

APPENDIX 5. PROPOSED RATIONAL
METHOD, HYDROGRAPH, BASIN
ROUTING AND HYDRAULIC
CALULATIONS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/17/25

SAN BERNARDINO COUNTY FIRE STATION No. 227
EXISTING HYDROLOGIC CONDITION
OFFSITE AREA "A"
10-YEAR

Program License Serial Number 6158

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 1.090 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

SCHOOL subarea

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm) = 0.587(In/Hr)
Initial subarea data:
Initial area flow distance = 449.000(Ft.)
Top (of initial area) elevation = 1294.000(Ft.)
Bottom (of initial area) elevation = 1286.130(Ft.)
Difference in elevation = 7.870(Ft.)
Slope = 0.01753 s(%) = 1.75
 $TC = k(0.412)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 10.643 min.
Rainfall intensity = 3.077(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.728
Subarea runoff = 4.975(CFS)
Total initial stream area = 2.220(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.587(In/Hr)
End of computations, Total Study Area = 2.22 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 06/18/25

SAN BERNARDINO COUNTY FIRE STATION No.227
EXISTING HYDROLOGY SCHOOL CONDITIONS
AREA "A"

Program License Serial Number 6158

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.900 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

SCHOOL subarea

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.471(In/Hr)
Initial subarea data:
Initial area flow distance = 641.000(Ft.)
Top (of initial area) elevation = 1294.000(Ft.)
Bottom (of initial area) elevation = 1284.000(Ft.)
Difference in elevation = 10.000(Ft.)
Slope = 0.01560 s(%)= 1.56
 $TC = k(0.412)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 12.561 min.
Rainfall intensity = 4.856(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.813
Subarea runoff = 13.653(CFS)
Total initial stream area = 3.460(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.471(In/Hr)
End of computations, Total Study Area = 3.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 06/16/25

SAN BERNARDINO COUNTY FIRE STATION 227
PROPOSED FIRE STATION IMPROVEMENTS
ONSITE AREA B&C
DRAINAGE AREA "B&C"

Program License Serial Number 6158

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.900 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

Process from Point/Station 2.000 to Point/Station 3.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 328.000(Ft.)
Top (of initial area) elevation = 1287.900(Ft.)
Bottom (of initial area) elevation = 1285.000(Ft.)
Difference in elevation = 2.900(Ft.)
Slope = 0.00884 s(%)= 0.88
TC = $k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 7.942 min.
Rainfall intensity = 6.393(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.889
Subarea runoff = 4.319(CFS)
Total initial stream area = 0.760(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

Process from Point/Station 3.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1282.980(Ft.)
Downstream point/station elevation = 1281.890(Ft.)
Pipe length = 34.00(Ft.) Manning's N = 0.009
No. of pipes = 1 Required pipe flow = 4.319(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 4.319(CFS)
Normal flow depth in pipe = 5.78(In.)
Flow top width inside pipe = 11.99(In.)
Critical Depth = 10.48(In.)

Pipe flow velocity = 11.54(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 7.99 min.

Process from Point/Station 4.000 to Point/Station 4.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
Stream flow area = 0.760(Ac.)
Runoff from this stream = 4.319(CFS)
Time of concentration = 7.99 min.
Rainfall intensity = 6.369(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 58.000(Ft.)
Top (of initial area) elevation = 1286.700(Ft.)
Bottom (of initial area) elevation = 1283.900(Ft.)
Difference in elevation = 2.800(Ft.)
Slope = 0.04828 s(%)= 4.83
TC = $k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 2.828 min.
Rainfall intensity = 11.878(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff = 4.460(CFS)
Total initial stream area = 0.420(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

Process from Point/Station 2.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1282.870(Ft.)
Downstream point/station elevation = 1281.890(Ft.)
Pipe length = 140.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.460(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.460(CFS)
Normal flow depth in pipe = 10.38(In.)
Flow top width inside pipe = 13.85(In.)
Critical Depth = 10.28(In.)
Pipe flow velocity = 4.92(Ft/s)
Travel time through pipe = 0.47 min.
Time of concentration (TC) = 3.30 min.

Process from Point/Station 4.000 to Point/Station 4.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 0.420(Ac.)

Runoff from this stream = 4.460(CFS)

Time of concentration = 3.30 min.

Rainfall intensity = 10.823(In/Hr)

Area averaged loss rate (Fm) = 0.0785(In/Hr)

Area averaged Pervious ratio (Ap) = 0.1000

Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	-----------------	------------	----------	------------	----------------------------

1	4.32	0.760	7.99	0.079	6.369
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2	4.46	0.420	3.30	0.079	10.823
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Qmax(1) =

1.000 * 1.000 * 4.319) +
0.585 * 1.000 * 4.460) + = 6.930

Qmax(2) =

1.708 * 0.413 * 4.319) +
1.000 * 1.000 * 4.460) + = 7.509

Total of 2 main streams to confluence:

Flow rates before confluence point:

5.319 5.460

Maximum flow rates at confluence using above data:

6.930 7.509

Area of streams before confluence:

0.760 0.420

Effective area values after confluence:

1.180 0.734

Results of confluence:

Total flow rate = 7.509(CFS)

Time of concentration = 3.302 min.

Effective stream area after confluence = 0.734(Ac.)

Study area average Pervious fraction(Ap) = 0.100

Study area average soil loss rate(Fm) = 0.079(In/Hr)

Study area total = 1.18(Ac.)

End of computations, Total Study Area = 1.18 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100

Area averaged SCS curve number = 32.0

PROPOSED CONDITION HYDROGRAPH

Unit Hydrograph Analysis

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Study date 06/17/25

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6158

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
1.18	1	1.90

Rainfall data for year 100		
1.18	6	3.60

Rainfall data for year 100		
1.18	24	6.85

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***** Area-averaged max loss rate, Fm *****

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	1.18	1.000	0.785	0.230	0.181

Area-averaged adjusted loss rate Fm (In/Hr) = 0.181

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
0.27	0.230	32.0	52.0	9.23	0.257
0.91	0.770	98.0	98.0	0.20	0.965

Area-averaged catchment yield fraction, Y = 0.802

Area-averaged low loss fraction, Yb = 0.198

User entry of time of concentration = 0.055 (hours)

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Watershed area = 1.18(Ac.)
Catchment Lag time = 0.044 hours

Unit interval = 5.000 minutes
 Unit interval percentage of lag time = 189.3939
 Hydrograph baseflow = 0.00(CFS)
 Average maximum watershed loss rate(Fm) = 0.181(In/Hr)
 Average low loss rate fraction (Yb) = 0.198 (decimal)
 VALLEY DEVELOPED S-Graph Selected
 Computed peak 5-minute rainfall = 0.475(In)
 Computed peak 30-minute rainfall = 1.250(In)
 Specified peak 1-hour rainfall = 1.900(In)
 Computed peak 3-hour rainfall = 2.690(In)
 Specified peak 6-hour rainfall = 3.600(In)
 Specified peak 24-hour rainfall = 6.850(In)

Note: user specified rainfall values used.

Rainfall depth area reduction factors:

Using a total area of 1.18(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.475(In)
30-minute factor = 1.000	Adjusted rainfall = 1.250(In)
1-hour factor = 1.000	Adjusted rainfall = 1.900(In)
3-hour factor = 1.000	Adjusted rainfall = 2.690(In)
6-hour factor = 1.000	Adjusted rainfall = 3.600(In)
24-hour factor = 1.000	Adjusted rainfall = 6.850(In)

Unit Hydrograph		
Interval	'S' Graph	Unit Hydrograph
Number	Mean values	((CFS))

	(K = 14.27 (CFS))	
1	45.718	6.524
2	100.000	3.262

Peak Unit	Adjusted mass rainfall	Unit rainfall
Number	(In)	(In)
1	0.4750	0.4750
2	0.6906	0.2156
3	0.8597	0.1690
4	1.0041	0.1445
5	1.1327	0.1286
6	1.2499	0.1172
7	1.3719	0.1220
8	1.4872	0.1152
9	1.5968	0.1097
10	1.7018	0.1049
11	1.8026	0.1009
12	1.8999	0.0973
13	1.9486	0.0487
14	1.9949	0.0462
15	2.0389	0.0440
16	2.0810	0.0421
17	2.1213	0.0403
18	2.1601	0.0387
19	2.1973	0.0373
20	2.2333	0.0360
21	2.2681	0.0348
22	2.3017	0.0336
23	2.3343	0.0326
24	2.3660	0.0317
25	2.3968	0.0308
26	2.4267	0.0299
27	2.4559	0.0292
28	2.4843	0.0284
29	2.5120	0.0277
30	2.5391	0.0271
31	2.5656	0.0265

32	2.5915	0.0259
33	2.6169	0.0254
34	2.6418	0.0248
35	2.6661	0.0244
36	2.6900	0.0239
37	2.7211	0.0312
38	2.7518	0.0307
39	2.7820	0.0302
40	2.8118	0.0298
41	2.8411	0.0293
42	2.8701	0.0289
43	2.8986	0.0285
44	2.9268	0.0281
45	2.9545	0.0278
46	2.9820	0.0274
47	3.0090	0.0271
48	3.0358	0.0268
49	3.0622	0.0264
50	3.0883	0.0261
51	3.1142	0.0258
52	3.1397	0.0255
53	3.1649	0.0252
54	3.1899	0.0250
55	3.2146	0.0247
56	3.2390	0.0244
57	3.2632	0.0242
58	3.2872	0.0239
59	3.3109	0.0237
60	3.3344	0.0235
61	3.3576	0.0233
62	3.3806	0.0230
63	3.4035	0.0228
64	3.4261	0.0226
65	3.4485	0.0224
66	3.4707	0.0222
67	3.4927	0.0220
68	3.5145	0.0218
69	3.5361	0.0216
70	3.5576	0.0215
71	3.5789	0.0213
72	3.6000	0.0211
73	3.6231	0.0231
74	3.6461	0.0229
75	3.6688	0.0228
76	3.6915	0.0226
77	3.7139	0.0225
78	3.7362	0.0223
79	3.7584	0.0222
80	3.7804	0.0220
81	3.8022	0.0219
82	3.8239	0.0217
83	3.8455	0.0216
84	3.8669	0.0214
85	3.8882	0.0213
86	3.9094	0.0212
87	3.9304	0.0210
88	3.9513	0.0209
89	3.9721	0.0208
90	3.9928	0.0206
91	4.0133	0.0205
92	4.0337	0.0204
93	4.0540	0.0203
94	4.0741	0.0202
95	4.0942	0.0201
96	4.1141	0.0199
97	4.1340	0.0198
98	4.1537	0.0197
99	4.1733	0.0196
100	4.1928	0.0195

101	4.2122	0.0194
102	4.2315	0.0193
103	4.2507	0.0192
104	4.2698	0.0191
105	4.2888	0.0190
106	4.3077	0.0189
107	4.3266	0.0188
108	4.3453	0.0187
109	4.3639	0.0186
110	4.3824	0.0185
111	4.4009	0.0184
112	4.4192	0.0184
113	4.4375	0.0183
114	4.4557	0.0182
115	4.4738	0.0181
116	4.4918	0.0180
117	4.5097	0.0179
118	4.5276	0.0178
119	4.5453	0.0178
120	4.5630	0.0177
121	4.5806	0.0176
122	4.5981	0.0175
123	4.6156	0.0175
124	4.6330	0.0174
125	4.6503	0.0173
126	4.6675	0.0172
127	4.6846	0.0172
128	4.7017	0.0171
129	4.7187	0.0170
130	4.7357	0.0169
131	4.7526	0.0169
132	4.7694	0.0168
133	4.7861	0.0167
134	4.8028	0.0167
135	4.8194	0.0166
136	4.8359	0.0165
137	4.8524	0.0165
138	4.8688	0.0164
139	4.8851	0.0163
140	4.9014	0.0163
141	4.9176	0.0162
142	4.9337	0.0162
143	4.9498	0.0161
144	4.9659	0.0160
145	4.9818	0.0160
146	4.9978	0.0159
147	5.0136	0.0159
148	5.0294	0.0158
149	5.0452	0.0157
150	5.0608	0.0157
151	5.0765	0.0156
152	5.0920	0.0156
153	5.1076	0.0155
154	5.1230	0.0155
155	5.1384	0.0154
156	5.1538	0.0154
157	5.1691	0.0153
158	5.1844	0.0153
159	5.1996	0.0152
160	5.2147	0.0151
161	5.2298	0.0151
162	5.2448	0.0150
163	5.2598	0.0150
164	5.2748	0.0150
165	5.2897	0.0149
166	5.3046	0.0149
167	5.3194	0.0148
168	5.3341	0.0148
169	5.3488	0.0147

170	5.3635	0.0147
171	5.3781	0.0146
172	5.3927	0.0146
173	5.4072	0.0145
174	5.4217	0.0145
175	5.4361	0.0144
176	5.4505	0.0144
177	5.4649	0.0143
178	5.4792	0.0143
179	5.4934	0.0143
180	5.5077	0.0142
181	5.5218	0.0142
182	5.5360	0.0141
183	5.5501	0.0141
184	5.5641	0.0141
185	5.5781	0.0140
186	5.5921	0.0140
187	5.6060	0.0139
188	5.6199	0.0139
189	5.6338	0.0139
190	5.6476	0.0138
191	5.6614	0.0138
192	5.6751	0.0137
193	5.6888	0.0137
194	5.7025	0.0137
195	5.7161	0.0136
196	5.7297	0.0136
197	5.7432	0.0135
198	5.7567	0.0135
199	5.7702	0.0135
200	5.7836	0.0134
201	5.7970	0.0134
202	5.8104	0.0134
203	5.8237	0.0133
204	5.8370	0.0133
205	5.8503	0.0133
206	5.8635	0.0132
207	5.8767	0.0132
208	5.8899	0.0132
209	5.9030	0.0131
210	5.9161	0.0131
211	5.9291	0.0131
212	5.9422	0.0130
213	5.9552	0.0130
214	5.9681	0.0130
215	5.9810	0.0129
216	5.9939	0.0129
217	6.0068	0.0129
218	6.0196	0.0128
219	6.0324	0.0128
220	6.0452	0.0128
221	6.0579	0.0127
222	6.0706	0.0127
223	6.0833	0.0127
224	6.0959	0.0126
225	6.1086	0.0126
226	6.1211	0.0126
227	6.1337	0.0126
228	6.1462	0.0125
229	6.1587	0.0125
230	6.1712	0.0125
231	6.1836	0.0124
232	6.1960	0.0124
233	6.2084	0.0124
234	6.2208	0.0124
235	6.2331	0.0123
236	6.2454	0.0123
237	6.2576	0.0123
238	6.2699	0.0122

239	6.2821	0.0122
240	6.2943	0.0122
241	6.3064	0.0122
242	6.3186	0.0121
243	6.3307	0.0121
244	6.3427	0.0121
245	6.3548	0.0120
246	6.3668	0.0120
247	6.3788	0.0120
248	6.3908	0.0120
249	6.4027	0.0119
250	6.4146	0.0119
251	6.4265	0.0119
252	6.4384	0.0119
253	6.4503	0.0118
254	6.4621	0.0118
255	6.4739	0.0118
256	6.4856	0.0118
257	6.4974	0.0117
258	6.5091	0.0117
259	6.5208	0.0117
260	6.5325	0.0117
261	6.5441	0.0116
262	6.5557	0.0116
263	6.5673	0.0116
264	6.5789	0.0116
265	6.5905	0.0116
266	6.6020	0.0115
267	6.6135	0.0115
268	6.6250	0.0115
269	6.6364	0.0115
270	6.6479	0.0114
271	6.6593	0.0114
272	6.6707	0.0114
273	6.6821	0.0114
274	6.6934	0.0113
275	6.7047	0.0113
276	6.7160	0.0113
277	6.7273	0.0113
278	6.7386	0.0113
279	6.7498	0.0112
280	6.7610	0.0112
281	6.7722	0.0112
282	6.7834	0.0112
283	6.7945	0.0112
284	6.8057	0.0111
285	6.8168	0.0111
286	6.8279	0.0111
287	6.8389	0.0111
288	6.8500	0.0110

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0110	0.0022	0.0089
2	0.0111	0.0022	0.0089
3	0.0111	0.0022	0.0089
4	0.0111	0.0022	0.0089
5	0.0112	0.0022	0.0090
6	0.0112	0.0022	0.0090
7	0.0112	0.0022	0.0090
8	0.0113	0.0022	0.0090
9	0.0113	0.0022	0.0091
10	0.0113	0.0022	0.0091
11	0.0114	0.0022	0.0091
12	0.0114	0.0023	0.0091
13	0.0114	0.0023	0.0092
14	0.0115	0.0023	0.0092

15	0.0115	0.0023	0.0092
16	0.0115	0.0023	0.0092
17	0.0116	0.0023	0.0093
18	0.0116	0.0023	0.0093
19	0.0116	0.0023	0.0093
20	0.0117	0.0023	0.0094
21	0.0117	0.0023	0.0094
22	0.0117	0.0023	0.0094
23	0.0118	0.0023	0.0095
24	0.0118	0.0023	0.0095
25	0.0119	0.0023	0.0095
26	0.0119	0.0024	0.0095
27	0.0119	0.0024	0.0096
28	0.0120	0.0024	0.0096
29	0.0120	0.0024	0.0096
30	0.0120	0.0024	0.0097
31	0.0121	0.0024	0.0097
32	0.0121	0.0024	0.0097
33	0.0122	0.0024	0.0098
34	0.0122	0.0024	0.0098
35	0.0123	0.0024	0.0098
36	0.0123	0.0024	0.0099
37	0.0124	0.0024	0.0099
38	0.0124	0.0024	0.0099
39	0.0124	0.0025	0.0100
40	0.0125	0.0025	0.0100
41	0.0125	0.0025	0.0100
42	0.0126	0.0025	0.0101
43	0.0126	0.0025	0.0101
44	0.0126	0.0025	0.0101
45	0.0127	0.0025	0.0102
46	0.0127	0.0025	0.0102
47	0.0128	0.0025	0.0103
48	0.0128	0.0025	0.0103
49	0.0129	0.0026	0.0103
50	0.0129	0.0026	0.0104
51	0.0130	0.0026	0.0104
52	0.0130	0.0026	0.0104
53	0.0131	0.0026	0.0105
54	0.0131	0.0026	0.0105
55	0.0132	0.0026	0.0106
56	0.0132	0.0026	0.0106
57	0.0133	0.0026	0.0107
58	0.0133	0.0026	0.0107
59	0.0134	0.0027	0.0108
60	0.0134	0.0027	0.0108
61	0.0135	0.0027	0.0108
62	0.0135	0.0027	0.0109
63	0.0136	0.0027	0.0109
64	0.0137	0.0027	0.0110
65	0.0137	0.0027	0.0110
66	0.0138	0.0027	0.0110
67	0.0139	0.0027	0.0111
68	0.0139	0.0027	0.0111
69	0.0140	0.0028	0.0112
70	0.0140	0.0028	0.0112
71	0.0141	0.0028	0.0113
72	0.0141	0.0028	0.0113
73	0.0142	0.0028	0.0114
74	0.0143	0.0028	0.0114
75	0.0143	0.0028	0.0115
76	0.0144	0.0028	0.0115
77	0.0145	0.0029	0.0116
78	0.0145	0.0029	0.0117
79	0.0146	0.0029	0.0117
80	0.0147	0.0029	0.0118
81	0.0148	0.0029	0.0118
82	0.0148	0.0029	0.0119
83	0.0149	0.0029	0.0120

84	0.0150	0.0030	0.0120
85	0.0150	0.0030	0.0121
86	0.0151	0.0030	0.0121
87	0.0152	0.0030	0.0122
88	0.0153	0.0030	0.0122
89	0.0154	0.0030	0.0123
90	0.0154	0.0030	0.0124
91	0.0155	0.0031	0.0124
92	0.0156	0.0031	0.0125
93	0.0157	0.0031	0.0126
94	0.0157	0.0031	0.0126
95	0.0159	0.0031	0.0127
96	0.0159	0.0031	0.0128
97	0.0160	0.0032	0.0129
98	0.0161	0.0032	0.0129
99	0.0162	0.0032	0.0130
100	0.0163	0.0032	0.0131
101	0.0164	0.0032	0.0132
102	0.0165	0.0033	0.0132
103	0.0166	0.0033	0.0133
104	0.0167	0.0033	0.0134
105	0.0168	0.0033	0.0135
106	0.0169	0.0033	0.0135
107	0.0170	0.0034	0.0136
108	0.0171	0.0034	0.0137
109	0.0172	0.0034	0.0138
110	0.0173	0.0034	0.0139
111	0.0175	0.0035	0.0140
112	0.0175	0.0035	0.0141
113	0.0177	0.0035	0.0142
114	0.0178	0.0035	0.0143
115	0.0179	0.0035	0.0144
116	0.0180	0.0036	0.0144
117	0.0182	0.0036	0.0146
118	0.0183	0.0036	0.0147
119	0.0184	0.0036	0.0148
120	0.0185	0.0037	0.0149
121	0.0187	0.0037	0.0150
122	0.0188	0.0037	0.0151
123	0.0190	0.0038	0.0152
124	0.0191	0.0038	0.0153
125	0.0193	0.0038	0.0155
126	0.0194	0.0038	0.0156
127	0.0196	0.0039	0.0157
128	0.0197	0.0039	0.0158
129	0.0199	0.0039	0.0160
130	0.0201	0.0040	0.0161
131	0.0203	0.0040	0.0163
132	0.0204	0.0040	0.0164
133	0.0206	0.0041	0.0166
134	0.0208	0.0041	0.0167
135	0.0210	0.0042	0.0169
136	0.0212	0.0042	0.0170
137	0.0214	0.0042	0.0172
138	0.0216	0.0043	0.0173
139	0.0219	0.0043	0.0175
140	0.0220	0.0044	0.0177
141	0.0223	0.0044	0.0179
142	0.0225	0.0044	0.0180
143	0.0228	0.0045	0.0183
144	0.0229	0.0045	0.0184
145	0.0211	0.0042	0.0169
146	0.0213	0.0042	0.0171
147	0.0216	0.0043	0.0174
148	0.0218	0.0043	0.0175
149	0.0222	0.0044	0.0178
150	0.0224	0.0044	0.0180
151	0.0228	0.0045	0.0183
152	0.0230	0.0046	0.0185

153	0.0235	0.0046	0.0188
154	0.0237	0.0047	0.0190
155	0.0242	0.0048	0.0194
156	0.0244	0.0048	0.0196
157	0.0250	0.0049	0.0200
158	0.0252	0.0050	0.0202
159	0.0258	0.0051	0.0207
160	0.0261	0.0052	0.0210
161	0.0268	0.0053	0.0215
162	0.0271	0.0054	0.0217
163	0.0278	0.0055	0.0223
164	0.0281	0.0056	0.0226
165	0.0289	0.0057	0.0232
166	0.0293	0.0058	0.0235
167	0.0302	0.0060	0.0242
168	0.0307	0.0061	0.0246
169	0.0239	0.0047	0.0192
170	0.0244	0.0048	0.0195
171	0.0254	0.0050	0.0203
172	0.0259	0.0051	0.0208
173	0.0271	0.0054	0.0217
174	0.0277	0.0055	0.0223
175	0.0292	0.0058	0.0234
176	0.0299	0.0059	0.0240
177	0.0317	0.0063	0.0254
178	0.0326	0.0065	0.0262
179	0.0348	0.0069	0.0279
180	0.0360	0.0071	0.0289
181	0.0387	0.0077	0.0311
182	0.0403	0.0080	0.0323
183	0.0440	0.0087	0.0353
184	0.0462	0.0091	0.0371
185	0.0973	0.0150	0.0822
186	0.1009	0.0150	0.0858
187	0.1097	0.0150	0.0946
188	0.1152	0.0150	0.1002
189	0.1172	0.0150	0.1022
190	0.1286	0.0150	0.1135
191	0.1690	0.0150	0.1540
192	0.2156	0.0150	0.2006
193	0.4750	0.0150	0.4599
194	0.1445	0.0150	0.1294
195	0.1220	0.0150	0.1069
196	0.1049	0.0150	0.0899
197	0.0487	0.0096	0.0391
198	0.0421	0.0083	0.0338
199	0.0373	0.0074	0.0299
200	0.0336	0.0067	0.0270
201	0.0308	0.0061	0.0247
202	0.0284	0.0056	0.0228
203	0.0265	0.0052	0.0213
204	0.0248	0.0049	0.0199
205	0.0312	0.0062	0.0250
206	0.0298	0.0059	0.0239
207	0.0285	0.0056	0.0229
208	0.0274	0.0054	0.0220
209	0.0264	0.0052	0.0212
210	0.0255	0.0050	0.0205
211	0.0247	0.0049	0.0198
212	0.0239	0.0047	0.0192
213	0.0233	0.0046	0.0187
214	0.0226	0.0045	0.0181
215	0.0220	0.0044	0.0177
216	0.0215	0.0042	0.0172
217	0.0231	0.0046	0.0185
218	0.0226	0.0045	0.0181
219	0.0222	0.0044	0.0178
220	0.0217	0.0043	0.0174
221	0.0213	0.0042	0.0171

222	0.0209	0.0041	0.0168
223	0.0205	0.0041	0.0165
224	0.0202	0.0040	0.0162
225	0.0198	0.0039	0.0159
226	0.0195	0.0039	0.0157
227	0.0192	0.0038	0.0154
228	0.0189	0.0037	0.0152
229	0.0186	0.0037	0.0149
230	0.0184	0.0036	0.0147
231	0.0181	0.0036	0.0145
232	0.0178	0.0035	0.0143
233	0.0176	0.0035	0.0141
234	0.0174	0.0034	0.0139
235	0.0172	0.0034	0.0138
236	0.0169	0.0034	0.0136
237	0.0167	0.0033	0.0134
238	0.0165	0.0033	0.0133
239	0.0163	0.0032	0.0131
240	0.0162	0.0032	0.0130
241	0.0160	0.0032	0.0128
242	0.0158	0.0031	0.0127
243	0.0156	0.0031	0.0125
244	0.0155	0.0031	0.0124
245	0.0153	0.0030	0.0123
246	0.0151	0.0030	0.0122
247	0.0150	0.0030	0.0120
248	0.0149	0.0029	0.0119
249	0.0147	0.0029	0.0118
250	0.0146	0.0029	0.0117
251	0.0144	0.0029	0.0116
252	0.0143	0.0028	0.0115
253	0.0142	0.0028	0.0114
254	0.0141	0.0028	0.0113
255	0.0139	0.0028	0.0112
256	0.0138	0.0027	0.0111
257	0.0137	0.0027	0.0110
258	0.0136	0.0027	0.0109
259	0.0135	0.0027	0.0108
260	0.0134	0.0026	0.0107
261	0.0133	0.0026	0.0106
262	0.0132	0.0026	0.0106
263	0.0131	0.0026	0.0105
264	0.0130	0.0026	0.0104
265	0.0129	0.0025	0.0103
266	0.0128	0.0025	0.0102
267	0.0127	0.0025	0.0102
268	0.0126	0.0025	0.0101
269	0.0125	0.0025	0.0100
270	0.0124	0.0025	0.0100
271	0.0123	0.0024	0.0099
272	0.0122	0.0024	0.0098
273	0.0122	0.0024	0.0098
274	0.0121	0.0024	0.0097
275	0.0120	0.0024	0.0096
276	0.0119	0.0024	0.0096
277	0.0118	0.0023	0.0095
278	0.0118	0.0023	0.0094
279	0.0117	0.0023	0.0094
280	0.0116	0.0023	0.0093
281	0.0116	0.0023	0.0093
282	0.0115	0.0023	0.0092
283	0.0114	0.0023	0.0092
284	0.0113	0.0022	0.0091
285	0.0113	0.0022	0.0090
286	0.0112	0.0022	0.0090
287	0.0112	0.0022	0.0089
288	0.0111	0.0022	0.0089

Total soil rain loss = 1.16(In)
 Total effective rainfall = 5.69(In)
 Peak flow rate in flood hydrograph = 3.65(CFS)

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24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0004		0.06	Q				
0+10	0.0010		0.09	Q				
0+15	0.0016		0.09	Q				
0+20	0.0022		0.09	Q				
0+25	0.0028		0.09	Q				
0+30	0.0034		0.09	Q				
0+35	0.0040		0.09	Q				
0+40	0.0046		0.09	Q				
0+45	0.0052		0.09	Q				
0+50	0.0058		0.09	Q				
0+55	0.0065		0.09	Q				
1+ 0	0.0071		0.09	Q				
1+ 5	0.0077		0.09	Q				
1+10	0.0083		0.09	Q				
1+15	0.0089		0.09	Q				
1+20	0.0096		0.09	Q				
1+25	0.0102		0.09	QV				
1+30	0.0108		0.09	QV				
1+35	0.0114		0.09	QV				
1+40	0.0121		0.09	QV				
1+45	0.0127		0.09	QV				
1+50	0.0133		0.09	QV				
1+55	0.0140		0.09	QV				
2+ 0	0.0146		0.09	QV				
2+ 5	0.0152		0.09	QV				
2+10	0.0159		0.09	QV				
2+15	0.0165		0.09	QV				
2+20	0.0172		0.09	QV				
2+25	0.0178		0.09	QV				
2+30	0.0185		0.09	QV				
2+35	0.0191		0.09	QV				
2+40	0.0198		0.10	Q V				
2+45	0.0204		0.10	Q V				
2+50	0.0211		0.10	Q V				
2+55	0.0218		0.10	Q V				
3+ 0	0.0224		0.10	Q V				
3+ 5	0.0231		0.10	Q V				
3+10	0.0238		0.10	Q V				
3+15	0.0244		0.10	Q V				
3+20	0.0251		0.10	Q V				
3+25	0.0258		0.10	Q V				
3+30	0.0265		0.10	Q V				
3+35	0.0272		0.10	Q V				
3+40	0.0278		0.10	Q V				
3+45	0.0285		0.10	Q V				
3+50	0.0292		0.10	Q V				
3+55	0.0299		0.10	Q V				
4+ 0	0.0306		0.10	Q V				
4+ 5	0.0313		0.10	Q V				
4+10	0.0320		0.10	Q V				
4+15	0.0327		0.10	Q V				
4+20	0.0334		0.10	Q V				
4+25	0.0341		0.10	Q V				
4+30	0.0348		0.10	Q V				
4+35	0.0355		0.10	Q V				
4+40	0.0362		0.10	Q V				

4+45	0.0370	0.10	Q	V
4+50	0.0377	0.10	Q	V
4+55	0.0384	0.11	Q	V
5+ 0	0.0391	0.11	Q	V
5+ 5	0.0398	0.11	Q	V
5+10	0.0406	0.11	Q	V
5+15	0.0413	0.11	Q	V
5+20	0.0421	0.11	Q	V
5+25	0.0428	0.11	Q	V
5+30	0.0435	0.11	Q	V
5+35	0.0443	0.11	Q	V
5+40	0.0450	0.11	Q	V
5+45	0.0458	0.11	Q	V
5+50	0.0465	0.11	Q	V
5+55	0.0473	0.11	Q	V
6+ 0	0.0481	0.11	Q	V
6+ 5	0.0488	0.11	Q	V
6+10	0.0496	0.11	Q	V
6+15	0.0504	0.11	Q	V
6+20	0.0512	0.11	Q	V
6+25	0.0519	0.11	Q	V
6+30	0.0527	0.11	Q	V
6+35	0.0535	0.11	Q	V
6+40	0.0543	0.12	Q	V
6+45	0.0551	0.12	Q	V
6+50	0.0559	0.12	Q	V
6+55	0.0567	0.12	Q	V
7+ 0	0.0575	0.12	Q	V
7+ 5	0.0583	0.12	Q	V
7+10	0.0591	0.12	Q	V
7+15	0.0600	0.12	Q	V
7+20	0.0608	0.12	Q	V
7+25	0.0616	0.12	Q	V
7+30	0.0624	0.12	Q	V
7+35	0.0633	0.12	Q	V
7+40	0.0641	0.12	Q	V
7+45	0.0650	0.12	Q	V
7+50	0.0658	0.12	Q	V
7+55	0.0667	0.12	Q	V
8+ 0	0.0675	0.12	Q	V
8+ 5	0.0684	0.13	Q	V
8+10	0.0693	0.13	Q	V
8+15	0.0701	0.13	Q	V
8+20	0.0710	0.13	Q	V
8+25	0.0719	0.13	Q	V
8+30	0.0728	0.13	Q	V
8+35	0.0737	0.13	Q	V
8+40	0.0746	0.13	Q	V
8+45	0.0755	0.13	Q	V
8+50	0.0764	0.13	Q	V
8+55	0.0773	0.13	Q	V
9+ 0	0.0782	0.13	Q	V
9+ 5	0.0792	0.13	Q	V
9+10	0.0801	0.14	Q	V
9+15	0.0811	0.14	Q	V
9+20	0.0820	0.14	Q	V
9+25	0.0830	0.14	Q	V
9+30	0.0839	0.14	Q	V
9+35	0.0849	0.14	Q	V
9+40	0.0859	0.14	Q	V
9+45	0.0868	0.14	Q	V
9+50	0.0878	0.14	Q	V
9+55	0.0888	0.14	Q	V
10+ 0	0.0898	0.15	Q	V
10+ 5	0.0908	0.15	Q	V
10+10	0.0918	0.15	Q	V
10+15	0.0929	0.15	Q	V
10+20	0.0939	0.15	Q	V
10+25	0.0949	0.15	Q	V

10+30	0.0960	0.15	Q	V				
10+35	0.0970	0.15	Q	V				
10+40	0.0981	0.15	Q	V				
10+45	0.0992	0.16	Q	V				
10+50	0.1003	0.16	Q	V				
10+55	0.1013	0.16	Q	V				
11+ 0	0.1024	0.16	Q	V				
11+ 5	0.1036	0.16	Q	V				
11+10	0.1047	0.16	Q	V				
11+15	0.1058	0.16	Q	V				
11+20	0.1070	0.17	Q	V				
11+25	0.1081	0.17	Q	V				
11+30	0.1093	0.17	Q	V				
11+35	0.1104	0.17	Q	V				
11+40	0.1116	0.17	Q	V				
11+45	0.1128	0.17	Q	V				
11+50	0.1140	0.18	Q	V				
11+55	0.1153	0.18	Q	V				
12+ 0	0.1165	0.18	Q	V				
12+ 5	0.1177	0.17	Q	V				
12+10	0.1188	0.17	Q	V				
12+15	0.1200	0.17	Q	V				
12+20	0.1212	0.17	Q	V				
12+25	0.1224	0.17	Q	V				
12+30	0.1236	0.18	Q	V				
12+35	0.1248	0.18	Q	V				
12+40	0.1260	0.18	Q	V				
12+45	0.1273	0.18	Q	V				
12+50	0.1286	0.19	Q	V				
12+55	0.1299	0.19	Q	V				
13+ 0	0.1312	0.19	Q	V				
13+ 5	0.1325	0.19	Q	V				
13+10	0.1339	0.20	Q	V				
13+15	0.1353	0.20	Q	V				
13+20	0.1367	0.20	Q	V				
13+25	0.1381	0.21	Q	V				
13+30	0.1396	0.21	Q	V				
13+35	0.1411	0.22	Q	V				
13+40	0.1426	0.22	Q	V				
13+45	0.1441	0.23	Q	V				
13+50	0.1457	0.23	Q	V				
13+55	0.1473	0.23	Q	V				
14+ 0	0.1490	0.24	Q	V				
14+ 5	0.1504	0.21	Q	V				
14+10	0.1517	0.19	Q	V				
14+15	0.1531	0.20	Q	V				
14+20	0.1545	0.20	Q	V				
14+25	0.1559	0.21	Q	V				
14+30	0.1574	0.22	Q	V				
14+35	0.1589	0.23	Q	V				
14+40	0.1605	0.23	Q	V				
14+45	0.1622	0.24	Q	V				
14+50	0.1640	0.25	Q	V				
14+55	0.1658	0.27	Q	V				
15+ 0	0.1677	0.28	Q	V				
15+ 5	0.1698	0.30	Q	V				
15+10	0.1719	0.31	Q	V				
15+15	0.1742	0.34	Q	V				
15+20	0.1767	0.36	Q	V				
15+25	0.1812	0.66	Q	V				
15+30	0.1869	0.83	Q	V				
15+35	0.1931	0.90	Q	V				
15+40	0.1997	0.96	Q	V				
15+45	0.2066	0.99	Q	V				
15+50	0.2140	1.07	Q	V				
15+55	0.2234	1.38	Q	V				
16+ 0	0.2359	1.81	Q	V				
16+ 5	0.2611	3.65		V				
16+10	0.2772	2.34	Q	V				

16+15	0.2850	1.12	Q
16+20	0.2914	0.94	Q
16+25	0.2952	0.55	Q
16+30	0.2976	0.35	Q
16+35	0.2997	0.31	Q
16+40	0.3016	0.27	Q
16+45	0.3033	0.25	Q
16+50	0.3048	0.23	Q
16+55	0.3063	0.21	Q
17+ 0	0.3077	0.20	Q
17+ 5	0.3093	0.23	Q
17+10	0.3109	0.24	Q
17+15	0.3125	0.23	Q
17+20	0.3140	0.22	Q
17+25	0.3154	0.21	Q
17+30	0.3168	0.20	Q
17+35	0.3182	0.20	Q
17+40	0.3195	0.19	Q
17+45	0.3207	0.18	Q
17+50	0.3220	0.18	Q
17+55	0.3232	0.17	Q
18+ 0	0.3243	0.17	Q
18+ 5	0.3256	0.18	Q
18+10	0.3268	0.18	Q
18+15	0.3280	0.18	Q
18+20	0.3292	0.17	Q
18+25	0.3303	0.17	Q
18+30	0.3315	0.17	Q
18+35	0.3326	0.16	Q
18+40	0.3337	0.16	Q
18+45	0.3348	0.16	Q
18+50	0.3358	0.15	Q
18+55	0.3369	0.15	Q
19+ 0	0.3379	0.15	Q
19+ 5	0.3389	0.15	Q
19+10	0.3399	0.14	Q
19+15	0.3409	0.14	Q
19+20	0.3419	0.14	Q
19+25	0.3428	0.14	Q
19+30	0.3438	0.14	Q
19+35	0.3447	0.14	Q
19+40	0.3456	0.13	Q
19+45	0.3465	0.13	Q
19+50	0.3474	0.13	Q
19+55	0.3483	0.13	Q
20+ 0	0.3492	0.13	Q
20+ 5	0.3500	0.13	Q
20+10	0.3509	0.12	Q
20+15	0.3518	0.12	Q
20+20	0.3526	0.12	Q
20+25	0.3534	0.12	Q
20+30	0.3542	0.12	Q
20+35	0.3551	0.12	Q
20+40	0.3559	0.12	Q
20+45	0.3567	0.12	Q
20+50	0.3575	0.11	Q
20+55	0.3582	0.11	Q
21+ 0	0.3590	0.11	Q
21+ 5	0.3598	0.11	Q
21+10	0.3605	0.11	Q
21+15	0.3613	0.11	Q
21+20	0.3620	0.11	Q
21+25	0.3628	0.11	Q
21+30	0.3635	0.11	Q
21+35	0.3643	0.11	Q
21+40	0.3650	0.11	Q
21+45	0.3657	0.10	Q
21+50	0.3664	0.10	Q
21+55	0.3671	0.10	Q

22+ 0	0.3678	0.10	Q				V
22+ 5	0.3685	0.10	Q				V
22+10	0.3692	0.10	Q				V
22+15	0.3699	0.10	Q				V
22+20	0.3706	0.10	Q				V
22+25	0.3713	0.10	Q				V
22+30	0.3719	0.10	Q				V
22+35	0.3726	0.10	Q				V
22+40	0.3733	0.10	Q				V
22+45	0.3739	0.10	Q				V
22+50	0.3746	0.10	Q				V
22+55	0.3752	0.09	Q				V
23+ 0	0.3759	0.09	Q				V
23+ 5	0.3765	0.09	Q				V
23+10	0.3771	0.09	Q				V
23+15	0.3778	0.09	Q				V
23+20	0.3784	0.09	Q				V
23+25	0.3790	0.09	Q				V
23+30	0.3797	0.09	Q				V
23+35	0.3803	0.09	Q				V
23+40	0.3809	0.09	Q				V
23+45	0.3815	0.09	Q				V
23+50	0.3821	0.09	Q				V
23+55	0.3827	0.09	Q				V
24+ 0	0.3833	0.09	Q				V
24+ 5	0.3835	0.03	Q				V

NOT FOR BID

BASIN ROUTING

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 06/18/25

Program License Serial Number 6158

***** HYDROGRAPH INFORMATION *****

From study/file name: PROPHYDRO.rte
*****HYDROGRAPH DATA*****
Number of intervals = 289
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 3.655 (CFS)
Total volume = 0.384 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 289
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:
Basin Depth Storage Outflow (S-0*dt/2) (S+0*dt/2)
(Ft.) (Ac.Ft) (CFS) (Ac.Ft) (Ac.Ft)

0.000	0.000	0.000	0.000	0.000
0.100	0.001	0.066	0.001	0.001
1.000	0.017	0.066	0.017	0.017
2.000	0.045	0.066	0.045	0.045
3.000	0.070	0.066	0.070	0.070
4.000	0.091	0.066	0.091	0.091
5.000	0.106	0.066	0.106	0.106
5.500	0.113	3.100	0.102	0.124

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	0	0.9	1.83	2.74	3.65 (Ft.)	Depth
0.083	0.06	0.01	0.000	0					0.02
0.167	0.09	0.03	0.001	0					0.05

0.250	0.09	0.05	0.001	0					0.08
0.333	0.09	0.07	0.001	0					0.10
0.417	0.09	0.07	0.001	0					0.11
0.500	0.09	0.07	0.001	0					0.12
0.583	0.09	0.07	0.001	0					0.13
0.667	0.09	0.07	0.002	0					0.13
0.750	0.09	0.07	0.002	0					0.14
0.833	0.09	0.07	0.002	0					0.15
0.917	0.09	0.07	0.002	0					0.16
1.000	0.09	0.07	0.002	0					0.17
1.083	0.09	0.07	0.002	0					0.18
1.167	0.09	0.07	0.003	0					0.19
1.250	0.09	0.07	0.003	0					0.20
1.333	0.09	0.07	0.003	0					0.21
1.417	0.09	0.07	0.003	0					0.22
1.500	0.09	0.07	0.003	0					0.23
1.583	0.09	0.07	0.003	0					0.24
1.667	0.09	0.07	0.004	0					0.25
1.750	0.09	0.07	0.004	0					0.26
1.833	0.09	0.07	0.004	0					0.27
1.917	0.09	0.07	0.004	0					0.28
2.000	0.09	0.07	0.004	0					0.29
2.083	0.09	0.07	0.004	0					0.30
2.167	0.09	0.07	0.005	0					0.31
2.250	0.09	0.07	0.005	0					0.32
2.333	0.09	0.07	0.005	0					0.33
2.417	0.09	0.07	0.005	0					0.34
2.500	0.09	0.07	0.005	0					0.35
2.583	0.09	0.07	0.006	0					0.36
2.667	0.10	0.07	0.006	0					0.37
2.750	0.10	0.07	0.006	0					0.38
2.833	0.10	0.07	0.006	0					0.40
2.917	0.10	0.07	0.006	0					0.41
3.000	0.10	0.07	0.007	0					0.42
3.083	0.10	0.07	0.007	0					0.43
3.167	0.10	0.07	0.007	0					0.44
3.250	0.10	0.07	0.007	0					0.45
3.333	0.10	0.07	0.008	0					0.47
3.417	0.10	0.07	0.008	0					0.48
3.500	0.10	0.07	0.008	0					0.49
3.583	0.10	0.07	0.008	0					0.50
3.667	0.10	0.07	0.008	0					0.52
3.750	0.10	0.07	0.009	0					0.53
3.833	0.10	0.07	0.009	0					0.54
3.917	0.10	0.07	0.009	0					0.56
4.000	0.10	0.07	0.009	0					0.57
4.083	0.10	0.07	0.010	0					0.58
4.167	0.10	0.07	0.010	0					0.60
4.250	0.10	0.07	0.010	0					0.61
4.333	0.10	0.07	0.010	0					0.62
4.417	0.10	0.07	0.011	0					0.64
4.500	0.10	0.07	0.011	0					0.65
4.583	0.10	0.07	0.011	0					0.67
4.667	0.10	0.07	0.011	0					0.68
4.750	0.10	0.07	0.012	0					0.70
4.833	0.10	0.07	0.012	0					0.71
4.917	0.11	0.07	0.012	0					0.73
5.000	0.11	0.07	0.012	0					0.74
5.083	0.11	0.07	0.013	0					0.76
5.167	0.11	0.07	0.013	0					0.77
5.250	0.11	0.07	0.013	0					0.79
5.333	0.11	0.07	0.014	0					0.80
5.417	0.11	0.07	0.014	0					0.82
5.500	0.11	0.07	0.014	0					0.84
5.583	0.11	0.07	0.014	0					0.85
5.667	0.11	0.07	0.015	0					0.87
5.750	0.11	0.07	0.015	0					0.89
5.833	0.11	0.07	0.015	0					0.90
5.917	0.11	0.07	0.016	0					0.92

6.000	0.11	0.07	0.016	O	0.94
6.083	0.11	0.07	0.016	O	0.95
6.167	0.11	0.07	0.017	O	0.97
6.250	0.11	0.07	0.017	O	0.99
6.333	0.11	0.07	0.017	O	1.01
6.417	0.11	0.07	0.017	O	1.02
6.500	0.11	0.07	0.018	O	1.03
6.583	0.11	0.07	0.018	OI	1.04
6.667	0.12	0.07	0.018	OI	1.05
6.750	0.12	0.07	0.019	OI	1.06
6.833	0.12	0.07	0.019	OI	1.08
6.917	0.12	0.07	0.019	OI	1.09
7.000	0.12	0.07	0.020	OI	1.10
7.083	0.12	0.07	0.020	OI	1.11
7.167	0.12	0.07	0.021	OI	1.13
7.250	0.12	0.07	0.021	OI	1.14
7.333	0.12	0.07	0.021	OI	1.15
7.417	0.12	0.07	0.022	OI	1.17
7.500	0.12	0.07	0.022	OI	1.18
7.583	0.12	0.07	0.022	OI	1.19
7.667	0.12	0.07	0.023	OI	1.21
7.750	0.12	0.07	0.023	OI	1.22
7.833	0.12	0.07	0.024	OI	1.24
7.917	0.12	0.07	0.024	OI	1.25
8.000	0.12	0.07	0.024	OI	1.26
8.083	0.13	0.07	0.025	OI	1.28
8.167	0.13	0.07	0.025	OI	1.29
8.250	0.13	0.07	0.026	OI	1.31
8.333	0.13	0.07	0.026	OI	1.32
8.417	0.13	0.07	0.026	OI	1.34
8.500	0.13	0.07	0.027	OI	1.35
8.583	0.13	0.07	0.027	OI	1.37
8.667	0.13	0.07	0.028	OI	1.39
8.750	0.13	0.07	0.028	OI	1.40
8.833	0.13	0.07	0.029	OI	1.42
8.917	0.13	0.07	0.029	OI	1.43
9.000	0.13	0.07	0.030	OI	1.45
9.083	0.13	0.07	0.030	OI	1.47
9.167	0.14	0.07	0.031	OI	1.48
9.250	0.14	0.07	0.031	OI	1.50
9.333	0.14	0.07	0.032	OI	1.52
9.417	0.14	0.07	0.032	OI	1.54
9.500	0.14	0.07	0.033	OI	1.55
9.583	0.14	0.07	0.033	OI	1.57
9.667	0.14	0.07	0.034	OI	1.59
9.750	0.14	0.07	0.034	OI	1.61
9.833	0.14	0.07	0.035	OI	1.63
9.917	0.14	0.07	0.035	OI	1.65
10.000	0.15	0.07	0.036	OI	1.67
10.083	0.15	0.07	0.036	OI	1.69
10.167	0.15	0.07	0.037	OI	1.71
10.250	0.15	0.07	0.037	OI	1.73
10.333	0.15	0.07	0.038	OI	1.75
10.417	0.15	0.07	0.039	OI	1.77
10.500	0.15	0.07	0.039	OI	1.79
10.583	0.15	0.07	0.040	OI	1.81
10.667	0.15	0.07	0.040	OI	1.83
10.750	0.16	0.07	0.041	OI	1.85
10.833	0.16	0.07	0.042	OI	1.88
10.917	0.16	0.07	0.042	OI	1.90
11.000	0.16	0.07	0.043	OI	1.92
11.083	0.16	0.07	0.043	OI	1.95
11.167	0.16	0.07	0.044	OI	1.97
11.250	0.16	0.07	0.045	OI	1.99
11.333	0.17	0.07	0.045	OI	2.02
11.417	0.17	0.07	0.046	OI	2.05
11.500	0.17	0.07	0.047	OI	2.08
11.583	0.17	0.07	0.048	OI	2.10
11.667	0.17	0.07	0.048	OI	2.13

11.750	0.17	0.07	0.049	OI						2.16
11.833	0.18	0.07	0.050	OI						2.19
11.917	0.18	0.07	0.051	OI						2.22
12.000	0.18	0.07	0.051	OI						2.25
12.083	0.17	0.07	0.052	OI						2.28
12.167	0.17	0.07	0.053	OI						2.31
12.250	0.17	0.07	0.054	OI						2.34
12.333	0.17	0.07	0.054	OI						2.37
12.417	0.17	0.07	0.055	OI						2.40
12.500	0.18	0.07	0.056	OI						2.43
12.583	0.18	0.07	0.056	OI						2.46
12.667	0.18	0.07	0.057	OI						2.49
12.750	0.18	0.07	0.058	OI						2.52
12.833	0.19	0.07	0.059	OI						2.55
12.917	0.19	0.07	0.060	OI						2.59
13.000	0.19	0.07	0.061	OI						2.62
13.083	0.19	0.07	0.061	OI						2.66
13.167	0.20	0.07	0.062	OI						2.69
13.250	0.20	0.07	0.063	OI						2.73
13.333	0.20	0.07	0.064	OI						2.77
13.417	0.21	0.07	0.065	OI						2.81
13.500	0.21	0.07	0.066	OI						2.85
13.583	0.22	0.07	0.067	OI						2.89
13.667	0.22	0.07	0.068	OI						2.93
13.750	0.23	0.07	0.069	OI						2.97
13.833	0.23	0.07	0.070	O I						3.02
13.917	0.23	0.07	0.072	O I						3.07
14.000	0.24	0.07	0.073	O I						3.13
14.083	0.21	0.07	0.074	OI						3.18
14.167	0.19	0.07	0.075	OI						3.22
14.250	0.20	0.07	0.076	OI						3.27
14.333	0.20	0.07	0.076	OI						3.31
14.417	0.21	0.07	0.077	OI						3.36
14.500	0.22	0.07	0.078	OI						3.40
14.583	0.23	0.07	0.080	OI						3.45
14.667	0.23	0.07	0.081	O I						3.51
14.750	0.24	0.07	0.082	O I						3.56
14.833	0.25	0.07	0.083	O I						3.62
14.917	0.27	0.07	0.084	O I						3.69
15.000	0.28	0.07	0.086	O I						3.76
15.083	0.30	0.07	0.087	O I						3.83
15.167	0.31	0.07	0.089	O I						3.91
15.250	0.34	0.07	0.091	O I						3.99
15.333	0.36	0.07	0.093	O I						4.12
15.417	0.66	0.07	0.096	O I						4.32
15.500	0.83	0.07	0.100	O I						4.63
15.583	0.90	0.07	0.106	O I						5.00
15.667	0.96	1.09	0.108		IO					5.17
15.750	0.99	0.96	0.108		O					5.15
15.833	1.07	1.05	0.108		O					5.16
15.917	1.38	1.26	0.109		OI					5.20
16.000	1.81	1.66	0.110		OI					5.26
16.083	3.65	2.95	0.113							5.47
16.167	2.34	3.01	0.113							5.49
16.250	1.12	1.48	0.109		I O					5.23
16.333	0.94	0.94	0.108		O					5.14
16.417	0.55	0.70	0.107		I O					5.10
16.500	0.35	0.40	0.107		O					5.05
16.583	0.31	0.31	0.107		O					5.04
16.667	0.27	0.28	0.107		O					5.04
16.750	0.25	0.26	0.106		O					5.03
16.833	0.23	0.24	0.106		O					5.03
16.917	0.21	0.22	0.106		O					5.03
17.000	0.20	0.20	0.106		O					5.02
17.083	0.23	0.22	0.106		O					5.02
17.167	0.24	0.24	0.106		O					5.03
17.250	0.23	0.23	0.106		IO					5.03
17.333	0.22	0.22	0.106		O					5.03
17.417	0.21	0.21	0.106		O					5.02

17.500	0.20	0.21	0.106	0					5.02
17.583	0.20	0.20	0.106	0					5.02
17.667	0.19	0.19	0.106	0					5.02
17.750	0.18	0.19	0.106	0					5.02
17.833	0.18	0.18	0.106	0					5.02
17.917	0.17	0.18	0.106	0					5.02
18.000	0.17	0.17	0.106	0					5.02
18.083	0.18	0.17	0.106	0					5.02
18.167	0.18	0.18	0.106	0					5.02
18.250	0.18	0.18	0.106	0					5.02
18.333	0.17	0.17	0.106	0					5.02
18.417	0.17	0.17	0.106	0					5.02
18.500	0.17	0.17	0.106	0					5.02
18.583	0.16	0.16	0.106	0					5.02
18.667	0.16	0.16	0.106	0					5.02
18.750	0.16	0.16	0.106	0					5.02
18.833	0.15	0.15	0.106	0					5.01
18.917	0.15	0.15	0.106	0					5.01
19.000	0.15	0.15	0.106	0					5.01
19.083	0.15	0.15	0.106	0					5.01
19.167	0.14	0.15	0.106	0					5.01
19.250	0.14	0.14	0.106	0					5.01
19.333	0.14	0.14	0.106	0					5.01
19.417	0.14	0.14	0.106	0					5.01
19.500	0.14	0.14	0.106	0					5.01
19.583	0.14	0.14	0.106	0					5.01
19.667	0.13	0.13	0.106	0					5.01
19.750	0.13	0.13	0.106	0					5.01
19.833	0.13	0.13	0.106	0					5.01
19.917	0.13	0.13	0.106	0					5.01
20.000	0.13	0.13	0.106	0					5.01
20.083	0.13	0.13	0.106	0					5.01
20.167	0.12	0.12	0.106	0					5.01
20.250	0.12	0.12	0.106	0					5.01
20.333	0.12	0.12	0.106	0					5.01
20.417	0.12	0.12	0.106	0					5.01
20.500	0.12	0.12	0.106	0					5.01
20.583	0.12	0.12	0.106	0					5.01
20.667	0.12	0.12	0.106	0					5.01
20.750	0.12	0.12	0.106	0					5.01
20.833	0.11	0.12	0.106	0					5.01
20.917	0.11	0.11	0.106	0					5.01
21.000	0.11	0.11	0.106	0					5.01
21.083	0.11	0.11	0.106	0					5.01
21.167	0.11	0.11	0.106	0					5.01
21.250	0.11	0.11	0.106	0					5.01
21.333	0.11	0.11	0.106	0					5.01
21.417	0.11	0.11	0.106	0					5.01
21.500	0.11	0.11	0.106	0					5.01
21.583	0.11	0.11	0.106	0					5.01
21.667	0.11	0.11	0.106	0					5.01
21.750	0.10	0.10	0.106	0					5.01
21.833	0.10	0.10	0.106	0					5.01
21.917	0.10	0.10	0.106	0					5.01
22.000	0.10	0.10	0.106	0					5.01
22.083	0.10	0.10	0.106	0					5.01
22.167	0.10	0.10	0.106	0					5.01
22.250	0.10	0.10	0.106	0					5.01
22.333	0.10	0.10	0.106	0					5.01
22.417	0.10	0.10	0.106	0					5.01
22.500	0.10	0.10	0.106	0					5.01
22.583	0.10	0.10	0.106	0					5.01
22.667	0.10	0.10	0.106	0					5.01
22.750	0.10	0.10	0.106	0					5.00
22.833	0.10	0.10	0.106	0					5.00
22.917	0.09	0.09	0.106	0					5.00
23.000	0.09	0.09	0.106	0					5.00
23.083	0.09	0.09	0.106	0					5.00
23.167	0.09	0.09	0.106	0					5.00

23.250	0.09	0.09	0.106	0					5.00
23.333	0.09	0.09	0.106	0					5.00
23.417	0.09	0.09	0.106	0					5.00
23.500	0.09	0.09	0.106	0					5.00
23.583	0.09	0.09	0.106	0					5.00
23.667	0.09	0.09	0.106	0					5.00
23.750	0.09	0.09	0.106	0					5.00
23.833	0.09	0.09	0.106	0					5.00
23.917	0.09	0.09	0.106	0					5.00
24.000	0.09	0.09	0.106	0					5.00
24.083	0.03	0.07	0.106	0					4.99
24.167	0.00	0.07	0.106	0					4.97
24.250	0.00	0.07	0.105	0					4.94
24.333	0.00	0.07	0.105	0					4.91
24.417	0.00	0.07	0.104	0					4.88
24.500	0.00	0.07	0.104	0					4.85
24.583	0.00	0.07	0.103	0					4.82
24.667	0.00	0.07	0.103	0					4.79
24.750	0.00	0.07	0.102	0					4.76
24.833	0.00	0.07	0.102	0					4.73
24.917	0.00	0.07	0.101	0					4.70
25.000	0.00	0.07	0.101	0					4.67
25.083	0.00	0.07	0.101	0					4.64
25.167	0.00	0.07	0.100	0					4.61
25.250	0.00	0.07	0.100	0					4.58
25.333	0.00	0.07	0.099	0					4.55
25.417	0.00	0.07	0.099	0					4.52
25.500	0.00	0.07	0.098	0					4.49
25.583	0.00	0.07	0.098	0					4.46
25.667	0.00	0.07	0.097	0					4.43
25.750	0.00	0.07	0.097	0					4.40
25.833	0.00	0.07	0.096	0					4.37
25.917	0.00	0.07	0.096	0					4.33
26.000	0.00	0.07	0.096	0					4.30
26.083	0.00	0.07	0.095	0					4.27
26.167	0.00	0.07	0.095	0					4.24
26.250	0.00	0.07	0.094	0					4.21
26.333	0.00	0.07	0.094	0					4.18
26.417	0.00	0.07	0.093	0					4.15
26.500	0.00	0.07	0.093	0					4.12
26.583	0.00	0.07	0.092	0					4.09
26.667	0.00	0.07	0.092	0					4.06
26.750	0.00	0.07	0.091	0					4.03
26.833	0.00	0.07	0.091	0					4.00
26.917	0.00	0.07	0.091	0					3.98
27.000	0.00	0.07	0.090	0					3.96
27.083	0.00	0.07	0.090	0					3.94
27.167	0.00	0.07	0.089	0					3.91
27.250	0.00	0.07	0.089	0					3.89
27.333	0.00	0.07	0.088	0					3.87
27.417	0.00	0.07	0.088	0					3.85
27.500	0.00	0.07	0.087	0					3.83
27.583	0.00	0.07	0.087	0					3.81
27.667	0.00	0.07	0.086	0					3.78
27.750	0.00	0.07	0.086	0					3.76
27.833	0.00	0.07	0.086	0					3.74
27.917	0.00	0.07	0.085	0					3.72
28.000	0.00	0.07	0.085	0					3.70
28.083	0.00	0.07	0.084	0					3.68
28.167	0.00	0.07	0.084	0					3.65
28.250	0.00	0.07	0.083	0					3.63
28.333	0.00	0.07	0.083	0					3.61
28.417	0.00	0.07	0.082	0					3.59
28.500	0.00	0.07	0.082	0					3.57
28.583	0.00	0.07	0.081	0					3.55
28.667	0.00	0.07	0.081	0					3.52
28.750	0.00	0.07	0.081	0					3.50
28.833	0.00	0.07	0.080	0					3.48
28.917	0.00	0.07	0.080	0					3.46

29.000	0.00	0.07	0.079	0	3.44
29.083	0.00	0.07	0.079	0	3.42
29.167	0.00	0.07	0.078	0	3.39
29.250	0.00	0.07	0.078	0	3.37
29.333	0.00	0.07	0.077	0	3.35
29.417	0.00	0.07	0.077	0	3.33
29.500	0.00	0.07	0.076	0	3.31
29.583	0.00	0.07	0.076	0	3.29
29.667	0.00	0.07	0.076	0	3.27
29.750	0.00	0.07	0.075	0	3.24
29.833	0.00	0.07	0.075	0	3.22
29.917	0.00	0.07	0.074	0	3.20
30.000	0.00	0.07	0.074	0	3.18
30.083	0.00	0.07	0.073	0	3.16
30.167	0.00	0.07	0.073	0	3.14
30.250	0.00	0.07	0.072	0	3.11
30.333	0.00	0.07	0.072	0	3.09
30.417	0.00	0.07	0.071	0	3.07
30.500	0.00	0.07	0.071	0	3.05
30.583	0.00	0.07	0.071	0	3.03
30.667	0.00	0.07	0.070	0	3.01
30.750	0.00	0.07	0.070	0	2.99
30.833	0.00	0.07	0.069	0	2.97
30.917	0.00	0.07	0.069	0	2.95
31.000	0.00	0.07	0.068	0	2.93
31.083	0.00	0.07	0.068	0	2.91
31.167	0.00	0.07	0.067	0	2.90
31.250	0.00	0.07	0.067	0	2.88
31.333	0.00	0.07	0.066	0	2.86
31.417	0.00	0.07	0.066	0	2.84
31.500	0.00	0.07	0.066	0	2.82
31.583	0.00	0.07	0.065	0	2.80
31.667	0.00	0.07	0.065	0	2.79
31.750	0.00	0.07	0.064	0	2.77
31.833	0.00	0.07	0.064	0	2.75
31.917	0.00	0.07	0.063	0	2.73
32.000	0.00	0.07	0.063	0	2.71
32.083	0.00	0.07	0.062	0	2.70
32.167	0.00	0.07	0.062	0	2.68
32.250	0.00	0.07	0.061	0	2.66
32.333	0.00	0.07	0.061	0	2.64
32.417	0.00	0.07	0.061	0	2.62
32.500	0.00	0.07	0.060	0	2.60
32.583	0.00	0.07	0.060	0	2.59
32.667	0.00	0.07	0.059	0	2.57
32.750	0.00	0.07	0.059	0	2.55
32.833	0.00	0.07	0.058	0	2.53
32.917	0.00	0.07	0.058	0	2.51
33.000	0.00	0.07	0.057	0	2.50
33.083	0.00	0.07	0.057	0	2.48
33.167	0.00	0.07	0.056	0	2.46
33.250	0.00	0.07	0.056	0	2.44
33.333	0.00	0.07	0.056	0	2.42
33.417	0.00	0.07	0.055	0	2.40
33.500	0.00	0.07	0.055	0	2.39
33.583	0.00	0.07	0.054	0	2.37
33.667	0.00	0.07	0.054	0	2.35
33.750	0.00	0.07	0.053	0	2.33
33.833	0.00	0.07	0.053	0	2.31
33.917	0.00	0.07	0.052	0	2.30
34.000	0.00	0.07	0.052	0	2.28
34.083	0.00	0.07	0.051	0	2.26
34.167	0.00	0.07	0.051	0	2.24
34.250	0.00	0.07	0.051	0	2.22
34.333	0.00	0.07	0.050	0	2.20
34.417	0.00	0.07	0.050	0	2.19
34.500	0.00	0.07	0.049	0	2.17
34.583	0.00	0.07	0.049	0	2.15
34.667	0.00	0.07	0.048	0	2.13

34.750	0.00	0.07	0.048	0	2.11
34.833	0.00	0.07	0.047	0	2.10
34.917	0.00	0.07	0.047	0	2.08
35.000	0.00	0.07	0.046	0	2.06
35.083	0.00	0.07	0.046	0	2.04
35.167	0.00	0.07	0.046	0	2.02
35.250	0.00	0.07	0.045	0	2.00
35.333	0.00	0.07	0.045	0	1.99
35.417	0.00	0.07	0.044	0	1.97
35.500	0.00	0.07	0.044	0	1.96
35.583	0.00	0.07	0.043	0	1.94
35.667	0.00	0.07	0.043	0	1.92
35.750	0.00	0.07	0.042	0	1.91
35.833	0.00	0.07	0.042	0	1.89
35.917	0.00	0.07	0.041	0	1.87
36.000	0.00	0.07	0.041	0	1.86
36.083	0.00	0.07	0.041	0	1.84
36.167	0.00	0.07	0.040	0	1.83
36.250	0.00	0.07	0.040	0	1.81
36.333	0.00	0.07	0.039	0	1.79
36.417	0.00	0.07	0.039	0	1.78
36.500	0.00	0.07	0.038	0	1.76
36.583	0.00	0.07	0.038	0	1.74
36.667	0.00	0.07	0.037	0	1.73
36.750	0.00	0.07	0.037	0	1.71
36.833	0.00	0.07	0.036	0	1.70
36.917	0.00	0.07	0.036	0	1.68
37.000	0.00	0.07	0.036	0	1.66
37.083	0.00	0.07	0.035	0	1.65
37.167	0.00	0.07	0.035	0	1.63
37.250	0.00	0.07	0.034	0	1.61
37.333	0.00	0.07	0.034	0	1.60
37.417	0.00	0.07	0.033	0	1.58
37.500	0.00	0.07	0.033	0	1.57
37.583	0.00	0.07	0.032	0	1.55
37.667	0.00	0.07	0.032	0	1.53
37.750	0.00	0.07	0.031	0	1.52
37.833	0.00	0.07	0.031	0	1.50
37.917	0.00	0.07	0.031	0	1.48
38.000	0.00	0.07	0.030	0	1.47
38.083	0.00	0.07	0.030	0	1.45
38.167	0.00	0.07	0.029	0	1.44
38.250	0.00	0.07	0.029	0	1.42
38.333	0.00	0.07	0.028	0	1.40
38.417	0.00	0.07	0.028	0	1.39
38.500	0.00	0.07	0.027	0	1.37
38.583	0.00	0.07	0.027	0	1.35
38.667	0.00	0.07	0.026	0	1.34
38.750	0.00	0.07	0.026	0	1.32
38.833	0.00	0.07	0.026	0	1.31
38.917	0.00	0.07	0.025	0	1.29
39.000	0.00	0.07	0.025	0	1.27
39.083	0.00	0.07	0.024	0	1.26
39.167	0.00	0.07	0.024	0	1.24
39.250	0.00	0.07	0.023	0	1.22
39.333	0.00	0.07	0.023	0	1.21
39.417	0.00	0.07	0.022	0	1.19
39.500	0.00	0.07	0.022	0	1.18
39.583	0.00	0.07	0.021	0	1.16
39.667	0.00	0.07	0.021	0	1.14
39.750	0.00	0.07	0.021	0	1.13
39.833	0.00	0.07	0.020	0	1.11
39.917	0.00	0.07	0.020	0	1.09
40.000	0.00	0.07	0.019	0	1.08
40.083	0.00	0.07	0.019	0	1.06
40.167	0.00	0.07	0.018	0	1.05
40.250	0.00	0.07	0.018	0	1.03
40.333	0.00	0.07	0.017	0	1.01
40.417	0.00	0.07	0.017	0	1.00

40.500	0.00	0.07	0.016	0					0.97
40.583	0.00	0.07	0.016	0					0.94
40.667	0.00	0.07	0.016	0					0.92
40.750	0.00	0.07	0.015	0					0.89
40.833	0.00	0.07	0.015	0					0.87
40.917	0.00	0.07	0.014	0					0.84
41.000	0.00	0.07	0.014	0					0.82
41.083	0.00	0.07	0.013	0					0.79
41.167	0.00	0.07	0.013	0					0.77
41.250	0.00	0.07	0.012	0					0.74
41.333	0.00	0.07	0.012	0					0.71
41.417	0.00	0.07	0.011	0					0.69
41.500	0.00	0.07	0.011	0					0.66
41.583	0.00	0.07	0.011	0					0.64
41.667	0.00	0.07	0.010	0					0.61
41.750	0.00	0.07	0.010	0					0.59
41.833	0.00	0.07	0.009	0					0.56
41.917	0.00	0.07	0.009	0					0.54
42.000	0.00	0.07	0.008	0					0.51
42.083	0.00	0.07	0.008	0					0.48
42.167	0.00	0.07	0.007	0					0.46
42.250	0.00	0.07	0.007	0					0.43
42.333	0.00	0.07	0.006	0					0.41
42.417	0.00	0.07	0.006	0					0.38
42.500	0.00	0.07	0.006	0					0.36
42.583	0.00	0.07	0.005	0					0.33
42.667	0.00	0.07	0.005	0					0.31
42.750	0.00	0.07	0.004	0					0.28
42.833	0.00	0.07	0.004	0					0.25
42.917	0.00	0.07	0.003	0					0.23
43.000	0.00	0.07	0.003	0					0.20
43.083	0.00	0.07	0.002	0					0.18
43.167	0.00	0.07	0.002	0					0.15
43.250	0.00	0.07	0.001	0					0.13
43.333	0.00	0.07	0.001	0					0.10
43.417	0.00	0.04	0.001	0					0.06
43.500	0.00	0.03	0.000	0					0.04
43.583	0.00	0.02	0.000	0					0.03
43.667	0.00	0.01	0.000	0					0.02
43.750	0.00	0.01	0.000	0					0.01
43.833	0.00	0.00	0.000	0					0.01
43.917	0.00	0.00	0.000	0					0.00
44.000	0.00	0.00	0.000	0					0.00
44.083	0.00	0.00	0.000	0					0.00
44.167	0.00	0.00	0.000	0					0.00

*****HYDROGRAPH DATA*****

Number of intervals = 530
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 3.011 (CFS)
Total volume = 0.384 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

36" x 36" Grate Inlet Capacity Calculations $Q=3.33 \cdot L \cdot (H^{1.55})$ - OFFSITE AREA A			
L (ft)	H (ft)	Capacity Q (cfs)	50% Clogging Capacity Q (cfs)
12	0.5	13.65	6.82
			Q10 Generated from Site (cfs)
			4.975

24" x 24" Grate Inlet Capacity Calculations $Q=3.33 \cdot L \cdot (H^{1.55})$ - AREA B			
L (ft)	H (ft)	Capacity Q (cfs)	50% Clogging Capacity Q (cfs)
6	0.5	6.82	3.41
			Q10 Generated from Site (cfs)
			4.3

24" x 24" Grate Inlet Capacity Calculations $Q=3.33 \cdot L \cdot (H^{1.55})$ - AREA C			
L (ft)	H (ft)	Capacity Q (cfs)	50% Clogging Capacity Q (cfs)
8	0.33	4.78	2.39
			Q10 Generated from Site (cfs)
			1.12*

24" x 24" Grate Inlet Capacity Calculations $Q=3.33 \cdot L \cdot (H^{1.55})$ - AREA C			
L (ft)	H (ft)	Capacity Q (cfs)	50% Clogging Capacity Q (cfs)
8	0.25	3.11	1.55
			Q10 Generated from Site (cfs)
			1.12*

Note: Total Q area C is 4.5 cfs. The total is intercepted by 4 catch basins. Each should have a minimum capacity of 1.12 cfs

OFFSITE RUNOFF
2-8-Inch Pipe Capacity Each connecting to Parkway Culvert
10-Year Storm Event

***** PIPE FLOW CALCULATIONS *****

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***** NON-PRESSURE, OPEN CHANNEL CALCULATIONS *****

CALCULATE PIPE SIZE GIVEN:

Channel Slope = $-.104004$ (Ft./Ft.) = -10.4004 %

Invert elevation at pipe INLET = 1284.840 (Ft.)

Invert elevation at pipe OUTLET = 1284.580 (Ft.)

Length of pipe = 2.500 (Ft.)

*** PIPE OPEN CHANNEL FLOW ***

Mannings "n" = $.013$

No. of pipes = 2 Velocity (Ft./Sec.) = 11.58

Nearest 1 Inch Pipe Diameter (In.) = 7.00

Individual pipe flow = 2.487 (CFS)

" " " = $1116.$ (GPM)

" " " = 1.608 (MGD)

Total pipe area = 38.48 (In²)

Total perimeter of pipe = 21.99 (In.)

Normal flow depth in pipe = 5.25 (In.)

Flow top width inside pipe = 6.06 (In.)

Area of flow = 30.9607 (In²)

Wetted Perimeter = 14.66 (In.)

Critical Depth not calculated

Total flow of pipe(s) = 4.975 (CFS)

" " " " = $2233.$ (GPM)

" " " " = 3.215 (MGD)

UNDER SIDEWALK DRAIN CALCULATIONS OFFSITE FLOWS

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*** Improved Channel Analysis ***

Upstream (headworks) Elevation = 84.580(Ft.)
Downstream (outlet) Elevation = 84.330(Ft.)
Runoff/Flow Distance = 12.400(Ft.)
Maximum flow rate in channel(s) = 4.975(CFS)

*** CALCULATED DEPTH DATA AT FLOW = 4.97(CFS) ***

Covered channel
Channel base width = 3.500(Ft.)
Slope or 'Z' of left channel bank = 0.000
Slope or 'Z' of right channel bank = 0.000
Manning's 'N' = 0.015
Maximum depth of channel = 0.333(Ft.)
Flow(q) thru channel = 4.975(CFS)
Depth of flow = 0.268(Ft.)
Average velocity = 5.312(Ft/s)
Total flow rate in 1/2 street = 4.975(CFS)
Channel flow top width = 3.500(Ft.)
Depth of flow in channel = 0.27(Ft.)

Total number of channels (same dimensions) = 1
Flow Velocity = 5.31(Ft/s)
Individual channel flow = 4.975(CFS)
Total capacity of channel(s) = 4.975(CFS)

Sub-Channel No. 1 Critical depth = 0.398(Ft.)
Critical flow top width = 3.500(Ft.)
Critical flow velocity = 3.567(Ft/s)
Critical flow area = 1.395(Sq.Ft)

12-INCH OVERFLOW PIPE CONNECTING INFILTRATION SYSTEM TO UNDER SIDEWALK DRAIN

***** PIPE FLOW CALCULATIONS *****
Copyright (c) 1988, CivilDesign Software, Inc.

For: For Licensed CivilDesign User

***** NON-PRESSURE, OPEN CHANNEL CALCULATIONS *****

CALCULATE PIPE SIZE GIVEN:
Channel Slope = $-.014035$ (Ft./Ft.) = -1.4035%
Invert elevation at pipe INLET = 84.100 (Ft.)
Invert elevation at pipe OUTLET = 83.940 (Ft.)
Length of pipe = 11.400 (Ft.)

*** PIPE OPEN CHANNEL FLOW ***

Mannings "n" = $.013$
No. of pipes = 1 Velocity (Ft./Sec.) = 5.76
Nearest 1 Inch Pipe Diameter (In.) = 11.00
Individual pipe flow = 3.100 (CFS)
" " " = $1391.$ (GPM)
" " " = 2.004 (MGD)
Total pipe area = 95.03 (In2)
Total perimeter of pipe = 34.56 (In.)
Normal flow depth in pipe = 8.36 (In.)
Flow top width inside pipe = 9.40 (In.)
Area of flow = 77.4890 (In2)
Wetted Perimeter = 23.29 (In.)
Critical Depth in Pipe = 9.16 (In.)
Total flow of pipe(s) = 3.100 (CFS)
" " " " = $1391.$ (GPM)
" " " " = 2.004 (MGD)

UNDER SIDEWALK DRAIN CALCULATIONS ONSITE FLOWS

CIVILCADD/CIVILDESIGN Engineering Software, (c) 2004 Version 7.0

Program License Serial Number 6158

*** Improved Channel Analysis ***

Upstream (headworks) Elevation = 83.940(Ft.)
Downstream (outlet) Elevation = 83.850(Ft.)
Runoff/Flow Distance = 18.350(Ft.)
Maximum flow rate in channel(s) = 3.011(CFS)

*** CALCULATED DEPTH DATA AT FLOW = 3.01(CFS) ***

Covered channel
Channel base width = 4.000(Ft.)
Slope or 'Z' of left channel bank = 0.000
Slope or 'Z' of right channel bank = 0.000
Manning's 'N' = 0.015
Maximum depth of channel = 0.333(Ft.)
Flow(q) thru channel = 3.011(CFS)
Depth of flow = 0.278(Ft.)
Average velocity = 2.709(Ft/s)
Total flow rate in 1/2 street = 3.011(CFS)
Channel flow top width = 4.000(Ft.)
Depth of flow in channel = 0.28(Ft.)

Total number of channels (same dimensions) = 1
Flow Velocity = 2.71(Ft/s)
Individual channel flow = 3.011(CFS)
Total capacity of channel(s) = 3.011(CFS)

Sub-Channel No. 1 Critical depth = 0.262(Ft.)
Critical flow top width = 4.000(Ft.)
Critical flow velocity = 2.876(Ft/s)
Critical flow area = 1.047(Sq.Ft)

APPENDIX 6. EXISTING HYDROLOGY MAPS



LEGEND

5 NODE NUMBER

WATERSHED BOUNDARY

WATERCOURSE

WATERCOURSE ELEVATION

(100)

L=100 LENGTH IN FEET

NAME DRAINAGE AREA

AREA (AC)

HYDROLOGY DATA

TOTAL AREA	Q (100 YR. 1 HR)	TIME OF CONC.
3.46	13.65 CFS	12.56 min

STK

4300 ZEVVO DR., TEMECULA, CALIFORNIA 92590-3780
Phone: 951-266-9110 Fax: 951-266-6079 Email: sk@stkc.com

CONSULTANT:

ERSC

Engineering Resources of Southern California

1861 W. Redlands Blvd, Bldg 7B
Redlands, Ca. 92373
P: (909) 890-1255
F: (909) 890-0995

PROJECT ADMINISTERED BY:
SAN BERNARDINO COUNTY
PROJECT & FACILITIES
MANAGEMENT DEPARTMENT

385 N. ARROWHEAD AVE.
SAN BERNARDINO, CA 92415

PROJECT NAME:
SAN BERNARDINO
COUNTY FIRE
DEPARTMENT:
FIRE STATION 227

PROJECT # 10.10.1202
CIP #22-105
APN: 0154-281-01

180 W. 38TH STREET
SAN BERNADINO,
CA 92405

ISSUE INFORMATION:

DATE:	INFORMATION:
03-14-25	Plan Check
05-13-25	Plan Check

SHEET INFORMATION:

STK PROJECT NO.: 374-193-24
SCALE: AS NOTED
DATE: DECEMBER 2024
PLOT DATE: -
DRAWING NAME:

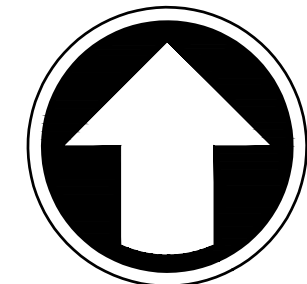
SEAL:



SHEET TITLE:

EXISTING
HYDROLOGY MAP

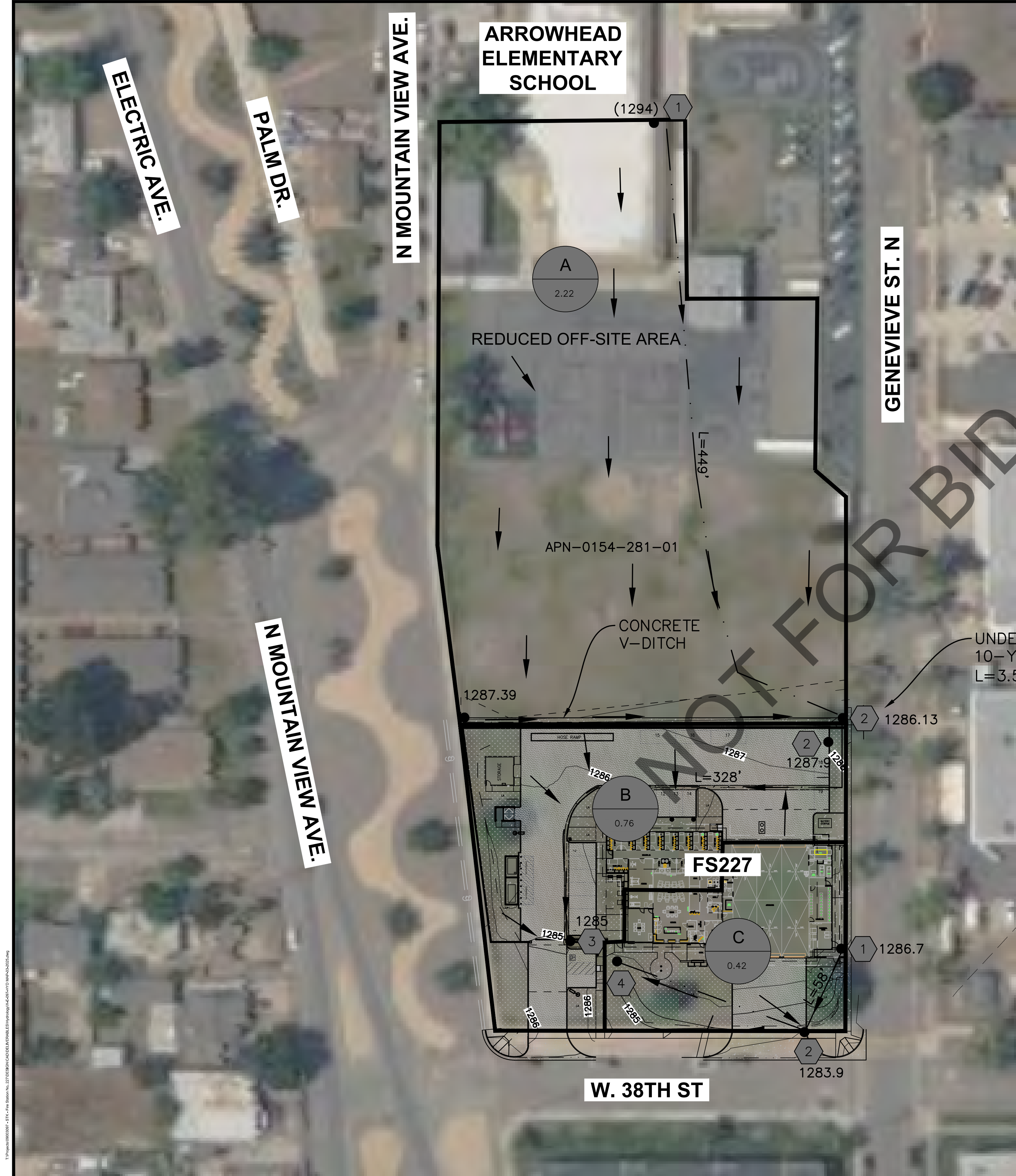
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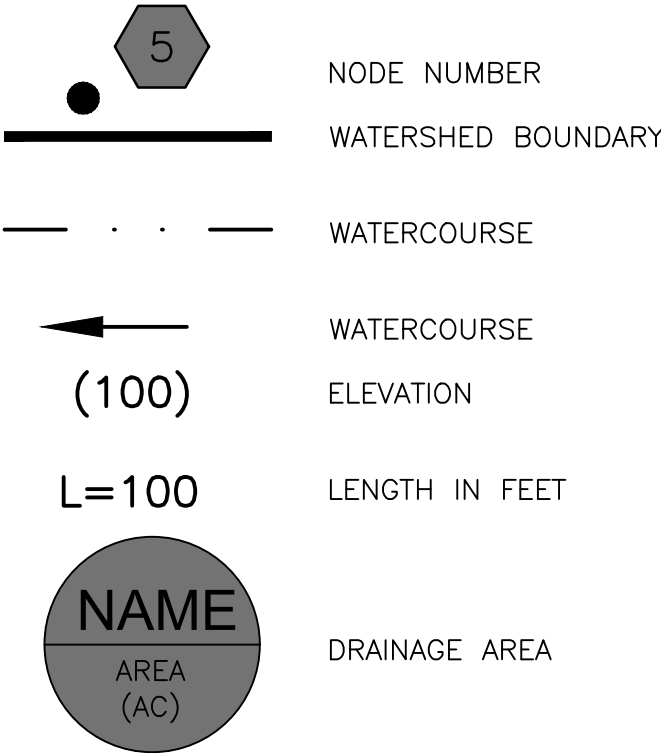


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APPENDIX 7. PROPOSED HYDROLOGY MAPS



LEGEND



HYDROLOGY DATA			
DA	TOTAL AREA	Q (100 YR, 1 HR)	TIME OF CONC.
A	2.22	9.77 CFS	12.56 min
B&C	1.18	7.51 CFS	3.30 min

HYDROLOGY DATA			
DA	TOTAL AREA	Q (10 YR, 1 HR)	TIME OF CONC.
A	2.22	4.975 CFS	10.64 min



PROJECT ADMINISTERED BY:
SAN BERNARDINO COUNTY
PROJECT & FACILITIES
MANAGEMENT DEPARTMENT

385 N. ARROWHEAD AVE.
SAN BERNARDINO, CA 92415

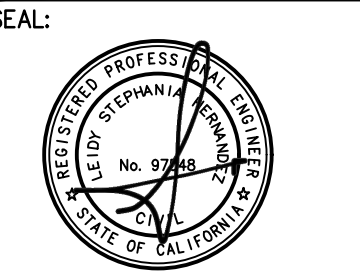
PROJECT NAME:
SAN BERNARDINO
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FIRE STATION 227

PROJECT # 10.10.1202
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APN: 0154-281-01

180 W. 38TH STREET
SAN BERNARDINO,
CA 92405

ISSUE INFORMATION:	
DATE:	INFORMATION:
03-14-25	Plan Check
05-13-25	Plan Check

SHEET INFORMATION:
STK PROJECT NO.: 374-193-24
SCALE: AS NOTED
DATE: DECEMBER 2024
PLOT DATE: -
DRAWING NAME:



SHEET TITLE:
PROPOSED
HYDROLOGY MAP

SHEET NO.:

