15.90	5.523	1145.20	8.176	8.176	0.115	-----	-----	-----	-----	-----	-----	8.290
16.20	5.415	1145.13	8.022	7.943	0.057	-----	-----	-----	-----	-----	-----	8.000
16.50	5.306	1145.06	7.791	7.723	0.021	-----	-----	-----	-----	-----	-----	7.744
16.80	5.197	1145.00	7.512	7.511	-----	-----	-----	-----	-----	-----	-----	7.511
17.10	5.088	1144.93	7.300	7.299	-----	-----	-----	-----	-----	-----	-----	7.299
17.40	4.978	1144.87	7.095	7.095	-----	-----	-----	-----	-----	-----	-----	7.095
17.70	4.869	1144.81	6.898	6.898	-----	-----	-----	-----	-----	-----	-----	6.898
18.00	4.759	1144.75	6.707	6.707	-----	-----	-----	-----	-----	-----	-----	6.707
18.30	4.648	1144.70	6.524	6.522	-----	-----	-----	-----	-----	-----	-----	6.522
18.60	4.538	1144.65	6.360	6.319	-----	-----	-----	-----	-----	-----	-----	6.318
18.90	4.427	1144.60	6.198	6.125	-----	-----	-----	-----	-----	-----	-----	6.125
19.20	4.317	1144.55	5.987	5.951	-----	-----	-----	-----	-----	-----	-----	5.951

Continues on next page...

To Pond 2

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.50	4.206	1144.50	5.785	5.783	-----	-----	-----	-----	-----	-----	-----	5.783
19.80	4.094	1144.46	5.581	5.581	-----	-----	-----	-----	-----	-----	-----	5.581
20.10	3.983	1144.42	5.389	5.388	-----	-----	-----	-----	-----	-----	-----	5.388
20.40	3.872	1144.38	5.186	5.186	-----	-----	-----	-----	-----	-----	-----	5.186
20.70	3.760	1144.34	4.984	4.983	-----	-----	-----	-----	-----	-----	-----	4.983
21.00	3.648	1144.31	4.794	4.793	-----	-----	-----	-----	-----	-----	-----	4.793
21.30	3.536	1144.28	4.616	4.615	-----	-----	-----	-----	-----	-----	-----	4.615
21.60	3.424	1144.25	4.446	4.446	-----	-----	-----	-----	-----	-----	-----	4.446
21.90	3.312	1144.22	4.286	4.286	-----	-----	-----	-----	-----	-----	-----	4.286
22.20	3.200	1144.19	4.135	4.135	-----	-----	-----	-----	-----	-----	-----	4.135
22.50	3.087	1144.16	3.993	3.993	-----	-----	-----	-----	-----	-----	-----	3.992
22.80	2.975	1144.14	3.854	3.854	-----	-----	-----	-----	-----	-----	-----	3.854
23.10	2.862	1144.11	3.720	3.720	-----	-----	-----	-----	-----	-----	-----	3.720
23.40	2.750	1144.09	3.594	3.588	-----	-----	-----	-----	-----	-----	-----	3.588
23.70	2.637	1144.06	3.474	3.459	-----	-----	-----	-----	-----	-----	-----	3.459
24.00	2.524	1144.04	3.357	3.332	-----	-----	-----	-----	-----	-----	-----	3.332
24.30	0.330	1143.99	3.097	3.060	-----	-----	-----	-----	-----	-----	-----	3.060
24.60	0.000	1143.91	2.631	2.628	-----	-----	-----	-----	-----	-----	-----	2.628
24.90	0.000	1143.83	2.266	2.265	-----	-----	-----	-----	-----	-----	-----	2.266
25.20	0.000	1143.77	1.966	1.966	-----	-----	-----	-----	-----	-----	-----	1.966
25.50	0.000	1143.72	1.717	1.717	-----	-----	-----	-----	-----	-----	-----	1.717
25.80	0.000	1143.67	1.521	1.517	-----	-----	-----	-----	-----	-----	-----	1.516
26.10	0.000	1143.62	1.356	1.346	-----	-----	-----	-----	-----	-----	-----	1.346
26.40	0.000	1143.59	1.210	1.200	-----	-----	-----	-----	-----	-----	-----	1.200
26.70	0.000	1143.55	1.083	1.077	-----	-----	-----	-----	-----	-----	-----	1.077
27.00	0.000	1143.52	0.969	0.966	-----	-----	-----	-----	-----	-----	-----	0.966
27.30	0.000	1143.49	0.872	0.870	-----	-----	-----	-----	-----	-----	-----	0.870
27.60	0.000	1143.47	0.798	0.793	-----	-----	-----	-----	-----	-----	-----	0.793
27.90	0.000	1143.45	0.731	0.723	-----	-----	-----	-----	-----	-----	-----	0.723
28.20	0.000	1143.43	0.670	0.659	-----	-----	-----	-----	-----	-----	-----	0.659
28.50	0.000	1143.41	0.614	0.601	-----	-----	-----	-----	-----	-----	-----	0.601
28.80	0.000	1143.39	0.569	0.555	-----	-----	-----	-----	-----	-----	-----	0.555

...End

Hydrograph Report

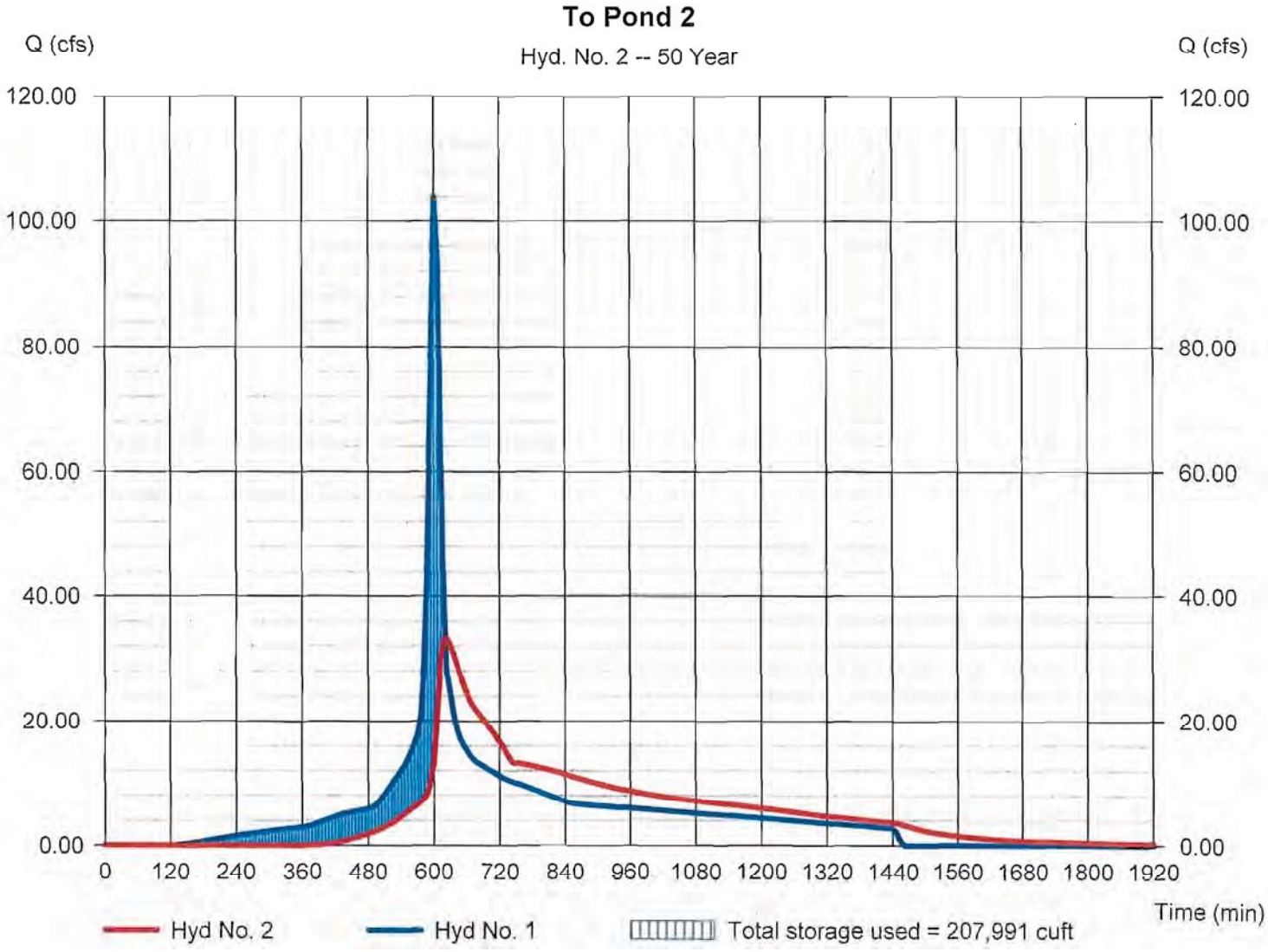
Hydraflow Hydrographs by Intelisolve v9.1 Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 33.25 cfs
Storm frequency	= 50 yrs	Time to peak	= 624 min
Time interval	= 6 min	Hyd. volume	= 592,308 cuft
Inflow hyd. No.	= 1 - Phase 3B Pond	Max. Elevation	= 1147.78 ft
Reservoir name	= Pond 3B	Max. Storage	= 207,991 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 18, 2009

Hyd. No. 2

To Pond 2

Hydrograph type	= Reservoir	Peak discharge	= 33.25 cfs
Storm frequency	= 50 yrs	Time to peak	= 10.40 hrs
Time interval	= 6 min	Hyd. volume	= 231,956 cuft
Inflow hyd. No.	= 1 - Phase 3B Pond	Reservoir name	= Pond 3B
Max. Elevation	= 1147.78 ft	Max. Storage	= 207,991 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 2.00% of Qp. Print interval = 3)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
7.50	5.268	1143.54	1.053	1.048	-----	-----	-----	-----	-----	-----	-----	1.048
7.80	5.585	1143.67	1.526	1.521	-----	-----	-----	-----	-----	-----	-----	1.521
8.10	5.956	1143.79	2.043	2.042	-----	-----	-----	-----	-----	-----	-----	2.042
8.40	7.508	1143.92	2.679	2.672	-----	-----	-----	-----	-----	-----	-----	2.673
8.70	9.705	1144.08	3.540	3.530	-----	-----	-----	-----	-----	-----	-----	3.530
9.00	11.93	1144.27	4.594	4.594	-----	-----	-----	-----	-----	-----	-----	4.594
9.30	14.99	1144.50	5.796	5.792	-----	-----	-----	-----	-----	-----	-----	5.792
9.60	20.84	1144.82	6.934	6.933	-----	-----	-----	-----	-----	-----	-----	6.933
9.90	76.21	1145.72	9.745	9.703	0.744	-----	-----	-----	-----	-----	-----	10.45
10.20	64.73	1147.58	18.27	12.38	11.50	-----	5.888	-----	-----	-----	-----	29.77
10.50	24.29	1147.70	20.23	11.75	11.87	-----	8.479	-----	-----	-----	-----	32.11
10.80	17.09	1147.45	16.38	12.84	10.98	-----	3.542	-----	-----	-----	-----	27.36
11.10	14.43	1147.22	13.63	13.23	9.548	-----	0.395	-----	-----	-----	-----	23.17
11.40	13.00	1147.01	12.89	12.86	8.069	-----	-----	-----	-----	-----	-----	20.93
11.70	12.08	1146.81	12.47	12.44	6.413	-----	-----	-----	-----	-----	-----	18.85
12.00	11.15	1146.65	12.08	12.07	4.557	-----	-----	-----	-----	-----	-----	16.63
12.30	10.36	1146.53	11.78	11.78	2.246	-----	-----	-----	-----	-----	-----	14.03
12.60	9.767	1146.44	11.57	11.57	1.556	-----	-----	-----	-----	-----	-----	13.12
12.90	9.180	1146.35	11.38	11.34	1.502	-----	-----	-----	-----	-----	-----	12.84
13.20	8.591	1146.25	11.16	11.10	1.414	-----	-----	-----	-----	-----	-----	12.51
13.50	7.999	1146.15	10.86	10.84	1.300	-----	-----	-----	-----	-----	-----	12.14
13.80	7.404	1146.03	10.55	10.55	1.166	-----	-----	-----	-----	-----	-----	11.72
14.10	6.823	1145.92	10.23	10.23	1.012	-----	-----	-----	-----	-----	-----	11.24
14.40	6.558	1145.80	9.985	9.912	0.852	-----	-----	-----	-----	-----	-----	10.76
14.70	6.442	1145.69	9.648	9.618	0.700	-----	-----	-----	-----	-----	-----	10.32
15.00	6.326	1145.58	9.336	9.336	0.562	-----	-----	-----	-----	-----	-----	9.898
15.30	6.210	1145.49	9.058	9.057	0.439	-----	-----	-----	-----	-----	-----	9.496
15.60	6.093	1145.40	8.797	8.796	0.330	-----	-----	-----	-----	-----	-----	9.126
15.90	5.975	1145.32	8.551	8.550	0.239	-----	-----	-----	-----	-----	-----	8.789
16.20	5.858	1145.25	8.319	8.319	0.161	-----	-----	-----	-----	-----	-----	8.479
16.50	5.740	1145.18	8.124	8.100	0.096	-----	-----	-----	-----	-----	-----	8.196
16.80	5.622	1145.11	7.989	7.893	0.045	-----	-----	-----	-----	-----	-----	7.938
17.10	5.503	1145.05	7.751	7.694	0.018	-----	-----	-----	-----	-----	-----	7.711
17.40	5.384	1144.99	7.501	7.501	-----	-----	-----	-----	-----	-----	-----	7.501
17.70	5.265	1144.93	7.306	7.305	-----	-----	-----	-----	-----	-----	-----	7.305
18.00	5.146	1144.88	7.117	7.116	-----	-----	-----	-----	-----	-----	-----	7.116
18.30	5.027	1144.82	6.933	6.933	-----	-----	-----	-----	-----	-----	-----	6.932
18.60	4.907	1144.77	6.753	6.753	-----	-----	-----	-----	-----	-----	-----	6.753
18.90	4.787	1144.71	6.579	6.578	-----	-----	-----	-----	-----	-----	-----	6.578
19.20	4.667	1144.66	6.417	6.389	-----	-----	-----	-----	-----	-----	-----	6.389

Continues on next page...

To Pond 2

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
19.50	4.547	1144.62	6.266	6.201	-----	-----	-----	-----	-----	-----	-----	6.201
19.80	4.426	1144.57	6.079	6.027	-----	-----	-----	-----	-----	-----	-----	6.027
20.10	4.306	1144.52	5.880	5.862	-----	-----	-----	-----	-----	-----	-----	5.862
20.40	4.185	1144.48	5.682	5.681	-----	-----	-----	-----	-----	-----	-----	5.681
20.70	4.064	1144.44	5.488	5.487	-----	-----	-----	-----	-----	-----	-----	5.487
21.00	3.943	1144.40	5.301	5.300	-----	-----	-----	-----	-----	-----	-----	5.300
21.30	3.822	1144.36	5.091	5.090	-----	-----	-----	-----	-----	-----	-----	5.090
21.60	3.701	1144.33	4.894	4.893	-----	-----	-----	-----	-----	-----	-----	4.893
21.90	3.580	1144.29	4.708	4.707	-----	-----	-----	-----	-----	-----	-----	4.707
22.20	3.458	1144.26	4.531	4.531	-----	-----	-----	-----	-----	-----	-----	4.531
22.50	3.337	1144.23	4.362	4.362	-----	-----	-----	-----	-----	-----	-----	4.362
22.80	3.215	1144.20	4.201	4.201	-----	-----	-----	-----	-----	-----	-----	4.201
23.10	3.093	1144.17	4.050	4.050	-----	-----	-----	-----	-----	-----	-----	4.050
23.40	2.972	1144.15	3.904	3.904	-----	-----	-----	-----	-----	-----	-----	3.904
23.70	2.850	1144.12	3.761	3.761	-----	-----	-----	-----	-----	-----	-----	3.761
24.00	2.728	1144.09	3.624	3.621	-----	-----	-----	-----	-----	-----	-----	3.621
24.30	0.356	1144.04	3.349	3.324	-----	-----	-----	-----	-----	-----	-----	3.324
24.60	0.000	1143.95	2.875	2.853	-----	-----	-----	-----	-----	-----	-----	2.854
24.90	0.000	1143.87	2.451	2.451	-----	-----	-----	-----	-----	-----	-----	2.451
25.20	0.000	1143.80	2.114	2.114	-----	-----	-----	-----	-----	-----	-----	2.114
25.50	0.000	1143.74	1.846	1.845	-----	-----	-----	-----	-----	-----	-----	1.845
25.80	0.000	1143.69	1.617	1.615	-----	-----	-----	-----	-----	-----	-----	1.616
26.10	0.000	1143.65	1.441	1.434	-----	-----	-----	-----	-----	-----	-----	1.434
26.40	0.000	1143.61	1.284	1.273	-----	-----	-----	-----	-----	-----	-----	1.273
26.70	0.000	1143.57	1.149	1.140	-----	-----	-----	-----	-----	-----	-----	1.140
27.00	0.000	1143.54	1.028	1.023	-----	-----	-----	-----	-----	-----	-----	1.023
27.30	0.000	1143.51	0.919	0.918	-----	-----	-----	-----	-----	-----	-----	0.918
27.60	0.000	1143.48	0.836	0.834	-----	-----	-----	-----	-----	-----	-----	0.833
27.90	0.000	1143.46	0.766	0.760	-----	-----	-----	-----	-----	-----	-----	0.760
28.20	0.000	1143.44	0.702	0.693	-----	-----	-----	-----	-----	-----	-----	0.693

...End

Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 Friday, Sep 18, 2009

Pond No. 1 - Pond 3B

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1140.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1140.00	1,600	0	0
1.00	1141.00	2,519	2,042	2,042
2.00	1142.00	3,366	2,932	4,974
3.00	1143.00	35,160	16,467	21,441
4.00	1144.00	36,836	35,991	57,432
5.00	1145.00	38,537	37,680	95,111
6.00	1146.00	40,264	39,393	134,505
7.00	1147.00	42,015	41,132	175,637
8.00	1148.00	43,792	42,896	218,533

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	18.00	18.00	0.00
Span (in)	= 24.00	18.00	18.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1143.00	1143.00	1145.00	0.00
Length (ft)	= 250.00	2.00	2.00	0.00
Slope (%)	= 1.25	1.00	1.00	n/a
N-Value	= .010	.024	.024	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.28	0.00	0.00	0.00
Crest El. (ft)	= 1147.15	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

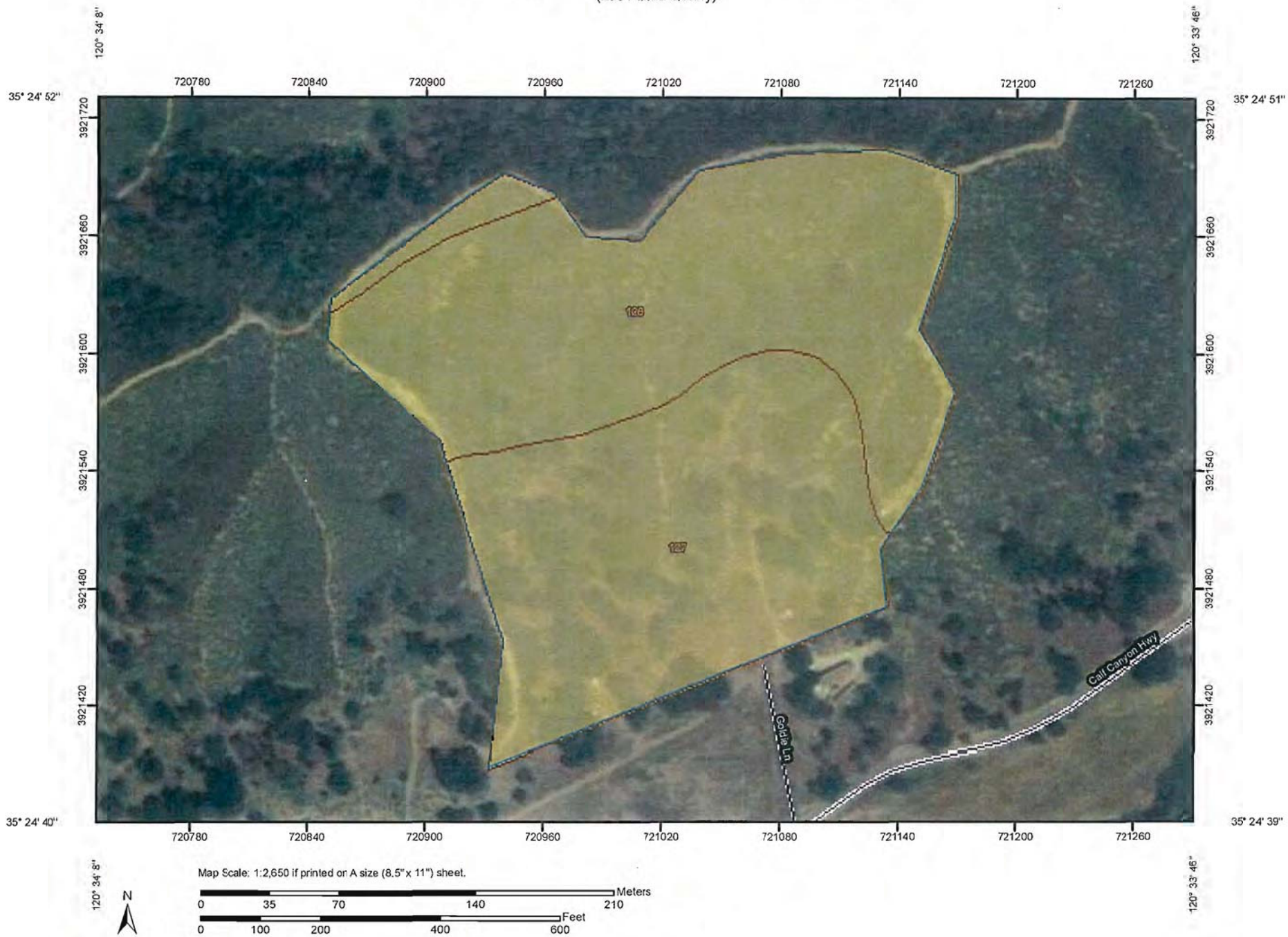
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1140.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
1.00	2,042	1141.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
2.00	4,974	1142.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
3.00	21,441	1143.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
4.00	57,432	1144.00	3.15 ic	3.11 ic	0.00	---	0.00	---	---	---	---	---	3.11
5.00	95,111	1145.00	7.53 ic	7.53 ic	0.00	---	0.00	---	---	---	---	---	7.53
6.00	134,505	1146.00	10.46 ic	10.46 ic	1.12 oc	---	0.00	---	---	---	---	---	11.59
7.00	175,637	1147.00	12.88 ic	12.85 ic	8.03 oc	---	0.00	---	---	---	---	---	20.88
8.00	218,533	1148.00	23.71 ic	10.57 ic	12.76 ic	---	12.22 ic	---	---	---	---	---	35.55

Soil Survey Data
&
San Luis Obispo County Standards

Hydrologic Soil Group—San Luis Obispo County, California, Paso Robles Area
(Las Pilitas Quarry)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:2,650 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Luis Obispo County, California, Paso Robles Area
Survey Area Data: Version 4, Jan 2, 2008

Date(s) aerial images were photographed: 6/6/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Luis Obispo County, California, Paso Robles Area				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
126	Cieneba coarse sandy loam, 30 to 75 percent slopes	C	8.2	51.9%
127	Cieneba-Andregg complex, 30 to 75 percent slopes	C	7.6	48.1%
Totals for Area of Interest			**15.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2]	Hydrologic condition [3]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

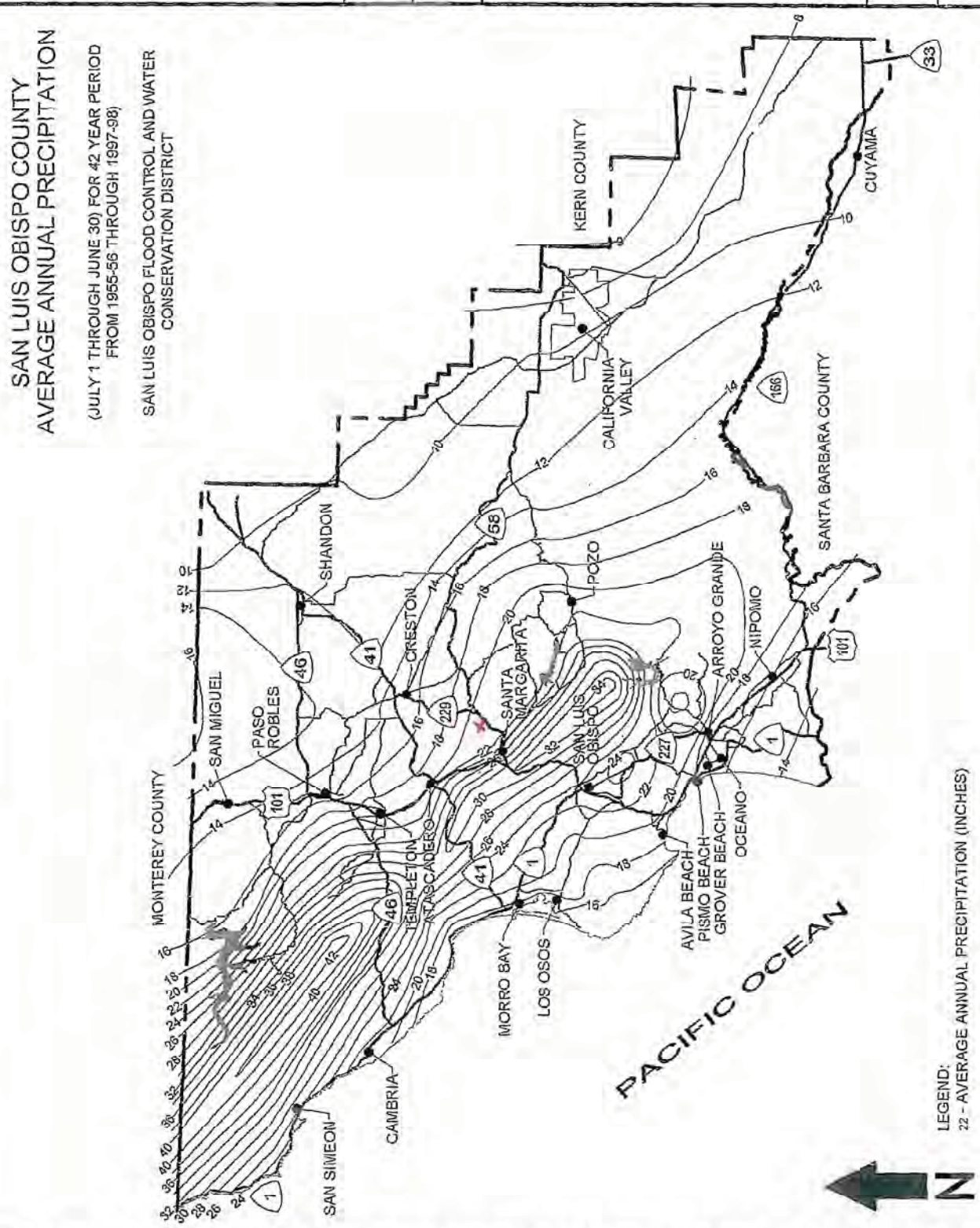
Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2]	A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Revisions

Description	Approved	Date	Description	Approved	Date

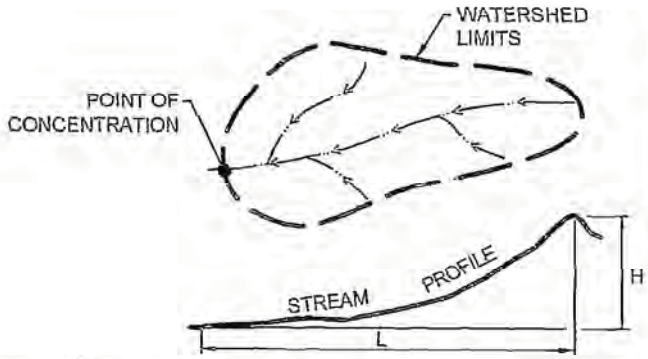


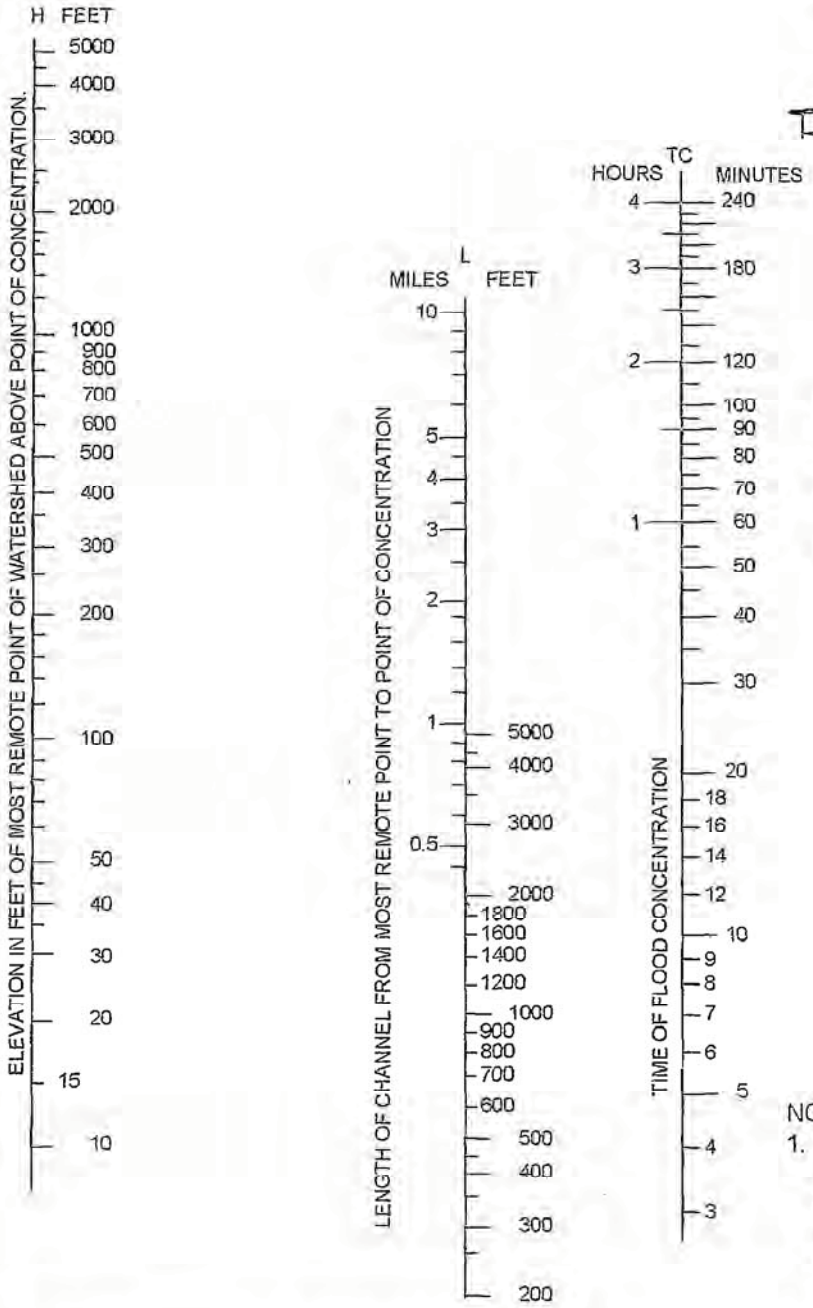
SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

AVERAGE ANNUAL RAINFALL

Scale:	Issued:
NTS	Aug. 2006
Drawing No:	H-1
Sheet No:	1 OF 1

Revisions					
Description	Approved	Date	Description	Approved	Date





EQUATIONS FOR ESTIMATED "TIME OF CONCENTRATION"

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385}$$

LEGEND:

Tc = TIME OF CONCENTRATION IN HOURS.

L = LENGTH OF CHANNEL IN MILES.

H = DIFFERENCE IN ELEVATION BETWEEN MOST REMOTE POINT AND THE POINT OF CONCENTRATION IN FEET.

NOTES:

1. THIS NOMOGRAPH IS TO BE LIMITED TO WATERSHED AREAS OF 200 ACRES OR LESS. FOR LARGER WATERSHEDS REFER TO THE DESIGN STANDARDS.

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

TIME OF CONCENTRATION

FOR WATERSHEDS LESS THAN 200 ACRES

Scale:	Issued: Aug. 2006
Drawing No:	H-2
Sheet No:	1 OF 1

Revisions					
Description	Approved	Date	Description	Approved	Date

TABLE 2: RATIONAL METHOD STANDARD RUNOFF COEFFICIENTS FOR UNDEVELOPED AREAS

	EXTREME	HIGH	NORMAL	LOW
RELIEF	0.28 TO 0.35 STEEP, RUGGED TERRAIN WITH AVERAGE SLOPES ABOVE 30%	0.20 TO 0.28 HILLY, WITH AVERAGE SLOPES OF 10% TO 30%	0.14 TO 0.20 ROLLING, WITH AVERAGE SLOPE OF 5% TO 10%	0.08 TO 0.14 RELATIVELY FLAT LAND, WITH AVERAGE SLOPES OF 0% TO 5%
SOIL INFILTRATION	0.12 TO 0.16 NO EFFECTIVE SOIL COVER, EITHER ROCK OR THIN MANTLE OF NEGLIGIBLE INFILTRATION CAPACITY	0.08 TO 0.12 SLOW TO TAKE UP WATER, CLAY OR SHALLOW LOAM SOILS OF LOW INFILTRATION CAPACITY, IMPERFECTLY OR POORLY DRAINED	0.06 TO 0.08 NORMAL; WELL DRAINED LIGHT OR MEDIUM TEXTURED SOILS, SANDY LOAMS, SILT AND SILT LOAMS	0.04 TO 0.06 HIGH; DEEP SAND OR OTHER SOILS THAT TAKES UP WATER READILY, VERY LIGHT WELL DRAINED SOILS
VEGETAL COVER	0.12 TO 0.16 NO EFFECTIVE PLANT COVER, BARE OR VERY SPARSE COVER	0.08 TO 0.12 POOR TO FAIR; CULTIVATION CROPS, OR POOR NATURAL COVER, LESS THAN 20% OF DRAINAGE AREA OVER GOOD COVER	0.06 TO 0.08 FAIR TO GOOD; ABOUT 50% OF AREA IN GOOD GRASSLAND OR WOODLAND, NOT MORE THAN 50% OF AREA IN CULTIVATED CROPS	0.04 TO 0.06 GOOD TO EXCELLENT; ABOUT 90% OF DRAINAGE AREA IN GOOD GRASSLAND, WOODLAND, OR EQUIVALENT COVER
SURFACE STORAGE	0.10 TO 0.12 NEGLIGIBLE SURFACE DEPRESSIONS FEW AND SHALLOW, DRAINAGE WAYS STEEP AND SMALL, NO MARSHES	0.08 TO 0.10 LOW; WELL DEFINED SYSTEM OF SMALL DRAINAGE WAYS, NO PONDS OR MARSHES	0.06 TO 0.08 NORMAL; CONSIDERABLE SURFACE STORAGE, LAKES AND POND MARSHES	0.04 TO 0.06 HIGH; SURFACE STORAGE, HIGH DRAINAGE SYSTEM NOT SHARPLY DEFINED, LARGE FLOOD PLAIN STORAGE OR LARGE NUMBER OF PONDS OR MARSHES

(REFERENCES FIGURE 819.2A OF HIGHWAY DESIGN MANUAL)

EXAMPLE:

GIVEN: AN UNDEVELOPED WATERSHED CONSISTING OF:

1. ROLLING TERRAIN WITH AVERAGE SLOPES OF 5%
2. CLAY SOILS
3. GOOD GRASSLAND AREA
4. NORMAL SURFACE DEPRESSIONS

FIND: THE RUNOFF COEFFICIENT FOR THE ABOVE WATERSHED

SOLUTION:

1. RELIEF = 0.14
2. SOIL INFILTRATION = 0.08
3. VEGETAL COVER = 0.04
4. SURFACE STORAGE = 0.06

ANSWER: THE RUNOFF COEFFICIENT, C = 0.32

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

RUNOFF COEFFICIENTS FOR UNDEVELOPED AREAS

Scale:	Issued: Aug. 2006
Drawing No:	H-3a
Sheet No:	2 OF 2

Revisions					
Description	Approved	Date	Description	Approved	Date

TABLE 1: ANNUAL RAINFALL < 14":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.00	0.90	0.60	0.40	0.26	0.22	0.18	0.14
5	1.40	1.20	0.80	0.50	0.37	0.32	0.25	0.20
10	1.70	1.40	1.00	0.60	0.44	0.38	0.30	0.23
25	2.00	1.70	1.10	0.70	0.54	0.47	0.37	0.28
50	2.20	1.90	1.30	0.80	0.60	0.53	0.44	0.34
100	2.40	2.10	1.40	0.90	0.65	0.59	0.48	0.36

TABLE 2: ANNUAL RAINFALL 14" TO 17":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.30	1.10	0.80	0.50	0.35	0.30	0.23	0.18
5	1.90	1.60	1.10	0.70	0.49	0.42	0.33	0.26
10	2.30	1.90	1.30	0.80	0.60	0.51	0.40	0.30
25	2.60	2.20	1.50	1.00	0.71	0.63	0.50	0.38
50	3.00	2.50	1.70	1.10	0.81	0.74	0.60	0.47
100	3.20	2.70	1.90	1.20	0.90	0.80	0.65	0.49

TABLE 3: ANNUAL RAINFALL 18" TO 21":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.70	1.40	1.00	0.65	0.44	0.37	0.29	0.22
5	2.30	1.90	1.30	0.85	0.60	0.52	0.41	0.33
10	2.80	2.40	1.60	1.03	0.74	0.64	0.50	0.38
25	3.20	2.70	1.90	1.20	0.92	0.80	0.64	0.50
50	3.70	3.10	2.10	1.40	1.05	0.92	0.74	0.58
100	4.00	3.40	2.30	1.50	1.13	1.00	0.80	0.62

TABLE 4: ANNUAL RAINFALL 22" TO 28":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	2.10	1.80	1.20	0.77	0.55	0.47	0.36	0.28
5	2.80	2.50	1.70	1.05	0.76	0.64	0.52	0.42
10	3.60	3.00	2.10	1.30	0.92	0.81	0.64	0.48
25	3.90	3.50	2.40	1.50	1.10	0.98	0.78	0.60
50	4.50	3.90	2.60	1.70	1.28	1.15	0.94	0.72
100	5.00	4.30	2.90	1.85	1.40	1.25	0.98	0.76

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

RAINFALL INTENSITY DATA

Scale:	Issued: Aug. 2006
Drawing No:	H-4
Sheet No:	1 OF 1