APPENDIX C

EAST STORMWATER POND

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CALCULATION COVER SHEET

Date: 7/11/08 Page 1 of 1

Project No.: 89241.6 Project Title: Piñon Ridge Mill Design

Calculation No.: 89241.6-1

Calculation Title: East Stormwater Pond Design

Design Verification Required: ☐ Yes ☒ No

Calculation Type: ☐ Scoping ☐ Preliminary ☒ Final ☐ Voided
☐ Superseded by Calculation No.:

ORIGINAL AND REVISED CALCULATIONS/ANALYSIS APPROVAL

	Rev. 1 Printed Name/Signature/Date	Rev. ____ Printed Name/Signature/Date	Rev. ____ Printed Name/Signature/Date
Originator:	T. Klutke 7/9/08		
Checked By:	[illegible] 7/11/08		
Approved By:	C. Larson 12/1/08		
Other:			

AFFECTED DOCUMENTS

Document Number	Document Title	Rev. No.	Responsible Project Manager Initials
DEN 8R179	SITE DRAINAGE ANALYSIS & DESIGN REPORT - PINON RIDGE MILL		CL

RECORD OF REVISION

Rev.	Reason for Revision

ATTACHMENTS

Attachment No.	Title	Total Pages
1	Various Design/Analysis Calcs	43

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MEMORANDUM

TO: Kimberly Finke Morrison, P.E.

FROM: Travis Kluthe, E.I.T. TK

Charles Larson, P.E. CL

DATE: July 11, 2008

SUBJECT: East Stormwater Pond Hydraulic Design

CC: Bob Monok, Alan Kuhn, P.E., Dave Adams, P.E.

We have prepared this memorandum to provide Golder Associates Inc. (Golder) with hydraulic design details and conceptual sketches of the East Stormwater Pond (East Pond) and outlet works for the Piñon Ridge mill site. The East Pond will be sized such that it will store the 100-year storm volume and route the 1000-year storm volume through an outlet structure. The contributing drainage area includes an effectively impervious ore pad, roadways and several buildings, and areas with minimal disturbance.

According to NOAA Atlas 2, the 100-year 24 hour design rainfall depth for the Piñon Ridge site is 3.0 inches. The 1000-year 24 hour design storm rainfall depth was determined to be 4.4 inches using NOAA Atlas 14 data from a location on the Utah/Colorado border approximately 16 miles West of the Piñon Ridge mill site. This alternate site was chosen because NOAA Atlas 14 data is not yet available for 1000-year storm events in Colorado and it maintains similar elevation and orographic characteristics.

The SCS curve number method was used to determine the runoff volume and the SCS lag method was used to route the runoff through each subbasin. The SCS Type II dimensionless rainfall distribution was used to model rainfall intensity. A local soils report was downloaded from the NRCS website and vegetation types were determined based on visual inspection. The total estimated drainage area of the six subbasins in

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approximately 29 acres. The 100-year and 1000-year storm runoff volumes were determined to be 4 and 8 acre-feet, respectively.

In compliance with space and design restrictions, the East Pond will have a width and length of 110 and 275 feet, respectively, measured from the inner crest edge. The East Pond will have side slopes of 3H:1V and will be 12 feet deep from finished grade to bottom of pond, according to Golder's constructability recommendations. The crest elevation will be 5,525 feet to accommodate two surface drainage channels.

The outlet works will be a combination weir/pipe structure to minimize overall pond size and increase pipe flow capacity. The weir will be a concrete box drop structure with a crest elevation of 5,523 feet—coinciding with the 100-year storm runoff volume. The weir box will transfer flow into a 30-inch HDPE outlet pipe that enters a storm sewer network eventually discharging into the evaporation ponds. Assuming the East Pond is already at the 100-year storm storage capacity, the 1000-year storm event will result in a maximum water surface elevation of 5,524.2 feet with approximately 1 acre-foot of additional storage and 0.8 feet of residual freeboard. The maximum outlet discharge for this scenario is 39 cubic feet per second (cfs).

The concrete weir box should generally conform to specifications of a Type D Inlet according to CDOT Standard Plan No. M-604-11. The inlet will have a height (H) of 4.0 feet to accommodate a pipe diameter (D) of 2.5 feet. The inlet structure will require a standard inlet grate with a level grate installation and access steps.

Two inlet channels conveying local surface drainage will also enter the pond. The surface drainage channels were designed to convey the 100-year storm runoff and the bulk of the 1,000-year storm runoff. The channel entering from the west will be a V-ditch 1.0 foot deep with 3H:1V side slopes. The channel entering from the east will be a trapezoidal section 1.5 feet deep with a 3 foot bottom width and 3H:1V side slopes. Conceptual sketches of the pond, inlet channels and outlet works are attached.

The inlet channel draining the ore pad will be a trapezoidal section 1.5 feet deep with a 3 foot bottom width and 3H:1V side slopes. The channel will discharge into a settling basin before entering the East Pond. The details of the settling basin are unknown at this time; however it is assumed the basin is relatively small and will provide little flow attenuation or disruption. As such, the hydraulic analysis was simplified to assume direct discharge from the ore pad into the East Pond.

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References

National Weather Service. "Precipitation Frequency Data Server." NOAA Atlas 14. 2008. <http://hdsc.nws.noaa.gov/hdsc/pfds/sa/ut_pfds.html>.

National Weather Service. "Precipitation Frequency Atlas of the Western United States." NOAA Atlas 2 Volume III-Colorado. 1973. Figures 28 and 30.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. 2008. <http://websoilsurvey.nrcs.usda.gov/>.

Colorado Department of Transportation (CDOT). "Standard Plan List M & S Standards." July 4th, 2006.

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EAST STORMWATER POND HYDROLOGIC ANALYSIS

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PROJECT Piñon Ridge Mill PROJECT NO. 89241.6
SUBJECT East Pond Hydrology BY TAK DATE 7/9/08
REVIEWED BY CW DATE 7/10/08

Objective: Determine 100-yr and 1000-yr storm runoff volumes for East Stormwater Pond.

Assumptions:
1) Use SCS Type II Dimensionless rainfall distribution
2) 100% runoff from ore pad
3) Use 100-yr and 1000-yr design rainfall depths of 3.00 in and 4.43 in, respectively.

Basin Characteristics:

Areas measured digitally; attached map shows subbasins.

SCS lag equation:

$$t_L = \frac{L^{0.8}(S+1)^{0.7}}{1900\,Y^{0.5}}$$

where: t_L = lag time in hrs
L = hydraulic length in ft
$S = \frac{1000}{CN} - 10$
Y = Land Slope in %

Curve numbers determined using NRCS Soil Report and Tables 2-2a and 2-2d from TR-55. Basin characteristics summerized in attached Spreadsheet.

Storm Volumes:

Design storm volumes from HEC-1:

100-yr volume = 4 ac-ft

1000-yr volume = 8 ac-ft

East Stormwater Pond Basin Sketch

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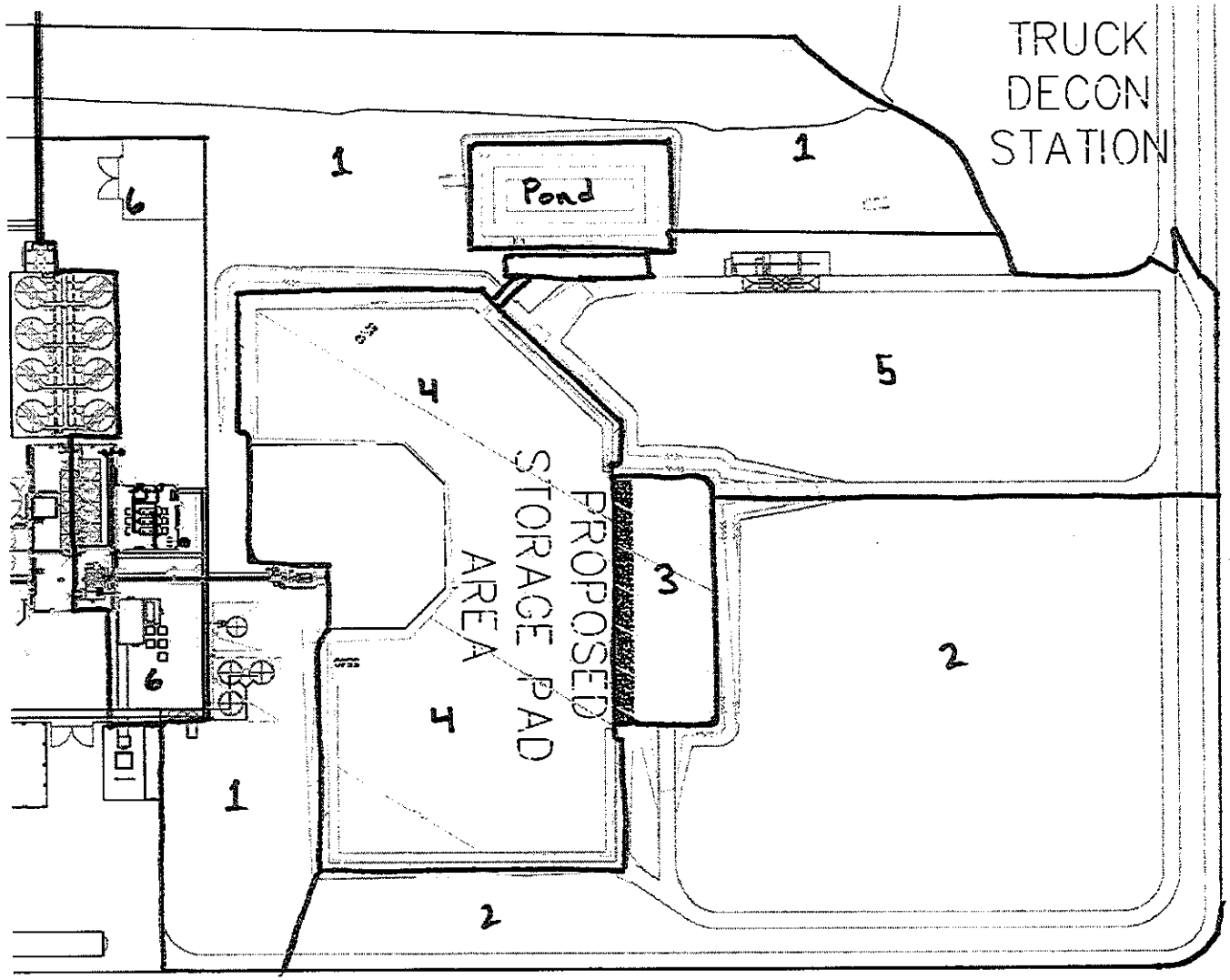

1" = 200' N

APP C

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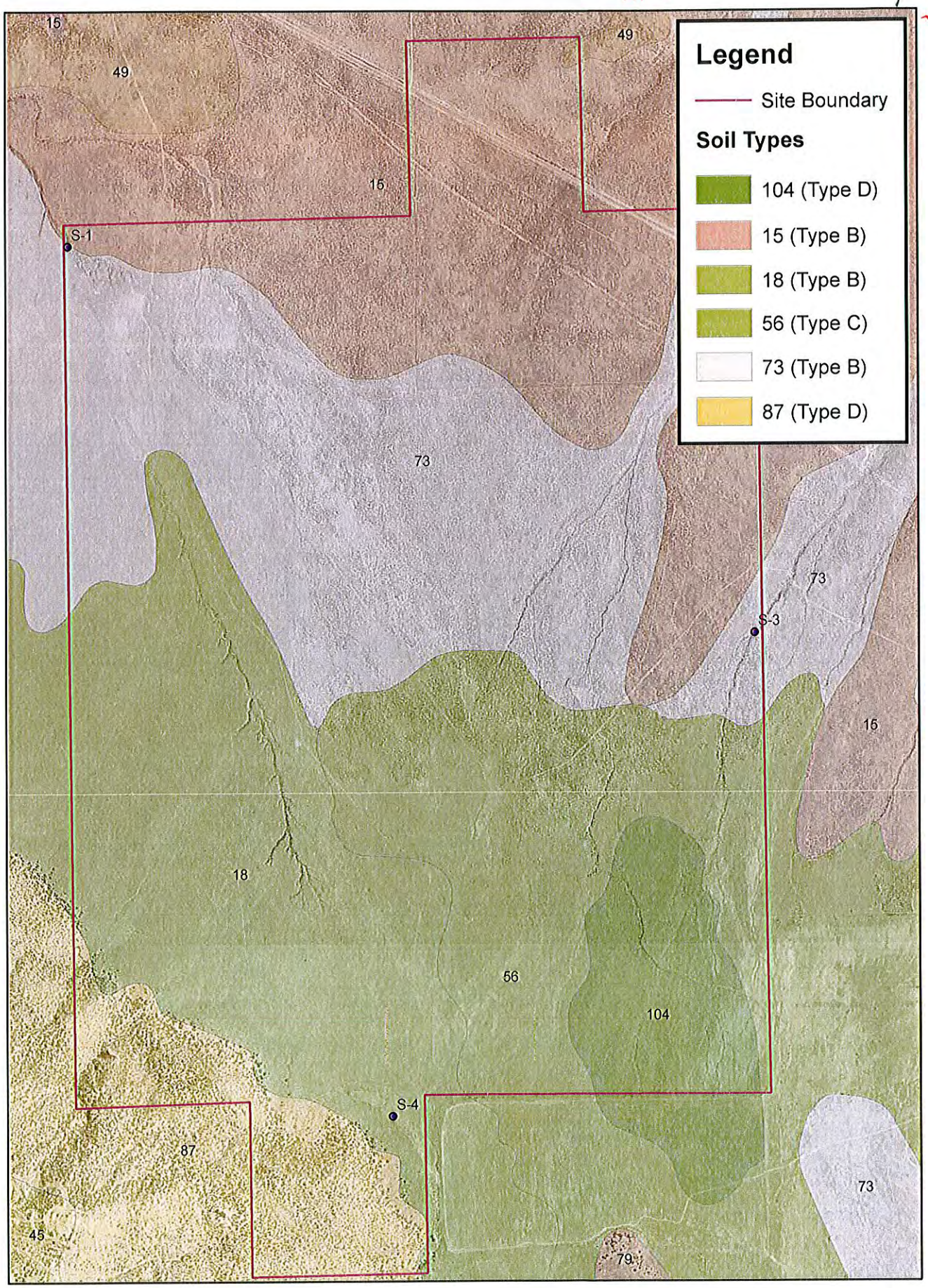

0 500 1,000 2,000 Feet

Pinon Ridge Soils Map

N

7/10/08

Pinon Ridge Uranium Mill Hydrologic Analysis
East Stormwater Pond Drainage Area Characteristics

Basin 1

L =	830	ft	0.157	mi
S =	2.7	%		
A_1 =	0.08	ac	0.000	mi^2
A_2 =	3.46	ac	0.005	mi^2
A_3 =	1.50	ac	0.002	mi^2
A_4 =	0.00	ac	0.000	mi^2
A_5 =	0.00	ac	0.000	mi^2
A_{IMP} =	0.24	ac	0.000	mi^2
A_T =	5.28	ac	0.008	mi^2
A_{EFF} =	5.04		0.008	mi^2

SCS T_{LAG} =	0.21	hrs
CN_1 =	85	Hard Pack Gravel (Group B)
CN_2 =	67	Natural Soil 56 (Group B)
CN_3 =	85	Tailing Cell Slope
CN_4 =	91	Hard Pack Gravel (Group D)
CN_5 =	85	Natural Soil 104 (Group D)
CN_{EFF} =	73	

Basin 2

L =	650	ft	0.123	mi
S =	2.7	%		
A_1 =	0.90	ac	0.001	mi^2
A_2 =	0.00	ac	0.000	mi^2
A_3 =	0.00	ac	0.000	mi^2
A_4 =	0.60	ac	0.001	mi^2
A_5 =	8.34	ac	0.013	mi^2
A_{IMP} =	0.00	ac	0.000	mi^2
A_T =	9.84	ac	0.015	mi^2
A_{EFF} =	9.84		0.015	mi^2

SCS T_{LAG} =	0.11	hrs
CN_1 =	85	Hard Pack Gravel (Group B)
CN_2 =	67	Natural Soil 56 (Group B)
CN_3 =	85	Tailing Cell Slope
CN_4 =	91	Hard Pack Gravel (Group D)
CN_5 =	85	Natural Soil 104 (Group D)
CN_{EFF} =	85	

Basin 3

L =	300	ft	0.057	mi
S =	2.0	%		
A_1 =	0.00	ac	0.000	mi^2
A_2 =	0.00	ac	0.000	mi^2
A_3 =	0.00	ac	0.000	mi^2
A_4 =	0.84	ac	0.001	mi^2
A_5 =	0.00	ac	0.000	mi^2
A_{IMP} =	0.00	ac	0.000	mi^2
A_T =	0.84	ac	0.001	mi^2
A_{EFF} =	0.84		0.001	mi^2

SCS T_{LAG} =	0.06	hrs
CN_1 =	85	Hard Pack Gravel (Group B)
CN_2 =	67	Natural Soil 56 (Group B)
CN_3 =	85	Tailing Cell Slope
CN_4 =	91	Hard Pack Gravel (Group D)
CN_5 =	85	Natural Soil 104 (Group D)
CN_{EFF} =	91	

Basin 5

L =	500	ft	0.095	mi
S =	1.2	%		
A_1 =	0.00	ac	0.000	mi^2
A_2 =	0.00	ac	0.000	mi^2
A_3 =	0.00	ac	0.000	mi^2
A_4 =	0.61	ac	0.001	mi^2
A_5 =	4.45	ac	0.007	mi^2
A_{IMP} =	0.00	ac	0.000	mi^2
A_T =	5.06	ac	0.008	mi^2
A_{EFF} =	5.06		0.008	mi^2

SCS T_{LAG} =	0.14	hrs
CN_1 =	85	Hard Pack Gravel (Group B)
CN_2 =	67	Natural Soil 56 (Group B)
CN_3 =	85	Tailing Cell Slope
CN_4 =	91	Hard Pack Gravel (Group D)
CN_5 =	85	Natural Soil 104 (Group D)
CN_{EFF} =	86	

Basin 6

L =	700	ft	0.133	mi
S =	0.5	%		
A_1 =	1.90	ac	0.003	mi^2
A_2 =	0.00	ac	0.000	mi^2
A_3 =	0.00	ac	0.000	mi^2
A_4 =	0.00	ac	0.000	mi^2
A_5 =	0.00	ac	0.000	mi^2
A_{IMP} =	0.20	ac	0.000	mi^2
A_T =	2.10	ac	0.003	mi^2
A_{EFF} =	1.90		0.003	mi^2

SCS T_{LAG} =	0.29	hrs
CN_1 =	85	Hard Pack Gravel (Group B)
CN_2 =	67	Natural Soil 56 (Group B)
CN_3 =	85	Tailing Cell Slope
CN_4 =	91	Hard Pack Gravel (Group D)
CN_5 =	85	Natural Soil 104 (Group D)
CN_{EFF} =	85	

A_{EFF} = Subbasin area contributing to SCS unit hydrograph. Impervious area runoff included in separate QI record.

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 2-2d 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.

Pinon Ridge Uranium Mill Hydrologic Analysis

Rainfall Distribution

SCS Rainfall Distribution: Type II

Frequency (yr): 1000

Total 24-hour Rainfall Depth (in): 4.43

Hour, t	t/24	P_t/P_{24}	SCS Cumul P
0.00	0.000	0.000	0.000
2.00	0.083	0.022	0.097
4.00	0.167	0.048	0.213
6.00	0.250	0.080	0.354
7.00	0.292	0.098	0.434
8.00	0.333	0.120	0.532
8.50	0.354	0.133	0.589
9.00	0.375	0.147	0.651
9.50	0.396	0.163	0.722
9.75	0.406	0.172	0.762
10.00	0.417	0.181	0.802
10.50	0.438	0.204	0.904
11.00	0.458	0.235	1.041
11.50	0.479	0.283	1.254
11.75	0.490	0.357	1.582
12.00	0.500	0.663	2.937
12.50	0.521	0.735	3.256
13.00	0.542	0.772	3.420
13.50	0.563	0.799	3.540
14.00	0.583	0.820	3.633
16.00	0.667	0.880	3.898
20.00	0.833	0.952	4.217
24.00	1.000	1.000	4.430

Hour	HEC-1 Cumul P
0	0.000
1	0.049
2	0.097
3	0.155
4	0.213
5	0.284
6	0.354
7	0.434
8	0.532
9	0.651
10	0.802
11	1.041
12	2.937
13	3.420
14	3.633
15	3.766
16	3.898
17	3.978
18	4.058
19	4.138
20	4.217
21	4.271
22	4.324
23	4.377
24	4.430

P_t/P_{24}			
Type I	Type IA	Type II	Type III
0.000	0.000	0.000	0.000
0.035	0.050	0.022	0.020
0.076	0.116	0.048	0.043
0.125	0.206	0.080	0.072
0.156	0.268	0.098	0.089
0.194	0.425	0.120	0.115
0.219	0.480	0.133	0.130
0.254	0.520	0.147	0.148
0.303	0.550	0.163	0.167
0.362	0.564	0.172	0.178
0.515	0.577	0.181	0.189
0.583	0.601	0.204	0.216
0.624	0.624	0.235	0.250
0.654	0.645	0.283	0.298
0.669	0.655	0.357	0.339
0.682	0.664	0.663	0.500
0.706	0.683	0.735	0.702
0.727	0.701	0.772	0.751
0.748	0.719	0.799	0.785
0.767	0.736	0.820	0.811
0.830	0.800	0.880	0.886
0.926	0.906	0.952	0.957
1.000	1.000	1.000	1.000

1000-yr

	Basin 4	Basin 6	Pond
Impervious/Pond Area (ac) =	6.25	0.2	0.75
Impervious/Pond Area (ft^2) =	272250	8712	32670

Time Hour	Time (sec)	Inc. Depth (ft)	Basin 4 (cfs)	Basin 6 (cfs)	Pond (cfs)
0	3600	0.000	0.00	0.00	0.00
1	3600	0.004	0.31	0.01	0.04
2	3600	0.004	0.31	0.01	0.04
3	3600	0.005	0.36	0.01	0.04
4	3600	0.005	0.36	0.01	0.04
5	3600	0.006	0.45	0.01	0.05
6	3600	0.006	0.45	0.01	0.05
7	3600	0.007	0.50	0.02	0.06
8	3600	0.008	0.61	0.02	0.07
9	3600	0.010	0.75	0.02	0.09
10	3600	0.013	0.95	0.03	0.11
11	3600	0.020	1.51	0.05	0.18
12	3600	0.158	11.95	0.38	1.43
13	3600	0.040	3.04	0.10	0.37
14	3600	0.018	1.34	0.04	0.16
15	3600	0.011	0.84	0.03	0.10
16	3600	0.011	0.84	0.03	0.10
17	3600	0.007	0.50	0.02	0.06
18	3600	0.007	0.50	0.02	0.06
19	3600	0.007	0.50	0.02	0.06
20	3600	0.007	0.50	0.02	0.06
21	3600	0.004	0.34	0.01	0.04
22	3600	0.004	0.34	0.01	0.04
23	3600	0.004	0.34	0.01	0.04
24	3600	0.004	0.34	0.01	0.04

1000-Year Rainfall Data

7/10/08

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Pinon Ridge Uranium Mill Hydrologic Analysis

Rainfall Distribution

SCS Rainfall Distribution: Type II

Frequency (yr): 100

Total 24-hour Rainfall Depth (in): 3

Hour, t	t/24	P_t/P_{24}	SCS Cumul P	Hour	HEC-1 Cumul P	P_t/P_{24} Type I	Type IA	Type II	Type III
0.00	0.000	0.000	0.000	0	0.000	0.000	0.000	0.000	0.000
2.00	0.083	0.022	0.066	1	0.033	0.035	0.050	0.022	0.020
4.00	0.167	0.048	0.144	2	0.066	0.076	0.116	0.048	0.043
6.00	0.250	0.080	0.240	3	0.105	0.125	0.206	0.080	0.072
7.00	0.292	0.098	0.294	4	0.144	0.156	0.268	0.098	0.089
8.00	0.333	0.120	0.360	5	0.192	0.194	0.425	0.120	0.115
8.50	0.354	0.133	0.399	6	0.240	0.219	0.480	0.133	0.130
9.00	0.375	0.147	0.441	7	0.294	0.254	0.520	0.147	0.148
9.50	0.396	0.163	0.489	8	0.360	0.303	0.550	0.163	0.167
9.75	0.406	0.172	0.516	9	0.441	0.362	0.564	0.172	0.178
10.00	0.417	0.181	0.543	10	0.543	0.515	0.577	0.181	0.189
10.50	0.438	0.204	0.612	11	0.705	0.583	0.601	0.204	0.216
11.00	0.458	0.235	0.705	12	1.989	0.624	0.624	0.235	0.250
11.50	0.479	0.283	0.849	13	2.316	0.654	0.645	0.283	0.298
11.75	0.490	0.357	1.071	14	2.460	0.669	0.655	0.357	0.339
12.00	0.500	0.663	1.989	15	2.550	0.682	0.664	0.663	0.500
12.50	0.521	0.735	2.205	16	2.640	0.706	0.683	0.735	0.702
13.00	0.542	0.772	2.316	17	2.694	0.727	0.701	0.772	0.751
13.50	0.563	0.799	2.397	18	2.748	0.748	0.719	0.799	0.785
14.00	0.583	0.820	2.460	19	2.802	0.767	0.736	0.820	0.811
16.00	0.667	0.880	2.640	20	2.856	0.830	0.800	0.880	0.886
20.00	0.833	0.952	2.856	21	2.892	0.926	0.906	0.952	0.957
24.00	1.000	1.000	3.000	22	2.928	1.000	1.000	1.000	1.000
				23	2.964				
				24	3.000				

100-yr

Impervious/Pond Area (ac) =	6.25	0.2	0.75
Impervious/Pond Area (ft^2) =	272250	8712	32670

Time Hour	Time (sec)	Inc. Depth (ft)	Basin 4 (cfs)	Basin 6 (cfs)	Pond (cfs)
0	3600	0.000	0.00	0.00	0.00
1	3600	0.003	0.21	0.01	0.02
2	3600	0.003	0.21	0.01	0.02
3	3600	0.003	0.25	0.01	0.03
4	3600	0.003	0.25	0.01	0.03
5	3600	0.004	0.30	0.01	0.04
6	3600	0.004	0.30	0.01	0.04
7	3600	0.005	0.34	0.01	0.04
8	3600	0.006	0.42	0.01	0.05
9	3600	0.007	0.51	0.02	0.06
10	3600	0.009	0.64	0.02	0.08
11	3600	0.014	1.02	0.03	0.12
12	3600	0.107	8.09 ✓	0.26	0.97
13	3600	0.027	2.06	0.07	0.25
14	3600	0.012	0.91	0.03	0.11
15	3600	0.007	0.57	0.02	0.07
16	3600	0.008	0.57	0.02	0.07
17	3600	0.004	0.34	0.01	0.04
18	3600	0.005	0.34	0.01	0.04
19	3600	0.004	0.34	0.01	0.04
20	3600	0.004	0.34	0.01	0.04
21	3600	0.003	0.23	0.01	0.03
22	3600	0.003	0.23	0.01	0.03
23	3600	0.003	0.23	0.01	0.03
24	3600	0.003	0.23	0.01	0.03

100-Year Rainfall Data

7/16/08

8/43

Pinon Ridge Uranium Mill Hydrologic Analysis

Rainfall Distribution

SCS Rainfall Distribution: Type II

Frequency (yr): 10

Total 24-hour Rainfall Depth (in): 2

10-yr

Impervious/Pond Area (ac) =	6.25	0.2	0.75
Impervious/Pond Area (ft^2) =	272250	8712	32670

Hour, t	t/24	P_t/P_{24}	SCS Cumul P	Hour	HEC-1 Cumul P	P_t/P_{24} Type I	Type IA	Type II	Type III	Time Hour	Time (sec)	Inc. Depth (ft)	Basin 4 (cfs)	Basin 6 (cfs)	Pond (cfs)
0.00	0.000	0.000	0.000	0	0.000	0.000	0.000	0.000	0.000	0	3600	0.000	0.00	0.00	0.00
2.00	0.083	0.022	0.044	1	0.022	0.035	0.050	0.022	0.020	1	3600	0.002	0.14	0.00	0.02
4.00	0.167	0.048	0.096	2	0.044	0.076	0.116	0.048	0.043	2	3600	0.002	0.14	0.00	0.02
6.00	0.250	0.080	0.160	3	0.070	0.125	0.206	0.080	0.072	3	3600	0.002	0.16	0.01	0.02
7.00	0.292	0.098	0.196	4	0.096	0.156	0.268	0.098	0.089	4	3600	0.002	0.16	0.01	0.02
8.00	0.333	0.120	0.240	5	0.128	0.194	0.425	0.120	0.115	5	3600	0.003	0.20	0.01	0.02
8.50	0.354	0.133	0.266	6	0.160	0.219	0.480	0.133	0.130	6	3600	0.003	0.20	0.01	0.02
9.00	0.375	0.147	0.294	7	0.196	0.254	0.520	0.147	0.148	7	3600	0.003	0.23	0.01	0.03
9.50	0.396	0.163	0.326	8	0.240	0.303	0.550	0.163	0.167	8	3600	0.004	0.28	0.01	0.03
9.75	0.406	0.172	0.344	9	0.294	0.362	0.564	0.172	0.178	9	3600	0.005	0.34	0.01	0.04
10.00	0.417	0.181	0.362	10	0.362	0.515	0.577	0.181	0.189	10	3600	0.006	0.43	0.01	0.05
10.50	0.438	0.204	0.408	11	0.470	0.583	0.601	0.204	0.216	11	3600	0.009	0.68	0.02	0.08
11.00	0.458	0.235	0.470	12	1.326	0.624	0.624	0.235	0.250	12	3600	0.071	5.39	0.17	0.65
11.50	0.479	0.283	0.566	13	1.544	0.654	0.645	0.283	0.298	13	3600	0.018	1.37	0.04	0.16
11.75	0.490	0.357	0.714	14	1.640	0.669	0.655	0.357	0.339	14	3600	0.008	0.60	0.02	0.07
12.00	0.500	0.663	1.326	15	1.700	0.682	0.664	0.663	0.500	15	3600	0.005	0.38	0.01	0.05
12.50	0.521	0.735	1.470	16	1.760	0.706	0.683	0.735	0.702	16	3600	0.005	0.38	0.01	0.05
13.00	0.542	0.772	1.544	17	1.796	0.727	0.701	0.772	0.751	17	3600	0.003	0.23	0.01	0.03
13.50	0.563	0.799	1.598	18	1.832	0.748	0.719	0.799	0.785	18	3600	0.003	0.23	0.01	0.03
14.00	0.583	0.820	1.640	19	1.868	0.767	0.736	0.820	0.811	19	3600	0.003	0.23	0.01	0.03
16.00	0.667	0.880	1.760	20	1.904	0.830	0.800	0.880	0.886	20	3600	0.003	0.23	0.01	0.03
20.00	0.833	0.952	1.904	21	1.928	0.926	0.906	0.952	0.957	21	3600	0.002	0.15	0.00	0.02
24.00	1.000	1.000	2.000	22	1.952	1.000	1.000	1.000	1.000	22	3600	0.002	0.15	0.00	0.02
				23	1.976					23	3600	0.002	0.15	0.00	0.02
				24	2.000					24	3600	0.002	0.15	0.00	0.02

- CAR 7/10/08

9/43

```
1*****************************************                                                  ****************************************
 *                                       *                                                  *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998               *                                                  *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                 *                                                  *          609 SECOND STREET           *
 *                                       *                                                  *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   13JUN08  TIME  13:38:34   *                                                  *           (916) 756-1104             *
 *                                       *                                                  *                                      *
 *****************************************                                                  ****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                                HEC-1 INPUT                                                PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 *** FREE ***
                        *DIAGRAM
             1          ID    PINON RIDGE EAST STORMWATER POND SIZING
             2          ID
             3          ID    USE 10 YR 24 HR RAINFALL EVENT WITH DEPTH OF 2.00 IN
             4          ID
             5          ID    DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
             6          ID    OTHER IMPERVIOUS STRUCTURES
             7          ID
             8          ID    KLEINFELDER PROJECT NUMBER 83088
             9          ID    JUNE 12 2008
                        *
            10          IT       3       0       0     500
            11          IO       5       0       0
                        *

            12          KK      B1
            13          KM    BASIN 1
            14          IN      60
            15          PC    0.02    0.04    0.07    0.10    0.13    0.16    0.20    0.24    0.29    0.36
            16          PC    0.47    1.36    1.54    1.64    1.70    1.76    1.80    1.83    1.87    1.90
            17          PC    1.93    1.95    1.98    2.00
            18          BA   0.008
            19          LS       0      73       0
            20          UD   0.21
                        *

            21          KK  B6CHAN
            22          KM   BASIN 6 CHANNEL TO EAST STORMWATER POND
            23          RD     300   0.003   0.018            TRAP       0       3
                        *

            24          KK      B6
            25          KM    BASIN 6
            26          IN      60
            27          PC    0.02    0.04    0.07    0.10    0.13    0.16    0.20    0.24    0.29    0.36
            28          PC    0.47    1.36    1.54    1.64    1.70    1.76    1.80    1.83    1.87    1.90
            29          PC    1.93    1.95    1.98    2.00
            30          BA   0.003
            31          LS       0      85      15
            32          UD    0.29
                        *
```

```
 33          KK   COMB1
 34          KM    COMBINE BASIN 1 AND BASIN 6
 35          HC       2
             *

 36          KK      B3
 37          KM    BASIN 3
 38          IN      60
 39          PC    0.02    0.04    0.07    0.10    0.13    0.16    0.20    0.24    0.29    0.36
 40          PC    0.47    1.36    1.54    1.64    1.70    1.76    1.80    1.83    1.87    1.90
 41          PC    1.93    1.95    1.98    2.00
 42          BA   0.001
1                                          HEC-1 INPUT                                          PAGE  2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 43          LS       0      91       0
 44          UD    0.06
             *

 45          KK      B2
 46          KM    BASIN 2
 47          IN      60
 48          PC    0.02    0.04    0.07    0.10    0.13    0.16    0.20    0.24    0.29    0.36
 49          PC    0.47    1.36    1.54    1.64    1.70    1.76    1.80    1.83    1.87    1.90
 50          PC    1.93    1.95    1.98    2.00
 51          BA   0.015
 52          LS       0      85       0
 53          UD    0.11
             *

 54          KK   COMB2
 55          KM    COMBINE BASIN 2 AND BASIN 3
 56          HC       2
             *

 57          KK  B2CULV
 58          KM    BASIN 2 CULVERT
 59          RD      50   0.005   0.024            CIRC       2
             *

 60          KK      B5
 61          KM    BASIN 5
 62          IN      60
 63          PC    0.02    0.04    0.07    0.10    0.13    0.16    0.20    0.24    0.29    0.36
 64          PC    0.47    1.36    1.54    1.64    1.70    1.76    1.80    1.83    1.87    1.90
 65          PC    1.93    1.95    1.98    2.00
 66          BA   0.008
 67          LS       0      86       0
 68          UD    0.14
             *

 69          KK   COMB3
 70          KM    COMBINE BASIN 5 WITH B2CULV
 71          HC       2
             *

 72          KK  B5CULV
 73          KM    BASIN 5 CULVERT
 74          RD      50   0.005   0.024            CIRC     2.5
             *

 75          KK  B5CHAN
 76          KM    BASIN 5 CHANNEL TO EAST STORMWATER POND
 77          RD     400   0.005   0.030            TRAP       3       3
             *
1                                          HEC-1 INPUT                                          PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 78          KK   EPOND
 79          KM    EAST STORMWATER POND
 80          BA   0.001
 81          IN      60
 82          QI    0.02    0.02    0.02    0.02    0.02    0.02    0.03    0.03    0.04    0.05
 83          QI    0.08    0.65    0.16    0.07    0.05    0.05    0.03    0.03    0.03    0.03
 84          QI    0.02    0.02    0.02    0.02
             *

 85          KK   COMB4
```

```
86          KM    COMBINE CHANNEL INFLOW TO POND
87          HC       2
            *

88          KK      B4
89          KM    BASIN 4
90          BA    0.01
91          IN      60
92          QI    0.14    0.14    0.16    0.16    0.20    0.20    0.23    0.28    0.34    0.43
93          QI    0.68    5.39    1.37    0.60    0.38    0.38    0.23    0.23    0.23    0.23
94          QI    0.15    0.15    0.15    0.15
            *

95          KK   COMB5
96          KM    COMBINE ALL INFLOW TO POND
97          HC       3
98          KO       3
            *
99          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   12          B1
                V
                V
   21       B6CHAN
                .
                .
   24           .          B6
                .           .
                .           .
   33        COMB1............
                .
                .
   36           .          B3
                .           .
                .           .
   45           .           .          B2
                .           .           .
                .           .           .
   54           .       COMB2............
                .           V
                .           V
   57           .      B2CULV
                .           .
                .           .
   60           .           .          B5
                .           .           .
                .           .           .
   69           .       COMB3............
                .           V
                .           V
   72           .      B5CULV
                .           V
                .           V
   75           .      B5CHAN
                .           .
                .           .
   78           .           .       EPOND
                .           .           .
                .           .           .
   85           .       COMB4............
                .           .
                .           .
   88           .           .          B4
                .           .           .
                .           .           .
   95        COMB5........................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   13JUN08  TIME  13:38:34  *
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
```

```
*                                        *                                        *                                        *
*****************************************                                        *****************************************


                        PINON RIDGE EAST STORMWATER POND SIZING

                        USE 10 YR 24 HR RAINFALL EVENT WITH DEPTH OF 2.00 IN

                        DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
                        OTHER IMPERVIOUS STRUCTURES

                        KLEINFELDER PROJECT NUMBER 83088
                        JUNE 12 2008

  11 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           3  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2    0  ENDING DATE
                      NDTIME        0057  ENDING TIME
                      ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .05 HOURS
                       TOTAL TIME BASE   24.95 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  95 KK     *     COMB5  *
            *            *
            **************

  98 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

  97 HC          HYDROGRAPH COMBINATION
                       ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    COMB5

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.95-HR
+   (CFS)       (HR)
                          (CFS)
+      15.     11.05                    4.          1.          1.           1.
                        (INCHES)      .752       1.018       1.023        1.023
                         (AC-FT)       2.          2.          3.           3.

                        CUMULATIVE AREA =     .05 SQ MI

1
                                                      RUNOFF SUMMARY
                                                FLOW IN CUBIC FEET PER SECOND
```

TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	B1	1.	11.10	0.	0.	0.	.01		
+	ROUTED TO	B6CHAN	1.	11.15	0.	0.	0.	.01		
+	HYDROGRAPH AT	B6	1.	11.10	0.	0.	0.	.00		
+	2 COMBINED AT	COMB1	2.	11.10	0.	0.	0.	.01		
+	HYDROGRAPH AT	B3	0.	11.00	0.	0.	0.	.00		
+	HYDROGRAPH AT	B2	5.	11.00	1.	0.	0.	.01		
+	2 COMBINED AT	COMB2	5.	11.00	1.	0.	0.	.02		
+	ROUTED TO	B2CULV	5.	11.00	1.	0.	0.	.02		
+	HYDROGRAPH AT	B5	3.	11.00	1.	0.	0.	.01		
+	2 COMBINED AT	COMB3	8.	11.00	2.	1.	1.	.02		
+	ROUTED TO	B5CULV	8.	11.00	2.	1.	1.	.02		
+	ROUTED TO	B5CHAN	8.	11.05	2.	1.	1.	.02		
+	HYDROGRAPH AT	EPOND	1.	11.00	0.	0.	0.	.00		
+	2 COMBINED AT	COMB4	8.	11.05	2.	1.	1.	.03		
+	HYDROGRAPH AT	B4	5.	11.00	1.	1.	1.	.01		
+	3 COMBINED AT	COMB5	15.	11.05	4.	1.	1.	.05		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
B6CHAN	MANE	2.40	.83	667.20	.31	3.00	.83	669.00	.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1329E+00 EXCESS= .0000E+00 OUTFLOW= .1329E+00 BASIN STORAGE= .1521E-03 PERCENT ERROR= -.1

B2CULV	MANE	.25	5.12	660.12	.80	3.00	5.12	660.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6855E+00 EXCESS= .0000E+00 OUTFLOW= .6855E+00 BASIN STORAGE= .1330E-04 PERCENT ERROR= .0

B5CULV	MANE	.23	7.70	660.00	.81	3.00	7.70	660.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1041E+01 EXCESS= .0000E+00 OUTFLOW= .1041E+01 BASIN STORAGE= .1293E-04 PERCENT ERROR= .0

```
B5CHAN  MANE          3.00       7.60     663.00        .81       3.00       7.60     663.00          .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1041E+01 EXCESS= .0000E+00 OUTFLOW= .1041E+01 BASIN STORAGE= .4387E-03 PERCENT ERROR=    .0

1                                                    HEC-1 INPUT                                                    PAGE  1

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                      *
*** FREE ***
                      *DIAGRAM
          1           ID    PINON RIDGE EAST STORMWATER POND SIZING
          2           ID
          3           ID    USE 100 YR 24 HR RAINFALL EVENT WITH DEPTH OF 3.00 IN
          4           ID
          5           ID    DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
          6           ID    OTHER IMPERVIOUS STRUCTURES
          7           ID
          8           ID    KLEINFELDER PROJECT NUMBER 83088
          9           ID    JUNE 12 2008
                      *
         10           IT       3       0       0     500
         11           IO       5       0       0
                      *

         12           KK      B1
         13           KM    BASIN 1
         14           IN      60
         15           PC    0.03    0.07    0.11    0.14    0.19    0.24    0.29    0.36    0.44    0.54
         16           PC    0.71    1.99    2.35    2.46    2.55    2.64    2.69    2.75    2.80    2.86
         17           PC    2.89    2.93    2.96    3.00
         18           BA   0.008
         19           LS       0      73       0
         20           UD   0.21
                      *

         21           KK  B6CHAN
         22           KM   BASIN 6 CHANNEL TO EAST STORMWATER POND
         23           RD     300   0.003   0.018            TRAP       0       3
                      *

         24           KK      B6
         25           KM    BASIN 6
         26           IN      60
         27           PC    0.03    0.07    0.11    0.14    0.19    0.24    0.29    0.36    0.44    0.54
         28           PC    0.71    1.99    2.35    2.46    2.55    2.64    2.69    2.75    2.80    2.86
         29           PC    2.89    2.93    2.96    3.00
         30           BA   0.003
         31           LS       0      85      15
         32           UD    0.29
                      *

         33           KK   COMB1
         34           KM    COMBINE BASIN 1 AND BASIN 6
         35           HC       2
                      *

         36           KK      B3
         37           KM    BASIN 3
         38           IN      60
         39           PC    0.03    0.07    0.11    0.14    0.19    0.24    0.29    0.36    0.44    0.54
         40           PC    0.71    1.99    2.35    2.46    2.55    2.64    2.69    2.75    2.80    2.86
         41           PC    2.89    2.93    2.96    3.00
1                                                    HEC-1 INPUT                                                    PAGE  2

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

         42           BA   0.001
         43           LS       0      91       0
         44           UD    0.06
                      *

         45           KK      B2
         46           KM    BASIN 2
         47           IN      60
         48           PC    0.03    0.07    0.11    0.14    0.19    0.24    0.29    0.36    0.44    0.54
         49           PC    0.71    1.99    2.35    2.46    2.55    2.64    2.69    2.75    2.80    2.86
         50           PC    2.89    2.93    2.96    3.00
         51           BA   0.015
```

```
 52          LS       0      85       0
 53          UD    0.11
             *

 54          KK   COMB2
 55          KM    COMBINE BASIN 2 AND BASIN 3
 56          HC       2
             *

 57          KK  B2CULV
 58          KM    BASIN 2 CULVERT
 59          RD      50   0.005   0.024            CIRC       2
             *

 60          KK      B5
 61          KM    BASIN 5
 62          IN      60
 63          PC    0.03    0.07    0.11    0.14    0.19    0.24    0.29    0.36    0.44    0.54
 64          PC    0.71    1.99    2.35    2.46    2.55    2.64    2.69    2.75    2.80    2.86
 65          PC    2.89    2.93    2.96    3.00
 66          BA   0.008
 67          LS       0      86       0
 68          UD    0.14
             *

 69          KK   COMB3
 70          KM    COMBINE BASIN 5 WITH B2CULV
 71          HC       2
             *

 72          KK  B5CULV
 73          KM    BASIN 5 CULVERT
 74          RD      50   0.005   0.024            CIRC     2.5
             *

 75          KK  B5CHAN
 76          KM    BASIN 5 CHANNEL TO EAST STORMWATER POND
 77          RD     400   0.005   0.030            TRAP       3      3
             *
1                                                HEC-1 INPUT                                                PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 78          KK   EPOND
 79          KM    EAST STORMWATER POND
 80          BA   0.001
 81          QI    0.02    0.02    0.03    0.03    0.04    0.04    0.04    0.05    0.06    0.08
 82          QI    0.12    0.97    0.25    0.11    0.07    0.07    0.04    0.04    0.04    0.04
 83          QI    0.03    0.03    0.03    0.03
             *

 84          KK   COMB4
 85          KM    COMBINE CHANNEL INFLOW TO POND
 86          HC       2
             *

 87          KK      B4
 88          KM    BASIN 4
 89          BA    0.01
 90          QI    0.21    0.21    0.25    0.25    0.30    0.30    0.34    0.42    0.51    0.64
 91          QI    1.02    8.09    2.06    0.91    0.57    0.57    0.34    0.34    0.34    0.34
 92          QI    0.23    0.23    0.23    0.23
             *

 93          KK   COMB5
 94          KM    COMBINE ALL INFLOW TO POND
 95          HC       3
 96          KO       3
             *
 97          ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   12         B1
               V
               V
```

```
 21      B6CHAN
              .
              .
 24           .          B6
              .           .
              .           .
 33       COMB1............
              .
              .
 36           .          B3
              .           .
              .           .
 45           .           .          B2
              .           .           .
              .           .           .
 54           .       COMB2............
              .           V
              .           V
 57           .      B2CULV
              .           .
              .           .
 60           .           .          B5
              .           .           .
              .           .           .
 69           .       COMB3............
              .           V
              .           V
 72           .      B5CULV
              .           V
              .           V
 75           .      B5CHAN
              .           .
              .           .
 78           .           .       EPOND
              .           .           .
              .           .           .
 84           .       COMB4............
              .           .
              .           .
 87           .           .          B4
              .           .           .
              .           .           .
 93       COMB5........................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998                *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   13JUN08  TIME  13:38:34  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

PINON RIDGE EAST STORMWATER POND SIZING

USE 100 YR 24 HR RAINFALL EVENT WITH DEPTH OF 3.00 IN

DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
OTHER IMPERVIOUS STRUCTURES

KLEINFELDER PROJECT NUMBER 83088
JUNE 12 2008

```
 11 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0057  ENDING TIME
```

```
                    ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL     .05 HOURS
                      TOTAL TIME BASE   24.95 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  93 KK     *     COMB5  *
            *            *
            **************

  96 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

  95 HC          HYDROGRAPH COMBINATION
                       ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

     ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    COMB5

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.95-HR
+   (CFS)       (HR)
                          (CFS)
+      27.     11.00                   7.          2.          2.          2.
                        (INCHES)     1.370       1.816       1.824       1.824
                         (AC-FT)       3.          4.          4.          4.

                        CUMULATIVE AREA =     .05 SQ MI

1
                                                  RUNOFF SUMMARY
                                             FLOW IN CUBIC FEET PER SECOND
                                           TIME IN HOURS,  AREA IN SQUARE MILES

                                     PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
          OPERATION       STATION    FLOW    PEAK                                          AREA      STAGE     MAX STAGE
+                                                       6-HOUR     24-HOUR     72-HOUR

          HYDROGRAPH AT
+                            B1       2.   11.05          1.          0.          0.        .01

          ROUTED TO
+                         B6CHAN      2.   11.10          1.          0.          0.        .01

          HYDROGRAPH AT
+                            B6       2.   11.05          0.          0.          0.        .00

          2 COMBINED AT
+                          COMB1      4.   11.10          1.          0.          0.        .01

          HYDROGRAPH AT
+                            B3       1.   11.00          0.          0.          0.        .00

          HYDROGRAPH AT
+                            B2       9.   11.00          2.          1.          1.        .01

          2 COMBINED AT
+                          COMB2      9.   11.00          2.          1.          1.        .02

          ROUTED TO
+                         B2CULV      9.   11.00          2.          1.          1.        .02
```

```
        HYDROGRAPH AT
+                          B5        5.   11.00          1.         0.         0.        .01

        2 COMBINED AT
+                        COMB3       14.   11.00          3.         1.         1.        .02

        ROUTED TO
+                       B5CULV       14.   11.00          3.         1.         1.        .02

        ROUTED TO
+                       B5CHAN       14.   11.05          3.         1.         1.        .02

        HYDROGRAPH AT
+                        EPOND        1.   11.00          0.         0.         0.        .00

        2 COMBINED AT
+                        COMB4       15.   11.05          4.         1.         1.        .03

        HYDROGRAPH AT
+                          B4        8.   11.00          2.         1.         1.        .01

        3 COMBINED AT
+                        COMB5       27.   11.00          7.         2.         2.        .05
1
                                  SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                      (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                          INTERPOLATED TO
                                                                       COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                   PEAK                                    PEAK

                               (MIN)     (CFS)     (MIN)      (IN)     (MIN)     (CFS)     (MIN)       (IN)

          B6CHAN  MANE         2.22      2.32    665.90       .84      3.00      2.32    666.00        .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3580E+00 EXCESS= .0000E+00 OUTFLOW= .3579E+00 BASIN STORAGE= .1351E-03 PERCENT ERROR=    .0

          B2CULV  MANE          .22      9.25    659.87      1.59      3.00      9.25    660.00       1.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1360E+01 EXCESS= .0000E+00 OUTFLOW= .1359E+01 BASIN STORAGE= .1329E-04 PERCENT ERROR=    .0

          B5CULV  MANE          .20     13.90    659.90      1.61      3.00     13.90    660.00       1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2058E+01 EXCESS= .0000E+00 OUTFLOW= .2058E+01 BASIN STORAGE= .1291E-04 PERCENT ERROR=    .0

          B5CHAN  MANE         3.00     13.80    663.00      1.61      3.00     13.80    663.00       1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2058E+01 EXCESS= .0000E+00 OUTFLOW= .2058E+01 BASIN STORAGE= .5151E-03 PERCENT ERROR=    .0

1                                                  HEC-1 INPUT                                                  PAGE  1

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                      *
 *** FREE ***
                      *DIAGRAM
           1          ID    PINON RIDGE EAST STORMWATER POND SIZING
           2          ID
           3          ID    USE 1000 YR 24 HR RAINFALL EVENT WITH DEPTH OF 4.43 IN
           4          ID
           5          ID    DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
           6          ID    OTHER IMPERVIOUS STRUCTURES
           7          ID
           8          ID    KLEINFELDER PROJECT NUMBER 83088
           9          ID    JUNE 12 2008
                      *
          10          IT       3       0       0     500
          11          IO       5       0       0
                      *

          12          KK      B1
          13          KM    BASIN 1
```

```
14          IN      60
15          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
16          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
17          PC    4.27    4.32    4.38    4.43
18          BA   0.008
19          LS       0      73       0
20          UD    0.21
            *

21          KK  B6CHAN
22          KM   BASIN 6 CHANNEL TO EAST STORMWATER POND
23          RD     300   0.003   0.018            TRAP       0       3
            *

24          KK      B6
25          KM    BASIN 6
26          IN      60
27          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
28          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
29          PC    4.27    4.32    4.38    4.43
30          BA   0.003
31          LS       0      85      15
32          UD    0.29
            *

33          KK   COMB1
34          KM    COMBINE BASIN 1 AND BASIN 6
35          HC       2
            *

36          KK      B3
37          KM    BASIN 3
38          IN      60
39          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
40          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
41          PC    4.27    4.32    4.38    4.43
1                                         HEC-1 INPUT                                          PAGE  2

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

42          BA   0.001
43          LS       0      91       0
44          UD    0.06
            *

45          KK      B2
46          KM    BASIN 2
47          IN      60
48          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
49          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
50          PC    4.27    4.32    4.38    4.43
51          BA   0.015
52          LS       0      85       0
53          UD    0.11
            *

54          KK   COMB2
55          KM    COMBINE BASIN 2 AND BASIN 3
56          HC       2
            *

57          KK  B2CULV
58          KM    BASIN 2 CULVERT
59          RD      50   0.005   0.024            CIRC       2
            *

60          KK      B5
61          KM    BASIN 5
62          IN      60
63          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
64          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
65          PC    4.27    4.32    4.38    4.43
66          BA   0.008
67          LS       0      86       0
68          UD    0.14
            *

69          KK   COMB3
70          KM    COMBINE BASIN 5 WITH B2CULV
71          HC       2
            *
```

```
  72          KK  B5CULV
  73          KM    BASIN 5 CULVERT
  74          RD      50   0.005   0.024            CIRC     2.5
              *

  75          KK  B5CHAN
  76          KM    BASIN 5 CHANNEL TO EAST STORMWATER POND
  77          RD     400   0.005   0.016            TRAP       3      3
              *
1                                          HEC-1 INPUT                                                  PAGE  3

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  78          KK   EPOND
  79          KM    EAST STORMWATER POND
  80          BA   0.001
  81          QI    0.04    0.04    0.04    0.04    0.05    0.05    0.06    0.07    0.09    0.11
  82          QI    0.18    1.43    0.37    0.16    0.10    0.10    0.06    0.06    0.06    0.06
  83          QI    0.04    0.04    0.04    0.04    0.04
              *

  84          KK   COMB4
  85          KM    COMBINE CHANNEL INFLOW TO POND
  86          HC       2
              *

  87          KK      B4
  88          KM    BASIN 4
  89          BA    0.01
  90          QI    0.31    0.31    0.36    0.36    0.45    0.45    0.50    0.61    0.75    0.95
  91          QI    1.51   11.95    3.04    1.34    0.84    0.84    0.50    0.50    0.50    0.50
  92          QI    0.34    0.34    0.34    0.34
              *

  93          KK   COMB5
  94          KM    COMBINE ALL INFLOW TO POND
  95          HC       3
  96          KO       3
              *
  97          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   12          B1
                V
                V
   21      B6CHAN
                .
                .
   24           .          B6
                .           .
                .           .
   33       COMB1............
                .
                .
   36           .          B3
                .           .
                .           .
   45           .           .          B2
                .           .           .
                .           .           .
   54           .       COMB2............
                .           V
                .           V
   57           .      B2CULV
                .           .
                .           .
   60           .           .          B5
                .           .           .
                .           .           .
   69           .       COMB3............
                .           V
                .           V
   72           .      B5CULV
                .           V
```

```
                .          V
   75           .      B5CHAN
                .          .
                .          .
   78           .          .       EPOND
                .          .          .
                .          .          .
   84           .      COMB4............
                .          .
                .          .
   87           .          .          B4
                .          .          .
                .          .          .
   93       COMB5........................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   13JUN08  TIME  13:38:34  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

PINON RIDGE EAST STORMWATER POND SIZING

USE 1000 YR 24 HR RAINFALL EVENT WITH DEPTH OF 4.43 IN

DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
OTHER IMPERVIOUS STRUCTURES

KLEINFELDER PROJECT NUMBER 83088
JUNE 12 2008

```
  11 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0057  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL     .05 HOURS
                      TOTAL TIME BASE   24.95 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT
```

*** ***

```
            **************
            *            *
  93 KK     *     COMB5  *
            *            *
            **************

  96 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
```

95 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

***

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.95-HR
+	45.	11.00	(CFS)	12.	4.	4.	4.
			(INCHES)	2.332	3.056	3.068	3.068
			(AC-FT)	6.	7.	8.	8.

CUMULATIVE AREA = .05 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	B1	5.	11.05	1.	0.	0.	.01		
+	ROUTED TO	B6CHAN	5.	11.05	1.	0.	0.	.01		
+	HYDROGRAPH AT	B6	3.	11.05	1.	0.	0.	.00		
+	2 COMBINED AT	COMB1	8.	11.05	2.	1.	1.	.01		
+	HYDROGRAPH AT	B3	1.	11.00	0.	0.	0.	.00		
+	HYDROGRAPH AT	B2	15.	11.00	4.	1.	1.	.01		
+	2 COMBINED AT	COMB2	16.	11.00	4.	1.	1.	.02		
+	ROUTED TO	B2CULV	16.	11.00	4.	1.	1.	.02		
+	HYDROGRAPH AT	B5	8.	11.00	2.	1.	1.	.01		
+	2 COMBINED AT	COMB3	24.	11.00	6.	2.	2.	.02		
+	ROUTED TO	B5CULV	24.	11.00	6.	2.	2.	.02		
+	ROUTED TO	B5CHAN	24.	11.00	6.	2.	2.	.02		
+	HYDROGRAPH AT	EPOND	1.	11.00	0.	0.	0.	.00		
+	2 COMBINED AT	COMB4	25.	11.00	6.	2.	2.	.03		
+	HYDROGRAPH AT	B4	12.	11.00	3.	1.	1.	.01		
+	3 COMBINED AT	COMB5	45.	11.00	12.	4.	4.	.05		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
INTERPOLATED TO
COMPUTATION INTERVAL

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
B6CHAN	MANE	1.82	5.08	665.27	1.81	3.00	5.05	663.00	1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7704E+00 EXCESS= .0000E+00 OUTFLOW= .7704E+00 BASIN STORAGE= .1470E-03 PERCENT ERROR= .0

B2CULV	MANE	.20	15.94	660.00	2.84	3.00	15.94	660.00	2.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2420E+01 EXCESS= .0000E+00 OUTFLOW= .2420E+01 BASIN STORAGE= .1346E-04 PERCENT ERROR= .0

B5CULV	MANE	.18	23.94	659.90	2.86	3.00	23.93	660.00	2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3655E+01 EXCESS= .0000E+00 OUTFLOW= .3655E+01 BASIN STORAGE= .1280E-04 PERCENT ERROR= .0

B5CHAN	MANE	2.17	23.78	661.59	2.86	3.00	23.74	660.00	2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3655E+01 EXCESS= .0000E+00 OUTFLOW= .3655E+01 BASIN STORAGE= .3144E-03 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

EAST STORMWATER POND OUTLET WORKS ANALYSIS

KLEINFELDER
Bright People. Right Solutions.

PROJECT Piñon Ridge Mill PROJECT NO. 89241.6
SUBJECT East Pond Outlet Works BY TAK DATE 7/9/08
REVIEWED BY CDL DATE 7/10/08

Objective: Size East Pond and outlet works to store 100-yr storm volume and route 1000-yr storm volume.

Pond Sizing: The following design constraints apply: 1) 110 ft maximum pond width; 2) 3H:1V side slope; 3) 12 ft maximum depth.

To store 100-yr volume of 4 ac-ft, with 2 ft of freeboard, East Pond length is 275 ft with a 110 ft width. Dimensions are for inner crest. Set weir box crest at el. 5523 ft, coinciding with 100-yr storm water surface elevation. Pond crest el. at 5525 ft to accomodate surface drainage and 1,000-yr storm volume.

Pinon Ridge East Stormwater Pond
Outlet Works
30-inch HDPE Pipe

RATING CURVE FOR A DROP INLET (TRANSITIONS FROM WEIR FLOW TO PRESSURIZED PIPE FLOW)

Bernoulli's Flow
A*SQRT(2*g*H/K)

Intake Weir Crest El. =	**5,523.0**	feet
Outlet Invert Elevation =	**5,508.0**	feet
Outlet Pipe Midpoint =	**5,509.3**	feet
Orifice Coef. =	**0.6**	
Inlet Invert El. =	**5,520.0**	
Pipe Diameter, D =	**2.5**	feet
Area =	4.9	sq.ft.
Net area through trashrack bars (ft^2) =	15.7	**95%**
Gross trashrack area (ft^2) =	**16.5**	
Velocity through trashrack (ft/s) =	5.8	= **Avg**
Trashrack Loss, Kt =	0.12	
Entrance Loss, Ke =	**1.5**	
Bend Loss, Kbend =	**0**	
Expansion Loss, Kex =	**0**	
Contraction Loss, Kc =	**0**	
Friction Coefficient =	**0.012**	feet
Pipe Length =	**1550**	feet
Gate Loss, Kg =	**0**	
Exit Loss, Kv =	**3**	
SUM OF AREA-ADJUSTED LOSS COEF. =		**12.1**

*SIMPLE PIPE (NO GATE, NO Δ DIAMETER)

COMPLEX PIPE (CONTRACT, MULTIGATE)
Must do friction loss by segment and relate flow areas by ratios. See p. 456, Design of Small Dams.

Exp. =	**1.5**
Inlet Box Length (ft) =	**2.9**
Inlet Box Width (ft) =	**5.7**
Avg. Weir Length (ft) =	**3.8**
No. of Weirs =	**3**
Number of Contracted Sides/Weir =	**3**
Reduction factor (Red), Leff = L - (Red)*H	0.45
Wall Thickness of Box (ft) =	**0.5**

Headwater Elevation (feet)	Headwater above Weir Crest (feet)	Headwater above Intake Invert (feet)	Weir Coeff.	Total Effective Weir Length	Orifice Flow (cfs)	Bernoulli's Flow (cfs)	Weir Flow (cfs)	Governing Flow Rate (cfs)	Velocity (fps)
5523.0	0.0	3.0	0.00	11.5	88	42	0	0	0.0
5523.1	0.1	3.1	2.80	11.5	88	42	1	1	0.2
5523.2	0.2	3.2	2.80	11.4	88	42	3	3	0.6
5523.3	0.3	3.3	2.80	11.4	89	43	5	5	1.1
5523.4	0.4	3.4	2.92	11.3	89	43	8	8	1.7
5523.5	0.5	3.5	2.92	11.3	89	43	12	12	2.4
5523.6	0.6	3.6	3.08	11.2	90	43	16	16	3.3
5523.7	0.7	3.7	3.08	11.2	90	43	20	20	4.1
5523.8	0.8	3.8	3.30	11.1	90	43	26	26	5.4
5523.9	0.9	3.9	3.30	11.1	90	43	31	31	6.4
5524.0	1.0	4.0	3.32	11.1	91	44	37	37	7.5
5524.1	1.1	4.1	3.32	11.0	91	44	42	42	8.6
5524.2	1.2	4.2	3.32	11.0	91	44	48	44	8.9
5524.3	1.3	4.3	3.32	10.9	92	44	54	44	9.0
5524.4	1.4	4.4	3.32	10.9	92	44	60	44	9.0
5524.5	1.5	4.5	3.32	10.8	92	44	66	44	9.0
5524.6	1.6	4.6	3.32	10.8	93	44	72	44	9.1
5524.7	1.7	4.7	3.32	10.7	93	45	79	45	9.1
5524.8	1.8	4.8	3.32	10.7	93	45	86	45	9.1
5524.9	1.9	4.9	3.32	10.6	94	45	93	45	9.1
5525.0	2.0	5.0	3.32	10.6	94	45	100	45	9.2

FOR PLOT

Headwater Elevation (feet)	Flow Rate (cfs)
5523.0	0
5523.1	1
5523.2	3
5523.3	5
5523.4	8
5523.5	12
5523.6	16
5523.7	20
5523.8	26
5523.9	31
5524.0	37
5524.1	42
5524.2	44
5524.3	44
5524.4	44
5524.5	44
5524.6	44
5524.7	45
5524.8	45
5524.9	45
5525.0	45

FINAL FOR REPORT

ELEVATION (feet)	DISCHARGE (cfs)
5523.0	0
5523.5	12
5524.0	37
5524.5	44
5525.0	45

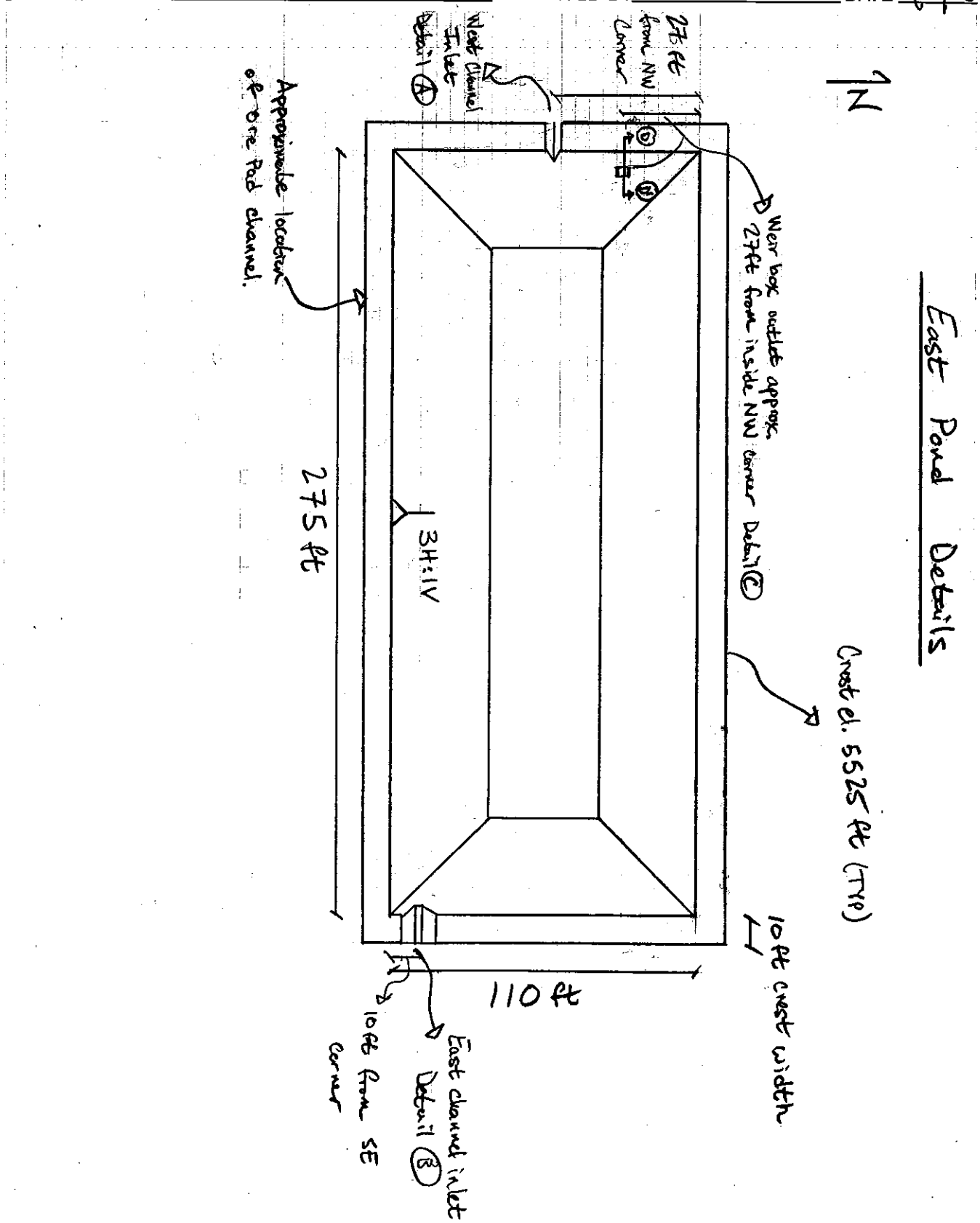
Broad Crested Weir Coeff Lookup (W = 0.50 ft)

H_e	B&K C
0.2	2.80
0.4	2.92
0.6	3.08
0.8	3.30
1.0	3.32
1.2	3.32
1.4	3.32
1.6	3.32
1.8	3.32
2.0	3.32

26/43

KLEINFELDER
Bright People. Right Solutions.

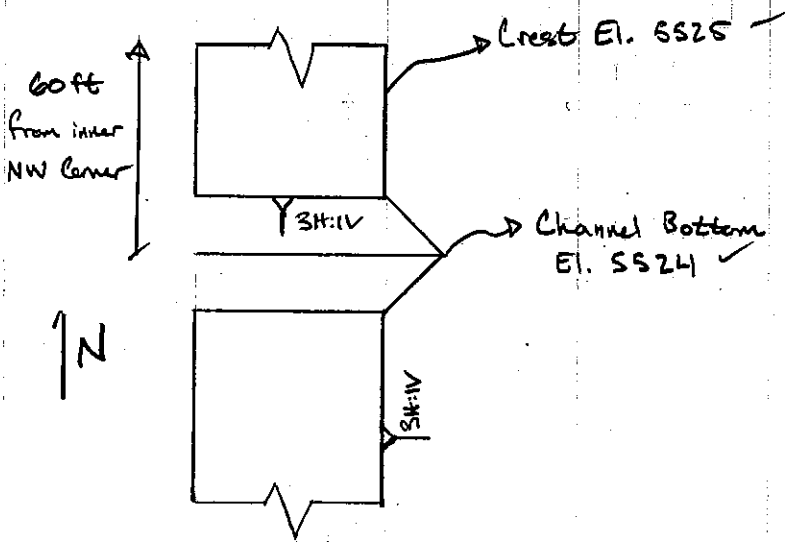
PROJECT Piñon Ridge Mill PROJECT NO. 89241.6
SUBJECT East Pond Size BY TAK DATE 7/9/08
REVIEWED BY Cor DATE 7/10/08



KLEINFELDER
Bright People. Right Solutions.

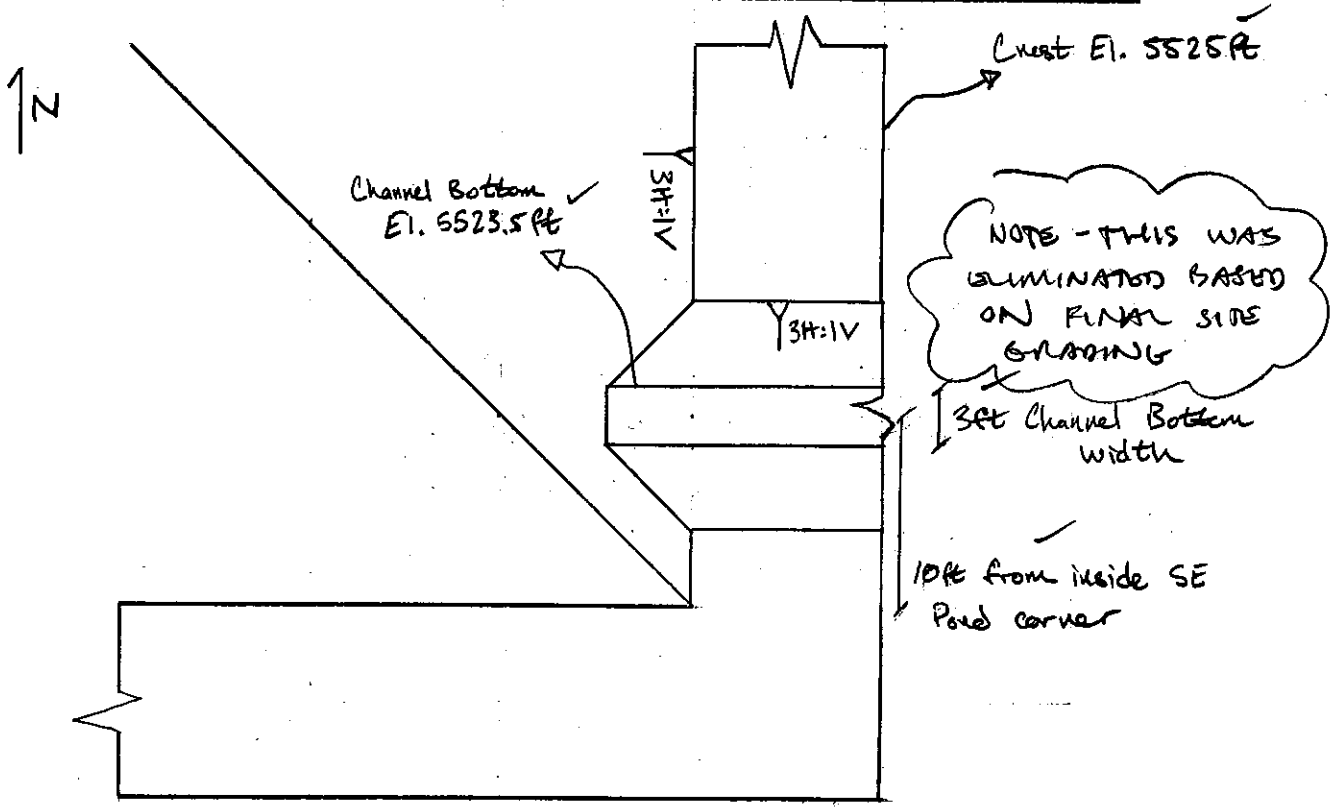
PROJECT Pinion Ridge Mill PROJECT NO. 89241.6
SUBJECT East Pond Channels BY TK DATE 7/9/08
REVIEWED BY CR DATE 7/10/08

West Channel Entrance into East Stormwater Pond



Detail (A)

East Channel Entrance into East Stormwater Pond

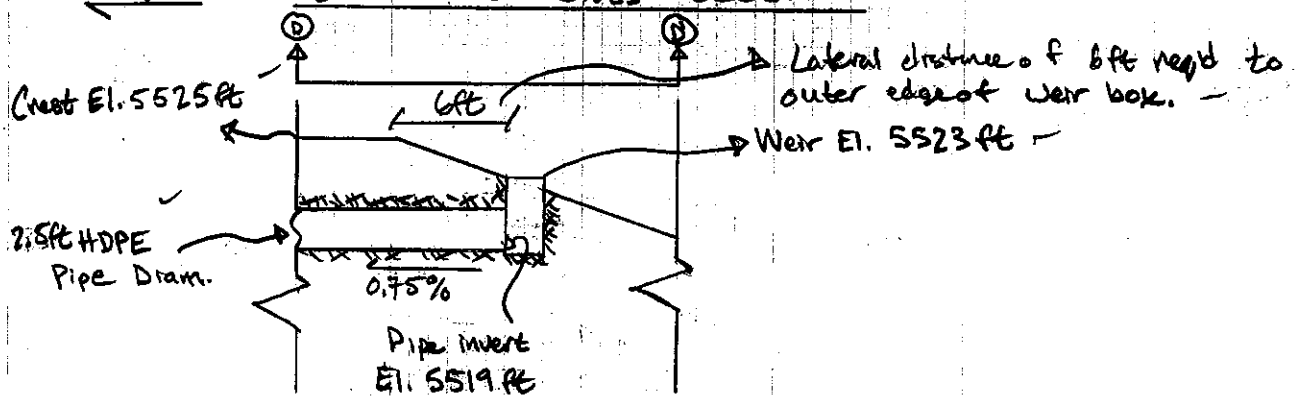


Detail (B)

KLEINFELDER
Bright People. Right Solutions.

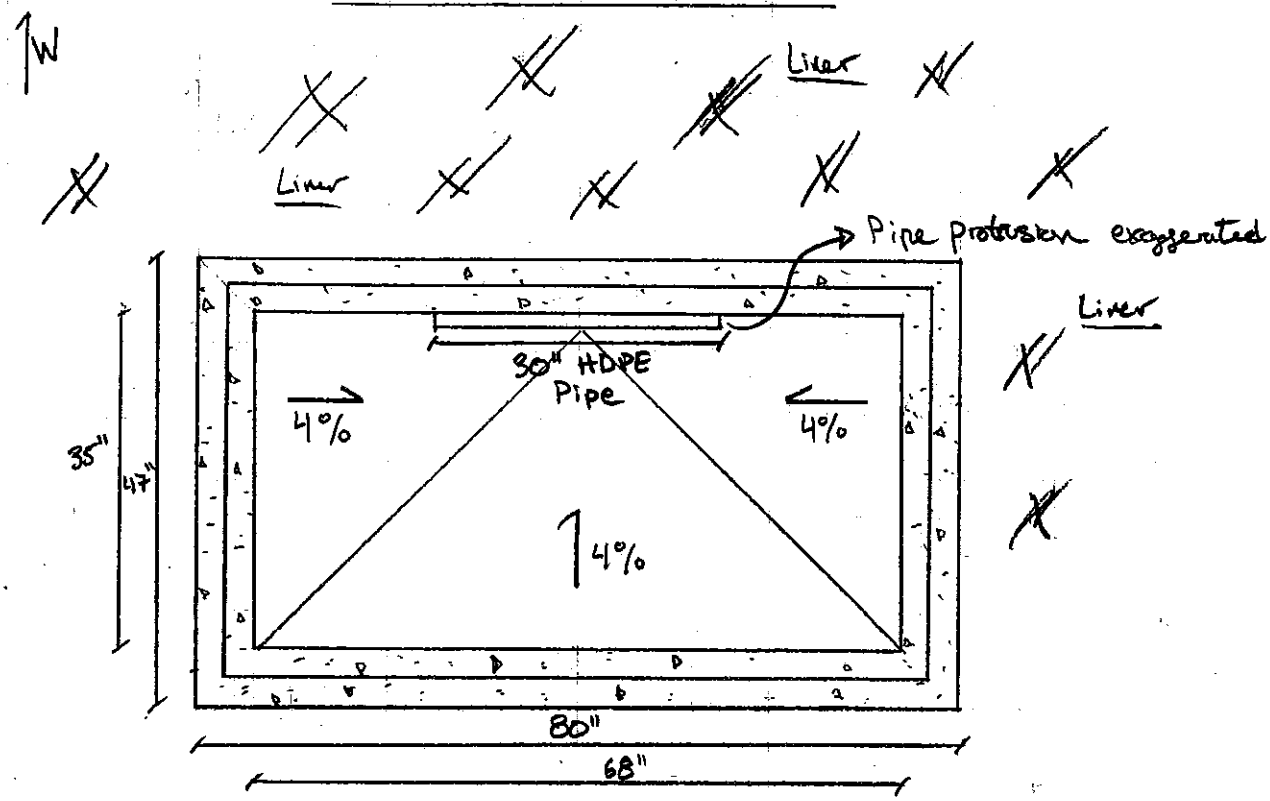
PROJECT Pinon Ridge MPH PROJECT NO. 89241.6
SUBJECT East Pond Outlet BY TAK DATE 7/9/08
REVIEWED BY CM DATE 7/10/08

East Pond Cross Section



* Weir Structure will be typical Type D Inlet. Details are specified in the report.

Weir Box Plan View



Pinon Ridge East Stormwater Pond Sizing

Assuming 3H:1V Side Slope	
Crest El. (ft) =	5525
Bottom El. (ft) =	5513
Length (ft) =	275
Width (ft) =	110
Depth (ft) =	12

Elevation (SE) (ft)	Length (ft)	Width (ft)	Volume (ac-ft)	Cum. Vol. (ac-ft)	1000-Yr Storm Cum. Vol. (SV) (ac-ft)	
5525	275	110	0.3	5.2	1.3	1000-Yr Overflow Capacity (Crest elev)
5524.5	272	107	0.3	4.8	1.0	
5524	269	104	0.3	4.5	0.6	
5523.5	266	101	0.3	4.2	0.3	
5523	263	98	0.3	3.9	0.0	100-Yr Storage Capacity (Pipe invert elev)
5522.5	260	95	0.3	3.6	0.0	
5522	257	92	0.3	3.3	0.0	
5521.5	254	89	0.3	3.0	0.0	
5521	251	86	0.2	2.8	0.0	
5520.5	248	83	0.2	2.5	0.0	
5520	245	80	0.2	2.3	0.0	
5519.5	242	77	0.2	2.0	0.0	
5519	239	74	0.4	1.8	0.0	
5518	233	68	0.4	1.4	0.0	
5517	227	62	0.3	1.1	0.0	
5516	221	56	0.3	0.7	0.0	
5515	215	50	0.2	0.5	0.0	
5514	209	44	0.2	0.2	0.0	

7/10/08

```
1*****************************************                                                  ****************************************
 *                                       *                                                  *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998               *                                                  *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                 *                                                  *          609 SECOND STREET           *
 *                                       *                                                  *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   09JUL08  TIME  13:21:58   *                                                  *           (916) 756-1104             *
 *                                       *                                                  *                                      *
 *****************************************                                                  ****************************************


                                                X     X  XXXXXXX   XXXXX           X
                                                X     X  X        X     X         XX
                                                X     X  X        X                X
                                                XXXXXXX  XXXX     X        XXXXX   X
                                                X     X  X        X                X
                                                X     X  X        X     X          X
                                                X     X  XXXXXXX   XXXXX          XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                  HEC-1 INPUT                                                  PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 *** FREE ***
                        *DIAGRAM
             1          ID    PINON RIDGE EAST DETENTION POND SIZING
             2          ID
             3          ID    USE 1000 YR 24 HR RAINFALL EVENT WITH DEPTH OF 4.43 IN
             4          ID
             5          ID    DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
             6          ID    OTHER IMPERVIOUS STRUCTURES
             7          ID
             8          ID    KLEINFELDER PROJECT NUMBER 83088
             9          ID    MAY 12 2008
                        *
            10          IT       3       0       0     500
            11          IO       5       0       0
            12          JP       3
                        *

            13          KK      B6
            14          KM    BASIN 6
            15          IN      60
            16          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
            17          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
            18          PC    4.27    4.32    4.38    4.43
            19          BA   0.003
            20          LS       0      85      15
            21          UD    0.29
                        *

            22          KK  B6CHAN
            23          KM    BASIN 6 CHANNEL TO EAST STORMWATER POND
            24          RD     300   0.003   0.018            TRAP       0       3
                        *

            25          KK      B1
            26          KM    BASIN 1
            27          IN      60
            28          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
            29          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
            30          PC    4.27    4.32    4.38    4.43
            31          BA   0.008
            32          LS       0      73       0
            33          UD   0.21
                        *
```

```
 34          KK   COMB1
 35          KM    COMBINE BASIN 1 AND BASIN 6
 36          HC       2
             *

 37          KK      B3
 38          KM    BASIN 3
 39          IN      60
 40          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
 41          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
 42          PC    4.27    4.32    4.38    4.43
1                                          HEC-1 INPUT                                          PAGE  2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 43          BA   0.001
 44          LS       0      91       0
 45          UD    0.06
             *

 46          KK      B2
 47          KM    BASIN 2
 48          IN      60
 49          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
 50          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
 51          PC    4.27    4.32    4.38    4.43
 52          BA   0.015
 53          LS       0      85       0
 54          UD    0.11
             *

 55          KK   COMB2
 56          KM    COMBINE BASIN 2 AND BASIN 3
 57          HC       2
             *

 58          KK  B2CULV
 59          KM    BASIN 2 CULVERT
 60          RD      50   0.005   0.024            CIRC       2
             *

 61          KK      B5
 62          KM    BASIN 5
 63          IN      60
 64          PC    0.05    0.10    0.16    0.21    0.28    0.35    0.43    0.53    0.65    0.80
 65          PC    1.04    2.94    3.42    3.63    3.77    3.90    3.98    4.06    4.14    4.22
 66          PC    4.27    4.32    4.38    4.43
 67          BA   0.008
 68          LS       0      86       0
 69          UD    0.14
             *

 70          KK   COMB3
 71          KM    COMBINE BASIN 5 WITH B2CULV
 72          HC       2
             *

 73          KK  B5CULV
 74          KM    BASIN 5 CULVERT
 75          RD      50   0.005   0.024            CIRC     2.5
             *

 76          KK  B5CHAN
 77          KM    BASIN 5 CHANNEL TO EAST STORMWATER POND
 78          RD     400   0.005   0.018            TRAP       3       3
             *
1                                          HEC-1 INPUT                                          PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 79          KK   EPOND
 80          KM    EAST STORMWATER POND
 81          BA   0.001
 82          QI    0.04    0.04    0.04    0.04    0.05    0.05    0.06    0.07    0.09    0.11
 83          QI    0.18    1.43    0.37    0.16    0.10    0.10    0.06    0.06    0.06    0.06
 84          QI    0.04    0.04    0.04    0.04    0.04
             *

 85          KK   COMB4
```

```
 86          KM    COMBINE CHANNEL INFLOW TO POND
 87          HC       2
             *

 88          KK      B4
 89          KM    BASIN 4
 90          BA    0.01
 91          QI    0.31    0.31    0.36    0.36    0.45    0.45    0.50    0.61    0.75    0.95
 92          QI    1.51   11.95    3.04    1.34    0.84    0.84    0.50    0.50    0.50    0.50
 93          QI    0.34    0.34    0.34    0.34
             *

 94          KK   COMB5
 95          KM    COMBINE ALL INFLOW TO POND
 96          HC       3
             *

 97          KK  OUTLETSIZING
 98          KP       1
 99          KM   30 INCH OUTLET PIPE AND 35X80IN WEIR TO ROUTE 1000YR STORM THROUGH 110X275FT
100          RS       1    FLOW       0
101          SV     0.0     0.3     0.6     1.0     1.3
102          SE    5523  5523.5    5524  5524.5    5525
103          SQ     0.0      12      37      44      45
104          KO       3
105          KP       2
106          KM   30 INCH OUTLET PIPE AND 2X3 FT WEIR TO ROUTE 1000YR STORM THROUGH 110X275 FT
107          RS       1    FLOW       0
108          SV     0.0     0.3     0.6     1.0     1.3
109          SE    5523  5523.5    5524  5524.5    5525
110          SQ     0.0       7      22      39      45
111          KO       3
112          KP       3
113          KM   30 INCH OUTLET PIPE AND 2X2 FT WEIR TO ROUTE 1000YR STORM THROUGH 110X275 FT
114          RS       1    FLOW       0
115          SV     0.0     0.3     0.6     1.0     1.3
116          SE    5523  5523.5    5524  5524.5    5525
117          SQ     0.0       6      18      32      45
118          KO       3
             *
119          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    13          B6
                 V
                 V
    22       B6CHAN
                 .
                 .
    25           .          B1
                 .           .
                 .           .
    34        COMB1...........
                 .
                 .
    37           .          B3
                 .           .
                 .           .
    46           .           .          B2
                 .           .           .
                 .           .           .
    55           .       COMB2...........
                 .           V
                 .           V
    58           .      B2CULV
                 .           .
                 .           .
    61           .           .          B5
                 .           .           .
                 .           .           .
    70           .       COMB3...........
                 .           V
                 .           V
    73           .      B5CULV
                 .           V
                 .           V
```

```
76          .      B5CHAN
            .          .
            .          .
79          .          .       EPOND
            .          .          .
            .          .          .
85          .       COMB4...........
            .          .
            .          .
88          .          .          B4
            .          .          .
            .          .          .
94       COMB5......................
            V
            V
97      OUTLET
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   09JUL08  TIME  13:21:58   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

PINON RIOGE EAST DETENTION POND SIZING

USE 1000 YR 24 HR RAINFALL EVENT WITH DEPTH OF 4.43 IN

DIRECT RUNOFF METHOD USED FOR BUILDINGS CONCRETE SLABS AND
OTHER IMPERVIOUS STRUCTURES

KLEINFELDER PROJECT NUMBER 83088
MAY 12 2008

```
 11 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0057  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL     .05 HOURS
                      TOTAL TIME BASE   24.95 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           3  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF RUNOFF
                   1.00
```

*** ***

****

```
          *            *
 97 KK    *   OUTLET   *     SIZING
          *            *
          **************

104 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

100 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC         .00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

101 SV            STORAGE          .0        .3        .6       1.0       1.3

102 SE          ELEVATION     5523.00   5523.50   5524.00   5524.50   5525.00

103 SQ          DISCHARGE          0.       12.       37.       44.       45.

                                                                 ***

     ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION   OUTLET
                          FOR PLAN 1, RATIO = 1.00

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.95-HR
+   (CFS)       (HR)
                          (CFS)
+      39.     11.15                12.          4.          4.           4.
                       (INCHES)    2.327       3.056       3.064        3.064
                        (AC-FT)      6.          7.          8.           8.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     24.95-HR
+  (AC-FT)      (HR)
        1.     11.15                 0.          0.          0.           0.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.95-HR
+   (FEET)      (HR)
   5524.15     11.15             5523.41     5523.13     5523.12      5523.12

                       CUMULATIVE AREA =      .05 SQ MI


***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

105 KP        PLAN  2 FOR STATION   OUTLET          SIZING
                        30 INCH OUTLET PIPE AND 2X3 FT WEIR TO ROUTE 1000YR STORM THROUGH 110X275 FT

111 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

107 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC         .00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

108 SV            STORAGE          .0        .3        .6       I.0       1.3

109 SE          ELEVATION     5523.00   5523.50   5524.00   5524.50   5525.00

II0 SQ          DISCHARGE          0.        7.       22.       39.       45.

                                                                 ***

     ***            ***            ***            ***            ***
```

```
                    HYDROGRAPH AT STATION   OUTLET
                      FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.95-HR
+   (CFS)       (HR)
                          (CFS)
+      39.     11.15                 11.          4.          4.           4.
                        (INCHES)   2.319       3.054       3.060        3.060
                         (AC-FT)      6.          7.          8.           8.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     24.95-HR
+  (AC-FT)      (HR)
        1.     11.15                  0.          0.          0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.95-HR
+   (FEET)      (HR)
   5524.50     11.15              5523.59     5523.19     5523.19      5523.19

                        CUMULATIVE AREA =     .05 SQ MI


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  112 KP        PLAN  3 FOR STATION   OUTLET          SIZING
                          30 INCH OUTLET PIPE AND 2X2 FT WEIR TO ROUTE 1000YR STORM THROUGH 110X275 FT

  118 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

  114 RS          STORAGE ROUTING
                        NSTPS           1  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC         .00  INITIAL CONDITION
                            X         .00 WORKING R AND D COEFFICIENT

  115 SV            STORAGE          .0        .3        .6       1.0       1.3

  116 SE          ELEVATION     5523.00   5523.50   5524.00   5524.50   5525.00

  117 SQ          DISCHARGE          0.        6.       18.       32.       45.

                                                                  ***

      ***             ***             ***             ***             ***

                    HYDROGRAPH AT STATION   OUTLET
                      FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.95-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     11.15                 11.          4.          4.           4.
                        (INCHES)   2.315       3.053       3.059        3.059
                         (AC-FT)      6.          7.          8.           8.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     24.95-HR
+  (AC-FT)      (HR)
        1.     11.15                  0.          0.          0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     24.95-HR
+   (FEET)      (HR)
   5524.74     11.15              5523.66     5523.23     5523.22      5523.22

                        CUMULATIVE AREA =     .05 SQ MI

1

                PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS
```

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN		RATIO 1 1.00
HYDROGRAPH AT					
+	B6	.00	1	FLOW	3.
				TIME	11.05
			2	FLOW	3.
				TIME	11.05
			3	FLOW	3.
				TIME	11.05
ROUTED TO					
+	B6CHAN	.00	1	FLOW	3.
				TIME	11.10
			2	FLOW	3.
				TIME	11.10
			3	FLOW	3.
				TIME	11.10
HYDROGRAPH AT					
+	B1	.01	1	FLOW	5.
				TIME	11.05
			2	FLOW	5.
				TIME	11.05
			3	FLOW	5.
				TIME	11.05
2 COMBINED AT					
+	COMB1	.01	1	FLOW	8.
				TIME	11.05
			2	FLOW	8.
				TIME	11.05
			3	FLOW	8.
				TIME	11.05
HYDROGRAPH AT					
+	B3	.00	1	FLOW	1.
				TIME	11.00
			2	FLOW	1.
				TIME	11.00
			3	FLOW	1.
				TIME	11.00
HYDROGRAPH AT					
+	B2	.01	1	FLOW	15.
				TIME	11.00
			2	FLOW	15.
				TIME	11.00
			3	FLOW	15.
				TIME	11.00
2 COMBINED AT					
+	COMB2	.02	1	FLOW	16.
				TIME	11.00
			2	FLOW	16.
				TIME	11.00
			3	FLOW	16.
				TIME	11.00
ROUTED TO					
+	B2CULV	.02	1	FLOW	16.
				TIME	11.00
			2	FLOW	16.
				TIME	11.00
			3	FLOW	16.
				TIME	11.00
HYDROGRAPH AT					
+	B5	.01	1	FLOW	8.
				TIME	11.00
			2	FLOW	8.
				TIME	11.00
			3	FLOW	8.
				TIME	11.00
2 COMBINED AT					
+	COMB3	.02	1	FLOW	24.
				TIME	11.00

```
                                    2   FLOW          24.
                                        TIME        11.00
                                    3   FLOW          24.
                                        TIME        11.00

 ROUTED TO
+                B5CULV       .02    1   FLOW          24.
                                        TIME        11.00
                                    2   FLOW          24.
                                        TIME        11.00
                                    3   FLOW          24.
                                        TIME        11.00

 ROUTED TO
+                B5CHAN       .02    1   FLOW          24.
                                        TIME        11.00
                                    2   FLOW          24.
                                        TIME        11.00
                                    3   FLOW          24.
                                        TIME        11.00

 HYDROGRAPH AT
+                 EPOND       .00    1   FLOW           1.
                                        TIME        11.00
                                    2   FLOW           1.
                                        TIME        11.00
                                    3   FLOW           1.
                                        TIME        11.00

  2 COMBINED AT
+                 COMB4       .03    1   FLOW          25.
                                        TIME        11.00
                                    2   FLOW          25.
                                        TIME        11.00
                                    3   FLOW          25.
                                        TIME        11.00

 HYDROGRAPH AT
+                    B4       .01    1   FLOW          12.
                                        TIME        11.00
                                    2   FLOW          12.
                                        TIME        11.00
                                    3   FLOW          12.
                                        TIME        11.00

  3 COMBINED AT
+                 COMB5       .05    1   FLOW          45.
                                        TIME        11.00
                                    2   FLOW          45.
                                        TIME        11.00
                                    3   FLOW          45.
                                        TIME        11.00

 ROUTED TO
+                OUTLET       .05    1   FLOW          39.
                                        TIME        11.15
                                    2   FLOW          39.
                                        TIME        11.15
                                    3   FLOW          38.
                                        TIME        11.15

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE     5524.15
                                        TIME        11.15
                                    2   STAGE     5524.50
                                        TIME        11.15
                                    3   STAGE     5524.74
                                        TIME        11.15
1
                                        SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                            (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                  INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                   PEAK                                      PEAK

                               (MIN)     (CFS)     (MIN)      (IN)     (MIN)     (CFS)     (MIN)       (IN)

        FOR PLAN = 1  RATIO=  .00
          B6CHAN  MANE         2.10      2.88    664.21      3.04      3.00      2.88    666.00       3.04
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4859E+00 EXCESS= .0000E+00 OUTFLOW= .4859E+00 BASIN STORAGE= .1535E-03 PERCENT ERROR=    .0

          FOR PLAN = 2  RATIO=  .00
            B6CHAN  MANE        2.10      2.88    664.21      3.04      3.00      2.88    666.00        3.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4859E+00 EXCESS= .0000E+00 OUTFLOW= .4859E+00 BASIN STORAGE= .1535E-03 PERCENT ERROR=    .0

          FOR PLAN = 3  RATIO=  .00
            B6CHAN  MANE        2.10      2.88    664.21      3.04      3.00      2.88    666.00        3.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4859E+00 EXCESS= .0000E+00 OUTFLOW= .4859E+00 BASIN STORAGE= .1535E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            B2CULV  MANE         .20     15.94    660.00      2.84      3.00     15.94    660.00        2.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2420E+01 EXCESS= .0000E+00 OUTFLOW= .2420E+01 BASIN STORAGE= .1346E-04 PERCENT ERROR=    .0

          FOR PLAN = 2  RATIO=  .00
            B2CULV  MANE         .20     15.94    660.00      2.84      3.00     15.94    660.00        2.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2420E+01 EXCESS= .0000E+00 OUTFLOW= .2420E+01 BASIN STORAGE= .1346E-04 PERCENT ERROR=    .0

          FOR PLAN = 3  RATIO=  .00
            B2CULV  MANE         .20     15.94    660.00      2.84      3.00     15.94    660.00        2.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2420E+01 EXCESS= .0000E+00 OUTFLOW= .2420E+01 BASIN STORAGE= .1346E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            B5CULV  MANE         .18     23.94    659.90      2.86      3.00     23.93    660.00        2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3655E+01 EXCESS= .0000E+00 OUTFLOW= .3655E+01 BASIN STORAGE= .1280E-04 PERCENT ERROR=    .0

          FOR PLAN = 2  RATIO=  .00
            B5CULV  MANE         .18     23.94    659.90      2.86      3.00     23.93    660.00        2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3655E+01 EXCESS= .0000E+00 OUTFLOW= .3655E+01 BASIN STORAGE= .1280E-04 PERCENT ERROR=    .0

          FOR PLAN = 3  RATIO=  .00
            B5CULV  MANE         .18     23.94    659.90      2.86      3.00     23.93    660.00        2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3655E+01 EXCESS= .0000E+00 OUTFLOW= .3655E+01 BASIN STORAGE= .1280E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            B5CHAN  MANE        2.37     23.76    661.06      2.86      3.00     23.71    660.00        2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3656E+01 EXCESS= .0000E+00 OUTFLOW= .3656E+01 BASIN STORAGE= .2642E-03 PERCENT ERROR=    .0

          FOR PLAN = 2  RATIO=  .00
            B5CHAN  MANE        2.37     23.76    661.06      2.86      3.00     23.71    660.00        2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3656E+01 EXCESS= .0000E+00 OUTFLOW= .3656E+01 BASIN STORAGE= .2642E-03 PERCENT ERROR=    .0

          FOR PLAN = 3  RATIO=  .00
            B5CHAN  MANE        2.37     23.76    661.06      2.86      3.00     23.71    660.00        2.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3656E+01 EXCESS= .0000E+00 OUTFLOW= .3656E+01 BASIN STORAGE= .2642E-03 PERCENT ERROR=    .0
*** NORMAL END OF HEC-1 ***
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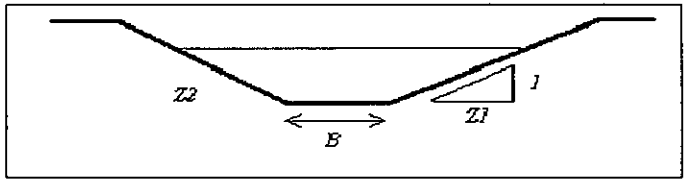
EAST STORMWATER POND INLET CHANNEL ANALYSIS

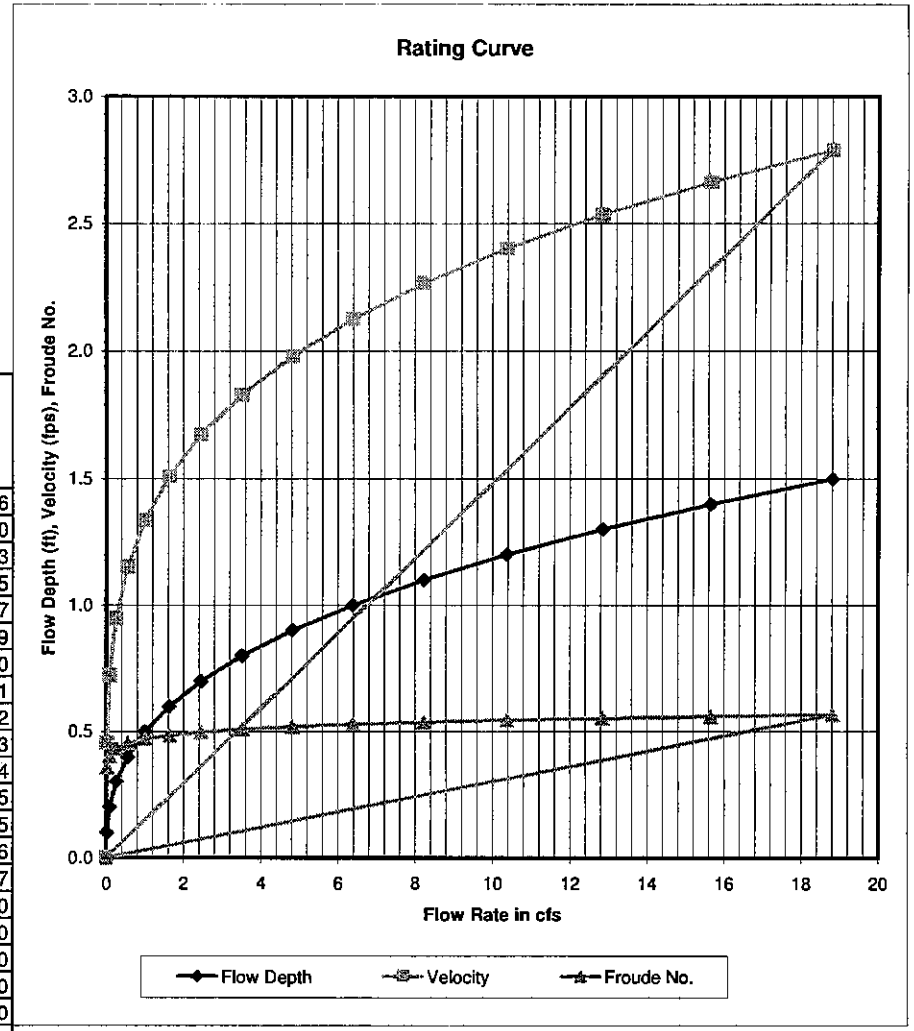
RATING CURVE FOR TRAPEZOIDAL CHANNEL

RATING CURVE FOR TRAPEZOIDAL CHANNEL



Bottom Width	B =	0.00	feet
Left Side Slope	Z1 =	3.00	ft/ft
Right Side Slope	Z2 =	3.00	ft/ft
Manning's n	n =	0.030	
Longitudinal Slope	S =	0.0050	ft/ft

	Flow Depth Y (ft)	Flow Area A (sq ft)	Wetted Perimeter P (ft)	Hydraulic Radius R (ft)	Flow Velocity V (fps)	Flow rate Q (cfs)	Froude Number Fr
	0.10	0.03	0.63	0.05	0.5	0.0	0.36
	0.20	0.12	1.26	0.09	0.7	0.1	0.40
	0.30	0.27	1.90	0.14	0.9	0.3	0.43
	0.40	0.48	2.53	0.19	1.2	0.6	0.45
	0.50	0.75	3.16	0.24	1.3	1.0	0.47
	0.60	1.08	3.79	0.28	1.5	1.6	0.49
	0.70	1.47	4.43	0.33	1.7	2.5	0.50
100yr Q →	0.80	1.92	5.06	0.38	1.8	3.5	0.51
	0.90	2.43	5.69	0.43	2.0	4.8	0.52
	1.00	3.00	6.32	0.47	2.1	6.4	0.53
1000yr Q →	1.10	3.63	6.96	0.52	2.3	8.2	0.54
	1.20	4.32	7.59	0.57	2.4	10.4	0.55
	1.30	5.07	8.22	0.62	2.5	12.8	0.55
	1.40	5.88	8.85	0.66	2.7	15.7	0.56
	1.50	6.75	9.49	0.71	2.8	18.8	0.57
		0.00	0.00	0.00	0.0	0.0	0.00
		0.00	0.00	0.00	0.0	0.0	0.00
		0.00	0.00	0.00	0.0	0.0	0.00
		0.00	0.00	0.00	0.0	0.0	0.00
		0.00	0.00	0.00	0.0	0.0	0.00
		0.00	0.00	0.00	0.0	0.0	0.00



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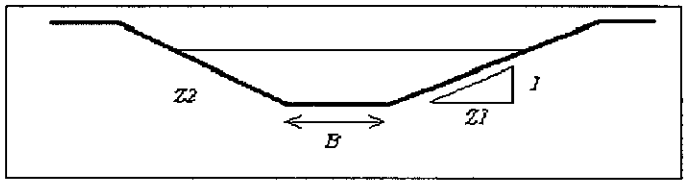
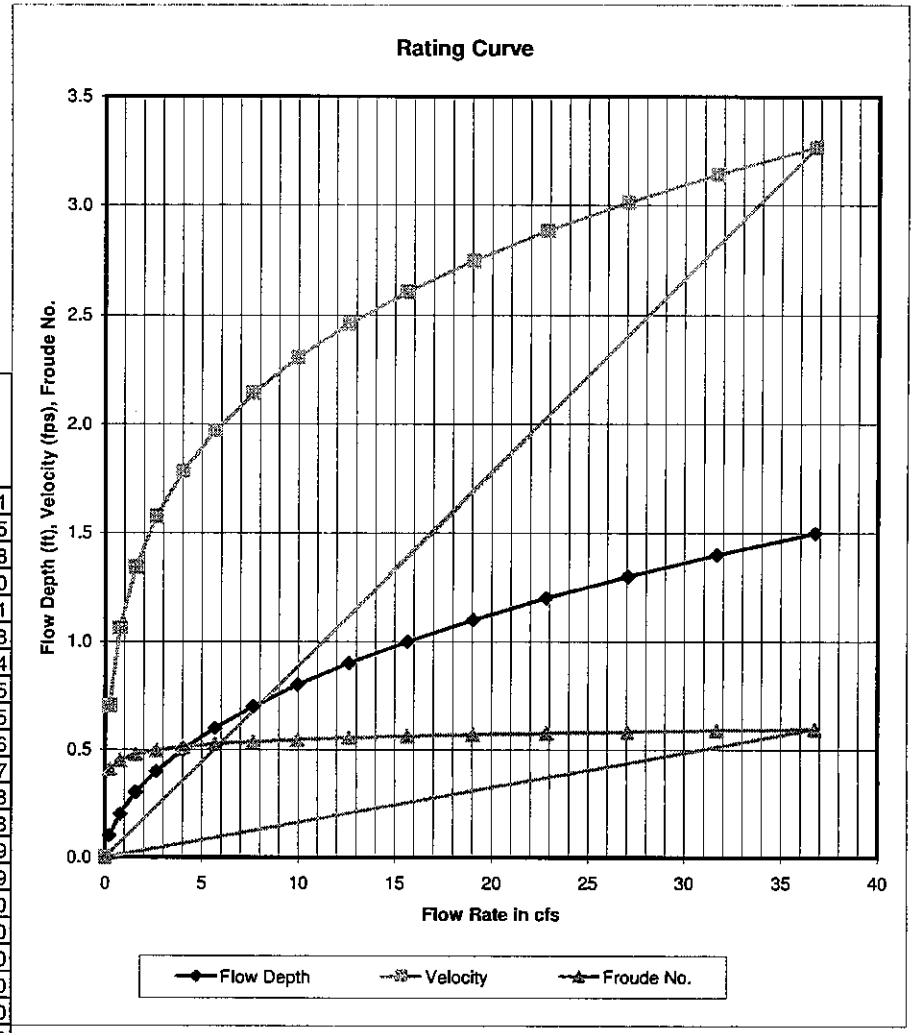
RATING CURVE FOR TRAPEZOIDAL CHANNEL

RATING CURVE FOR TRAPEZOIDAL CHANNEL



Bottom Width	B =	3.00	feet
Left Side Slope	Z1 =	3.00	ft/ft
Right Side Slope	Z2 =	3.00	ft/ft
Manning's n	n =	0.030	
Longitudinal Slope	S =	0.0050	ft/ft

	Flow Depth Y (ft)	Flow Area A (sq ft)	Wetted Perimeter P (ft)	Hydraulic Radius R (ft)	Flow Velocity V (fps)	Flow rate Q (cfs)	Froude Number Fr
	0.10	0.33	3.63	0.09	0.7	0.2	0.41
	0.20	0.72	4.26	0.17	1.1	0.8	0.45
	0.30	1.17	4.90	0.24	1.3	1.6	0.48
	0.40	1.68	5.53	0.30	1.6	2.6	0.50
	0.50	2.25	6.16	0.37	1.8	4.0	0.51
	0.60	2.88	6.79	0.42	2.0	5.7	0.53
	0.70	3.57	7.43	0.48	2.1	7.7	0.54
	0.80	4.32	8.06	0.54	2.3	10.0	0.55
	0.90	5.13	8.69	0.59	2.5	12.6	0.55
100yr Q →	1.00	6.00	9.32	0.64	2.6	15.6	0.56
	1.10	6.93	9.96	0.70	2.7	19.0	0.57
	1.20	7.92	10.59	0.75	2.9	22.8	0.58
1,000yr Q →	1.30	8.97	11.22	0.80	3.0	27.0	0.58
	1.40	10.08	11.85	0.85	3.1	31.7	0.59
	1.50	11.25	12.49	0.90	3.3	36.7	0.59
		0.00	3.00	0.00	0.0	0.0	0.00
		0.00	3.00	0.00	0.0	0.0	0.00
		0.00	3.00	0.00	0.0	0.0	0.00
		0.00	3.00	0.00	0.0	0.0	0.00
		0.00	3.00	0.00	0.0	0.0	0.00
		0.00	3.00	0.00	0.0	0.0	0.00



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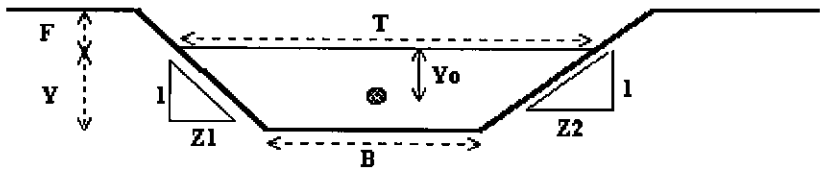
EAST STORMWATER POND ORE PAD CHANNEL ANALYSIS

Critical Flow Analysis - Trapezoidal Channel

Project: Pinon Ridge Uranium Mill
Channel ID: Ore Pad Channel to East Stormwater Pond



Design Information (Input)			
Bottom Width	B =	3.0	ft
Left Side Slope	Z1 =	3.0	ft/ft
Right Side Slope	Z2 =	3.0	ft/ft
Design Discharge	Q =	**12.0**	cfs

Critical Flow Condition (Calculated)			
Critical Flow Depth	**Y =**	**0.6**	ft
Critical Flow Area	A =	3.1	sq ft
Critical Top Width	T =	6.8	ft
Critical Hydraulic Depth	D =	0.5	ft
Critical Flow Velocity	V =	3.9	fps
Froude Number	**Fr =**	**1.0**	
Critical Wetted Perimeter	P =	7.02	ft
Critical Hydraulic Radius	R =	0.44	ft
Critical (min) Specific Energy	Esc =	0.87	ft
Centroid on the Critical Flow Area	Yoc =	0.24	ft
Critical (min) Specific Force	Fsc =	0.14	kip

Pinon Ridge Uranium Mill Hydrologic Analysis

Rainfall Distribution

SCS Rainfall Distribution: Type II

Frequency (yr): 1000

Total 24-hour Rainfall Depth (in): 4.43

*Assume entire ore pad is impervious

Structure Area (ac) = 6.25

Structure Area (ft^2) = 272250

Hour, t	t/24	P_t/P_{24}	SCS Cumul P	Hour	HEC-1 Cumul P	P_t/P_{24} Type I	Type IA	Type II	Type III	Time Hour	Time (sec)	Inc. Depth (ft)	Structure QI (cfs)
0.00	0.000	0.000	0.000	0	0.000	0.000	0.000	0.000	0.000	0	3600	0.00	0.0
2.00	0.083	0.022	0.097	1	0.049	0.035	0.050	0.022	0.020	1	3600	0.00	0.3
4.00	0.167	0.048	0.213	2	0.097	0.076	0.116	0.048	0.043	2	3600	0.00	0.3
6.00	0.250	0.080	0.354	3	0.155	0.125	0.206	0.080	0.072	3	3600	0.00	0.4
7.00	0.292	0.098	0.434	4	0.213	0.156	0.268	0.098	0.089	4	3600	0.00	0.4
8.00	0.333	0.120	0.532	5	0.284	0.194	0.425	0.120	0.115	5	3600	0.01	0.4
8.50	0.354	0.133	0.589	6	0.354	0.219	0.480	0.133	0.130	6	3600	0.01	0.4
9.00	0.375	0.147	0.651	7	0.434	0.254	0.520	0.147	0.148	7	3600	0.01	0.5
9.50	0.396	0.163	0.722	8	0.532	0.303	0.550	0.163	0.167	8	3600	0.01	0.6
9.75	0.406	0.172	0.762	9	0.651	0.362	0.564	0.172	0.178	9	3600	0.01	0.8
10.00	0.417	0.181	0.802	10	0.802	0.515	0.577	0.181	0.189	10	3600	0.01	0.9
10.50	0.438	0.204	0.904	11	1.041	0.583	0.601	0.204	0.216	11	3600	0.02	1.5
11.00	0.458	0.235	1.041	12	2.937	0.624	0.624	0.235	0.250	12	3600	0.16	11.9
11.50	0.479	0.283	1.254	13	3.420	0.654	0.645	0.283	0.298	13	3600	0.04	3.0
11.75	0.490	0.357	1.582	14	3.633	0.669	0.655	0.357	0.339	14	3600	0.02	1.3
12.00	0.500	0.663	2.937	15	3.766	0.682	0.664	0.663	0.500	15	3600	0.01	0.8
12.50	0.521	0.735	3.256	16	3.898	0.706	0.683	0.735	0.702	16	3600	0.01	0.8
13.00	0.542	0.772	3.420	17	3.978	0.727	0.701	0.772	0.751	17	3600	0.01	0.5
13.50	0.563	0.799	3.540	18	4.058	0.748	0.719	0.799	0.785	18	3600	0.01	0.5
14.00	0.583	0.820	3.633	19	4.138	0.767	0.736	0.820	0.811	19	3600	0.01	0.5
16.00	0.667	0.880	3.898	20	4.217	0.830	0.800	0.880	0.886	20	3600	0.01	0.5
20.00	0.833	0.952	4.217	21	4.271	0.926	0.906	0.952	0.957	21	3600	0.00	0.3
24.00	1.000	1.000	4.430	22	4.324	1.000	1.000	1.000	1.000	22	3600	0.00	0.3
				23	4.377					23	3600	0.00	0.3
				24	4.430					24	3600	0.00	0.3
											Peak Flow (cfs) =		11.9

CBR 7/10/08