CANYON RANCH PRELIMINARY HYDROLOGY REPORT

TTM 20402, 20403, 20404

Prepared for:
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PROACTIVE
ENGINEERING CONSULTANTS

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INTRODUCTION

The Project - Tentative Tract Map 20402 is a proposed residential community encompassing approximately 24.9 acres within the City of Redlands, California. The project site is bounded by San Timoteo Canyon Rd to the west, existing residential site to the north and east, and agricultural land to the south. See **Figure 1 – Vicinity Map** for reference. The proposed Project consists of residential lots and an infiltration basin.

The Project - Tentative Tract Map 20403 is a proposed residential community encompassing approximately 11.2 acres within the City of Loma Linda, California. The project site is bounded by New Jersey Street to the west, existing residential site to the north, San Timoteo Canyon Rd to the east, and a church, parking lot, and grassland to the south. See **Figure 1 – Vicinity Map** for reference. The proposed Project consists of residential lots, open space, and a bioretention basin.

The Project - Tentative Tract Map 20404 is a proposed residential community encompassing approximately 55.7 acres within the City of Loma Linda, California. The project site is bounded by San Timoteo Creek to the west, a church and parking lot to the north, San Timoteo Canyon Rd to the east, and grass – poor cover land to the south. See **Figure 1 – Vicinity Map** for reference. The proposed Project consists of residential lots and a basin. This study has been prepared to examine the hydrology impacts associated with the proposed Project as described below:

1. Examine differences between pre-and post-development flows to identify the preliminary infiltration basin sizing and potential downstream impacts to the San Timoteo Creek.

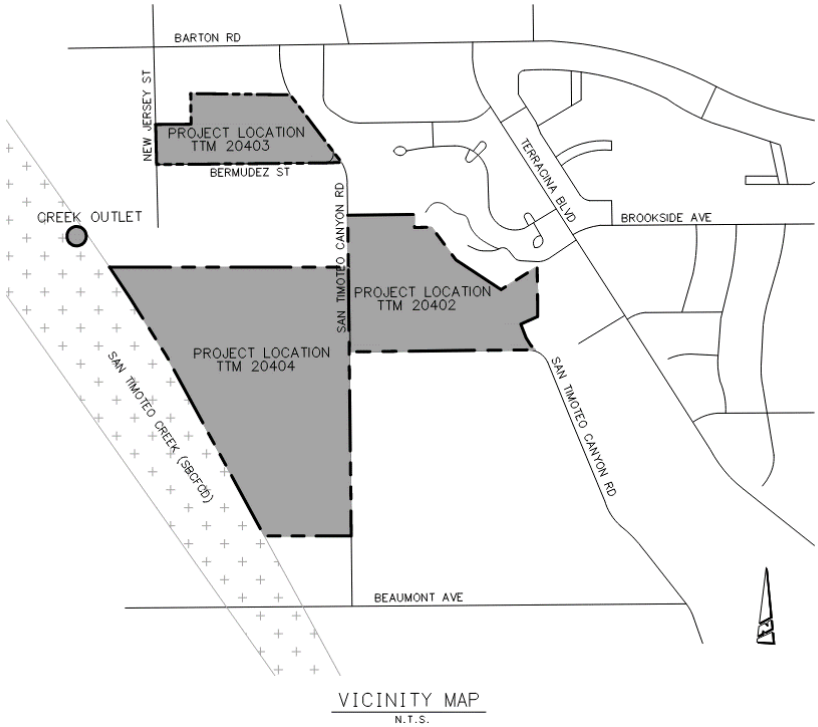

Figure 1 – Vicinity Map

HYDROLOGY ANALYSIS AND METHODOLOGY

HYDROLOGY CRITERIA

This study has been prepared in conformance with the hydrological procedure and standards set forth in the San Bernardino County Hydrology Manual.

Due to the size of the watershed (less than 640 acres), the rational method is used to calculate the peak runoff at each concentration point for the existing and proposed conditions. The point precipitation value for the 10-year and 100-year event are used in the rational method analysis.

Accommodating to the San Bernardino County Detention Basin Design Criteria's requirement to limit post development 100-year peak flow discharge to 90% of 25-year existing peak flow, the hydrograph method is utilized to size the required bioretention basin for the Project. Precipitation values for the the 25-year and 100-year event are utilized in the hydrograph analysis.

The precipitation values utilized in this report are derived from the San Bernadino County Hydrology Manual Isohyetal Maps.

The antecedent moisture content (AMC) used for the 10-year analysis is AMC II and for the 100-year analysis is AMC III per the San Bernardino Hydrology Manual.

LAND USE DEVELOPMENT

The site of TTM's 20402, 20403, and 20404 were an orange orchard and are currently composed of grassland with poor cover. In the proposed condition, residential land use will generally maintain the existing drainage pattern. Runoff will be conveyed via surface flows to proposed catch basins and outlet into a proposed combined infiltration/water quality basin. From here, flows will exit via a designated discharge point and outlet into the San Timoteo Creek.

WATERSHED DESCRIPTION AND DRAINAGE PATTERNS

The Project site drainage for TTM's 20402, 20403, and 20404 are tributary to the San Timoteo Creek. The existing ground surface for all generally slopes from southeast to northwest in the 1% to 2% range. The Project Site is a minor tributary of the Santa Ana River Watershed and ultimately outlets to the Santa Ana River located northwest of the site.

INFILTRATION AND SOILS

The most significant factor affecting infiltration is the nature of the soil in the watershed. Accordingly, the U.S. Department of Agriculture Soil Conservation Service (now the Natural Resource Conversation Service) classifies soil

according to their infiltration capacity. The soil group used was derived from the San Bernadino County Hydrology Manual.

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

Group B soils have slow infiltration rates when thoroughly wetted and consist mainly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

Other important factors in soil infiltration are the antecedent moisture condition (AMC) and land use/soil cover. Following the methodology outlined in the San Bernardino County Hydrology manual, an AMC III (highest runoff potential) is assumed for events with a 100-year return period. AMC II is used for 10, 25, and 50-year return frequency storms and AMC 1 is used for 2 and 5-year storms.

WATERSHED MODEL DEVELOPMENT

This study uses the Advance Engineering Software (AES) HydroWIN v. 2015 Rational Method Analysis computer program. The computer program utilizes San Bernardino County methodology to perform the hydrologic analysis. As a result of the existing topography, the proposed condition's hydrology has been modeled to generally continue the existing condition hydrology by flowing from southeast to northwest. To accurately reflect the impacts of the project to the downstream channel, existing and proposed flows have been analyzed. See the Existing Hydrology Study and Proposed Hydrology Study in Appendix A and B, respectively.

In accordance with the San Bernardino County Detention Basin Design Criteria's requirement to limit post development 100-year peak flow discharge to 90% of 25-year existing peak flow, AES v. 2015 is utilized to demonstrate the effects of the proposed infiltration/water quality basin. The results of the unit hydrographs and basin routing are summarized in Table 1 below. See Appendix B for the unit hydrograph and basin routing calculations.

While the infiltration and water quality basins are combined, they have been designed to function independent of each other (no water quality/infiltration volume overlap).

UNIT HYDROGRAPH FLOW ATTENUATION ANALYSIS

As stated above, the San Bernardino County Detention Basin Design Criteria's requirement to limit post development 100-year peak flow discharge to 90% of 25-year existing peak flow. To achieve this threshold, flows from TTM's 20402, 20403, and 20404 will be attenuated using an infiltration basin. Preliminary sizing for the infiltration basin is calculated using the San Bernardino County hydrograph and basin routing procedures. The results are as follows:

Table 1 – TTM's 20402, 20403, & 20404 Unit Hydrograph Summary

		Existing Condition Q25	**Proposed Condition Q100**	**Outflow % of Existing Q25**
TTM's 20402, 20403, & 20404	Peak Inflow	102.8 cfs	75.0 cfs	73%
	Max Storage volume	0.00 ac-ft	2.88 ac-ft	
	Peak Outflow	102.8 cfs	75.0 cfs	

CONCLUSION

Preliminary hydrology for the Project at TTM's 20402, 20403, and 20404 have been completed for the existing and proposed 25 and 100-year events. With the use of an infiltration and detention basin on each tract, the proposed 100-year peak flow has been mitigated to less than 90% of the existing 25-year peak flow as required by the San Bernardino County Detention Basin Design Criteria. Since the proposed flow has been mitigated to meet city and county requirements, no downstream impacts to the San Timoteo Creek are expected.

San Timoteo Creek currently has a flow of 19,000 cfs, including the existing 102.8 cfs coming from the site. By using on-site basins, the proposed condition reduces the flow from the site to 75.0 cfs. This decreases the flow in the channel 0.1%, which is less than the 3% channel discharge recommendation in the USACE H&H Branch Policy Memorandum Number 1 "Side Drain Connections into Flood Risk Management Projects". This minimizes the flow disturbance being introduced to the channel.

APPENDIX A – EXISTING HYDROLOGY ANALYSIS

25-YEAR EXISTING HYDROLOGY UNIT HYDROGRAPH

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____________________________________________________________________________
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             F L O O D   R O U T I N G   A N A L Y S I S
          USING COUNTY HYDROLOGY MANUAL OF SAN BERNARDINO(1986)
         (c) Copyright 1989-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:





 ************************* DESCRIPTION OF STUDY *************************
* TTM 20402, 20403, 20404 - EXISTING CONDITION                           *
* 25 YEAR                                                                *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: EXC25H.DAT
  TIME/DATE OF STUDY: 15:46 04/11/2022


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      25.100 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.199 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.416
         LOW LOSS FRACTION = 0.657
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.35
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.70
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.93
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.35
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.70
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.72
```

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE FACTOR = 0.999
30-MINUTE FACTOR = 0.999
1-HOUR FACTOR = 0.999
3-HOUR FACTOR = 1.000
6-HOUR FACTOR = 1.000
24-HOUR FACTOR = 1.000

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 41.876

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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	3.163	9.601
2	21.253	54.912
3	52.963	96.256
4	80.503	83.599
5	92.733	37.125
6	97.444	14.302
7	98.697	3.803
8	99.397	2.122
9	99.759	1.099
10	99.940	0.550
11	100.000	0.183

↑
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0032	0.0021	0.0011
2	0.0032	0.0021	0.0011
3	0.0032	0.0021	0.0011
4	0.0032	0.0021	0.0011
5	0.0033	0.0021	0.0011
6	0.0033	0.0021	0.0011
7	0.0033	0.0022	0.0011
8	0.0033	0.0022	0.0011
9	0.0033	0.0022	0.0011
10	0.0033	0.0022	0.0011

11	0.0033	0.0022	0.0011
12	0.0033	0.0022	0.0011
13	0.0033	0.0022	0.0011
14	0.0034	0.0022	0.0012
15	0.0034	0.0022	0.0012
16	0.0034	0.0022	0.0012
17	0.0034	0.0022	0.0012
18	0.0034	0.0022	0.0012
19	0.0034	0.0022	0.0012
20	0.0034	0.0023	0.0012
21	0.0034	0.0023	0.0012
22	0.0035	0.0023	0.0012
23	0.0035	0.0023	0.0012
24	0.0035	0.0023	0.0012
25	0.0035	0.0023	0.0012
26	0.0035	0.0023	0.0012
27	0.0035	0.0023	0.0012
28	0.0035	0.0023	0.0012
29	0.0036	0.0023	0.0012
30	0.0036	0.0023	0.0012
31	0.0036	0.0024	0.0012
32	0.0036	0.0024	0.0012
33	0.0036	0.0024	0.0012
34	0.0036	0.0024	0.0012
35	0.0036	0.0024	0.0013
36	0.0037	0.0024	0.0013
37	0.0037	0.0024	0.0013
38	0.0037	0.0024	0.0013
39	0.0037	0.0024	0.0013
40	0.0037	0.0024	0.0013
41	0.0037	0.0025	0.0013
42	0.0038	0.0025	0.0013
43	0.0038	0.0025	0.0013
44	0.0038	0.0025	0.0013
45	0.0038	0.0025	0.0013
46	0.0038	0.0025	0.0013
47	0.0038	0.0025	0.0013
48	0.0039	0.0025	0.0013
49	0.0039	0.0025	0.0013
50	0.0039	0.0026	0.0013
51	0.0039	0.0026	0.0013
52	0.0039	0.0026	0.0013
53	0.0040	0.0026	0.0014
54	0.0040	0.0026	0.0014
55	0.0040	0.0026	0.0014
56	0.0040	0.0026	0.0014
57	0.0040	0.0026	0.0014
58	0.0040	0.0027	0.0014
59	0.0041	0.0027	0.0014
60	0.0041	0.0027	0.0014

61	0.0041	0.0027	0.0014
62	0.0041	0.0027	0.0014
63	0.0042	0.0027	0.0014
64	0.0042	0.0027	0.0014
65	0.0042	0.0028	0.0014
66	0.0042	0.0028	0.0014
67	0.0042	0.0028	0.0015
68	0.0043	0.0028	0.0015
69	0.0043	0.0028	0.0015
70	0.0043	0.0028	0.0015
71	0.0043	0.0028	0.0015
72	0.0043	0.0029	0.0015
73	0.0044	0.0029	0.0015
74	0.0044	0.0029	0.0015
75	0.0044	0.0029	0.0015
76	0.0044	0.0029	0.0015
77	0.0045	0.0029	0.0015
78	0.0045	0.0030	0.0015
79	0.0045	0.0030	0.0016
80	0.0045	0.0030	0.0016
81	0.0046	0.0030	0.0016
82	0.0046	0.0030	0.0016
83	0.0046	0.0030	0.0016
84	0.0047	0.0031	0.0016
85	0.0047	0.0031	0.0016
86	0.0047	0.0031	0.0016
87	0.0048	0.0031	0.0016
88	0.0048	0.0031	0.0016
89	0.0048	0.0032	0.0017
90	0.0048	0.0032	0.0017
91	0.0049	0.0032	0.0017
92	0.0049	0.0032	0.0017
93	0.0049	0.0032	0.0017
94	0.0050	0.0033	0.0017
95	0.0050	0.0033	0.0017
96	0.0050	0.0033	0.0017
97	0.0051	0.0033	0.0017
98	0.0051	0.0033	0.0017
99	0.0051	0.0034	0.0018
100	0.0052	0.0034	0.0018
101	0.0052	0.0034	0.0018
102	0.0052	0.0034	0.0018
103	0.0053	0.0035	0.0018
104	0.0053	0.0035	0.0018
105	0.0054	0.0035	0.0018
106	0.0054	0.0035	0.0019
107	0.0055	0.0036	0.0019
108	0.0055	0.0036	0.0019
109	0.0055	0.0036	0.0019
110	0.0056	0.0037	0.0019

111	0.0056	0.0037	0.0019
112	0.0057	0.0037	0.0019
113	0.0057	0.0038	0.0020
114	0.0058	0.0038	0.0020
115	0.0058	0.0038	0.0020
116	0.0059	0.0038	0.0020
117	0.0059	0.0039	0.0020
118	0.0060	0.0039	0.0020
119	0.0060	0.0040	0.0021
120	0.0061	0.0040	0.0021
121	0.0061	0.0040	0.0021
122	0.0062	0.0041	0.0021
123	0.0063	0.0041	0.0021
124	0.0063	0.0041	0.0022
125	0.0064	0.0042	0.0022
126	0.0064	0.0042	0.0022
127	0.0065	0.0043	0.0022
128	0.0066	0.0043	0.0022
129	0.0066	0.0044	0.0023
130	0.0067	0.0044	0.0023
131	0.0068	0.0045	0.0023
132	0.0068	0.0045	0.0023
133	0.0069	0.0046	0.0024
134	0.0070	0.0046	0.0024
135	0.0071	0.0047	0.0024
136	0.0071	0.0047	0.0025
137	0.0073	0.0048	0.0025
138	0.0073	0.0048	0.0025
139	0.0074	0.0049	0.0026
140	0.0075	0.0049	0.0026
141	0.0076	0.0050	0.0026
142	0.0077	0.0051	0.0026
143	0.0078	0.0051	0.0027
144	0.0079	0.0052	0.0027
145	0.0079	0.0052	0.0027
146	0.0080	0.0052	0.0027
147	0.0081	0.0053	0.0028
148	0.0082	0.0054	0.0028
149	0.0084	0.0055	0.0029
150	0.0085	0.0056	0.0029
151	0.0086	0.0057	0.0030
152	0.0087	0.0057	0.0030
153	0.0089	0.0059	0.0031
154	0.0090	0.0059	0.0031
155	0.0092	0.0061	0.0032
156	0.0093	0.0061	0.0032
157	0.0096	0.0063	0.0033
158	0.0097	0.0064	0.0033
159	0.0100	0.0065	0.0034
160	0.0101	0.0066	0.0035

161	0.0104	0.0068	0.0036
162	0.0105	0.0069	0.0036
163	0.0108	0.0071	0.0037
164	0.0110	0.0072	0.0038
165	0.0113	0.0075	0.0039
166	0.0115	0.0076	0.0040
167	0.0119	0.0078	0.0041
168	0.0121	0.0080	0.0042
169	0.0129	0.0085	0.0044
170	0.0131	0.0086	0.0045
171	0.0136	0.0090	0.0047
172	0.0139	0.0091	0.0048
173	0.0145	0.0096	0.0050
174	0.0149	0.0098	0.0051
175	0.0156	0.0103	0.0054
176	0.0160	0.0105	0.0055
177	0.0169	0.0111	0.0058
178	0.0174	0.0114	0.0060
179	0.0185	0.0121	0.0063
180	0.0191	0.0126	0.0066
181	0.0205	0.0135	0.0070
182	0.0213	0.0140	0.0073
183	0.0232	0.0153	0.0080
184	0.0244	0.0160	0.0084
185	0.0325	0.0214	0.0112
186	0.0344	0.0226	0.0118
187	0.0389	0.0256	0.0133
188	0.0419	0.0276	0.0144
189	0.0476	0.0313	0.0163
190	0.0539	0.0347	0.0192
191	0.0776	0.0347	0.0429
192	0.1076	0.0347	0.0729
193	0.3496	0.0347	0.3149
194	0.0629	0.0347	0.0283
195	0.0456	0.0300	0.0156
196	0.0364	0.0239	0.0125
197	0.0256	0.0168	0.0088
198	0.0222	0.0146	0.0076
199	0.0198	0.0130	0.0068
200	0.0179	0.0118	0.0061
201	0.0164	0.0108	0.0056
202	0.0152	0.0100	0.0052
203	0.0142	0.0093	0.0049
204	0.0134	0.0088	0.0046
205	0.0124	0.0081	0.0042
206	0.0117	0.0077	0.0040
207	0.0112	0.0073	0.0038
208	0.0107	0.0070	0.0037
209	0.0102	0.0067	0.0035
210	0.0098	0.0065	0.0034

211	0.0095	0.0062	0.0032
212	0.0091	0.0060	0.0031
213	0.0088	0.0058	0.0030
214	0.0085	0.0056	0.0029
215	0.0083	0.0054	0.0028
216	0.0080	0.0053	0.0028
217	0.0080	0.0052	0.0027
218	0.0078	0.0051	0.0027
219	0.0076	0.0050	0.0026
220	0.0074	0.0048	0.0025
221	0.0072	0.0047	0.0025
222	0.0070	0.0046	0.0024
223	0.0069	0.0045	0.0024
224	0.0067	0.0044	0.0023
225	0.0066	0.0043	0.0023
226	0.0065	0.0042	0.0022
227	0.0063	0.0042	0.0022
228	0.0062	0.0041	0.0021
229	0.0061	0.0040	0.0021
230	0.0060	0.0039	0.0021
231	0.0059	0.0039	0.0020
232	0.0058	0.0038	0.0020
233	0.0057	0.0037	0.0020
234	0.0056	0.0037	0.0019
235	0.0055	0.0036	0.0019
236	0.0054	0.0036	0.0019
237	0.0053	0.0035	0.0018
238	0.0053	0.0035	0.0018
239	0.0052	0.0034	0.0018
240	0.0051	0.0034	0.0018
241	0.0051	0.0033	0.0017
242	0.0050	0.0033	0.0017
243	0.0049	0.0032	0.0017
244	0.0049	0.0032	0.0017
245	0.0048	0.0031	0.0016
246	0.0047	0.0031	0.0016
247	0.0047	0.0031	0.0016
248	0.0046	0.0030	0.0016
249	0.0046	0.0030	0.0016
250	0.0045	0.0030	0.0015
251	0.0045	0.0029	0.0015
252	0.0044	0.0029	0.0015
253	0.0044	0.0029	0.0015
254	0.0043	0.0028	0.0015
255	0.0043	0.0028	0.0015
256	0.0042	0.0028	0.0014
257	0.0042	0.0027	0.0014
258	0.0041	0.0027	0.0014
259	0.0041	0.0027	0.0014
260	0.0041	0.0027	0.0014

261	0.0040	0.0026	0.0014
262	0.0040	0.0026	0.0014
263	0.0039	0.0026	0.0014
264	0.0039	0.0026	0.0013
265	0.0039	0.0025	0.0013
266	0.0038	0.0025	0.0013
267	0.0038	0.0025	0.0013
268	0.0038	0.0025	0.0013
269	0.0037	0.0025	0.0013
270	0.0037	0.0024	0.0013
271	0.0037	0.0024	0.0013
272	0.0036	0.0024	0.0012
273	0.0036	0.0024	0.0012
274	0.0036	0.0024	0.0012
275	0.0035	0.0023	0.0012
276	0.0035	0.0023	0.0012
277	0.0035	0.0023	0.0012
278	0.0035	0.0023	0.0012
279	0.0034	0.0023	0.0012
280	0.0034	0.0022	0.0012
281	0.0034	0.0022	0.0012
282	0.0034	0.0022	0.0012
283	0.0033	0.0022	0.0011
284	0.0033	0.0022	0.0011
285	0.0033	0.0022	0.0011
286	0.0033	0.0021	0.0011
287	0.0032	0.0021	0.0011
288	0.0032	0.0021	0.0011

TOTAL STORM RAINFALL(INCHES) = 2.72
TOTAL SOIL-LOSS(INCHES) = 1.53
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.19

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 3.2048
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.4830

↑

==========

2 4 - 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 FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	12.5	25.0	37.5	50.0
0.083	0.0001	0.01	Q	.	.	.	.

0.167	0.0006	0.07	Q	.	.	.	.
0.250	0.0018	0.18	Q	.	.	.	.
0.333	0.0036	0.27	Q	.	.	.	.
0.417	0.0058	0.31	Q	.	.	.	.
0.500	0.0080	0.33	Q	.	.	.	.
0.583	0.0103	0.33	Q	.	.	.	.
0.667	0.0127	0.34	Q	.	.	.	.
0.750	0.0150	0.34	Q	.	.	.	.
0.833	0.0173	0.34	Q	.	.	.	.
0.917	0.0197	0.34	Q	.	.	.	.
1.000	0.0221	0.34	Q	.	.	.	.
1.083	0.0244	0.34	Q	.	.	.	.
1.167	0.0268	0.35	Q	.	.	.	.
1.250	0.0292	0.35	Q	.	.	.	.
1.333	0.0316	0.35	Q	.	.	.	.
1.417	0.0340	0.35	Q	.	.	.	.
1.500	0.0364	0.35	Q	.	.	.	.
1.583	0.0389	0.35	Q	.	.	.	.
1.667	0.0413	0.35	Q	.	.	.	.
1.750	0.0438	0.36	Q	.	.	.	.
1.833	0.0462	0.36	Q	.	.	.	.
1.917	0.0487	0.36	Q	.	.	.	.
2.000	0.0512	0.36	Q	.	.	.	.
2.083	0.0536	0.36	Q	.	.	.	.
2.167	0.0561	0.36	Q	.	.	.	.
2.250	0.0586	0.36	Q	.	.	.	.
2.333	0.0612	0.37	Q	.	.	.	.
2.417	0.0637	0.37	QV	.	.	.	.
2.500	0.0662	0.37	QV	.	.	.	.
2.583	0.0688	0.37	QV	.	.	.	.
2.667	0.0713	0.37	QV	.	.	.	.
2.750	0.0739	0.37	QV	.	.	.	.
2.833	0.0765	0.37	QV	.	.	.	.
2.917	0.0790	0.38	QV	.	.	.	.
3.000	0.0816	0.38	QV	.	.	.	.
3.083	0.0842	0.38	QV	.	.	.	.
3.167	0.0869	0.38	QV	.	.	.	.
3.250	0.0895	0.38	QV	.	.	.	.
3.333	0.0921	0.38	QV	.	.	.	.
3.417	0.0948	0.39	QV	.	.	.	.
3.500	0.0975	0.39	QV	.	.	.	.
3.583	0.1001	0.39	QV	.	.	.	.
3.667	0.1028	0.39	QV	.	.	.	.
3.750	0.1055	0.39	QV	.	.	.	.
3.833	0.1082	0.39	QV	.	.	.	.
3.917	0.1109	0.40	QV	.	.	.	.
4.000	0.1137	0.40	QV	.	.	.	.
4.083	0.1164	0.40	QV	.	.	.	.
4.167	0.1192	0.40	QV	.	.	.	.
4.250	0.1220	0.40	QV	.	.	.	.

4.333	0.1247	0.40	Q V	.	.	.	.
4.417	0.1275	0.41	Q V	.	.	.	.
4.500	0.1304	0.41	Q V	.	.	.	.
4.583	0.1332	0.41	Q V	.	.	.	.
4.667	0.1360	0.41	Q V	.	.	.	.
4.750	0.1389	0.41	Q V	.	.	.	.
4.833	0.1417	0.42	Q V	.	.	.	.
4.917	0.1446	0.42	Q V	.	.	.	.
5.000	0.1475	0.42	Q V	.	.	.	.
5.083	0.1504	0.42	Q V	.	.	.	.
5.167	0.1533	0.42	Q V	.	.	.	.
5.250	0.1563	0.43	Q V	.	.	.	.
5.333	0.1592	0.43	Q V	.	.	.	.
5.417	0.1622	0.43	Q V	.	.	.	.
5.500	0.1652	0.43	Q V	.	.	.	.
5.583	0.1682	0.44	Q V	.	.	.	.
5.667	0.1712	0.44	Q V	.	.	.	.
5.750	0.1742	0.44	Q V	.	.	.	.
5.833	0.1772	0.44	Q V	.	.	.	.
5.917	0.1803	0.44	Q V	.	.	.	.
6.000	0.1834	0.45	Q V	.	.	.	.
6.083	0.1865	0.45	Q V	.	.	.	.
6.167	0.1896	0.45	Q V	.	.	.	.
6.250	0.1927	0.45	Q V	.	.	.	.
6.333	0.1959	0.46	Q V	.	.	.	.
6.417	0.1990	0.46	Q V	.	.	.	.
6.500	0.2022	0.46	Q V	.	.	.	.
6.583	0.2054	0.46	Q V	.	.	.	.
6.667	0.2086	0.47	Q V	.	.	.	.
6.750	0.2118	0.47	Q V	.	.	.	.
6.833	0.2151	0.47	Q V	.	.	.	.
6.917	0.2184	0.48	Q V	.	.	.	.
7.000	0.2217	0.48	Q V	.	.	.	.
7.083	0.2250	0.48	Q V	.	.	.	.
7.167	0.2283	0.48	Q V	.	.	.	.
7.250	0.2316	0.49	Q V	.	.	.	.
7.333	0.2350	0.49	Q V	.	.	.	.
7.417	0.2384	0.49	Q V	.	.	.	.
7.500	0.2418	0.50	Q V	.	.	.	.
7.583	0.2453	0.50	Q V	.	.	.	.
7.667	0.2487	0.50	Q V	.	.	.	.
7.750	0.2522	0.51	Q V	.	.	.	.
7.833	0.2557	0.51	Q V	.	.	.	.
7.917	0.2592	0.51	Q V	.	.	.	.
8.000	0.2628	0.52	Q V	.	.	.	.
8.083	0.2663	0.52	Q V	.	.	.	.
8.167	0.2699	0.52	Q V	.	.	.	.
8.250	0.2736	0.53	Q V	.	.	.	.
8.333	0.2772	0.53	Q V	.	.	.	.
8.417	0.2809	0.53	Q V	.	.	.	.

8.500	0.2846	0.54	Q	V	.	.	.	.
8.583	0.2883	0.54	Q	V	.	.	.	.
8.667	0.2921	0.54	Q	V	.	.	.	.
8.750	0.2958	0.55	Q	V	.	.	.	.
8.833	0.2996	0.55	Q	V	.	.	.	.
8.917	0.3035	0.56	Q	V	.	.	.	.
9.000	0.3073	0.56	Q	V	.	.	.	.
9.083	0.3112	0.57	Q	V	.	.	.	.
9.167	0.3152	0.57	Q	V	.	.	.	.
9.250	0.3191	0.57	Q	V	.	.	.	.
9.333	0.3231	0.58	Q	V	.	.	.	.
9.417	0.3271	0.58	Q	V	.	.	.	.
9.500	0.3312	0.59	Q	V	.	.	.	.
9.583	0.3353	0.59	Q	V	.	.	.	.
9.667	0.3394	0.60	Q	V	.	.	.	.
9.750	0.3435	0.60	Q	V	.	.	.	.
9.833	0.3477	0.61	Q	V	.	.	.	.
9.917	0.3519	0.61	Q	V	.	.	.	.
10.000	0.3562	0.62	Q	V	.	.	.	.
10.083	0.3605	0.62	Q	V	.	.	.	.
10.167	0.3648	0.63	Q	V	.	.	.	.
10.250	0.3692	0.64	Q	V	.	.	.	.
10.333	0.3736	0.64	Q	V	.	.	.	.
10.417	0.3781	0.65	Q	V	.	.	.	.
10.500	0.3826	0.65	Q	V	.	.	.	.
10.583	0.3871	0.66	Q	V	.	.	.	.
10.667	0.3917	0.67	Q	V	.	.	.	.
10.750	0.3963	0.67	Q	V	.	.	.	.
10.833	0.4010	0.68	Q	V	.	.	.	.
10.917	0.4058	0.69	Q	V	.	.	.	.
11.000	0.4105	0.69	Q	V	.	.	.	.
11.083	0.4154	0.70	Q	V	.	.	.	.
11.167	0.4202	0.71	Q	V	.	.	.	.
11.250	0.4252	0.72	Q	V	.	.	.	.
11.333	0.4302	0.72	Q	V	.	.	.	.
11.417	0.4352	0.73	Q	V	.	.	.	.
11.500	0.4403	0.74	Q	V	.	.	.	.
11.583	0.4455	0.75	Q	V	.	.	.	.
11.667	0.4507	0.76	Q	V	.	.	.	.
11.750	0.4560	0.77	Q	V	.	.	.	.
11.833	0.4613	0.78	Q	V	.	.	.	.
11.917	0.4668	0.79	Q	V	.	.	.	.
12.000	0.4723	0.80	Q	V	.	.	.	.
12.083	0.4778	0.81	Q	V	.	.	.	.
12.167	0.4834	0.82	Q	V	.	.	.	.
12.250	0.4891	0.82	Q	V	.	.	.	.
12.333	0.4948	0.83	Q	V	.	.	.	.
12.417	0.5006	0.84	Q	V	.	.	.	.
12.500	0.5064	0.85	Q	V	.	.	.	.
12.583	0.5124	0.86	Q	V	.	.	.	.

12.667	0.5184	0.88	Q V . . . .
12.750	0.5245	0.89	Q V . . . .
12.833	0.5307	0.90	Q V . . . .
12.917	0.5371	0.92	Q V . . . .
13.000	0.5435	0.93	Q V . . . .
13.083	0.5500	0.95	Q V . . . .
13.167	0.5567	0.97	Q V . . . .
13.250	0.5635	0.98	Q V. . . .
13.333	0.5704	1.00	Q V. . . .
13.417	0.5774	1.02	Q V. . . .
13.500	0.5846	1.04	Q V. . . .
13.583	0.5920	1.06	Q V. . . .
13.667	0.5994	1.09	Q V. . . .
13.750	0.6071	1.11	Q V. . . .
13.833	0.6149	1.14	Q V. . . .
13.917	0.6229	1.16	Q V . . .
14.000	0.6311	1.19	Q V . . .
14.083	0.6395	1.22	Q V . . .
14.167	0.6482	1.26	.Q V . . .
14.250	0.6572	1.30	.Q V . . .
14.333	0.6665	1.35	.Q V . . .
14.417	0.6761	1.39	.Q V . . .
14.500	0.6859	1.44	.Q .V . . .
14.583	0.6962	1.48	.Q .V . . .
14.667	0.7067	1.53	.Q .V . . .
14.750	0.7177	1.59	.Q .V . . .
14.833	0.7290	1.65	.Q .V . . .
14.917	0.7408	1.71	.Q .V . . .
15.000	0.7531	1.79	.Q . V . . .
15.083	0.7660	1.87	.Q . V . . .
15.167	0.7795	1.96	.Q . V . . .
15.250	0.7938	2.07	.Q . V . . .
15.333	0.8089	2.19	.Q . V . . .
15.417	0.8250	2.35	.Q . V . . .
15.500	0.8431	2.62	. Q . V . . .
15.583	0.8637	3.00	. Q . V . . .
15.667	0.8873	3.42	. Q . V . . .
15.750	0.9135	3.81	. Q . V . . .
15.833	0.9427	4.24	. Q . V . . .
15.917	0.9770	4.98	. Q . V . . .
16.000	1.0258	7.08	. Q . V . . .
16.083	1.1200	13.67	. Q V . . .
16.167	1.3212	29.22	. . .V Q . .
16.250	1.5974	40.10	. . . V . Q .
16.333	1.8280	33.48	. . . Q V. .
16.417	1.9492	17.60	. . Q . .V .
16.500	2.0113	9.02	. Q . . . V .
16.583	2.0442	4.77	. Q . . . V .
16.667	2.0681	3.47	. Q . . . V .
16.750	2.0867	2.70	. Q . . . V .

16.833	2.1021	2.23	.Q	.	.	.	V	.
16.917	2.1152	1.90	.Q	.	.	.	V	.
17.000	2.1268	1.69	.Q	.	.	.	V	.
17.083	2.1375	1.56	.Q	.	.	.	V	.
17.167	2.1475	1.45	.Q	.	.	.	V	.
17.250	2.1568	1.35	.Q	.	.	.	V	.
17.333	2.1655	1.27	.Q	.	.	.	V	.
17.417	2.1738	1.20	Q	.	.	.	V	.
17.500	2.1817	1.15	Q	.	.	.	V	.
17.583	2.1893	1.09	Q	.	.	.	V	.
17.667	2.1965	1.05	Q	.	.	.	V	.
17.750	2.2034	1.01	Q	.	.	.	V	.
17.833	2.2101	0.97	Q	.	.	.	V	.
17.917	2.2166	0.94	Q	.	.	.	V	.
18.000	2.2228	0.91	Q	.	.	.	V	.
18.083	2.2289	0.88	Q	.	.	.	V	.
18.167	2.2348	0.86	Q	.	.	.	V	.
18.250	2.2405	0.84	Q	.	.	.	V	.
18.333	2.2462	0.82	Q	.	.	.	V	.
18.417	2.2517	0.80	Q	.	.	.	V	.
18.500	2.2570	0.78	Q	.	.	.	V	.
18.583	2.2623	0.76	Q	.	.	.	V	.
18.667	2.2674	0.74	Q	.	.	.	V	.
18.750	2.2724	0.73	Q	.	.	.	V	.
18.833	2.2773	0.71	Q	.	.	.	V	.
18.917	2.2821	0.70	Q	.	.	.	V	.
19.000	2.2867	0.68	Q	.	.	.	V	.
19.083	2.2913	0.67	Q	.	.	.	V	.
19.167	2.2959	0.65	Q	.	.	.	V	.
19.250	2.3003	0.64	Q	.	.	.	V	.
19.333	2.3046	0.63	Q	.	.	.	V	.
19.417	2.3089	0.62	Q	.	.	.	V	.
19.500	2.3131	0.61	Q	.	.	.	V	.
19.583	2.3172	0.60	Q	.	.	.	V	.
19.667	2.3213	0.59	Q	.	.	.	V	.
19.750	2.3253	0.58	Q	.	.	.	V	.
19.833	2.3292	0.57	Q	.	.	.	V	.
19.917	2.3331	0.56	Q	.	.	.	V	.
20.000	2.3369	0.55	Q	.	.	.	V	.
20.083	2.3406	0.55	Q	.	.	.	V	.
20.167	2.3443	0.54	Q	.	.	.	V	.
20.250	2.3480	0.53	Q	.	.	.	V	.
20.333	2.3516	0.52	Q	.	.	.	V	.
20.417	2.3551	0.52	Q	.	.	.	V	.
20.500	2.3586	0.51	Q	.	.	.	V	.
20.583	2.3621	0.50	Q	.	.	.	V	.
20.667	2.3655	0.50	Q	.	.	.	V	.
20.750	2.3689	0.49	Q	.	.	.	V	.
20.833	2.3722	0.48	Q	.	.	.	V	.
20.917	2.3755	0.48	Q	.	.	.	V	.

```
   21.000      2.3788      0.47  Q         .         .         .       V .
   21.083      2.3820      0.47  Q         .         .         .       V .
   21.167      2.3852      0.46  Q         .         .         .       V .
   21.250      2.3883      0.46  Q         .         .         .       V .
   21.333      2.3914      0.45  Q         .         .         .       V .
   21.417      2.3945      0.45  Q         .         .         .       V .
   21.500      2.3976      0.44  Q         .         .         .       V .
   21.583      2.4006      0.44  Q         .         .         .       V .
   21.667      2.4036      0.43  Q         .         .         .       V .
   21.750      2.4065      0.43  Q         .         .         .       V .
   21.833      2.4094      0.42  Q         .         .         .       V .
   21.917      2.4123      0.42  Q         .         .         .       V .
   22.000      2.4152      0.42  Q         .         .         .       V .
   22.083      2.4180      0.41  Q         .         .         .       V .
   22.167      2.4209      0.41  Q         .         .         .       V .
   22.250      2.4236      0.40  Q         .         .         .        V.
   22.333      2.4264      0.40  Q         .         .         .        V.
   22.417      2.4291      0.40  Q         .         .         .        V.
   22.500      2.4318      0.39  Q         .         .         .        V.
   22.583      2.4345      0.39  Q         .         .         .        V.
   22.667      2.4372      0.39  Q         .         .         .        V.
   22.750      2.4398      0.38  Q         .         .         .        V.
   22.833      2.4425      0.38  Q         .         .         .        V.
   22.917      2.4451      0.38  Q         .         .         .        V.
   23.000      2.4476      0.37  Q         .         .         .        V.
   23.083      2.4502      0.37  Q         .         .         .        V.
   23.167      2.4527      0.37  Q         .         .         .        V.
   23.250      2.4553      0.37  Q         .         .         .        V.
   23.333      2.4577      0.36  Q         .         .         .        V.
   23.417      2.4602      0.36  Q         .         .         .        V.
   23.500      2.4627      0.36  Q         .         .         .        V.
   23.583      2.4651      0.35  Q         .         .         .        V.
   23.667      2.4675      0.35  Q         .         .         .        V.
   23.750      2.4699      0.35  Q         .         .         .        V.
   23.833      2.4723      0.35  Q         .         .         .        V.
   23.917      2.4747      0.34  Q         .         .         .        V.
   24.000      2.4770      0.34  Q         .         .         .        V.
   24.083      2.4793      0.33  Q         .         .         .        V.
   24.167      2.4811      0.27  Q         .         .         .        V.
   24.250      2.4822      0.16  Q         .         .         .        V.
   24.333      2.4827      0.07  Q         .         .         .        V.
   24.417      2.4829      0.02  Q         .         .         .        V.
   24.500      2.4829      0.01  Q         .         .         .        V.
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
```

```
   ========================                  =========
             0%                               1470.0
            10%                                 50.0
            20%                                 30.0
            30%                                 25.0
            40%                                 20.0
            50%                                 15.0
            60%                                 15.0
            70%                                 15.0
            80%                                 10.0
            90%                                  5.0


****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      11.200 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.234 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.416
         LOW LOSS FRACTION = 0.657
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.35
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.70
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.93
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.35
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.70
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.72

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  35.613
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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	2.400	3.250
2	15.548	17.810
3	40.030	33.161
4	68.358	38.370
5	85.922	23.791
6	94.030	10.982
7	97.553	4.772
8	98.602	1.421
9	99.262	0.894
10	99.705	0.600
11	99.926	0.300
12	100.000	0.100

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0032	0.0021	0.0011
2	0.0032	0.0021	0.0011
3	0.0032	0.0021	0.0011
4	0.0032	0.0021	0.0011
5	0.0033	0.0021	0.0011
6	0.0033	0.0021	0.0011
7	0.0033	0.0022	0.0011
8	0.0033	0.0022	0.0011
9	0.0033	0.0022	0.0011
10	0.0033	0.0022	0.0011
11	0.0033	0.0022	0.0011
12	0.0033	0.0022	0.0011
13	0.0033	0.0022	0.0011
14	0.0034	0.0022	0.0012
15	0.0034	0.0022	0.0012
16	0.0034	0.0022	0.0012
17	0.0034	0.0022	0.0012
18	0.0034	0.0022	0.0012
19	0.0034	0.0022	0.0012
20	0.0034	0.0023	0.0012
21	0.0034	0.0023	0.0012

22	0.0035	0.0023	0.0012
23	0.0035	0.0023	0.0012
24	0.0035	0.0023	0.0012
25	0.0035	0.0023	0.0012
26	0.0035	0.0023	0.0012
27	0.0035	0.0023	0.0012
28	0.0035	0.0023	0.0012
29	0.0036	0.0023	0.0012
30	0.0036	0.0023	0.0012
31	0.0036	0.0024	0.0012
32	0.0036	0.0024	0.0012
33	0.0036	0.0024	0.0012
34	0.0036	0.0024	0.0012
35	0.0036	0.0024	0.0013
36	0.0037	0.0024	0.0013
37	0.0037	0.0024	0.0013
38	0.0037	0.0024	0.0013
39	0.0037	0.0024	0.0013
40	0.0037	0.0024	0.0013
41	0.0037	0.0025	0.0013
42	0.0038	0.0025	0.0013
43	0.0038	0.0025	0.0013
44	0.0038	0.0025	0.0013
45	0.0038	0.0025	0.0013
46	0.0038	0.0025	0.0013
47	0.0038	0.0025	0.0013
48	0.0039	0.0025	0.0013
49	0.0039	0.0025	0.0013
50	0.0039	0.0026	0.0013
51	0.0039	0.0026	0.0013
52	0.0039	0.0026	0.0013
53	0.0040	0.0026	0.0014
54	0.0040	0.0026	0.0014
55	0.0040	0.0026	0.0014
56	0.0040	0.0026	0.0014
57	0.0040	0.0026	0.0014
58	0.0040	0.0027	0.0014
59	0.0041	0.0027	0.0014
60	0.0041	0.0027	0.0014
61	0.0041	0.0027	0.0014
62	0.0041	0.0027	0.0014
63	0.0042	0.0027	0.0014
64	0.0042	0.0027	0.0014
65	0.0042	0.0028	0.0014
66	0.0042	0.0028	0.0014
67	0.0042	0.0028	0.0015
68	0.0043	0.0028	0.0015
69	0.0043	0.0028	0.0015
70	0.0043	0.0028	0.0015
71	0.0043	0.0028	0.0015

72	0.0043	0.0029	0.0015
73	0.0044	0.0029	0.0015
74	0.0044	0.0029	0.0015
75	0.0044	0.0029	0.0015
76	0.0044	0.0029	0.0015
77	0.0045	0.0029	0.0015
78	0.0045	0.0030	0.0015
79	0.0045	0.0030	0.0016
80	0.0045	0.0030	0.0016
81	0.0046	0.0030	0.0016
82	0.0046	0.0030	0.0016
83	0.0046	0.0030	0.0016
84	0.0047	0.0031	0.0016
85	0.0047	0.0031	0.0016
86	0.0047	0.0031	0.0016
87	0.0048	0.0031	0.0016
88	0.0048	0.0031	0.0016
89	0.0048	0.0032	0.0017
90	0.0048	0.0032	0.0017
91	0.0049	0.0032	0.0017
92	0.0049	0.0032	0.0017
93	0.0049	0.0032	0.0017
94	0.0050	0.0033	0.0017
95	0.0050	0.0033	0.0017
96	0.0050	0.0033	0.0017
97	0.0051	0.0033	0.0017
98	0.0051	0.0033	0.0017
99	0.0051	0.0034	0.0018
100	0.0052	0.0034	0.0018
101	0.0052	0.0034	0.0018
102	0.0052	0.0034	0.0018
103	0.0053	0.0035	0.0018
104	0.0053	0.0035	0.0018
105	0.0054	0.0035	0.0018
106	0.0054	0.0035	0.0019
107	0.0055	0.0036	0.0019
108	0.0055	0.0036	0.0019
109	0.0055	0.0036	0.0019
110	0.0056	0.0037	0.0019
111	0.0056	0.0037	0.0019
112	0.0057	0.0037	0.0019
113	0.0057	0.0038	0.0020
114	0.0058	0.0038	0.0020
115	0.0058	0.0038	0.0020
116	0.0059	0.0038	0.0020
117	0.0059	0.0039	0.0020
118	0.0060	0.0039	0.0020
119	0.0060	0.0040	0.0021
120	0.0061	0.0040	0.0021
121	0.0061	0.0040	0.0021

122	0.0062	0.0041	0.0021
123	0.0063	0.0041	0.0021
124	0.0063	0.0041	0.0022
125	0.0064	0.0042	0.0022
126	0.0064	0.0042	0.0022
127	0.0065	0.0043	0.0022
128	0.0066	0.0043	0.0022
129	0.0066	0.0044	0.0023
130	0.0067	0.0044	0.0023
131	0.0068	0.0045	0.0023
132	0.0068	0.0045	0.0023
133	0.0069	0.0046	0.0024
134	0.0070	0.0046	0.0024
135	0.0071	0.0047	0.0024
136	0.0071	0.0047	0.0025
137	0.0073	0.0048	0.0025
138	0.0073	0.0048	0.0025
139	0.0074	0.0049	0.0026
140	0.0075	0.0049	0.0026
141	0.0076	0.0050	0.0026
142	0.0077	0.0051	0.0026
143	0.0078	0.0051	0.0027
144	0.0079	0.0052	0.0027
145	0.0079	0.0052	0.0027
146	0.0080	0.0052	0.0027
147	0.0081	0.0053	0.0028
148	0.0082	0.0054	0.0028
149	0.0084	0.0055	0.0029
150	0.0085	0.0056	0.0029
151	0.0086	0.0057	0.0030
152	0.0087	0.0057	0.0030
153	0.0089	0.0059	0.0031
154	0.0090	0.0059	0.0031
155	0.0092	0.0061	0.0032
156	0.0093	0.0061	0.0032
157	0.0096	0.0063	0.0033
158	0.0097	0.0064	0.0033
159	0.0100	0.0065	0.0034
160	0.0101	0.0066	0.0035
161	0.0104	0.0068	0.0036
162	0.0105	0.0069	0.0036
163	0.0108	0.0071	0.0037
164	0.0110	0.0072	0.0038
165	0.0113	0.0075	0.0039
166	0.0115	0.0076	0.0040
167	0.0119	0.0078	0.0041
168	0.0121	0.0080	0.0042
169	0.0129	0.0084	0.0044
170	0.0131	0.0086	0.0045
171	0.0136	0.0090	0.0047

172	0.0139	0.0091	0.0048
173	0.0145	0.0095	0.0050
174	0.0149	0.0098	0.0051
175	0.0156	0.0102	0.0053
176	0.0160	0.0105	0.0055
177	0.0169	0.0111	0.0058
178	0.0174	0.0114	0.0060
179	0.0185	0.0121	0.0063
180	0.0191	0.0125	0.0065
181	0.0205	0.0135	0.0070
182	0.0213	0.0140	0.0073
183	0.0232	0.0153	0.0080
184	0.0243	0.0160	0.0084
185	0.0326	0.0214	0.0112
186	0.0344	0.0226	0.0118
187	0.0389	0.0256	0.0133
188	0.0420	0.0276	0.0144
189	0.0476	0.0313	0.0163
190	0.0539	0.0347	0.0193
191	0.0776	0.0347	0.0430
192	0.1077	0.0347	0.0730
193	0.3498	0.0347	0.3152
194	0.0630	0.0347	0.0283
195	0.0456	0.0300	0.0156
196	0.0364	0.0239	0.0125
197	0.0256	0.0168	0.0088
198	0.0222	0.0146	0.0076
199	0.0198	0.0130	0.0068
200	0.0179	0.0118	0.0061
201	0.0164	0.0108	0.0056
202	0.0152	0.0100	0.0052
203	0.0142	0.0093	0.0049
204	0.0134	0.0088	0.0046
205	0.0124	0.0081	0.0042
206	0.0117	0.0077	0.0040
207	0.0112	0.0073	0.0038
208	0.0107	0.0070	0.0037
209	0.0102	0.0067	0.0035
210	0.0098	0.0065	0.0034
211	0.0095	0.0062	0.0032
212	0.0091	0.0060	0.0031
213	0.0088	0.0058	0.0030
214	0.0085	0.0056	0.0029
215	0.0083	0.0054	0.0028
216	0.0080	0.0053	0.0028
217	0.0080	0.0052	0.0027
218	0.0078	0.0051	0.0027
219	0.0076	0.0050	0.0026
220	0.0074	0.0048	0.0025
221	0.0072	0.0047	0.0025

222	0.0070	0.0046	0.0024
223	0.0069	0.0045	0.0024
224	0.0067	0.0044	0.0023
225	0.0066	0.0043	0.0023
226	0.0065	0.0042	0.0022
227	0.0063	0.0042	0.0022
228	0.0062	0.0041	0.0021
229	0.0061	0.0040	0.0021
230	0.0060	0.0039	0.0021
231	0.0059	0.0039	0.0020
232	0.0058	0.0038	0.0020
233	0.0057	0.0037	0.0020
234	0.0056	0.0037	0.0019
235	0.0055	0.0036	0.0019
236	0.0054	0.0036	0.0019
237	0.0053	0.0035	0.0018
238	0.0053	0.0035	0.0018
239	0.0052	0.0034	0.0018
240	0.0051	0.0034	0.0018
241	0.0051	0.0033	0.0017
242	0.0050	0.0033	0.0017
243	0.0049	0.0032	0.0017
244	0.0049	0.0032	0.0017
245	0.0048	0.0031	0.0016
246	0.0047	0.0031	0.0016
247	0.0047	0.0031	0.0016
248	0.0046	0.0030	0.0016
249	0.0046	0.0030	0.0016
250	0.0045	0.0030	0.0015
251	0.0045	0.0029	0.0015
252	0.0044	0.0029	0.0015
253	0.0044	0.0029	0.0015
254	0.0043	0.0028	0.0015
255	0.0043	0.0028	0.0015
256	0.0042	0.0028	0.0014
257	0.0042	0.0027	0.0014
258	0.0041	0.0027	0.0014
259	0.0041	0.0027	0.0014
260	0.0041	0.0027	0.0014
261	0.0040	0.0026	0.0014
262	0.0040	0.0026	0.0014
263	0.0039	0.0026	0.0014
264	0.0039	0.0026	0.0013
265	0.0039	0.0025	0.0013
266	0.0038	0.0025	0.0013
267	0.0038	0.0025	0.0013
268	0.0038	0.0025	0.0013
269	0.0037	0.0025	0.0013
270	0.0037	0.0024	0.0013
271	0.0037	0.0024	0.0013

272	0.0036	0.0024	0.0012
273	0.0036	0.0024	0.0012
274	0.0036	0.0024	0.0012
275	0.0035	0.0023	0.0012
276	0.0035	0.0023	0.0012
277	0.0035	0.0023	0.0012
278	0.0035	0.0023	0.0012
279	0.0034	0.0023	0.0012
280	0.0034	0.0022	0.0012
281	0.0034	0.0022	0.0012
282	0.0034	0.0022	0.0012
283	0.0033	0.0022	0.0011
284	0.0033	0.0022	0.0011
285	0.0033	0.0022	0.0011
286	0.0033	0.0021	0.0011
287	0.0032	0.0021	0.0011
288	0.0032	0.0021	0.0011

TOTAL STORM RAINFALL(INCHES) = 2.72
TOTAL SOIL-LOSS(INCHES) = 1.53
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.19

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.4298
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.1082

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2 4 - 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

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0002	0.02	Q	.	.	.	.
0.250	0.0006	0.06	Q	.	.	.	.
0.333	0.0013	0.10	Q	.	.	.	.
0.417	0.0022	0.13	Q	.	.	.	.
0.500	0.0032	0.14	Q	.	.	.	.
0.583	0.0042	0.15	Q	.	.	.	.
0.667	0.0052	0.15	Q	.	.	.	.
0.750	0.0062	0.15	Q	.	.	.	.
0.833	0.0073	0.15	Q	.	.	.	.
0.917	0.0083	0.15	Q	.	.	.	.
1.000	0.0094	0.15	Q	.	.	.	.

1.083	0.0104	0.15	Q	.	.	.	.
1.167	0.0115	0.15	Q	.	.	.	.
1.250	0.0126	0.15	Q	.	.	.	.
1.333	0.0136	0.16	Q	.	.	.	.
1.417	0.0147	0.16	Q	.	.	.	.
1.500	0.0158	0.16	Q	.	.	.	.
1.583	0.0169	0.16	Q	.	.	.	.
1.667	0.0180	0.16	Q	.	.	.	.
1.750	0.0190	0.16	Q	.	.	.	.
1.833	0.0201	0.16	Q	.	.	.	.
1.917	0.0212	0.16	Q	.	.	.	.
2.000	0.0223	0.16	Q	.	.	.	.
2.083	0.0234	0.16	Q	.	.	.	.
2.167	0.0246	0.16	Q	.	.	.	.
2.250	0.0257	0.16	Q	.	.	.	.
2.333	0.0268	0.16	Q	.	.	.	.
2.417	0.0279	0.16	QV	.	.	.	.
2.500	0.0290	0.16	QV	.	.	.	.
2.583	0.0302	0.16	QV	.	.	.	.
2.667	0.0313	0.17	QV	.	.	.	.
2.750	0.0325	0.17	QV	.	.	.	.
2.833	0.0336	0.17	QV	.	.	.	.
2.917	0.0348	0.17	QV	.	.	.	.
3.000	0.0359	0.17	QV	.	.	.	.
3.083	0.0371	0.17	QV	.	.	.	.
3.167	0.0382	0.17	QV	.	.	.	.
3.250	0.0394	0.17	QV	.	.	.	.
3.333	0.0406	0.17	QV	.	.	.	.
3.417	0.0418	0.17	QV	.	.	.	.
3.500	0.0430	0.17	QV	.	.	.	.
3.583	0.0441	0.17	QV	.	.	.	.
3.667	0.0453	0.17	QV	.	.	.	.
3.750	0.0465	0.17	QV	.	.	.	.
3.833	0.0478	0.18	QV	.	.	.	.
3.917	0.0490	0.18	QV	.	.	.	.
4.000	0.0502	0.18	QV	.	.	.	.
4.083	0.0514	0.18	QV	.	.	.	.
4.167	0.0526	0.18	QV	.	.	.	.
4.250	0.0539	0.18	QV	.	.	.	.
4.333	0.0551	0.18	QV	.	.	.	.
4.417	0.0564	0.18	Q V	.	.	.	.
4.500	0.0576	0.18	Q V	.	.	.	.
4.583	0.0589	0.18	Q V	.	.	.	.
4.667	0.0601	0.18	Q V	.	.	.	.
4.750	0.0614	0.18	Q V	.	.	.	.
4.833	0.0627	0.19	Q V	.	.	.	.
4.917	0.0640	0.19	Q V	.	.	.	.
5.000	0.0652	0.19	Q V	.	.	.	.
5.083	0.0665	0.19	Q V	.	.	.	.
5.167	0.0678	0.19	Q V	.	.	.	.

5.250	0.0691	0.19	Q V	.	.	.	.
5.333	0.0705	0.19	Q V	.	.	.	.
5.417	0.0718	0.19	Q V	.	.	.	.
5.500	0.0731	0.19	Q V	.	.	.	.
5.583	0.0744	0.19	Q V	.	.	.	.
5.667	0.0758	0.19	Q V	.	.	.	.
5.750	0.0771	0.20	Q V	.	.	.	.
5.833	0.0785	0.20	Q V	.	.	.	.
5.917	0.0798	0.20	Q V	.	.	.	.
6.000	0.0812	0.20	Q V	.	.	.	.
6.083	0.0826	0.20	Q V	.	.	.	.
6.167	0.0840	0.20	Q V	.	.	.	.
6.250	0.0854	0.20	Q V	.	.	.	.
6.333	0.0868	0.20	Q V	.	.	.	.
6.417	0.0882	0.20	Q V	.	.	.	.
6.500	0.0896	0.21	Q V	.	.	.	.
6.583	0.0910	0.21	Q V	.	.	.	.
6.667	0.0924	0.21	Q V	.	.	.	.
6.750	0.0939	0.21	Q V	.	.	.	.
6.833	0.0953	0.21	Q V	.	.	.	.
6.917	0.0968	0.21	Q V	.	.	.	.
7.000	0.0983	0.21	Q V	.	.	.	.
7.083	0.0997	0.21	Q V	.	.	.	.
7.167	0.1012	0.22	Q V	.	.	.	.
7.250	0.1027	0.22	Q V	.	.	.	.
7.333	0.1042	0.22	Q V	.	.	.	.
7.417	0.1057	0.22	Q V	.	.	.	.
7.500	0.1072	0.22	Q V	.	.	.	.
7.583	0.1088	0.22	Q V	.	.	.	.
7.667	0.1103	0.22	Q V	.	.	.	.
7.750	0.1118	0.22	Q V	.	.	.	.
7.833	0.1134	0.23	Q V	.	.	.	.
7.917	0.1150	0.23	Q V	.	.	.	.
8.000	0.1166	0.23	Q V	.	.	.	.
8.083	0.1181	0.23	Q V	.	.	.	.
8.167	0.1197	0.23	Q V	.	.	.	.
8.250	0.1214	0.23	Q V	.	.	.	.
8.333	0.1230	0.24	Q V	.	.	.	.
8.417	0.1246	0.24	Q V	.	.	.	.
8.500	0.1263	0.24	Q V	.	.	.	.
8.583	0.1279	0.24	Q V	.	.	.	.
8.667	0.1296	0.24	Q V	.	.	.	.
8.750	0.1313	0.24	Q V	.	.	.	.
8.833	0.1330	0.25	Q V	.	.	.	.
8.917	0.1347	0.25	Q V	.	.	.	.
9.000	0.1364	0.25	Q V	.	.	.	.
9.083	0.1381	0.25	Q V	.	.	.	.
9.167	0.1399	0.25	Q V	.	.	.	.
9.250	0.1416	0.26	Q V	.	.	.	.
9.333	0.1434	0.26	Q V	.	.	.	.

9.417	0.1452	0.26	Q	V	.	.	.	.
9.500	0.1470	0.26	Q	V	.	.	.	.
9.583	0.1488	0.26	Q	V	.	.	.	.
9.667	0.1506	0.27	Q	V	.	.	.	.
9.750	0.1525	0.27	Q	V	.	.	.	.
9.833	0.1543	0.27	Q	V	.	.	.	.
9.917	0.1562	0.27	Q	V	.	.	.	.
10.000	0.1581	0.27	Q	V	.	.	.	.
10.083	0.1600	0.28	Q	V	.	.	.	.
10.167	0.1619	0.28	Q	V	.	.	.	.
10.250	0.1639	0.28	Q	V	.	.	.	.
10.333	0.1658	0.29	Q	V	.	.	.	.
10.417	0.1678	0.29	Q	V	.	.	.	.
10.500	0.1698	0.29	Q	V	.	.	.	.
10.583	0.1718	0.29	Q	V	.	.	.	.
10.667	0.1739	0.30	Q	V	.	.	.	.
10.750	0.1759	0.30	Q	V	.	.	.	.
10.833	0.1780	0.30	Q	V	.	.	.	.
10.917	0.1801	0.31	Q	V	.	.	.	.
11.000	0.1822	0.31	Q	V	.	.	.	.
11.083	0.1844	0.31	Q	V	.	.	.	.
11.167	0.1866	0.31	Q	V	.	.	.	.
11.250	0.1887	0.32	Q	V	.	.	.	.
11.333	0.1910	0.32	Q	V	.	.	.	.
11.417	0.1932	0.33	Q	V	.	.	.	.
11.500	0.1955	0.33	Q	V	.	.	.	.
11.583	0.1978	0.33	Q	V	.	.	.	.
11.667	0.2001	0.34	Q	V	.	.	.	.
11.750	0.2024	0.34	Q	V	.	.	.	.
11.833	0.2048	0.34	Q	V	.	.	.	.
11.917	0.2072	0.35	Q	V	.	.	.	.
12.000	0.2096	0.35	Q	V	.	.	.	.
12.083	0.2121	0.36	Q	V	.	.	.	.
12.167	0.2146	0.36	Q	V	.	.	.	.
12.250	0.2171	0.37	Q	V	.	.	.	.
12.333	0.2197	0.37	Q	V	.	.	.	.
12.417	0.2222	0.37	Q	V	.	.	.	.
12.500	0.2248	0.38	Q	V	.	.	.	.
12.583	0.2274	0.38	Q	V	.	.	.	.
12.667	0.2301	0.39	Q	V	.	.	.	.
12.750	0.2328	0.39	Q	V	.	.	.	.
12.833	0.2356	0.40	Q	V	.	.	.	.
12.917	0.2384	0.41	Q	V	.	.	.	.
13.000	0.2412	0.41	Q	V	.	.	.	.
13.083	0.2441	0.42	Q	V	.	.	.	.
13.167	0.2471	0.43	Q	V	.	.	.	.
13.250	0.2501	0.44	Q	V	.	.	.	.
13.333	0.2531	0.44	Q	V	.	.	.	.
13.417	0.2563	0.45	Q	V	.	.	.	.
13.500	0.2594	0.46	Q	V	.	.	.	.

13.583	0.2627	0.47	Q V. . . .
13.667	0.2660	0.48	Q V. . . .
13.750	0.2694	0.49	Q V. . . .
13.833	0.2728	0.50	.Q V. . . .
13.917	0.2764	0.51	.Q V. . . .
14.000	0.2800	0.53	.Q V . . .
14.083	0.2837	0.54	.Q V . . .
14.167	0.2875	0.55	.Q V . . .
14.250	0.2915	0.57	.Q V . . .
14.333	0.2956	0.59	.Q V . . .
14.417	0.2998	0.61	.Q V . . .
14.500	0.3041	0.63	.Q V . . .
14.583	0.3086	0.65	.Q .V . . .
14.667	0.3132	0.67	.Q .V . . .
14.750	0.3180	0.70	.Q .V . . .
14.833	0.3230	0.72	.Q .V . . .
14.917	0.3282	0.75	.Q .V . . .
15.000	0.3336	0.78	.Q . V . . .
15.083	0.3392	0.82	.Q . V . . .
15.167	0.3451	0.86	.Q . V . . .
15.250	0.3513	0.90	.Q . V . . .
15.333	0.3579	0.95	.Q . V . . .
15.417	0.3649	1.02	. Q . V . . .
15.500	0.3727	1.12	. Q . V . . .
15.583	0.3814	1.27	. Q . V . . .
15.667	0.3914	1.45	. Q . V . . .
15.750	0.4025	1.62	. Q . V . . .
15.833	0.4150	1.81	. Q . V . . .
15.917	0.4295	2.10	. Q . V . . .
16.000	0.4491	2.84	. Q . V . . .
16.083	0.4844	5.13	. Q V . . .
16.167	0.5569	10.52	. . VQ . .
16.250	0.6613	15.16	. . . V Q .
16.333	0.7694	15.70	. . . V .Q .
16.417	0.8412	10.42	. . Q V .
16.500	0.8809	5.77	. .Q . .V .
16.583	0.9035	3.28	. Q . . . V .
16.667	0.9164	1.88	. Q . . . V .
16.750	0.9264	1.45	. Q . . . V .
16.833	0.9345	1.18	. Q . . . V .
16.917	0.9412	0.97	.Q . . . V .
17.000	0.9469	0.82	.Q . . . V .
17.083	0.9519	0.72	.Q . . . V .
17.167	0.9565	0.67	.Q . . . V .
17.250	0.9608	0.62	.Q . . . V .
17.333	0.9648	0.58	.Q . . . V .
17.417	0.9686	0.55	.Q . . . V .
17.500	0.9722	0.52	.Q . . . V .
17.583	0.9756	0.50	Q . . . V .
17.667	0.9789	0.48	Q . . . V .

17.750	0.9821	0.46	Q	.	.	.	V	.
17.833	0.9851	0.44	Q	.	.	.	V	.
17.917	0.9880	0.43	Q	.	.	.	V	.
18.000	0.9909	0.41	Q	.	.	.	V	.
18.083	0.9936	0.40	Q	.	.	.	V	.
18.167	0.9963	0.39	Q	.	.	.	V	.
18.250	0.9989	0.38	Q	.	.	.	V	.
18.333	1.0014	0.37	Q	.	.	.	V	.
18.417	1.0039	0.36	Q	.	.	.	V	.
18.500	1.0063	0.35	Q	.	.	.	V	.
18.583	1.0087	0.34	Q	.	.	.	V	.
18.667	1.0110	0.33	Q	.	.	.	V	.
18.750	1.0132	0.33	Q	.	.	.	V	.
18.833	1.0154	0.32	Q	.	.	.	V	.
18.917	1.0176	0.31	Q	.	.	.	V	.
19.000	1.0197	0.31	Q	.	.	.	V	.
19.083	1.0218	0.30	Q	.	.	.	V	.
19.167	1.0238	0.29	Q	.	.	.	V	.
19.250	1.0258	0.29	Q	.	.	.	V	.
19.333	1.0278	0.28	Q	.	.	.	V	.
19.417	1.0297	0.28	Q	.	.	.	V	.
19.500	1.0316	0.27	Q	.	.	.	V	.
19.583	1.0334	0.27	Q	.	.	.	V	.
19.667	1.0352	0.26	Q	.	.	.	V	.
19.750	1.0370	0.26	Q	.	.	.	V	.
19.833	1.0388	0.26	Q	.	.	.	V	.
19.917	1.0405	0.25	Q	.	.	.	V	.
20.000	1.0423	0.25	Q	.	.	.	V	.
20.083	1.0439	0.24	Q	.	.	.	V	.
20.167	1.0456	0.24	Q	.	.	.	V	.
20.250	1.0472	0.24	Q	.	.	.	V	.
20.333	1.0489	0.23	Q	.	.	.	V	.
20.417	1.0505	0.23	Q	.	.	.	V	.
20.500	1.0520	0.23	Q	.	.	.	V	.
20.583	1.0536	0.23	Q	.	.	.	V	.
20.667	1.0551	0.22	Q	.	.	.	V	.
20.750	1.0566	0.22	Q	.	.	.	V	.
20.833	1.0581	0.22	Q	.	.	.	V	.
20.917	1.0596	0.21	Q	.	.	.	V	.
21.000	1.0611	0.21	Q	.	.	.	V	.
21.083	1.0625	0.21	Q	.	.	.	V	.
21.167	1.0639	0.21	Q	.	.	.	V	.
21.250	1.0653	0.20	Q	.	.	.	V	.
21.333	1.0667	0.20	Q	.	.	.	V	.
21.417	1.0681	0.20	Q	.	.	.	V	.
21.500	1.0695	0.20	Q	.	.	.	V	.
21.583	1.0708	0.20	Q	.	.	.	V	.
21.667	1.0722	0.19	Q	.	.	.	V	.
21.750	1.0735	0.19	Q	.	.	.	V	.
21.833	1.0748	0.19	Q	.	.	.	V	.

```
   21.917      1.0761      0.19  Q         .         .         .       V .
   22.000      1.0774      0.19  Q         .         .         .       V .
   22.083      1.0787      0.18  Q         .         .         .       V .
   22.167      1.0799      0.18  Q         .         .         .       V .
   22.250      1.0812      0.18  Q         .         .         .        V.
   22.333      1.0824      0.18  Q         .         .         .        V.
   22.417      1.0836      0.18  Q         .         .         .        V.
   22.500      1.0849      0.18  Q         .         .         .        V.
   22.583      1.0861      0.17  Q         .         .         .        V.
   22.667      1.0873      0.17  Q         .         .         .        V.
   22.750      1.0884      0.17  Q         .         .         .        V.
   22.833      1.0896      0.17  Q         .         .         .        V.
   22.917      1.0908      0.17  Q         .         .         .        V.
   23.000      1.0919      0.17  Q         .         .         .        V.
   23.083      1.0931      0.17  Q         .         .         .        V.
   23.167      1.0942      0.16  Q         .         .         .        V.
   23.250      1.0953      0.16  Q         .         .         .        V.
   23.333      1.0965      0.16  Q         .         .         .        V.
   23.417      1.0976      0.16  Q         .         .         .        V.
   23.500      1.0987      0.16  Q         .         .         .        V.
   23.583      1.0998      0.16  Q         .         .         .        V.
   23.667      1.1008      0.16  Q         .         .         .        V.
   23.750      1.1019      0.16  Q         .         .         .        V.
   23.833      1.1030      0.16  Q         .         .         .        V.
   23.917      1.1040      0.15  Q         .         .         .        V.
   24.000      1.1051      0.15  Q         .         .         .        V.
   24.083      1.1061      0.15  Q         .         .         .        V.
   24.167      1.1070      0.13  Q         .         .         .        V.
   24.250      1.1076      0.09  Q         .         .         .        V.
   24.333      1.1079      0.05  Q         .         .         .        V.
   24.417      1.1081      0.02  Q         .         .         .        V.
   24.500      1.1082      0.01  Q         .         .         .        V.
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    =======================                 =========
               0%                            1470.0
              10%                              60.0
              20%                              35.0
              30%                              30.0
              40%                              20.0
              50%                              20.0
              60%                              20.0
              70%                              10.0
              80%                              10.0
              90%                              10.0
```

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****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      55.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.358 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.416
         LOW LOSS FRACTION = 0.657
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.35
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.70
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.93
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.35
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.70
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.72

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  23.277



============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                 1.373                  9.248
        2                 6.371                 33.671
```

3	18.166	79.454
4	33.673	104.456
5	53.218	131.663
6	71.092	120.397
7	82.896	79.517
8	90.101	48.532
9	94.444	29.260
10	96.913	16.626
11	98.170	8.471
12	98.613	2.982
13	99.049	2.940
14	99.486	2.940
15	99.922	2.940
16	100.000	0.523

↑

****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0032	0.0021	0.0011
2	0.0032	0.0021	0.0011
3	0.0032	0.0021	0.0011
4	0.0032	0.0021	0.0011
5	0.0033	0.0021	0.0011
6	0.0033	0.0021	0.0011
7	0.0033	0.0022	0.0011
8	0.0033	0.0022	0.0011
9	0.0033	0.0022	0.0011
10	0.0033	0.0022	0.0011
11	0.0033	0.0022	0.0011
12	0.0033	0.0022	0.0011
13	0.0033	0.0022	0.0011
14	0.0034	0.0022	0.0012
15	0.0034	0.0022	0.0012
16	0.0034	0.0022	0.0012
17	0.0034	0.0022	0.0012
18	0.0034	0.0022	0.0012
19	0.0034	0.0022	0.0012
20	0.0034	0.0023	0.0012
21	0.0034	0.0023	0.0012
22	0.0035	0.0023	0.0012
23	0.0035	0.0023	0.0012
24	0.0035	0.0023	0.0012
25	0.0035	0.0023	0.0012
26	0.0035	0.0023	0.0012
27	0.0035	0.0023	0.0012
28	0.0035	0.0023	0.0012

29	0.0036	0.0023	0.0012
30	0.0036	0.0023	0.0012
31	0.0036	0.0024	0.0012
32	0.0036	0.0024	0.0012
33	0.0036	0.0024	0.0012
34	0.0036	0.0024	0.0012
35	0.0036	0.0024	0.0013
36	0.0037	0.0024	0.0013
37	0.0037	0.0024	0.0013
38	0.0037	0.0024	0.0013
39	0.0037	0.0024	0.0013
40	0.0037	0.0024	0.0013
41	0.0037	0.0025	0.0013
42	0.0038	0.0025	0.0013
43	0.0038	0.0025	0.0013
44	0.0038	0.0025	0.0013
45	0.0038	0.0025	0.0013
46	0.0038	0.0025	0.0013
47	0.0038	0.0025	0.0013
48	0.0039	0.0025	0.0013
49	0.0039	0.0025	0.0013
50	0.0039	0.0026	0.0013
51	0.0039	0.0026	0.0013
52	0.0039	0.0026	0.0013
53	0.0040	0.0026	0.0014
54	0.0040	0.0026	0.0014
55	0.0040	0.0026	0.0014
56	0.0040	0.0026	0.0014
57	0.0040	0.0026	0.0014
58	0.0040	0.0027	0.0014
59	0.0041	0.0027	0.0014
60	0.0041	0.0027	0.0014
61	0.0041	0.0027	0.0014
62	0.0041	0.0027	0.0014
63	0.0042	0.0027	0.0014
64	0.0042	0.0027	0.0014
65	0.0042	0.0028	0.0014
66	0.0042	0.0028	0.0014
67	0.0042	0.0028	0.0015
68	0.0043	0.0028	0.0015
69	0.0043	0.0028	0.0015
70	0.0043	0.0028	0.0015
71	0.0043	0.0028	0.0015
72	0.0043	0.0029	0.0015
73	0.0044	0.0029	0.0015
74	0.0044	0.0029	0.0015
75	0.0044	0.0029	0.0015
76	0.0044	0.0029	0.0015
77	0.0045	0.0029	0.0015
78	0.0045	0.0030	0.0015

79	0.0045	0.0030	0.0016
80	0.0045	0.0030	0.0016
81	0.0046	0.0030	0.0016
82	0.0046	0.0030	0.0016
83	0.0046	0.0030	0.0016
84	0.0047	0.0031	0.0016
85	0.0047	0.0031	0.0016
86	0.0047	0.0031	0.0016
87	0.0048	0.0031	0.0016
88	0.0048	0.0031	0.0016
89	0.0048	0.0032	0.0017
90	0.0048	0.0032	0.0017
91	0.0049	0.0032	0.0017
92	0.0049	0.0032	0.0017
93	0.0049	0.0032	0.0017
94	0.0050	0.0033	0.0017
95	0.0050	0.0033	0.0017
96	0.0050	0.0033	0.0017
97	0.0051	0.0033	0.0017
98	0.0051	0.0033	0.0017
99	0.0051	0.0034	0.0018
100	0.0052	0.0034	0.0018
101	0.0052	0.0034	0.0018
102	0.0052	0.0034	0.0018
103	0.0053	0.0035	0.0018
104	0.0053	0.0035	0.0018
105	0.0054	0.0035	0.0018
106	0.0054	0.0035	0.0019
107	0.0055	0.0036	0.0019
108	0.0055	0.0036	0.0019
109	0.0055	0.0036	0.0019
110	0.0056	0.0037	0.0019
111	0.0056	0.0037	0.0019
112	0.0057	0.0037	0.0019
113	0.0057	0.0038	0.0020
114	0.0058	0.0038	0.0020
115	0.0058	0.0038	0.0020
116	0.0059	0.0038	0.0020
117	0.0059	0.0039	0.0020
118	0.0060	0.0039	0.0020
119	0.0060	0.0040	0.0021
120	0.0061	0.0040	0.0021
121	0.0061	0.0040	0.0021
122	0.0062	0.0041	0.0021
123	0.0063	0.0041	0.0021
124	0.0063	0.0041	0.0022
125	0.0064	0.0042	0.0022
126	0.0064	0.0042	0.0022
127	0.0065	0.0043	0.0022
128	0.0066	0.0043	0.0022

129	0.0066	0.0044	0.0023
130	0.0067	0.0044	0.0023
131	0.0068	0.0045	0.0023
132	0.0068	0.0045	0.0023
133	0.0069	0.0046	0.0024
134	0.0070	0.0046	0.0024
135	0.0071	0.0047	0.0024
136	0.0071	0.0047	0.0025
137	0.0073	0.0048	0.0025
138	0.0073	0.0048	0.0025
139	0.0074	0.0049	0.0026
140	0.0075	0.0049	0.0026
141	0.0076	0.0050	0.0026
142	0.0077	0.0051	0.0026
143	0.0078	0.0051	0.0027
144	0.0079	0.0052	0.0027
145	0.0079	0.0052	0.0027
146	0.0080	0.0052	0.0027
147	0.0081	0.0053	0.0028
148	0.0082	0.0054	0.0028
149	0.0084	0.0055	0.0029
150	0.0085	0.0056	0.0029
151	0.0086	0.0057	0.0030
152	0.0087	0.0057	0.0030
153	0.0089	0.0059	0.0031
154	0.0090	0.0059	0.0031
155	0.0092	0.0061	0.0032
156	0.0093	0.0061	0.0032
157	0.0096	0.0063	0.0033
158	0.0097	0.0064	0.0033
159	0.0100	0.0065	0.0034
160	0.0101	0.0066	0.0035
161	0.0104	0.0068	0.0036
162	0.0105	0.0069	0.0036
163	0.0108	0.0071	0.0037
164	0.0110	0.0072	0.0038
165	0.0113	0.0075	0.0039
166	0.0115	0.0076	0.0040
167	0.0119	0.0078	0.0041
168	0.0121	0.0080	0.0042
169	0.0129	0.0085	0.0044
170	0.0132	0.0086	0.0045
171	0.0137	0.0090	0.0047
172	0.0140	0.0092	0.0048
173	0.0146	0.0096	0.0050
174	0.0149	0.0098	0.0051
175	0.0156	0.0103	0.0054
176	0.0161	0.0105	0.0055
177	0.0169	0.0111	0.0058
178	0.0174	0.0115	0.0060

179	0.0185	0.0122	0.0064
180	0.0192	0.0126	0.0066
181	0.0206	0.0135	0.0071
182	0.0214	0.0141	0.0073
183	0.0233	0.0153	0.0080
184	0.0244	0.0160	0.0084
185	0.0325	0.0213	0.0111
186	0.0343	0.0226	0.0118
187	0.0388	0.0255	0.0133
188	0.0419	0.0275	0.0144
189	0.0475	0.0312	0.0163
190	0.0538	0.0347	0.0192
191	0.0775	0.0347	0.0428
192	0.1074	0.0347	0.0728
193	0.3491	0.0347	0.3145
194	0.0628	0.0347	0.0282
195	0.0455	0.0299	0.0156
196	0.0364	0.0239	0.0125
197	0.0257	0.0169	0.0088
198	0.0223	0.0146	0.0076
199	0.0198	0.0130	0.0068
200	0.0180	0.0118	0.0062
201	0.0165	0.0108	0.0057
202	0.0153	0.0100	0.0052
203	0.0143	0.0094	0.0049
204	0.0134	0.0088	0.0046
205	0.0124	0.0081	0.0042
206	0.0117	0.0077	0.0040
207	0.0112	0.0073	0.0038
208	0.0107	0.0070	0.0037
209	0.0102	0.0067	0.0035
210	0.0098	0.0065	0.0034
211	0.0095	0.0062	0.0032
212	0.0091	0.0060	0.0031
213	0.0088	0.0058	0.0030
214	0.0085	0.0056	0.0029
215	0.0083	0.0054	0.0028
216	0.0080	0.0053	0.0028
217	0.0080	0.0052	0.0027
218	0.0078	0.0051	0.0027
219	0.0076	0.0050	0.0026
220	0.0074	0.0048	0.0025
221	0.0072	0.0047	0.0025
222	0.0070	0.0046	0.0024
223	0.0069	0.0045	0.0024
224	0.0067	0.0044	0.0023
225	0.0066	0.0043	0.0023
226	0.0065	0.0042	0.0022
227	0.0063	0.0042	0.0022
228	0.0062	0.0041	0.0021

229	0.0061	0.0040	0.0021
230	0.0060	0.0039	0.0021
231	0.0059	0.0039	0.0020
232	0.0058	0.0038	0.0020
233	0.0057	0.0037	0.0020
234	0.0056	0.0037	0.0019
235	0.0055	0.0036	0.0019
236	0.0054	0.0036	0.0019
237	0.0053	0.0035	0.0018
238	0.0053	0.0035	0.0018
239	0.0052	0.0034	0.0018
240	0.0051	0.0034	0.0018
241	0.0051	0.0033	0.0017
242	0.0050	0.0033	0.0017
243	0.0049	0.0032	0.0017
244	0.0049	0.0032	0.0017
245	0.0048	0.0031	0.0016
246	0.0047	0.0031	0.0016
247	0.0047	0.0031	0.0016
248	0.0046	0.0030	0.0016
249	0.0046	0.0030	0.0016
250	0.0045	0.0030	0.0015
251	0.0045	0.0029	0.0015
252	0.0044	0.0029	0.0015
253	0.0044	0.0029	0.0015
254	0.0043	0.0028	0.0015
255	0.0043	0.0028	0.0015
256	0.0042	0.0028	0.0014
257	0.0042	0.0027	0.0014
258	0.0041	0.0027	0.0014
259	0.0041	0.0027	0.0014
260	0.0041	0.0027	0.0014
261	0.0040	0.0026	0.0014
262	0.0040	0.0026	0.0014
263	0.0039	0.0026	0.0014
264	0.0039	0.0026	0.0013
265	0.0039	0.0025	0.0013
266	0.0038	0.0025	0.0013
267	0.0038	0.0025	0.0013
268	0.0038	0.0025	0.0013
269	0.0037	0.0025	0.0013
270	0.0037	0.0024	0.0013
271	0.0037	0.0024	0.0013
272	0.0036	0.0024	0.0012
273	0.0036	0.0024	0.0012
274	0.0036	0.0024	0.0012
275	0.0035	0.0023	0.0012
276	0.0035	0.0023	0.0012
277	0.0035	0.0023	0.0012
278	0.0035	0.0023	0.0012

279	0.0034	0.0023	0.0012
280	0.0034	0.0022	0.0012
281	0.0034	0.0022	0.0012
282	0.0034	0.0022	0.0012
283	0.0033	0.0022	0.0011
284	0.0033	0.0022	0.0011
285	0.0033	0.0022	0.0011
286	0.0033	0.0021	0.0011
287	0.0032	0.0021	0.0011
288	0.0032	0.0021	0.0011

TOTAL STORM RAINFALL(INCHES) = 2.72
TOTAL SOIL-LOSS(INCHES) = 1.53
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.19

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 7.1141
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.5070

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2 4 - 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

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	17.5	35.0	52.5	70.0
0.083	0.0001	0.01	Q	.	.	.	.
0.167	0.0004	0.05	Q	.	.	.	.
0.250	0.0013	0.13	Q	.	.	.	.
0.333	0.0030	0.25	Q	.	.	.	.
0.417	0.0058	0.40	Q	.	.	.	.
0.500	0.0094	0.53	Q	.	.	.	.
0.583	0.0137	0.62	Q	.	.	.	.
0.667	0.0183	0.67	Q	.	.	.	.
0.750	0.0232	0.71	Q	.	.	.	.
0.833	0.0282	0.73	Q	.	.	.	.
0.917	0.0333	0.74	Q	.	.	.	.
1.000	0.0385	0.75	Q	.	.	.	.
1.083	0.0437	0.75	Q	.	.	.	.
1.167	0.0489	0.76	Q	.	.	.	.
1.250	0.0541	0.76	Q	.	.	.	.
1.333	0.0594	0.77	Q	.	.	.	.
1.417	0.0647	0.77	Q	.	.	.	.
1.500	0.0701	0.77	Q	.	.	.	.
1.583	0.0754	0.78	Q	.	.	.	.

1.667	0.0808	0.78	Q	.	.	.	.
1.750	0.0862	0.78	Q	.	.	.	.
1.833	0.0916	0.79	Q	.	.	.	.
1.917	0.0970	0.79	Q	.	.	.	.
2.000	0.1025	0.79	Q	.	.	.	.
2.083	0.1079	0.79	Q	.	.	.	.
2.167	0.1134	0.80	Q	.	.	.	.
2.250	0.1190	0.80	Q	.	.	.	.
2.333	0.1245	0.80	Q	.	.	.	.
2.417	0.1300	0.81	Q	.	.	.	.
2.500	0.1356	0.81	Q	.	.	.	.
2.583	0.1412	0.81	QV	.	.	.	.
2.667	0.1469	0.82	QV	.	.	.	.
2.750	0.1525	0.82	QV	.	.	.	.
2.833	0.1582	0.82	QV	.	.	.	.
2.917	0.1639	0.83	QV	.	.	.	.
3.000	0.1696	0.83	QV	.	.	.	.
3.083	0.1753	0.83	QV	.	.	.	.
3.167	0.1811	0.84	QV	.	.	.	.
3.250	0.1869	0.84	QV	.	.	.	.
3.333	0.1927	0.84	QV	.	.	.	.
3.417	0.1985	0.85	QV	.	.	.	.
3.500	0.2044	0.85	QV	.	.	.	.
3.583	0.2103	0.85	QV	.	.	.	.
3.667	0.2162	0.86	QV	.	.	.	.
3.750	0.2221	0.86	QV	.	.	.	.
3.833	0.2281	0.87	QV	.	.	.	.
3.917	0.2341	0.87	QV	.	.	.	.
4.000	0.2401	0.87	QV	.	.	.	.
4.083	0.2461	0.88	QV	.	.	.	.
4.167	0.2522	0.88	QV	.	.	.	.
4.250	0.2583	0.89	QV	.	.	.	.
4.333	0.2644	0.89	QV	.	.	.	.
4.417	0.2706	0.89	QV	.	.	.	.
4.500	0.2767	0.90	Q V	.	.	.	.
4.583	0.2829	0.90	Q V	.	.	.	.
4.667	0.2892	0.91	Q V	.	.	.	.
4.750	0.2955	0.91	Q V	.	.	.	.
4.833	0.3018	0.91	Q V	.	.	.	.
4.917	0.3081	0.92	Q V	.	.	.	.
5.000	0.3144	0.92	Q V	.	.	.	.
5.083	0.3208	0.93	Q V	.	.	.	.
5.167	0.3272	0.93	Q V	.	.	.	.
5.250	0.3337	0.94	Q V	.	.	.	.
5.333	0.3402	0.94	Q V	.	.	.	.
5.417	0.3467	0.95	Q V	.	.	.	.
5.500	0.3532	0.95	Q V	.	.	.	.
5.583	0.3598	0.96	Q V	.	.	.	.
5.667	0.3664	0.96	Q V	.	.	.	.
5.750	0.3731	0.97	Q V	.	.	.	.

5.833	0.3798	0.97	Q	V	.	.	.	.
5.917	0.3865	0.98	Q	V	.	.	.	.
6.000	0.3932	0.98	Q	V	.	.	.	.
6.083	0.4000	0.99	Q	V	.	.	.	.
6.167	0.4069	0.99	Q	V	.	.	.	.
6.250	0.4137	1.00	Q	V	.	.	.	.
6.333	0.4206	1.00	Q	V	.	.	.	.
6.417	0.4276	1.01	Q	V	.	.	.	.
6.500	0.4345	1.01	Q	V	.	.	.	.
6.583	0.4416	1.02	Q	V	.	.	.	.
6.667	0.4486	1.02	Q	V	.	.	.	.
6.750	0.4557	1.03	Q	V	.	.	.	.
6.833	0.4628	1.04	Q	V	.	.	.	.
6.917	0.4700	1.04	Q	V	.	.	.	.
7.000	0.4772	1.05	Q	V	.	.	.	.
7.083	0.4845	1.05	Q	V	.	.	.	.
7.167	0.4918	1.06	Q	V	.	.	.	.
7.250	0.4991	1.07	Q	V	.	.	.	.
7.333	0.5065	1.07	Q	V	.	.	.	.
7.417	0.5140	1.08	Q	V	.	.	.	.
7.500	0.5215	1.09	Q	V	.	.	.	.
7.583	0.5290	1.09	Q	V	.	.	.	.
7.667	0.5366	1.10	Q	V	.	.	.	.
7.750	0.5442	1.11	Q	V	.	.	.	.
7.833	0.5519	1.11	Q	V	.	.	.	.
7.917	0.5596	1.12	Q	V	.	.	.	.
8.000	0.5674	1.13	Q	V	.	.	.	.
8.083	0.5752	1.14	Q	V	.	.	.	.
8.167	0.5830	1.14	Q	V	.	.	.	.
8.250	0.5910	1.15	Q	V	.	.	.	.
8.333	0.5990	1.16	Q	V	.	.	.	.
8.417	0.6070	1.17	Q	V	.	.	.	.
8.500	0.6151	1.18	Q	V	.	.	.	.
8.583	0.6232	1.18	Q	V	.	.	.	.
8.667	0.6314	1.19	Q	V	.	.	.	.
8.750	0.6397	1.20	Q	V	.	.	.	.
8.833	0.6480	1.21	Q	V	.	.	.	.
8.917	0.6564	1.22	Q	V	.	.	.	.
9.000	0.6649	1.23	Q	V	.	.	.	.
9.083	0.6734	1.24	Q	V	.	.	.	.
9.167	0.6820	1.25	Q	V	.	.	.	.
9.250	0.6906	1.25	Q	V	.	.	.	.
9.333	0.6993	1.26	Q	V	.	.	.	.
9.417	0.7081	1.27	Q	V	.	.	.	.
9.500	0.7169	1.28	Q	V	.	.	.	.
9.583	0.7258	1.29	Q	V	.	.	.	.
9.667	0.7348	1.31	Q	V	.	.	.	.
9.750	0.7439	1.32	Q	V	.	.	.	.
9.833	0.7530	1.33	Q	V	.	.	.	.
9.917	0.7622	1.34	Q	V	.	.	.	.

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10.000      0.7715      1.35  Q    V    .         .         .         .
10.083      0.7809      1.36  Q    V    .         .         .         .
10.167      0.7904      1.37  Q    V    .         .         .         .
10.250      0.7999      1.39  Q    V    .         .         .         .
10.333      0.8095      1.40  Q    V    .         .         .         .
10.417      0.8192      1.41  Q    V    .         .         .         .
10.500      0.8291      1.42  Q     V   .         .         .         .
10.583      0.8389      1.44  Q     V   .         .         .         .
10.667      0.8489      1.45  Q     V   .         .         .         .
10.750      0.8590      1.46  Q     V   .         .         .         .
10.833      0.8692      1.48  Q     V   .         .         .         .
10.917      0.8795      1.49  Q     V   .         .         .         .
11.000      0.8899      1.51  Q     V   .         .         .         .
11.083      0.9004      1.52  Q     V   .         .         .         .
11.167      0.9110      1.54  Q     V   .         .         .         .
11.250      0.9217      1.56  Q     V   .         .         .         .
11.333      0.9325      1.57  Q     V   .         .         .         .
11.417      0.9435      1.59  Q     V   .         .         .         .
11.500      0.9546      1.61  Q     V   .         .         .         .
11.583      0.9658      1.63  Q      V  .         .         .         .
11.667      0.9771      1.64  Q      V  .         .         .         .
11.750      0.9886      1.66  Q      V  .         .         .         .
11.833      1.0001      1.68  Q      V  .         .         .         .
11.917      1.0119      1.70  Q      V  .         .         .         .
12.000      1.0238      1.73  Q      V  .         .         .         .
12.083      1.0358      1.75  Q      V  .         .         .         .
12.167      1.0480      1.77  .Q     V  .         .         .         .
12.250      1.0603      1.79  .Q     V  .         .         .         .
12.333      1.0727      1.81  .Q     V  .         .         .         .
12.417      1.0853      1.82  .Q     V  .         .         .         .
12.500      1.0980      1.84  .Q     V  .         .         .         .
12.583      1.1108      1.87  .Q      V .         .         .         .
12.667      1.1238      1.89  .Q      V .         .         .         .
12.750      1.1370      1.92  .Q      V .         .         .         .
12.833      1.1504      1.95  .Q      V .         .         .         .
12.917      1.1640      1.98  .Q      V .         .         .         .
13.000      1.1779      2.01  .Q      V .         .         .         .
13.083      1.1919      2.04  .Q      V .         .         .         .
13.167      1.2062      2.08  .Q      V .         .         .         .
13.250      1.2208      2.11  .Q      V .         .         .         .
13.333      1.2356      2.15  .Q      V .         .         .         .
13.417      1.2506      2.19  .Q       V.         .         .         .
13.500      1.2660      2.23  .Q       V.         .         .         .
13.583      1.2816      2.27  .Q       V.         .         .         .
13.667      1.2976      2.32  .Q       V.         .         .         .
13.750      1.3139      2.37  .Q       V.         .         .         .
13.833      1.3305      2.42  .Q       V.         .         .         .
13.917      1.3476      2.47  .Q       V.         .         .         .
14.000      1.3650      2.53  .Q       V.         .         .         .
14.083      1.3828      2.59  .Q        V         .         .         .
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14.167	1.4011	2.65	.Q V . . .
14.250	1.4199	2.73	.Q V . . .
14.333	1.4392	2.81	.Q V . . .
14.417	1.4592	2.90	.Q V . . .
14.500	1.4799	3.00	.Q V . . .
14.583	1.5012	3.10	.Q V . . .
14.667	1.5233	3.20	.Q .V . . .
14.750	1.5460	3.31	.Q .V . . .
14.833	1.5696	3.42	.Q .V . . .
14.917	1.5941	3.55	. Q .V . . .
15.000	1.6194	3.69	. Q .V . . .
15.083	1.6459	3.84	. Q .V . . .
15.167	1.6734	4.00	. Q . V . . .
15.250	1.7023	4.19	. Q . V . . .
15.333	1.7327	4.41	. Q . V . . .
15.417	1.7648	4.67	. Q . V . . .
15.500	1.7993	5.01	. Q . V . . .
15.583	1.8372	5.49	. Q . V . . .
15.667	1.8791	6.09	. Q . V . . .
15.750	1.9261	6.83	. Q . V . . .
15.833	1.9789	7.66	. Q . V . . .
15.917	2.0395	8.79	. Q . V . . .
16.000	2.1141	10.83	. Q . V . . .
16.083	2.2304	16.89	. Q. V . . .
16.167	2.4237	28.07	. . QV . . .
16.250	2.7294	44.39	. . V. Q . .
16.333	3.0987	53.63	. . . V Q .
16.417	3.5129	60.13	. . . V . Q .
16.500	3.8814	53.51	. . . V Q .
16.583	4.1443	38.17	. . .Q V .
16.667	4.3234	26.01	. . Q . .V .
16.750	4.4463	17.84	. Q . . V .
16.833	4.5303	12.21	. Q . . . V .
16.917	4.5887	8.48	. Q . . . V .
17.000	4.6307	6.09	. Q . . . V .
17.083	4.6684	5.48	. Q . . . V .
17.167	4.7029	5.01	. Q . . . V .
17.250	4.7342	4.54	. Q . . . V .
17.333	4.7585	3.53	. Q . . . V .
17.417	4.7799	3.11	.Q . . . V .
17.500	4.7998	2.90	.Q . . . V .
17.583	4.8186	2.73	.Q . . . V .
17.667	4.8364	2.58	.Q . . . V .
17.750	4.8534	2.46	.Q . . . V .
17.833	4.8696	2.36	.Q . . . V .
17.917	4.8852	2.26	.Q . . . V .
18.000	4.9001	2.18	.Q . . . V .
18.083	4.9146	2.10	.Q . . . V .
18.167	4.9286	2.03	.Q . . . V .
18.250	4.9421	1.97	.Q . . . V .

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18.333      4.9553      1.91  .Q        .         .         .    V    .
18.417      4.9681      1.86  .Q        .         .         .     V   .
18.500      4.9807      1.82  .Q        .         .         .     V   .
18.583      4.9929      1.78  .Q        .         .         .     V   .
18.667      5.0048      1.73  Q         .         .         .     V   .
18.750      5.0165      1.69  Q         .         .         .     V   .
18.833      5.0279      1.65  Q         .         .         .     V   .
18.917      5.0390      1.62  Q         .         .         .     V   .
19.000      5.0499      1.58  Q         .         .         .     V   .
19.083      5.0605      1.55  Q         .         .         .     V   .
19.167      5.0710      1.51  Q         .         .         .     V   .
19.250      5.0812      1.48  Q         .         .         .     V   .
19.333      5.0912      1.46  Q         .         .         .     V   .
19.417      5.1011      1.43  Q         .         .         .      V  .
19.500      5.1107      1.40  Q         .         .         .      V  .
19.583      5.1202      1.38  Q         .         .         .      V  .
19.667      5.1295      1.35  Q         .         .         .      V  .
19.750      5.1387      1.33  Q         .         .         .      V  .
19.833      5.1477      1.31  Q         .         .         .      V  .
19.917      5.1566      1.29  Q         .         .         .      V  .
20.000      5.1653      1.27  Q         .         .         .      V  .
20.083      5.1739      1.25  Q         .         .         .      V  .
20.167      5.1824      1.23  Q         .         .         .      V  .
20.250      5.1907      1.21  Q         .         .         .      V  .
20.333      5.1990      1.19  Q         .         .         .      V  .
20.417      5.2071      1.18  Q         .         .         .      V  .
20.500      5.2151      1.16  Q         .         .         .      V  .
20.583      5.2230      1.15  Q         .         .         .      V  .
20.667      5.2308      1.13  Q         .         .         .      V  .
20.750      5.2384      1.12  Q         .         .         .       V .
20.833      5.2460      1.10  Q         .         .         .       V .
20.917      5.2535      1.09  Q         .         .         .       V .
21.000      5.2609      1.08  Q         .         .         .       V .
21.083      5.2683      1.06  Q         .         .         .       V .
21.167      5.2755      1.05  Q         .         .         .       V .
21.250      5.2826      1.04  Q         .         .         .       V .
21.333      5.2897      1.03  Q         .         .         .       V .
21.417      5.2967      1.01  Q         .         .         .       V .
21.500      5.3036      1.00  Q         .         .         .       V .
21.583      5.3104      0.99  Q         .         .         .       V .
21.667      5.3172      0.98  Q         .         .         .       V .
21.750      5.3239      0.97  Q         .         .         .       V .
21.833      5.3305      0.96  Q         .         .         .       V .
21.917      5.3371      0.95  Q         .         .         .       V .
22.000      5.3436      0.94  Q         .         .         .       V .
22.083      5.3500      0.93  Q         .         .         .       V .
22.167      5.3564      0.92  Q         .         .         .       V .
22.250      5.3627      0.92  Q         .         .         .       V .
22.333      5.3689      0.91  Q         .         .         .       V .
22.417      5.3751      0.90  Q         .         .         .        V.
```

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   22.500      5.3812      0.89  Q          .          .          .         V.
   22.583      5.3873      0.88  Q          .          .          .         V.
   22.667      5.3933      0.87  Q          .          .          .         V.
   22.750      5.3993      0.87  Q          .          .          .         V.
   22.833      5.4052      0.86  Q          .          .          .         V.
   22.917      5.4111      0.85  Q          .          .          .         V.
   23.000      5.4169      0.84  Q          .          .          .         V.
   23.083      5.4227      0.84  Q          .          .          .         V.
   23.167      5.4284      0.83  Q          .          .          .         V.
   23.250      5.4341      0.82  Q          .          .          .         V.
   23.333      5.4397      0.82  Q          .          .          .         V.
   23.417      5.4453      0.81  Q          .          .          .         V.
   23.500      5.4508      0.80  Q          .          .          .         V.
   23.583      5.4563      0.80  Q          .          .          .         V.
   23.667      5.4618      0.79  Q          .          .          .         V.
   23.750      5.4672      0.79  Q          .          .          .         V.
   23.833      5.4726      0.78  Q          .          .          .         V.
   23.917      5.4779      0.77  Q          .          .          .         V.
   24.000      5.4832      0.77  Q          .          .          .         V.
   24.083      5.4884      0.75  Q          .          .          .         V.
   24.167      5.4933      0.71  Q          .          .          .         V.
   24.250      5.4976      0.62  Q          .          .          .         V.
   24.333      5.5010      0.50  Q          .          .          .         V.
   24.417      5.5034      0.35  Q          .          .          .         V.
   24.500      5.5049      0.22  Q          .          .          .         V.
   24.583      5.5058      0.13  Q          .          .          .         V.
   24.667      5.5063      0.07  Q          .          .          .         V.
   24.750      5.5066      0.04  Q          .          .          .         V.
   24.833      5.5068      0.02  Q          .          .          .         V.
   24.917      5.5069      0.01  Q          .          .          .         V.
   25.000      5.5069      0.01  Q          .          .          .         V.
   25.083      5.5070      0.01  Q          .          .          .         V.
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    =======================                 =========
               0%                            1505.0
              10%                              85.0
              20%                              50.0
              30%                              35.0
              40%                              35.0
              50%                              25.0
              60%                              25.0
              70%                              20.0
              80%                              15.0
              90%                               5.0
```

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****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

            STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       50.0     100.0     150.0     200.0
----------------------------------------------------------------------------
   0.083      0.0002      0.02  Q         .         .         .         .
   0.167      0.0011      0.14  Q         .         .         .         .
   0.250      0.0037      0.37  Q         .         .         .         .
   0.333      0.0080      0.62  Q         .         .         .         .
   0.417      0.0137      0.84  Q         .         .         .         .
   0.500      0.0206      1.00  Q         .         .         .         .
   0.583      0.0282      1.10  Q         .         .         .         .
   0.667      0.0362      1.16  Q         .         .         .         .
   0.750      0.0444      1.20  Q         .         .         .         .
   0.833      0.0528      1.22  Q         .         .         .         .
   0.917      0.0613      1.24  Q         .         .         .         .
   1.000      0.0699      1.24  Q         .         .         .         .
   1.083      0.0785      1.25  Q         .         .         .         .
   1.167      0.0872      1.26  Q         .         .         .         .
   1.250      0.0959      1.27  Q         .         .         .         .
   1.333      0.1047      1.27  Q         .         .         .         .
   1.417      0.1135      1.28  Q         .         .         .         .
   1.500      0.1223      1.28  Q         .         .         .         .
   1.583      0.1312      1.29  Q         .         .         .         .
   1.667      0.1401      1.29  Q         .         .         .         .
   1.750      0.1490      1.30  Q         .         .         .         .
   1.833      0.1579      1.30  Q         .         .         .         .
   1.917      0.1669      1.31  Q         .         .         .         .
   2.000      0.1760      1.31  Q         .         .         .         .
   2.083      0.1850      1.32  Q         .         .         .         .
   2.167      0.1941      1.32  Q         .         .         .         .
   2.250      0.2033      1.33  Q         .         .         .         .
   2.333      0.2124      1.33  Q         .         .         .         .
   2.417      0.2216      1.34  Q         .         .         .         .
   2.500      0.2309      1.34  QV        .         .         .         .
   2.583      0.2402      1.35  QV        .         .         .         .
   2.667      0.2495      1.35  QV        .         .         .         .
   2.750      0.2588      1.36  QV        .         .         .         .
   2.833      0.2682      1.36  QV        .         .         .         .
   2.917      0.2777      1.37  QV        .         .         .         .
   3.000      0.2871      1.37  QV        .         .         .         .
   3.083      0.2966      1.38  QV        .         .         .         .
```

3.167	0.3062	1.39	QV	.	.	.	.
3.250	0.3158	1.39	QV	.	.	.	.
3.333	0.3254	1.40	QV	.	.	.	.
3.417	0.3351	1.40	QV	.	.	.	.
3.500	0.3448	1.41	QV	.	.	.	.
3.583	0.3545	1.42	QV	.	.	.	.
3.667	0.3643	1.42	QV	.	.	.	.
3.750	0.3742	1.43	QV	.	.	.	.
3.833	0.3840	1.43	QV	.	.	.	.
3.917	0.3940	1.44	QV	.	.	.	.
4.000	0.4039	1.45	QV	.	.	.	.
4.083	0.4140	1.45	QV	.	.	.	.
4.167	0.4240	1.46	QV	.	.	.	.
4.250	0.4341	1.47	QV	.	.	.	.
4.333	0.4443	1.47	QV	.	.	.	.
4.417	0.4545	1.48	QV	.	.	.	.
4.500	0.4647	1.49	Q V	.	.	.	.
4.583	0.4750	1.49	Q V	.	.	.	.
4.667	0.4853	1.50	Q V	.	.	.	.
4.750	0.4957	1.51	Q V	.	.	.	.
4.833	0.5062	1.52	Q V	.	.	.	.
4.917	0.5166	1.52	Q V	.	.	.	.
5.000	0.5272	1.53	Q V	.	.	.	.
5.083	0.5378	1.54	Q V	.	.	.	.
5.167	0.5484	1.55	Q V	.	.	.	.
5.250	0.5591	1.55	Q V	.	.	.	.
5.333	0.5699	1.56	Q V	.	.	.	.
5.417	0.5807	1.57	Q V	.	.	.	.
5.500	0.5915	1.58	Q V	.	.	.	.
5.583	0.6024	1.58	Q V	.	.	.	.
5.667	0.6134	1.59	Q V	.	.	.	.
5.750	0.6244	1.60	Q V	.	.	.	.
5.833	0.6355	1.61	Q V	.	.	.	.
5.917	0.6466	1.62	Q V	.	.	.	.
6.000	0.6578	1.63	Q V	.	.	.	.
6.083	0.6691	1.63	Q V	.	.	.	.
6.167	0.6804	1.64	Q V	.	.	.	.
6.250	0.6918	1.65	Q V	.	.	.	.
6.333	0.7032	1.66	Q V	.	.	.	.
6.417	0.7148	1.67	Q V	.	.	.	.
6.500	0.7263	1.68	Q V	.	.	.	.
6.583	0.7380	1.69	Q V	.	.	.	.
6.667	0.7497	1.70	Q V	.	.	.	.
6.750	0.7614	1.71	Q V	.	.	.	.
6.833	0.7733	1.72	Q V	.	.	.	.
6.917	0.7852	1.73	Q V	.	.	.	.
7.000	0.7971	1.74	Q V	.	.	.	.
7.083	0.8092	1.75	Q V	.	.	.	.
7.167	0.8213	1.76	Q V	.	.	.	.
7.250	0.8335	1.77	Q V	.	.	.	.

7.333	0.8458	1.78	Q	V	.	.	.	.
7.417	0.8581	1.79	Q	V	.	.	.	.
7.500	0.8705	1.80	Q	V	.	.	.	.
7.583	0.8830	1.81	Q	V	.	.	.	.
7.667	0.8956	1.83	Q	V	.	.	.	.
7.750	0.9082	1.84	Q	V	.	.	.	.
7.833	0.9210	1.85	Q	V	.	.	.	.
7.917	0.9338	1.86	Q	V	.	.	.	.
8.000	0.9467	1.87	Q	V	.	.	.	.
8.083	0.9597	1.89	Q	V	.	.	.	.
8.167	0.9727	1.90	Q	V	.	.	.	.
8.250	0.9859	1.91	Q	V	.	.	.	.
8.333	0.9991	1.92	Q	V	.	.	.	.
8.417	1.0125	1.94	Q	V	.	.	.	.
8.500	1.0259	1.95	Q	V	.	.	.	.
8.583	1.0395	1.96	Q	V	.	.	.	.
8.667	1.0531	1.98	Q	V	.	.	.	.
8.750	1.0668	1.99	Q	V	.	.	.	.
8.833	1.0806	2.01	Q	V	.	.	.	.
8.917	1.0946	2.02	Q	V	.	.	.	.
9.000	1.1086	2.04	Q	V	.	.	.	.
9.083	1.1227	2.05	Q	V	.	.	.	.
9.167	1.1370	2.07	Q	V	.	.	.	.
9.250	1.1513	2.08	Q	V	.	.	.	.
9.333	1.1658	2.10	Q	V	.	.	.	.
9.417	1.1804	2.12	Q	V	.	.	.	.
9.500	1.1951	2.13	Q	V	.	.	.	.
9.583	1.2099	2.15	Q	V	.	.	.	.
9.667	1.2248	2.17	Q	V	.	.	.	.
9.750	1.2399	2.19	Q	V	.	.	.	.
9.833	1.2551	2.21	Q	V	.	.	.	.
9.917	1.2704	2.22	Q	V	.	.	.	.
10.000	1.2858	2.24	Q	V	.	.	.	.
10.083	1.3014	2.26	Q	V	.	.	.	.
10.167	1.3171	2.28	Q	V	.	.	.	.
10.250	1.3330	2.30	Q	V	.	.	.	.
10.333	1.3490	2.32	Q	V	.	.	.	.
10.417	1.3651	2.35	Q	V	.	.	.	.
10.500	1.3815	2.37	Q	V	.	.	.	.
10.583	1.3979	2.39	Q	V	.	.	.	.
10.667	1.4145	2.41	Q	V	.	.	.	.
10.750	1.4313	2.44	Q	V	.	.	.	.
10.833	1.4483	2.46	Q	V	.	.	.	.
10.917	1.4654	2.49	Q	V	.	.	.	.
11.000	1.4827	2.51	Q	V	.	.	.	.
11.083	1.5001	2.54	Q	V	.	.	.	.
11.167	1.5178	2.56	Q	V	.	.	.	.
11.250	1.5356	2.59	Q	V	.	.	.	.
11.333	1.5537	2.62	Q	V	.	.	.	.
11.417	1.5719	2.65	Q	V	.	.	.	.

```
11.500      1.5903      2.68  Q     V   .         .         .         .
11.583      1.6090      2.71  Q      V  .         .         .         .
11.667      1.6279      2.74  Q      V  .         .         .         .
11.750      1.6470      2.77  Q      V  .         .         .         .
11.833      1.6663      2.81  Q      V  .         .         .         .
11.917      1.6859      2.84  Q      V  .         .         .         .
12.000      1.7057      2.88  Q      V  .         .         .         .
12.083      1.7257      2.91  Q      V  .         .         .         .
12.167      1.7460      2.94  Q      V  .         .         .         .
12.250      1.7665      2.97  Q      V  .         .         .         .
12.333      1.7872      3.00  Q      V  .         .         .         .
12.417      1.8080      3.03  Q      V  .         .         .         .
12.500      1.8292      3.07  Q       V .         .         .         .
12.583      1.8506      3.11  Q       V .         .         .         .
12.667      1.8723      3.15  Q       V .         .         .         .
12.750      1.8944      3.20  Q       V .         .         .         .
12.833      1.9168      3.25  Q       V .         .         .         .
12.917      1.9395      3.30  Q       V .         .         .         .
13.000      1.9626      3.36  Q       V .         .         .         .
13.083      1.9861      3.41  Q       V .         .         .         .
13.167      2.0100      3.47  Q       V .         .         .         .
13.250      2.0343      3.53  Q       V .         .         .         .
13.333      2.0591      3.60  Q        V.         .         .         .
13.417      2.0843      3.66  Q        V.         .         .         .
13.500      2.1100      3.73  Q        V.         .         .         .
13.583      2.1363      3.81  Q        V.         .         .         .
13.667      2.1630      3.89  Q        V.         .         .         .
13.750      2.1904      3.97  Q        V.         .         .         .
13.833      2.2183      4.06  Q        V.         .         .         .
13.917      2.2469      4.15  Q        V.         .         .         .
14.000      2.2761      4.24  Q         V         .         .         .
14.083      2.3060      4.35  Q         V         .         .         .
14.167      2.3368      4.47  Q         V         .         .         .
14.250      2.3685      4.61  Q         V         .         .         .
14.333      2.4013      4.75  Q         V         .         .         .
14.417      2.4351      4.91  Q         V         .         .         .
14.500      2.4700      5.07  .Q        V         .         .         .
14.583      2.5060      5.23  .Q        .V        .         .         .
14.667      2.5432      5.41  .Q        .V        .         .         .
14.750      2.5817      5.59  .Q        .V        .         .         .
14.833      2.6216      5.79  .Q        .V        .         .         .
14.917      2.6631      6.02  .Q        .V        .         .         .
15.000      2.7062      6.26  .Q        .V        .         .         .
15.083      2.7511      6.53  .Q        . V       .         .         .
15.167      2.7981      6.83  .Q        . V       .         .         .
15.250      2.8475      7.17  .Q        . V       .         .         .
15.333      2.8995      7.55  .Q        . V       .         .         .
15.417      2.9548      8.03  .Q        . V       .         .         .
15.500      3.0151      8.75  .Q        .  V      .         .         .
15.583      3.0823      9.76  .Q        .  V      .         .         .
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15.667	3.1577	10.95	. Q . V . . .
15.750	3.2422	12.26	. Q . V . . .
15.833	3.3366	13.72	. Q . V . . .
15.917	3.4460	15.88	. Q . V . . .
16.000	3.5889	20.76	. Q . V . . .
16.083	3.8348	35.69	. Q . V . . .
16.167	4.3018	67.81	. . Q V . . .
16.250	4.9881	99.65	. . Q.V . .
16.333	5.6961	102.81	. . Q V . .
16.417	6.3033	88.15	. . Q . V . .
16.500	6.7737	68.31	. . Q . V. .
16.583	7.0920	46.22	. Q. . .V .
16.667	7.3080	31.36	. Q . . . V .
16.750	7.4594	21.98	. Q . . . V .
16.833	7.5669	15.61	. Q . . . V .
16.917	7.6451	11.35	. Q . . . V .
17.000	7.7043	8.59	.Q . . . V .
17.083	7.7578	7.77	.Q . . . V .
17.167	7.8069	7.13	.Q . . . V .
17.250	7.8518	6.52	.Q . . . V .
17.333	7.8888	5.38	.Q . . . V .
17.417	7.9223	4.86	Q . . . V .
17.500	7.9537	4.57	Q . . . V .
17.583	7.9835	4.32	Q . . . V .
17.667	8.0118	4.11	Q . . . V .
17.750	8.0389	3.93	Q . . . V .
17.833	8.0648	3.77	Q . . . V .
17.917	8.0898	3.62	Q . . . V .
18.000	8.1138	3.49	Q . . . V .
18.083	8.1371	3.38	Q . . . V .
18.167	8.1596	3.27	Q . . . V .
18.250	8.1815	3.18	Q . . . V .
18.333	8.2029	3.10	Q . . . V .
18.417	8.2237	3.02	Q . . . V .
18.500	8.2440	2.95	Q . . . V .
18.583	8.2638	2.88	Q . . . V .
18.667	8.2832	2.81	Q . . . V .
18.750	8.3021	2.74	Q . . . V .
18.833	8.3206	2.68	Q . . . V .
18.917	8.3386	2.62	Q . . . V .
19.000	8.3563	2.57	Q . . . V .
19.083	8.3737	2.51	Q . . . V .
19.167	8.3906	2.46	Q . . . V .
19.250	8.4073	2.42	Q . . . V .
19.333	8.4236	2.37	Q . . . V .
19.417	8.4396	2.33	Q . . . V .
19.500	8.4554	2.29	Q . . . V .
19.583	8.4708	2.25	Q . . . V .
19.667	8.4860	2.21	Q . . . V .
19.750	8.5010	2.17	Q . . . V .

19.833	8.5157	2.14	Q	.	.	.	V .
19.917	8.5302	2.10	Q	.	.	.	V .
20.000	8.5444	2.07	Q	.	.	.	V .
20.083	8.5585	2.04	Q	.	.	.	V .
20.167	8.5723	2.01	Q	.	.	.	V .
20.250	8.5860	1.98	Q	.	.	.	V .
20.333	8.5994	1.95	Q	.	.	.	V .
20.417	8.6127	1.93	Q	.	.	.	V .
20.500	8.6257	1.90	Q	.	.	.	V .
20.583	8.6386	1.87	Q	.	.	.	V .
20.667	8.6514	1.85	Q	.	.	.	V .
20.750	8.6640	1.83	Q	.	.	.	V .
20.833	8.6764	1.80	Q	.	.	.	V .
20.917	8.6887	1.78	Q	.	.	.	V .
21.000	8.7008	1.76	Q	.	.	.	V .
21.083	8.7128	1.74	Q	.	.	.	V .
21.167	8.7246	1.72	Q	.	.	.	V .
21.250	8.7363	1.70	Q	.	.	.	V .
21.333	8.7479	1.68	Q	.	.	.	V .
21.417	8.7593	1.66	Q	.	.	.	V .
21.500	8.7707	1.64	Q	.	.	.	V .
21.583	8.7819	1.63	Q	.	.	.	V .
21.667	8.7929	1.61	Q	.	.	.	V .
21.750	8.8039	1.59	Q	.	.	.	V .
21.833	8.8148	1.58	Q	.	.	.	V .
21.917	8.8255	1.56	Q	.	.	.	V .
22.000	8.8362	1.55	Q	.	.	.	V .
22.083	8.8467	1.53	Q	.	.	.	V .
22.167	8.8572	1.52	Q	.	.	.	V .
22.250	8.8675	1.50	Q	.	.	.	V .
22.333	8.8777	1.49	Q	.	.	.	V.
22.417	8.8879	1.47	Q	.	.	.	V.
22.500	8.8980	1.46	Q	.	.	.	V.
22.583	8.9079	1.45	Q	.	.	.	V.
22.667	8.9178	1.43	Q	.	.	.	V.
22.750	8.9276	1.42	Q	.	.	.	V.
22.833	8.9373	1.41	Q	.	.	.	V.
22.917	8.9469	1.40	Q	.	.	.	V.
23.000	8.9565	1.39	Q	.	.	.	V.
23.083	8.9660	1.38	Q	.	.	.	V.
23.167	8.9754	1.36	Q	.	.	.	V.
23.250	8.9847	1.35	Q	.	.	.	V.
23.333	8.9939	1.34	Q	.	.	.	V.
23.417	9.0031	1.33	Q	.	.	.	V.
23.500	9.0122	1.32	Q	.	.	.	V.
23.583	9.0212	1.31	Q	.	.	.	V.
23.667	9.0302	1.30	Q	.	.	.	V.
23.750	9.0391	1.29	Q	.	.	.	V.
23.833	9.0479	1.28	Q	.	.	.	V.
23.917	9.0567	1.27	Q	.	.	.	V.

```
  24.000      9.0654      1.26  Q         .         .         .        V.
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ======================                  =========
              0%                            1445.0
             10%                              80.0
             20%                              50.0
             30%                              40.0
             40%                              30.0
             50%                              25.0
             60%                              25.0
             70%                              15.0
             80%                              15.0
             90%                              10.0
 ==============================================================================

  END OF FLOODSCx ROUTING ANALYSIS
```

APPENDIX B – UNIT HYDROGRAPHS AND BASIN ROUTING

BASIN ROUTING MAP

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR
1-800-422-4133

60 0 60 120 180

SCALE:	1"=60'
DESIGN:	CE
DRAWN:	CE
CHECKED:	SG
APPROVED:	

PREPARED BY:
PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

CITY OF REDLANDS

TTM'S 20402, 20403, AND 20404
BASIN ROUTING MAP

SHEET NO.
1 OF 1

100-YEAR PROPOSED HYDROLOGY UNIT HYDROGRAPH & BASIN 'A' ROUTING

```
____________________________________________________________________________
****************************************************************************

             F L O O D   R O U T I N G   A N A L Y S I S
          USING COUNTY HYDROLOGY MANUAL OF SAN BERNARDINO(1986)
         (c) Copyright 1989-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TR 20402, 20403, 20404 PROPOSED CONDITION                              *
* 100 YEAR STORM                                                         *
* 04/11/2021                                                             *
 ************************************************************************

  FILE NAME: 1COMBINE.DAT
  TIME/DATE OF STUDY: 07:21 04/14/2022


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      24.900 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.156 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.246
         LOW LOSS FRACTION = 0.294
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.46
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.93
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.23
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.88
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.45
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  4.90
```

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE FACTOR = 0.999
30-MINUTE FACTOR = 0.999
1-HOUR FACTOR = 0.999
3-HOUR FACTOR = 1.000
6-HOUR FACTOR = 1.000
24-HOUR FACTOR = 1.000

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 53.419

==========

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	5.068	15.262
2	33.584	85.872
3	73.235	119.401
4	92.306	57.429
5	97.847	16.687
6	99.098	3.766
7	99.639	1.631
8	99.910	0.815
9	100.000	0.272

↑
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0085	0.0025	0.0060
2	0.0085	0.0025	0.0060
3	0.0086	0.0025	0.0060
4	0.0086	0.0025	0.0061
5	0.0086	0.0025	0.0061
6	0.0086	0.0025	0.0061
7	0.0087	0.0025	0.0061
8	0.0087	0.0025	0.0061
9	0.0087	0.0026	0.0061
10	0.0087	0.0026	0.0062
11	0.0087	0.0026	0.0062
12	0.0088	0.0026	0.0062

13	0.0088	0.0026	0.0062
14	0.0088	0.0026	0.0062
15	0.0088	0.0026	0.0062
16	0.0089	0.0026	0.0063
17	0.0089	0.0026	0.0063
18	0.0089	0.0026	0.0063
19	0.0089	0.0026	0.0063
20	0.0090	0.0026	0.0063
21	0.0090	0.0026	0.0064
22	0.0090	0.0027	0.0064
23	0.0090	0.0027	0.0064
24	0.0091	0.0027	0.0064
25	0.0091	0.0027	0.0064
26	0.0091	0.0027	0.0064
27	0.0092	0.0027	0.0065
28	0.0092	0.0027	0.0065
29	0.0092	0.0027	0.0065
30	0.0092	0.0027	0.0065
31	0.0093	0.0027	0.0065
32	0.0093	0.0027	0.0066
33	0.0093	0.0027	0.0066
34	0.0093	0.0027	0.0066
35	0.0094	0.0028	0.0066
36	0.0094	0.0028	0.0066
37	0.0094	0.0028	0.0067
38	0.0095	0.0028	0.0067
39	0.0095	0.0028	0.0067
40	0.0095	0.0028	0.0067
41	0.0096	0.0028	0.0068
42	0.0096	0.0028	0.0068
43	0.0096	0.0028	0.0068
44	0.0097	0.0028	0.0068
45	0.0097	0.0029	0.0068
46	0.0097	0.0029	0.0069
47	0.0098	0.0029	0.0069
48	0.0098	0.0029	0.0069
49	0.0098	0.0029	0.0069
50	0.0099	0.0029	0.0070
51	0.0099	0.0029	0.0070
52	0.0099	0.0029	0.0070
53	0.0100	0.0029	0.0070
54	0.0100	0.0029	0.0071
55	0.0100	0.0030	0.0071
56	0.0101	0.0030	0.0071
57	0.0101	0.0030	0.0071
58	0.0101	0.0030	0.0072
59	0.0102	0.0030	0.0072
60	0.0102	0.0030	0.0072
61	0.0103	0.0030	0.0073
62	0.0103	0.0030	0.0073

63	0.0104	0.0030	0.0073
64	0.0104	0.0031	0.0073
65	0.0104	0.0031	0.0074
66	0.0105	0.0031	0.0074
67	0.0105	0.0031	0.0074
68	0.0105	0.0031	0.0074
69	0.0106	0.0031	0.0075
70	0.0106	0.0031	0.0075
71	0.0107	0.0031	0.0075
72	0.0107	0.0032	0.0076
73	0.0108	0.0032	0.0076
74	0.0108	0.0032	0.0076
75	0.0109	0.0032	0.0077
76	0.0109	0.0032	0.0077
77	0.0110	0.0032	0.0077
78	0.0110	0.0032	0.0078
79	0.0111	0.0033	0.0078
80	0.0111	0.0033	0.0078
81	0.0112	0.0033	0.0079
82	0.0112	0.0033	0.0079
83	0.0113	0.0033	0.0079
84	0.0113	0.0033	0.0080
85	0.0114	0.0033	0.0080
86	0.0114	0.0034	0.0080
87	0.0115	0.0034	0.0081
88	0.0115	0.0034	0.0081
89	0.0116	0.0034	0.0082
90	0.0116	0.0034	0.0082
91	0.0117	0.0034	0.0083
92	0.0117	0.0034	0.0083
93	0.0118	0.0035	0.0083
94	0.0118	0.0035	0.0084
95	0.0119	0.0035	0.0084
96	0.0120	0.0035	0.0084
97	0.0121	0.0035	0.0085
98	0.0121	0.0036	0.0085
99	0.0122	0.0036	0.0086
100	0.0122	0.0036	0.0086
101	0.0123	0.0036	0.0087
102	0.0124	0.0036	0.0087
103	0.0124	0.0037	0.0088
104	0.0125	0.0037	0.0088
105	0.0126	0.0037	0.0089
106	0.0126	0.0037	0.0089
107	0.0127	0.0037	0.0090
108	0.0128	0.0038	0.0090
109	0.0129	0.0038	0.0091
110	0.0129	0.0038	0.0091
111	0.0130	0.0038	0.0092
112	0.0131	0.0039	0.0092

113	0.0132	0.0039	0.0093
114	0.0133	0.0039	0.0094
115	0.0134	0.0039	0.0094
116	0.0134	0.0039	0.0095
117	0.0136	0.0040	0.0096
118	0.0136	0.0040	0.0096
119	0.0137	0.0040	0.0097
120	0.0138	0.0041	0.0097
121	0.0139	0.0041	0.0098
122	0.0140	0.0041	0.0099
123	0.0141	0.0042	0.0100
124	0.0142	0.0042	0.0100
125	0.0143	0.0042	0.0101
126	0.0144	0.0042	0.0102
127	0.0145	0.0043	0.0103
128	0.0146	0.0043	0.0103
129	0.0148	0.0043	0.0104
130	0.0149	0.0044	0.0105
131	0.0150	0.0044	0.0106
132	0.0151	0.0044	0.0107
133	0.0153	0.0045	0.0108
134	0.0153	0.0045	0.0108
135	0.0155	0.0046	0.0110
136	0.0156	0.0046	0.0110
137	0.0158	0.0046	0.0112
138	0.0159	0.0047	0.0112
139	0.0161	0.0047	0.0114
140	0.0162	0.0048	0.0114
141	0.0164	0.0048	0.0116
142	0.0165	0.0049	0.0117
143	0.0167	0.0049	0.0118
144	0.0168	0.0050	0.0119
145	0.0131	0.0038	0.0092
146	0.0132	0.0039	0.0093
147	0.0134	0.0039	0.0095
148	0.0135	0.0040	0.0096
149	0.0138	0.0041	0.0097
150	0.0139	0.0041	0.0098
151	0.0142	0.0042	0.0100
152	0.0143	0.0042	0.0101
153	0.0146	0.0043	0.0103
154	0.0148	0.0043	0.0104
155	0.0151	0.0044	0.0107
156	0.0153	0.0045	0.0108
157	0.0156	0.0046	0.0110
158	0.0158	0.0046	0.0112
159	0.0162	0.0048	0.0114
160	0.0164	0.0048	0.0116
161	0.0168	0.0049	0.0119
162	0.0170	0.0050	0.0120

163	0.0175	0.0051	0.0124
164	0.0178	0.0052	0.0125
165	0.0183	0.0054	0.0129
166	0.0186	0.0055	0.0131
167	0.0191	0.0056	0.0135
168	0.0195	0.0057	0.0137
169	0.0204	0.0060	0.0144
170	0.0207	0.0061	0.0146
171	0.0215	0.0063	0.0152
172	0.0219	0.0064	0.0155
173	0.0228	0.0067	0.0161
174	0.0233	0.0069	0.0165
175	0.0244	0.0072	0.0172
176	0.0250	0.0073	0.0176
177	0.0262	0.0077	0.0185
178	0.0270	0.0079	0.0190
179	0.0285	0.0084	0.0202
180	0.0294	0.0087	0.0208
181	0.0314	0.0092	0.0222
182	0.0326	0.0096	0.0230
183	0.0353	0.0104	0.0249
184	0.0369	0.0108	0.0260
185	0.0424	0.0125	0.0299
186	0.0448	0.0132	0.0316
187	0.0507	0.0149	0.0358
188	0.0547	0.0161	0.0387
189	0.0642	0.0189	0.0453
190	0.0726	0.0205	0.0521
191	0.1041	0.0205	0.0836
192	0.1439	0.0205	0.1234
193	0.4595	0.0205	0.4390
194	0.0846	0.0205	0.0641
195	0.0596	0.0175	0.0421
196	0.0475	0.0140	0.0335
197	0.0387	0.0114	0.0273
198	0.0339	0.0100	0.0239
199	0.0304	0.0089	0.0215
200	0.0277	0.0081	0.0196
201	0.0256	0.0075	0.0181
202	0.0238	0.0070	0.0168
203	0.0224	0.0066	0.0158
204	0.0211	0.0062	0.0149
205	0.0198	0.0058	0.0140
206	0.0188	0.0055	0.0133
207	0.0180	0.0053	0.0127
208	0.0173	0.0051	0.0122
209	0.0166	0.0049	0.0117
210	0.0160	0.0047	0.0113
211	0.0154	0.0045	0.0109
212	0.0149	0.0044	0.0105

213	0.0145	0.0043	0.0102
214	0.0141	0.0041	0.0099
215	0.0137	0.0040	0.0096
216	0.0133	0.0039	0.0094
217	0.0170	0.0050	0.0120
218	0.0166	0.0049	0.0117
219	0.0163	0.0048	0.0115
220	0.0160	0.0047	0.0113
221	0.0157	0.0046	0.0111
222	0.0154	0.0045	0.0109
223	0.0152	0.0045	0.0107
224	0.0149	0.0044	0.0105
225	0.0147	0.0043	0.0104
226	0.0145	0.0043	0.0102
227	0.0143	0.0042	0.0101
228	0.0141	0.0041	0.0099
229	0.0139	0.0041	0.0098
230	0.0137	0.0040	0.0097
231	0.0135	0.0040	0.0095
232	0.0133	0.0039	0.0094
233	0.0132	0.0039	0.0093
234	0.0130	0.0038	0.0092
235	0.0128	0.0038	0.0091
236	0.0127	0.0037	0.0090
237	0.0125	0.0037	0.0089
238	0.0124	0.0036	0.0088
239	0.0123	0.0036	0.0087
240	0.0121	0.0036	0.0086
241	0.0120	0.0035	0.0085
242	0.0119	0.0035	0.0084
243	0.0118	0.0035	0.0083
244	0.0117	0.0034	0.0082
245	0.0115	0.0034	0.0081
246	0.0114	0.0034	0.0081
247	0.0113	0.0033	0.0080
248	0.0112	0.0033	0.0079
249	0.0111	0.0033	0.0079
250	0.0110	0.0032	0.0078
251	0.0109	0.0032	0.0077
252	0.0108	0.0032	0.0077
253	0.0107	0.0032	0.0076
254	0.0107	0.0031	0.0075
255	0.0106	0.0031	0.0075
256	0.0105	0.0031	0.0074
257	0.0104	0.0031	0.0073
258	0.0103	0.0030	0.0073
259	0.0102	0.0030	0.0072
260	0.0102	0.0030	0.0072
261	0.0101	0.0030	0.0071
262	0.0100	0.0029	0.0071

263	0.0100	0.0029	0.0070
264	0.0099	0.0029	0.0070
265	0.0098	0.0029	0.0069
266	0.0097	0.0029	0.0069
267	0.0097	0.0028	0.0068
268	0.0096	0.0028	0.0068
269	0.0096	0.0028	0.0067
270	0.0095	0.0028	0.0067
271	0.0094	0.0028	0.0067
272	0.0094	0.0028	0.0066
273	0.0093	0.0027	0.0066
274	0.0093	0.0027	0.0065
275	0.0092	0.0027	0.0065
276	0.0091	0.0027	0.0065
277	0.0091	0.0027	0.0064
278	0.0090	0.0027	0.0064
279	0.0090	0.0026	0.0063
280	0.0089	0.0026	0.0063
281	0.0089	0.0026	0.0063
282	0.0088	0.0026	0.0062
283	0.0088	0.0026	0.0062
284	0.0087	0.0026	0.0062
285	0.0087	0.0026	0.0061
286	0.0086	0.0025	0.0061
287	0.0086	0.0025	0.0061
288	0.0085	0.0025	0.0060

TOTAL STORM RAINFALL(INCHES) = 4.90
TOTAL SOIL-LOSS(INCHES) = 1.29
TOTAL EFFECTIVE RAINFALL(INCHES) = 3.61

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.6742
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 7.4889

↑

==========

2 4 - 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 FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	17.5	35.0	52.5	70.0
0.083	0.0006	0.09	Q	.	.	.	.
0.167	0.0048	0.61	Q	.	.	.	.
0.250	0.0140	1.33	Q	.	.	.	.

0.333	0.0255	1.68	Q	.	.	.	.
0.417	0.0378	1.78	VQ	.	.	.	.
0.500	0.0502	1.81	VQ	.	.	.	.
0.583	0.0628	1.82	VQ	.	.	.	.
0.667	0.0754	1.83	VQ	.	.	.	.
0.750	0.0880	1.84	VQ	.	.	.	.
0.833	0.1007	1.84	VQ	.	.	.	.
0.917	0.1135	1.85	VQ	.	.	.	.
1.000	0.1262	1.85	VQ	.	.	.	.
1.083	0.1390	1.86	VQ	.	.	.	.
1.167	0.1519	1.86	VQ	.	.	.	.
1.250	0.1647	1.87	VQ	.	.	.	.
1.333	0.1776	1.87	VQ	.	.	.	.
1.417	0.1906	1.88	.Q	.	.	.	.
1.500	0.2036	1.88	.Q	.	.	.	.
1.583	0.2166	1.89	.Q	.	.	.	.
1.667	0.2296	1.90	.Q	.	.	.	.
1.750	0.2427	1.90	.Q	.	.	.	.
1.833	0.2558	1.91	.Q	.	.	.	.
1.917	0.2690	1.91	.Q	.	.	.	.
2.000	0.2822	1.92	.Q	.	.	.	.
2.083	0.2955	1.92	.Q	.	.	.	.
2.167	0.3087	1.93	.Q	.	.	.	.
2.250	0.3221	1.93	.Q	.	.	.	.
2.333	0.3354	1.94	.Q	.	.	.	.
2.417	0.3488	1.95	.Q	.	.	.	.
2.500	0.3623	1.95	.Q	.	.	.	.
2.583	0.3758	1.96	.QV	.	.	.	.
2.667	0.3893	1.96	.QV	.	.	.	.
2.750	0.4029	1.97	.QV	.	.	.	.
2.833	0.4165	1.98	.QV	.	.	.	.
2.917	0.4301	1.98	.QV	.	.	.	.
3.000	0.4438	1.99	.QV	.	.	.	.
3.083	0.4576	1.99	.QV	.	.	.	.
3.167	0.4713	2.00	.QV	.	.	.	.
3.250	0.4852	2.01	.QV	.	.	.	.
3.333	0.4990	2.01	.QV	.	.	.	.
3.417	0.5129	2.02	.QV	.	.	.	.
3.500	0.5269	2.03	.QV	.	.	.	.
3.583	0.5409	2.03	.QV	.	.	.	.
3.667	0.5550	2.04	.QV	.	.	.	.
3.750	0.5691	2.05	.Q V	.	.	.	.
3.833	0.5832	2.05	.Q V	.	.	.	.
3.917	0.5974	2.06	.Q V	.	.	.	.
4.000	0.6117	2.07	.Q V	.	.	.	.
4.083	0.6260	2.08	.Q V	.	.	.	.
4.167	0.6403	2.08	.Q V	.	.	.	.
4.250	0.6547	2.09	.Q V	.	.	.	.
4.333	0.6691	2.10	.Q V	.	.	.	.
4.417	0.6836	2.10	.Q V	.	.	.	.

```
4.500      0.6982      2.11  .Q V      .         .         .         .
4.583      0.7128      2.12  .Q V      .         .         .         .
4.667      0.7274      2.13  .Q V      .         .         .         .
4.750      0.7421      2.13  .Q V      .         .         .         .
4.833      0.7569      2.14  .Q  V     .         .         .         .
4.917      0.7717      2.15  .Q  V     .         .         .         .
5.000      0.7865      2.16  .Q  V     .         .         .         .
5.083      0.8015      2.17  .Q  V     .         .         .         .
5.167      0.8164      2.17  .Q  V     .         .         .         .
5.250      0.8315      2.18  .Q  V     .         .         .         .
5.333      0.8466      2.19  .Q  V     .         .         .         .
5.417      0.8617      2.20  .Q  V     .         .         .         .
5.500      0.8769      2.21  .Q  V     .         .         .         .
5.583      0.8922      2.22  .Q  V     .         .         .         .
5.667      0.9075      2.23  .Q  V     .         .         .         .
5.750      0.9229      2.23  .Q  V     .         .         .         .
5.833      0.9383      2.24  .Q   V    .         .         .         .
5.917      0.9538      2.25  .Q   V    .         .         .         .
6.000      0.9694      2.26  .Q   V    .         .         .         .
6.083      0.9851      2.27  .Q   V    .         .         .         .
6.167      1.0008      2.28  .Q   V    .         .         .         .
6.250      1.0165      2.29  .Q   V    .         .         .         .
6.333      1.0324      2.30  .Q   V    .         .         .         .
6.417      1.0483      2.31  .Q   V    .         .         .         .
6.500      1.0642      2.32  .Q   V    .         .         .         .
6.583      1.0803      2.33  .Q   V    .         .         .         .
6.667      1.0964      2.34  .Q   V    .         .         .         .
6.750      1.1126      2.35  .Q   V    .         .         .         .
6.833      1.1288      2.36  .Q    V   .         .         .         .
6.917      1.1451      2.37  .Q    V   .         .         .         .
7.000      1.1615      2.38  .Q    V   .         .         .         .
7.083      1.1780      2.39  .Q    V   .         .         .         .
7.167      1.1945      2.40  .Q    V   .         .         .         .
7.250      1.2112      2.41  .Q    V   .         .         .         .
7.333      1.2279      2.42  .Q    V   .         .         .         .
7.417      1.2446      2.44  .Q    V   .         .         .         .
7.500      1.2615      2.45  .Q    V   .         .         .         .
7.583      1.2784      2.46  .Q    V   .         .         .         .
7.667      1.2954      2.47  .Q    V   .         .         .         .
7.750      1.3126      2.48  .Q     V  .         .         .         .
7.833      1.3297      2.50  .Q     V  .         .         .         .
7.917      1.3470      2.51  .Q     V  .         .         .         .
8.000      1.3644      2.52  .Q     V  .         .         .         .
8.083      1.3818      2.53  .Q     V  .         .         .         .
8.167      1.3994      2.55  .Q     V  .         .         .         .
8.250      1.4170      2.56  .Q     V  .         .         .         .
8.333      1.4347      2.57  .Q     V  .         .         .         .
8.417      1.4525      2.59  .Q     V  .         .         .         .
8.500      1.4705      2.60  .Q     V  .         .         .         .
8.583      1.4885      2.62  .Q     V  .         .         .         .
```

8.667	1.5066	2.63	.Q	V .	.	.	.
8.750	1.5248	2.64	.Q	V .	.	.	.
8.833	1.5431	2.66	.Q	V .	.	.	.
8.917	1.5615	2.67	.Q	V .	.	.	.
9.000	1.5800	2.69	.Q	V .	.	.	.
9.083	1.5987	2.71	.Q	V .	.	.	.
9.167	1.6174	2.72	.Q	V .	.	.	.
9.250	1.6363	2.74	.Q	V .	.	.	.
9.333	1.6552	2.75	.Q	V .	.	.	.
9.417	1.6743	2.77	.Q	V .	.	.	.
9.500	1.6935	2.79	.Q	V.	.	.	.
9.583	1.7128	2.81	.Q	V.	.	.	.
9.667	1.7323	2.82	.Q	V.	.	.	.
9.750	1.7518	2.84	.Q	V.	.	.	.
9.833	1.7715	2.86	.Q	V.	.	.	.
9.917	1.7913	2.88	.Q	V.	.	.	.
10.000	1.8113	2.90	.Q	V.	.	.	.
10.083	1.8314	2.92	.Q	V.	.	.	.
10.167	1.8516	2.94	.Q	V.	.	.	.
10.250	1.8720	2.96	.Q	V.	.	.	.
10.333	1.8925	2.98	.Q	V	.	.	.
10.417	1.9131	3.00	.Q	V	.	.	.
10.500	1.9340	3.02	.Q	V	.	.	.
10.583	1.9549	3.04	.Q	V	.	.	.
10.667	1.9760	3.07	.Q	V	.	.	.
10.750	1.9973	3.09	.Q	V	.	.	.
10.833	2.0187	3.11	.Q	V	.	.	.
10.917	2.0403	3.14	.Q	V	.	.	.
11.000	2.0621	3.16	.Q	.V	.	.	.
11.083	2.0841	3.19	.Q	.V	.	.	.
11.167	2.1062	3.21	.Q	.V	.	.	.
11.250	2.1285	3.24	.Q	.V	.	.	.
11.333	2.1510	3.27	.Q	.V	.	.	.
11.417	2.1737	3.30	.Q	.V	.	.	.
11.500	2.1966	3.32	.Q	.V	.	.	.
11.583	2.2197	3.35	.Q	.V	.	.	.
11.667	2.2430	3.38	.Q	.V	.	.	.
11.750	2.2666	3.42	.Q	. V	.	.	.
11.833	2.2903	3.45	.Q	. V	.	.	.
11.917	2.3143	3.48	.Q	. V	.	.	.
12.000	2.3385	3.52	. Q	. V	.	.	.
12.083	2.3627	3.51	. Q	. V	.	.	.
12.167	2.3854	3.30	.Q	. V	.	.	.
12.250	2.4060	3.00	.Q	. V	.	.	.
12.333	2.4258	2.87	.Q	. V	.	.	.
12.417	2.4456	2.86	.Q	. V	.	.	.
12.500	2.4655	2.89	.Q	. V	.	.	.
12.583	2.4856	2.93	.Q	. V	.	.	.
12.667	2.5061	2.97	.Q	. V	.	.	.
12.750	2.5268	3.01	.Q	. V	.	.	.

12.833	2.5479	3.06	.Q . V . . .
12.917	2.5692	3.10	.Q . V . . .
13.000	2.5910	3.15	.Q . V . . .
13.083	2.6130	3.20	.Q . V . . .
13.167	2.6355	3.26	.Q . V . . .
13.250	2.6583	3.31	.Q . V . . .
13.333	2.6815	3.37	.Q . V . . .
13.417	2.7052	3.43	.Q . V . . .
13.500	2.7292	3.50	.Q . V . . .
13.583	2.7538	3.57	. Q . V . . .
13.667	2.7789	3.64	. Q . V . . .
13.750	2.8044	3.71	. Q . V . . .
13.833	2.8305	3.79	. Q . V . . .
13.917	2.8572	3.88	. Q . V . . .
14.000	2.8845	3.96	. Q . V . . .
14.083	2.9125	4.06	. Q . V . . .
14.167	2.9412	4.18	. Q . V . . .
14.250	2.9709	4.31	. Q . V . . .
14.333	3.0014	4.43	. Q . V . . .
14.417	3.0328	4.56	. Q . V . . .
14.500	3.0651	4.69	. Q . V . . .
14.583	3.0984	4.84	. Q . V . . .
14.667	3.1328	4.99	. Q . V . . .
14.750	3.1684	5.17	. Q . V . . .
14.833	3.2053	5.35	. Q . V . . .
14.917	3.2436	5.56	. Q . V . . .
15.000	3.2834	5.79	. Q . V . . .
15.083	3.3250	6.04	. Q . V . . .
15.167	3.3686	6.33	. Q . V . . .
15.250	3.4145	6.66	. Q . V . . .
15.333	3.4629	7.03	. Q . V . . .
15.417	3.5145	7.49	. Q . V . . .
15.500	3.5704	8.11	. Q . V. . .
15.583	3.6316	8.89	. Q . V. . .
15.667	3.6988	9.75	. Q . V. . .
15.750	3.7729	10.77	. Q . V . .
15.833	3.8560	12.07	. Q . V . .
15.917	3.9536	14.18	. Q . .V . .
16.000	4.0828	18.75	. Q .V . .
16.083	4.2982	31.27	. . Q . V . .
16.167	4.7069	59.36	. . . V . Q .
16.250	5.1709	67.36	. . . V . Q .
16.333	5.4429	39.50	. . . Q V. .
16.417	5.5805	19.98	. .Q . V. .
16.500	5.6640	12.13	. Q . . V .
16.583	5.7284	9.35	. Q . . V .
16.667	5.7820	7.78	. Q . . V .
16.750	5.8282	6.71	. Q . . .V .
16.833	5.8694	5.99	. Q . . .V .
16.917	5.9073	5.50	. Q . . .V .

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17.000      5.9425      5.11  . Q       .         .         .V        .
17.083      5.9754      4.78  . Q       .         .         .V        .
17.167      6.0064      4.49  . Q       .         .         . V       .
17.250      6.0356      4.24  . Q       .         .         . V       .
17.333      6.0633      4.02  . Q       .         .         . V       .
17.417      6.0898      3.84  . Q       .         .         . V       .
17.500      6.1151      3.68  . Q       .         .         . V       .
17.583      6.1395      3.54  . Q       .         .         . V       .
17.667      6.1629      3.41  .Q        .         .         . V       .
17.750      6.1856      3.29  .Q        .         .         .  V      .
17.833      6.2075      3.18  .Q        .         .         .  V      .
17.917      6.2287      3.08  .Q        .         .         .  V      .
18.000      6.2493      2.99  .Q        .         .         .  V      .
18.083      6.2696      2.95  .Q        .         .         .  V      .
18.167      6.2911      3.11  .Q        .         .         .  V      .
18.250      6.3143      3.38  .Q        .         .         .  V      .
18.333      6.3382      3.47  .Q        .         .         .  V      .
18.417      6.3620      3.45  .Q        .         .         .  V      .
18.500      6.3853      3.39  .Q        .         .         .   V     .
18.583      6.4083      3.34  .Q        .         .         .   V     .
18.667      6.4309      3.28  .Q        .         .         .   V     .
18.750      6.4532      3.23  .Q        .         .         .   V     .
18.833      6.4750      3.18  .Q        .         .         .   V     .
18.917      6.4966      3.13  .Q        .         .         .   V     .
19.000      6.5177      3.08  .Q        .         .         .   V     .
19.083      6.5386      3.03  .Q        .         .         .   V     .
19.167      6.5592      2.99  .Q        .         .         .    V    .
19.250      6.5795      2.95  .Q        .         .         .    V    .
19.333      6.5995      2.91  .Q        .         .         .    V    .
19.417      6.6193      2.87  .Q        .         .         .    V    .
19.500      6.6388      2.83  .Q        .         .         .    V    .
19.583      6.6581      2.80  .Q        .         .         .    V    .
19.667      6.6771      2.76  .Q        .         .         .    V    .
19.750      6.6959      2.73  .Q        .         .         .    V    .
19.833      6.7145      2.70  .Q        .         .         .    V    .
19.917      6.7328      2.67  .Q        .         .         .    V    .
20.000      6.7510      2.64  .Q        .         .         .     V   .
20.083      6.7690      2.61  .Q        .         .         .     V   .
20.167      6.7867      2.58  .Q        .         .         .     V   .
20.250      6.8043      2.55  .Q        .         .         .     V   .
20.333      6.8217      2.53  .Q        .         .         .     V   .
20.417      6.8390      2.50  .Q        .         .         .     V   .
20.500      6.8560      2.48  .Q        .         .         .     V   .
20.583      6.8729      2.45  .Q        .         .         .     V   .
20.667      6.8897      2.43  .Q        .         .         .     V   .
20.750      6.9062      2.41  .Q        .         .         .     V   .
20.833      6.9227      2.39  .Q        .         .         .     V   .
20.917      6.9390      2.36  .Q        .         .         .      V  .
21.000      6.9551      2.34  .Q        .         .         .      V  .
21.083      6.9711      2.32  .Q        .         .         .      V  .
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   21.167      6.9870      2.30  .Q        .         .         .      V  .
   21.250      7.0027      2.28  .Q        .         .         .      V  .
   21.333      7.0183      2.27  .Q        .         .         .      V  .
   21.417      7.0338      2.25  .Q        .         .         .      V  .
   21.500      7.0491      2.23  .Q        .         .         .      V  .
   21.583      7.0644      2.21  .Q        .         .         .      V  .
   21.667      7.0795      2.20  .Q        .         .         .      V  .
   21.750      7.0945      2.18  .Q        .         .         .      V  .
   21.833      7.1094      2.16  .Q        .         .         .      V  .
   21.917      7.1242      2.15  .Q        .         .         .       V .
   22.000      7.1388      2.13  .Q        .         .         .       V .
   22.083      7.1534      2.12  .Q        .         .         .       V .
   22.167      7.1679      2.10  .Q        .         .         .       V .
   22.250      7.1823      2.09  .Q        .         .         .       V .
   22.333      7.1965      2.07  .Q        .         .         .       V .
   22.417      7.2107      2.06  .Q        .         .         .       V .
   22.500      7.2248      2.04  .Q        .         .         .       V .
   22.583      7.2388      2.03  .Q        .         .         .       V .
   22.667      7.2526      2.02  .Q        .         .         .       V .
   22.750      7.2664      2.00  .Q        .         .         .       V .
   22.833      7.2802      1.99  .Q        .         .         .       V .
   22.917      7.2938      1.98  .Q        .         .         .       V .
   23.000      7.3073      1.97  .Q        .         .         .        V.
   23.083      7.3208      1.95  .Q        .         .         .        V.
   23.167      7.3342      1.94  .Q        .         .         .        V.
   23.250      7.3475      1.93  .Q        .         .         .        V.
   23.333      7.3607      1.92  .Q        .         .         .        V.
   23.417      7.3739      1.91  .Q        .         .         .        V.
   23.500      7.3869      1.90  .Q        .         .         .        V.
   23.583      7.3999      1.89  .Q        .         .         .        V.
   23.667      7.4129      1.88  .Q        .         .         .        V.
   23.750      7.4257      1.87  .Q        .         .         .        V.
   23.833      7.4385      1.86  .Q        .         .         .        V.
   23.917      7.4512      1.85  .Q        .         .         .        V.
   24.000      7.4638      1.84  .Q        .         .         .        V.
   24.083      7.4758      1.73  Q         .         .         .        V.
   24.167      7.4841      1.21  Q         .         .         .        V.
   24.250      7.4875      0.49  Q         .         .         .        V.
   24.333      7.4884      0.14  Q         .         .         .        V.
   24.417      7.4887      0.04  Q         .         .         .        V.
   24.500      7.4888      0.02  Q         .         .         .        V.
   24.583      7.4889      0.01  Q         .         .         .        V.
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    =======================                 =========
```

```
     0%                              1475.0
    10%                                85.0
    20%                                35.0
    30%                                20.0
    40%                                20.0
    50%                                15.0
    60%                                10.0
    70%                                10.0
    80%                                10.0
    90%                                 5.0


****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================

                  INFLOW
                (STREAM 1)
                     |
                     |
                     V                __effective depth
                -----------           |   (and volume)
               |           |    |    |
               |           |    |....V........
               | detention |<-->|           outflow
               |   basin   |    |.........______
                -----------     |    ^    |  \
                     |          |  dead   |   basin outlet
                     V          | storage |
                  OUTFLOW        ---------
                (STREAM 1)


        ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
        THROUGH A FLOW-THROUGH DETENTION BASIN
        SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
          DEAD STORAGE(AF) =      0.000
          SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
          SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
          DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.00


        BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

         INTERVAL    DEPTH      OUTFLOW     STORAGE
          NUMBER      (FT)       (CFS)        (AF)
              1        0.00        0.00       0.000
```

2	0.90	15.40	0.193
3	1.90	29.20	0.437
4	2.90	37.50	0.706
5	3.10	38.90	0.762

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MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.09	0.00	0.00	0.0	0.000
0.167	0.000	0.61	0.00	0.02	0.2	0.004
0.250	0.000	1.33	0.00	0.04	0.5	0.009
0.333	0.000	1.68	0.00	0.07	0.9	0.014
0.417	0.000	1.78	0.00	0.08	1.3	0.018
0.500	0.000	1.81	0.00	0.09	1.5	0.020
0.583	0.000	1.82	0.00	0.10	1.6	0.021
0.667	0.000	1.83	0.00	0.10	1.7	0.022
0.750	0.000	1.84	0.00	0.10	1.8	0.022
0.833	0.000	1.84	0.00	0.11	1.8	0.023
0.917	0.000	1.85	0.00	0.11	1.8	0.023
1.000	0.000	1.85	0.00	0.11	1.8	0.023
1.083	0.000	1.86	0.00	0.11	1.8	0.023
1.167	0.000	1.86	0.00	0.11	1.9	0.023
1.250	0.000	1.87	0.00	0.11	1.9	0.023
1.333	0.000	1.87	0.00	0.11	1.9	0.023
1.417	0.000	1.88	0.00	0.11	1.9	0.023
1.500	0.000	1.88	0.00	0.11	1.9	0.024
1.583	0.000	1.89	0.00	0.11	1.9	0.024
1.667	0.000	1.90	0.00	0.11	1.9	0.024
1.750	0.000	1.90	0.00	0.11	1.9	0.024
1.833	0.000	1.91	0.00	0.11	1.9	0.024
1.917	0.000	1.91	0.00	0.11	1.9	0.024
2.000	0.000	1.92	0.00	0.11	1.9	0.024
2.083	0.000	1.92	0.00	0.11	1.9	0.024
2.167	0.000	1.93	0.00	0.11	1.9	0.024
2.250	0.000	1.93	0.00	0.11	1.9	0.024
2.333	0.000	1.94	0.00	0.11	1.9	0.024
2.417	0.000	1.95	0.00	0.11	1.9	0.024
2.500	0.000	1.95	0.00	0.11	1.9	0.024
2.583	0.000	1.96	0.00	0.11	1.9	0.024
2.667	0.000	1.96	0.00	0.11	2.0	0.025
2.750	0.000	1.97	0.00	0.11	2.0	0.025
2.833	0.000	1.98	0.00	0.12	2.0	0.025
2.917	0.000	1.98	0.00	0.12	2.0	0.025

3.000	0.000	1.99	0.00	0.12	2.0	0.025
3.083	0.000	1.99	0.00	0.12	2.0	0.025
3.167	0.000	2.00	0.00	0.12	2.0	0.025
3.250	0.000	2.01	0.00	0.12	2.0	0.025
3.333	0.000	2.01	0.00	0.12	2.0	0.025
3.417	0.000	2.02	0.00	0.12	2.0	0.025
3.500	0.000	2.03	0.00	0.12	2.0	0.025
3.583	0.000	2.03	0.00	0.12	2.0	0.025
3.667	0.000	2.04	0.00	0.12	2.0	0.025
3.750	0.000	2.05	0.00	0.12	2.0	0.026
3.833	0.000	2.05	0.00	0.12	2.0	0.026
3.917	0.000	2.06	0.00	0.12	2.0	0.026
4.000	0.000	2.07	0.00	0.12	2.1	0.026
4.083	0.000	2.08	0.00	0.12	2.1	0.026
4.167	0.000	2.08	0.00	0.12	2.1	0.026
4.250	0.000	2.09	0.00	0.12	2.1	0.026
4.333	0.000	2.10	0.00	0.12	2.1	0.026
4.417	0.000	2.10	0.00	0.12	2.1	0.026
4.500	0.000	2.11	0.00	0.12	2.1	0.026
4.583	0.000	2.12	0.00	0.12	2.1	0.026
4.667	0.000	2.13	0.00	0.12	2.1	0.027
4.750	0.000	2.13	0.00	0.12	2.1	0.027
4.833	0.000	2.14	0.00	0.12	2.1	0.027
4.917	0.000	2.15	0.00	0.13	2.1	0.027
5.000	0.000	2.16	0.00	0.13	2.1	0.027
5.083	0.000	2.17	0.00	0.13	2.2	0.027
5.167	0.000	2.17	0.00	0.13	2.2	0.027
5.250	0.000	2.18	0.00	0.13	2.2	0.027
5.333	0.000	2.19	0.00	0.13	2.2	0.027
5.417	0.000	2.20	0.00	0.13	2.2	0.027
5.500	0.000	2.21	0.00	0.13	2.2	0.028
5.583	0.000	2.22	0.00	0.13	2.2	0.028
5.667	0.000	2.23	0.00	0.13	2.2	0.028
5.750	0.000	2.23	0.00	0.13	2.2	0.028
5.833	0.000	2.24	0.00	0.13	2.2	0.028
5.917	0.000	2.25	0.00	0.13	2.2	0.028
6.000	0.000	2.26	0.00	0.13	2.2	0.028
6.083	0.000	2.27	0.00	0.13	2.3	0.028
6.167	0.000	2.28	0.00	0.13	2.3	0.028
6.250	0.000	2.29	0.00	0.13	2.3	0.029
6.333	0.000	2.30	0.00	0.13	2.3	0.029
6.417	0.000	2.31	0.00	0.13	2.3	0.029
6.500	0.000	2.32	0.00	0.13	2.3	0.029
6.583	0.000	2.33	0.00	0.14	2.3	0.029
6.667	0.000	2.34	0.00	0.14	2.3	0.029
6.750	0.000	2.35	0.00	0.14	2.3	0.029
6.833	0.000	2.36	0.00	0.14	2.3	0.029
6.917	0.000	2.37	0.00	0.14	2.4	0.030
7.000	0.000	2.38	0.00	0.14	2.4	0.030
7.083	0.000	2.39	0.00	0.14	2.4	0.030

7.167	0.000	2.40	0.00	0.14	2.4	0.030
7.250	0.000	2.41	0.00	0.14	2.4	0.030
7.333	0.000	2.42	0.00	0.14	2.4	0.030
7.417	0.000	2.44	0.00	0.14	2.4	0.030
7.500	0.000	2.45	0.00	0.14	2.4	0.030
7.583	0.000	2.46	0.00	0.14	2.4	0.031
7.667	0.000	2.47	0.00	0.14	2.5	0.031
7.750	0.000	2.48	0.00	0.14	2.5	0.031
7.833	0.000	2.50	0.00	0.14	2.5	0.031
7.917	0.000	2.51	0.00	0.15	2.5	0.031
8.000	0.000	2.52	0.00	0.15	2.5	0.031
8.083	0.000	2.53	0.00	0.15	2.5	0.032
8.167	0.000	2.55	0.00	0.15	2.5	0.032
8.250	0.000	2.56	0.00	0.15	2.5	0.032
8.333	0.000	2.57	0.00	0.15	2.5	0.032
8.417	0.000	2.59	0.00	0.15	2.6	0.032
8.500	0.000	2.60	0.00	0.15	2.6	0.032
8.583	0.000	2.62	0.00	0.15	2.6	0.033
8.667	0.000	2.63	0.00	0.15	2.6	0.033
8.750	0.000	2.64	0.00	0.15	2.6	0.033
8.833	0.000	2.66	0.00	0.15	2.6	0.033
8.917	0.000	2.67	0.00	0.16	2.6	0.033
9.000	0.000	2.69	0.00	0.16	2.7	0.033
9.083	0.000	2.71	0.00	0.16	2.7	0.034
9.167	0.000	2.72	0.00	0.16	2.7	0.034
9.250	0.000	2.74	0.00	0.16	2.7	0.034
9.333	0.000	2.75	0.00	0.16	2.7	0.034
9.417	0.000	2.77	0.00	0.16	2.7	0.034
9.500	0.000	2.79	0.00	0.16	2.8	0.035
9.583	0.000	2.81	0.00	0.16	2.8	0.035
9.667	0.000	2.82	0.00	0.16	2.8	0.035
9.750	0.000	2.84	0.00	0.16	2.8	0.035
9.833	0.000	2.86	0.00	0.17	2.8	0.036
9.917	0.000	2.88	0.00	0.17	2.8	0.036
10.000	0.000	2.90	0.00	0.17	2.9	0.036
10.083	0.000	2.92	0.00	0.17	2.9	0.036
10.167	0.000	2.94	0.00	0.17	2.9	0.036
10.250	0.000	2.96	0.00	0.17	2.9	0.037
10.333	0.000	2.98	0.00	0.17	2.9	0.037
10.417	0.000	3.00	0.00	0.17	3.0	0.037
10.500	0.000	3.02	0.00	0.17	3.0	0.038
10.583	0.000	3.04	0.00	0.18	3.0	0.038
10.667	0.000	3.07	0.00	0.18	3.0	0.038
10.750	0.000	3.09	0.00	0.18	3.0	0.038
10.833	0.000	3.11	0.00	0.18	3.1	0.039
10.917	0.000	3.14	0.00	0.18	3.1	0.039
11.000	0.000	3.16	0.00	0.18	3.1	0.039
11.083	0.000	3.19	0.00	0.18	3.1	0.040
11.167	0.000	3.21	0.00	0.19	3.2	0.040
11.250	0.000	3.24	0.00	0.19	3.2	0.040

11.333	0.000	3.27	0.00	0.19	3.2	0.041
11.417	0.000	3.30	0.00	0.19	3.2	0.041
11.500	0.000	3.32	0.00	0.19	3.3	0.041
11.583	0.000	3.35	0.00	0.19	3.3	0.042
11.667	0.000	3.38	0.00	0.20	3.3	0.042
11.750	0.000	3.42	0.00	0.20	3.4	0.042
11.833	0.000	3.45	0.00	0.20	3.4	0.043
11.917	0.000	3.48	0.00	0.20	3.4	0.043
12.000	0.000	3.52	0.00	0.20	3.5	0.044
12.083	0.000	3.51	0.00	0.20	3.5	0.044
12.167	0.000	3.30	0.00	0.20	3.4	0.043
12.250	0.000	3.00	0.00	0.19	3.3	0.040
12.333	0.000	2.87	0.00	0.18	3.2	0.039
12.417	0.000	2.86	0.00	0.17	3.0	0.037
12.500	0.000	2.89	0.00	0.17	3.0	0.037
12.583	0.000	2.93	0.00	0.17	2.9	0.037
12.667	0.000	2.97	0.00	0.17	2.9	0.037
12.750	0.000	3.01	0.00	0.17	3.0	0.037
12.833	0.000	3.06	0.00	0.18	3.0	0.038
12.917	0.000	3.10	0.00	0.18	3.0	0.038
13.000	0.000	3.15	0.00	0.18	3.1	0.039
13.083	0.000	3.20	0.00	0.18	3.1	0.039
13.167	0.000	3.26	0.00	0.19	3.2	0.040
13.250	0.000	3.31	0.00	0.19	3.2	0.041
13.333	0.000	3.37	0.00	0.19	3.3	0.041
13.417	0.000	3.43	0.00	0.20	3.3	0.042
13.500	0.000	3.50	0.00	0.20	3.4	0.043
13.583	0.000	3.57	0.00	0.20	3.4	0.044
13.667	0.000	3.64	0.00	0.21	3.5	0.044
13.750	0.000	3.71	0.00	0.21	3.6	0.045
13.833	0.000	3.79	0.00	0.22	3.7	0.046
13.917	0.000	3.88	0.00	0.22	3.7	0.047
14.000	0.000	3.96	0.00	0.23	3.8	0.048
14.083	0.000	4.06	0.00	0.23	3.9	0.049
14.167	0.000	4.18	0.00	0.24	4.0	0.051
14.250	0.000	4.31	0.00	0.24	4.1	0.052
14.333	0.000	4.43	0.00	0.25	4.2	0.054
14.417	0.000	4.56	0.00	0.26	4.3	0.055
14.500	0.000	4.69	0.00	0.26	4.5	0.057
14.583	0.000	4.84	0.00	0.27	4.6	0.058
14.667	0.000	4.99	0.00	0.28	4.7	0.060
14.750	0.000	5.17	0.00	0.29	4.9	0.062
14.833	0.000	5.35	0.00	0.30	5.0	0.064
14.917	0.000	5.56	0.00	0.31	5.2	0.067
15.000	0.000	5.79	0.00	0.32	5.4	0.069
15.083	0.000	6.04	0.00	0.34	5.6	0.072
15.167	0.000	6.33	0.00	0.35	5.9	0.075
15.250	0.000	6.66	0.00	0.37	6.1	0.079
15.333	0.000	7.03	0.00	0.39	6.4	0.083
15.417	0.000	7.49	0.00	0.41	6.8	0.088

15.500	0.000	8.11	0.00	0.44	7.2	0.094
15.583	0.000	8.89	0.00	0.47	7.8	0.101
15.667	0.000	9.75	0.00	0.51	8.4	0.110
15.750	0.000	10.77	0.00	0.56	9.2	0.121
15.833	0.000	12.07	0.00	0.62	10.2	0.134
15.917	0.000	14.18	0.00	0.71	11.4	0.153
16.000	0.000	18.75	0.00	0.88	13.6	0.188
16.083	0.000	31.27	0.00	1.26	17.7	0.282
16.167	0.000	59.36	0.00	2.18	26.0	0.512
16.250	0.000	67.36	0.00	3.00	34.9	0.735
16.333	0.000	39.50	0.00	3.03	38.3	0.743
16.417	0.000	19.98	0.00	2.61	36.8	0.628
16.500	0.000	12.13	0.00	2.08	32.9	0.485
16.583	0.000	9.35	0.00	1.58	27.7	0.358
16.667	0.000	7.78	0.00	1.18	22.0	0.261
16.750	0.000	6.71	0.00	0.88	17.1	0.189
16.833	0.000	5.99	0.00	0.65	13.1	0.140
16.917	0.000	5.50	0.00	0.51	9.9	0.109
17.000	0.000	5.11	0.00	0.42	7.9	0.090
17.083	0.000	4.78	0.00	0.36	6.6	0.077
17.167	0.000	4.49	0.00	0.32	5.8	0.068
17.250	0.000	4.24	0.00	0.29	5.2	0.062
17.333	0.000	4.02	0.00	0.26	4.7	0.057
17.417	0.000	3.84	0.00	0.25	4.4	0.053
17.500	0.000	3.68	0.00	0.23	4.1	0.050
17.583	0.000	3.54	0.00	0.22	3.9	0.048
17.667	0.000	3.41	0.00	0.21	3.7	0.045
17.750	0.000	3.29	0.00	0.20	3.6	0.044
17.833	0.000	3.18	0.00	0.20	3.4	0.042
17.917	0.000	3.08	0.00	0.19	3.3	0.041
18.000	0.000	2.99	0.00	0.18	3.2	0.039
18.083	0.000	2.95	0.00	0.18	3.1	0.038
18.167	0.000	3.11	0.00	0.18	3.1	0.039
18.250	0.000	3.38	0.00	0.19	3.1	0.040
18.333	0.000	3.47	0.00	0.19	3.3	0.042
18.417	0.000	3.45	0.00	0.20	3.3	0.042
18.500	0.000	3.39	0.00	0.20	3.4	0.042
18.583	0.000	3.34	0.00	0.20	3.4	0.042
18.667	0.000	3.28	0.00	0.19	3.3	0.042
18.750	0.000	3.23	0.00	0.19	3.3	0.041
18.833	0.000	3.18	0.00	0.19	3.3	0.041
18.917	0.000	3.13	0.00	0.19	3.2	0.040
19.000	0.000	3.08	0.00	0.18	3.2	0.039
19.083	0.000	3.03	0.00	0.18	3.1	0.039
19.167	0.000	2.99	0.00	0.18	3.1	0.038
19.250	0.000	2.95	0.00	0.18	3.0	0.038
19.333	0.000	2.91	0.00	0.17	3.0	0.037
19.417	0.000	2.87	0.00	0.17	2.9	0.037
19.500	0.000	2.83	0.00	0.17	2.9	0.036
19.583	0.000	2.80	0.00	0.17	2.9	0.036

19.667	0.000	2.76	0.00	0.16	2.8	0.035
19.750	0.000	2.73	0.00	0.16	2.8	0.035
19.833	0.000	2.70	0.00	0.16	2.8	0.034
19.917	0.000	2.67	0.00	0.16	2.7	0.034
20.000	0.000	2.64	0.00	0.16	2.7	0.034
20.083	0.000	2.61	0.00	0.15	2.7	0.033
20.167	0.000	2.58	0.00	0.15	2.6	0.033
20.250	0.000	2.55	0.00	0.15	2.6	0.032
20.333	0.000	2.53	0.00	0.15	2.6	0.032
20.417	0.000	2.50	0.00	0.15	2.6	0.032
20.500	0.000	2.48	0.00	0.15	2.5	0.031
20.583	0.000	2.45	0.00	0.15	2.5	0.031
20.667	0.000	2.43	0.00	0.14	2.5	0.031
20.750	0.000	2.41	0.00	0.14	2.5	0.031
20.833	0.000	2.39	0.00	0.14	2.4	0.030
20.917	0.000	2.36	0.00	0.14	2.4	0.030
21.000	0.000	2.34	0.00	0.14	2.4	0.030
21.083	0.000	2.32	0.00	0.14	2.4	0.029
21.167	0.000	2.30	0.00	0.14	2.3	0.029
21.250	0.000	2.28	0.00	0.14	2.3	0.029
21.333	0.000	2.27	0.00	0.13	2.3	0.029
21.417	0.000	2.25	0.00	0.13	2.3	0.028
21.500	0.000	2.23	0.00	0.13	2.3	0.028
21.583	0.000	2.21	0.00	0.13	2.2	0.028
21.667	0.000	2.20	0.00	0.13	2.2	0.028
21.750	0.000	2.18	0.00	0.13	2.2	0.028
21.833	0.000	2.16	0.00	0.13	2.2	0.027
21.917	0.000	2.15	0.00	0.13	2.2	0.027
22.000	0.000	2.13	0.00	0.13	2.2	0.027
22.083	0.000	2.12	0.00	0.12	2.1	0.027
22.167	0.000	2.10	0.00	0.12	2.1	0.027
22.250	0.000	2.09	0.00	0.12	2.1	0.026
22.333	0.000	2.07	0.00	0.12	2.1	0.026
22.417	0.000	2.06	0.00	0.12	2.1	0.026
22.500	0.000	2.04	0.00	0.12	2.1	0.026
22.583	0.000	2.03	0.00	0.12	2.1	0.026
22.667	0.000	2.02	0.00	0.12	2.0	0.026
22.750	0.000	2.00	0.00	0.12	2.0	0.025
22.833	0.000	1.99	0.00	0.12	2.0	0.025
22.917	0.000	1.98	0.00	0.12	2.0	0.025
23.000	0.000	1.97	0.00	0.12	2.0	0.025
23.083	0.000	1.95	0.00	0.12	2.0	0.025
23.167	0.000	1.94	0.00	0.11	2.0	0.025
23.250	0.000	1.93	0.00	0.11	2.0	0.024
23.333	0.000	1.92	0.00	0.11	1.9	0.024
23.417	0.000	1.91	0.00	0.11	1.9	0.024
23.500	0.000	1.90	0.00	0.11	1.9	0.024
23.583	0.000	1.89	0.00	0.11	1.9	0.024
23.667	0.000	1.88	0.00	0.11	1.9	0.024
23.750	0.000	1.87	0.00	0.11	1.9	0.024

23.833	0.000	1.86	0.00	0.11	1.9	0.023
23.917	0.000	1.85	0.00	0.11	1.9	0.023

PROCESS SUMMARY OF STORAGE:

INFLOW VOLUME = 7.489 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 7.489 AF
LOSS VOLUME = 0.000 AF

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FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 4

>>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<

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MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 1532.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1225.00
DOWNSTREAM ELEVATION(FT) = 1200.60
PIPE DIAMETER(FT) = 4.00

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.02	0.50	0.00	0.000
0.167	0.16	0.50	0.00	0.000
0.250	0.51	0.50	0.00	0.000
0.333	0.94	0.78	0.00	0.000
0.417	1.28	1.06	0.00	0.000
0.500	1.50	1.24	0.00	0.000
0.583	1.64	1.35	0.00	0.000
0.667	1.72	1.42	0.00	0.000
0.750	1.77	1.46	0.22	0.000
0.833	1.80	1.49	3.15	0.000
0.917	1.82	1.51	2.70	0.000
1.000	1.83	1.52	2.05	0.000
1.083	1.84	1.53	2.33	0.000

1.167	1.85	1.53	1.99	0.000
1.250	1.86	1.54	1.87	0.000
1.333	1.86	1.54	1.87	0.000
1.417	1.87	1.55	1.87	0.000
1.500	1.87	1.55	1.88	0.000
1.583	1.88	1.56	1.88	0.000
1.667	1.89	1.56	1.89	0.000
1.750	1.89	1.56	1.89	0.000
1.833	1.90	1.57	1.90	0.000
1.917	1.90	1.57	1.90	0.000
2.000	1.91	1.58	1.91	0.000
2.083	1.91	1.58	1.91	0.000
2.167	1.92	1.59	1.92	0.000
2.250	1.92	1.59	1.92	0.000
2.333	1.93	1.60	1.93	0.000
2.417	1.94	1.60	1.94	0.000
2.500	1.94	1.61	1.94	0.000
2.583	1.95	1.61	1.95	0.000
2.667	1.95	1.62	1.95	0.000
2.750	1.96	1.62	1.96	0.000
2.833	1.97	1.63	1.96	0.000
2.917	1.97	1.63	1.97	0.000
3.000	1.98	1.64	1.98	0.000
3.083	1.98	1.64	1.98	0.000
3.167	1.99	1.65	1.99	0.000
3.250	2.00	1.65	2.00	0.000
3.333	2.00	1.66	2.00	0.000
3.417	2.01	1.66	2.01	0.000
3.500	2.02	1.67	2.01	0.000
3.583	2.02	1.67	2.02	0.000
3.667	2.03	1.68	2.03	0.000
3.750	2.04	1.68	2.03	0.000
3.833	2.04	1.69	2.04	0.000
3.917	2.05	1.70	2.05	0.000
4.000	2.06	1.70	2.06	0.000
4.083	2.06	1.71	2.06	0.000
4.167	2.07	1.71	2.07	0.000
4.250	2.08	1.72	2.09	0.000
4.333	2.08	1.72	2.09	0.000
4.417	2.09	1.73	2.09	0.000
4.500	2.10	1.74	2.10	0.000
4.583	2.11	1.74	2.11	0.000
4.667	2.11	1.75	2.11	0.000
4.750	2.12	1.76	2.12	0.000
4.833	2.13	1.76	2.13	0.000
4.917	2.14	1.77	2.14	0.000
5.000	2.14	1.77	2.14	0.000
5.083	2.15	1.78	2.15	0.000
5.167	2.16	1.79	2.16	0.000
5.250	2.17	1.79	2.17	0.000

5.333	2.18	1.80	2.18	0.000
5.417	2.18	1.81	2.18	0.000
5.500	2.19	1.81	2.19	0.000
5.583	2.20	1.82	2.20	0.000
5.667	2.21	1.83	2.21	0.000
5.750	2.22	1.84	2.22	0.000
5.833	2.23	1.84	2.23	0.000
5.917	2.24	1.85	2.24	0.000
6.000	2.24	1.86	2.24	0.000
6.083	2.25	1.87	2.25	0.000
6.167	2.26	1.87	2.26	0.000
6.250	2.27	1.88	2.27	0.000
6.333	2.28	1.89	2.28	0.000
6.417	2.29	1.90	2.29	0.000
6.500	2.30	1.90	2.30	0.000
6.583	2.31	1.91	2.31	0.000
6.667	2.32	1.92	2.32	0.000
6.750	2.33	1.93	2.33	0.000
6.833	2.34	1.94	2.34	0.000
6.917	2.35	1.95	2.35	0.000
7.000	2.36	1.95	2.36	0.000
7.083	2.37	1.96	2.37	0.000
7.167	2.38	1.97	2.38	0.000
7.250	2.39	1.98	2.39	0.000
7.333	2.40	1.99	2.40	0.000
7.417	2.42	2.00	2.42	0.000
7.500	2.43	2.01	2.43	0.000
7.583	2.44	2.02	2.44	0.000
7.667	2.45	2.03	2.45	0.000
7.750	2.46	2.04	2.46	0.000
7.833	2.47	2.05	2.47	0.000
7.917	2.49	2.06	2.49	0.000
8.000	2.50	2.07	2.50	0.000
8.083	2.51	2.08	2.51	0.000
8.167	2.52	2.09	2.52	0.000
8.250	2.54	2.10	2.54	0.000
8.333	2.55	2.11	2.55	0.000
8.417	2.56	2.12	2.56	0.000
8.500	2.58	2.13	2.58	0.000
8.583	2.59	2.14	2.59	0.000
8.667	2.60	2.16	2.60	0.000
8.750	2.62	2.17	2.62	0.000
8.833	2.63	2.18	2.63	0.000
8.917	2.65	2.19	2.65	0.000
9.000	2.66	2.20	2.66	0.000
9.083	2.68	2.22	2.68	0.000
9.167	2.69	2.23	2.69	0.000
9.250	2.71	2.24	2.71	0.000
9.333	2.72	2.25	2.72	0.000
9.417	2.74	2.27	2.74	0.000

9.500	2.76	2.28	2.76	0.000
9.583	2.77	2.30	2.77	0.000
9.667	2.79	2.31	2.79	0.000
9.750	2.81	2.32	2.81	0.000
9.833	2.83	2.34	2.83	0.000
9.917	2.84	2.35	2.84	0.000
10.000	2.86	2.37	2.86	0.000
10.083	2.88	2.39	2.88	0.000
10.167	2.90	2.40	2.90	0.000
10.250	2.92	2.42	2.92	0.000
10.333	2.94	2.43	2.94	0.000
10.417	2.96	2.45	2.96	0.000
10.500	2.98	2.47	2.98	0.000
10.583	3.00	2.49	3.00	0.000
10.667	3.03	2.50	3.02	0.000
10.750	3.05	2.52	3.05	0.000
10.833	3.07	2.54	3.07	0.000
10.917	3.09	2.56	3.09	0.000
11.000	3.12	2.58	3.13	0.000
11.083	3.14	2.60	3.17	0.000
11.167	3.17	2.62	3.17	0.000
11.250	3.19	2.64	3.19	0.000
11.333	3.22	2.66	3.22	0.000
11.417	3.25	2.69	3.25	0.000
11.500	3.27	2.71	3.27	0.000
11.583	3.30	2.73	3.30	0.000
11.667	3.33	2.76	3.33	0.000
11.750	3.36	2.78	3.36	0.000
11.833	3.39	2.81	3.39	0.000
11.917	3.42	2.83	3.42	0.000
12.000	3.46	2.86	3.45	0.000
12.083	3.48	2.88	3.49	0.000
12.167	3.45	2.85	3.50	0.000
12.250	3.32	2.75	3.41	0.000
12.333	3.15	2.61	3.19	0.000
12.417	3.03	2.51	2.99	0.000
12.500	2.97	2.45	3.02	0.000
12.583	2.94	2.43	2.92	0.000
12.667	2.94	2.44	2.83	0.000
12.750	2.96	2.45	2.89	0.000
12.833	2.99	2.48	2.95	0.000
12.917	3.03	2.51	3.00	0.000
13.000	3.07	2.54	3.05	0.000
13.083	3.12	2.58	3.11	0.000
13.167	3.17	2.62	3.22	0.000
13.250	3.22	2.66	3.24	0.000
13.333	3.27	2.71	3.27	0.000
13.417	3.33	2.75	3.33	0.000
13.500	3.39	2.80	3.38	0.000
13.583	3.45	2.86	3.45	0.000

13.667	3.52	2.91	3.51	0.000
13.750	3.58	2.97	3.58	0.000
13.833	3.66	3.03	3.65	0.000
13.917	3.73	3.09	3.73	0.000
14.000	3.81	3.16	3.81	0.000
14.083	3.90	3.23	3.89	0.000
14.167	3.99	3.31	3.98	0.000
14.250	4.10	3.39	4.09	0.000
14.333	4.22	3.49	4.21	0.000
14.417	4.34	3.59	4.33	0.000
14.500	4.46	3.69	4.46	0.000
14.583	4.59	3.80	4.59	0.000
14.667	4.73	3.92	4.72	0.000
14.750	4.88	4.04	4.87	0.000
14.833	5.04	4.17	5.03	0.000
14.917	5.22	4.32	5.21	0.000
15.000	5.42	4.48	5.40	0.000
15.083	5.63	4.66	5.61	0.000
15.167	5.87	4.86	5.85	0.000
15.250	6.14	5.08	6.11	0.000
15.333	6.44	5.33	6.68	0.000
15.417	6.80	5.63	6.83	0.000
15.500	7.23	5.98	7.23	0.000
15.583	7.78	6.44	7.78	0.000
15.667	8.44	6.99	8.44	0.000
15.750	9.22	7.53	9.14	0.000
15.833	10.17	7.70	9.68	0.000
15.917	11.44	7.92	10.81	0.000
16.000	13.61	8.30	12.61	0.000
16.083	17.72	9.02	16.06	0.000
16.167	25.96	10.15	22.93	0.000
16.250	34.87	11.11	31.90	0.000
16.333	38.33	11.42	37.23	0.000
16.417	36.76	11.29	37.28	0.000
16.500	32.88	10.90	34.10	0.000
16.583	27.72	10.37	29.47	0.000
16.667	21.99	9.61	23.95	0.000
16.750	17.14	8.92	19.01	0.000
16.833	13.10	8.21	14.77	0.000
16.917	9.93	7.65	11.46	0.000
17.000	7.94	6.57	8.39	0.000
17.083	6.65	5.50	6.65	0.000
17.167	5.78	4.78	6.17	0.000
17.250	5.17	4.28	5.39	0.000
17.333	4.72	3.91	4.56	0.000
17.417	4.38	3.63	4.27	0.000
17.500	4.11	3.41	4.04	0.000
17.583	3.90	3.22	3.85	0.000
17.667	3.71	3.07	3.68	0.000
17.750	3.56	2.94	3.53	0.000

17.833	3.42	2.83	3.40	0.000
17.917	3.29	2.73	3.28	0.000
18.000	3.18	2.63	3.17	0.000
18.083	3.09	2.56	3.07	0.000
18.167	3.07	2.54	3.00	0.000
18.250	3.14	2.60	3.08	0.000
18.333	3.26	2.70	3.14	0.000
18.417	3.35	2.77	3.42	0.000
18.500	3.38	2.80	3.43	0.000
18.583	3.37	2.79	3.41	0.000
18.667	3.35	2.77	3.37	0.000
18.750	3.31	2.74	3.32	0.000
18.833	3.26	2.70	3.27	0.000
18.917	3.21	2.66	3.22	0.000
19.000	3.17	2.62	3.17	0.000
19.083	3.12	2.58	3.12	0.000
19.167	3.07	2.54	3.07	0.000
19.250	3.03	2.51	3.05	0.000
19.333	2.98	2.47	3.04	0.000
19.417	2.94	2.44	2.94	0.000
19.500	2.90	2.40	2.90	0.000
19.583	2.86	2.37	2.86	0.000
19.667	2.83	2.34	2.82	0.000
19.750	2.79	2.31	2.79	0.000
19.833	2.76	2.28	2.75	0.000
19.917	2.73	2.26	2.72	0.000
20.000	2.69	2.23	2.69	0.000
20.083	2.66	2.20	2.66	0.000
20.167	2.63	2.18	2.63	0.000
20.250	2.60	2.16	2.60	0.000
20.333	2.58	2.13	2.57	0.000
20.417	2.55	2.11	2.55	0.000
20.500	2.52	2.09	2.52	0.000
20.583	2.50	2.07	2.50	0.000
20.667	2.47	2.05	2.47	0.000
20.750	2.45	2.03	2.45	0.000
20.833	2.43	2.01	2.43	0.000
20.917	2.40	1.99	2.40	0.000
21.000	2.38	1.97	2.38	0.000
21.083	2.36	1.95	2.36	0.000
21.167	2.34	1.94	2.34	0.000
21.250	2.32	1.92	2.32	0.000
21.333	2.30	1.90	2.30	0.000
21.417	2.28	1.89	2.28	0.000
21.500	2.26	1.87	2.26	0.000
21.583	2.25	1.86	2.24	0.000
21.667	2.23	1.84	2.23	0.000
21.750	2.21	1.83	2.21	0.000
21.833	2.19	1.81	2.19	0.000
21.917	2.18	1.80	2.18	0.000

22.000	2.16	1.79	2.16	0.000
22.083	2.14	1.77	2.14	0.000
22.167	2.13	1.76	2.13	0.000
22.250	2.11	1.75	2.11	0.000
22.333	2.10	1.74	2.10	0.000
22.417	2.08	1.72	2.08	0.000
22.500	2.07	1.71	2.07	0.000
22.583	2.06	1.70	2.05	0.000
22.667	2.04	1.69	2.04	0.000
22.750	2.03	1.68	2.03	0.000
22.833	2.02	1.67	2.05	0.000
22.917	2.00	1.66	2.00	0.000
23.000	1.99	1.65	1.99	0.000
23.083	1.98	1.64	1.98	0.000
23.167	1.97	1.63	1.96	0.000
23.250	1.95	1.62	1.95	0.000
23.333	1.94	1.61	1.94	0.000
23.417	1.93	1.60	1.93	0.000
23.500	1.92	1.59	1.92	0.000
23.583	1.91	1.58	1.91	0.000
23.667	1.90	1.57	1.90	0.000
23.750	1.89	1.56	1.88	0.000
23.833	1.88	1.55	1.87	0.000
23.917	1.86	1.54	1.86	0.000
24.000	1.85	1.53	1.85	0.000

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  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =   1
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  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
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      (UNIT-HYDROGRAPH ADDED TO STREAM #2)

         WATERSHED AREA =      11.200 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.184 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.221
         LOW LOSS FRACTION = 0.281
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.46
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.93
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.23
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.88
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SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.45
SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  4.90

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
  5-MINUTE FACTOR = 0.999
 30-MINUTE FACTOR = 0.999
  1-HOUR FACTOR = 0.999
  3-HOUR FACTOR = 1.000
  6-HOUR FACTOR = 1.000
 24-HOUR FACTOR = 1.000

UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME =  45.290
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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	3.671	4.972
2	24.613	28.366
3	59.779	47.632
4	85.080	34.271
5	95.011	13.451
6	98.216	4.342
7	99.113	1.214
8	99.645	0.721
9	99.911	0.361
10	100.000	0.120

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0085	0.0024	0.0061
2	0.0085	0.0024	0.0061
3	0.0086	0.0024	0.0062
4	0.0086	0.0024	0.0062
5	0.0086	0.0024	0.0062
6	0.0086	0.0024	0.0062
7	0.0087	0.0024	0.0062
8	0.0087	0.0024	0.0062
9	0.0087	0.0024	0.0063

10	0.0087	0.0024	0.0063
11	0.0087	0.0025	0.0063
12	0.0088	0.0025	0.0063
13	0.0088	0.0025	0.0063
14	0.0088	0.0025	0.0063
15	0.0088	0.0025	0.0064
16	0.0089	0.0025	0.0064
17	0.0089	0.0025	0.0064
18	0.0089	0.0025	0.0064
19	0.0089	0.0025	0.0064
20	0.0090	0.0025	0.0064
21	0.0090	0.0025	0.0065
22	0.0090	0.0025	0.0065
23	0.0090	0.0025	0.0065
24	0.0091	0.0025	0.0065
25	0.0091	0.0026	0.0065
26	0.0091	0.0026	0.0066
27	0.0092	0.0026	0.0066
28	0.0092	0.0026	0.0066
29	0.0092	0.0026	0.0066
30	0.0092	0.0026	0.0066
31	0.0093	0.0026	0.0067
32	0.0093	0.0026	0.0067
33	0.0093	0.0026	0.0067
34	0.0093	0.0026	0.0067
35	0.0094	0.0026	0.0067
36	0.0094	0.0026	0.0068
37	0.0094	0.0027	0.0068
38	0.0095	0.0027	0.0068
39	0.0095	0.0027	0.0068
40	0.0095	0.0027	0.0069
41	0.0096	0.0027	0.0069
42	0.0096	0.0027	0.0069
43	0.0096	0.0027	0.0069
44	0.0097	0.0027	0.0069
45	0.0097	0.0027	0.0070
46	0.0097	0.0027	0.0070
47	0.0098	0.0027	0.0070
48	0.0098	0.0028	0.0070
49	0.0098	0.0028	0.0071
50	0.0099	0.0028	0.0071
51	0.0099	0.0028	0.0071
52	0.0099	0.0028	0.0071
53	0.0100	0.0028	0.0072
54	0.0100	0.0028	0.0072
55	0.0100	0.0028	0.0072
56	0.0101	0.0028	0.0072
57	0.0101	0.0028	0.0073
58	0.0101	0.0029	0.0073
59	0.0102	0.0029	0.0073

60	0.0102	0.0029	0.0073
61	0.0103	0.0029	0.0074
62	0.0103	0.0029	0.0074
63	0.0104	0.0029	0.0074
64	0.0104	0.0029	0.0075
65	0.0104	0.0029	0.0075
66	0.0105	0.0029	0.0075
67	0.0105	0.0030	0.0076
68	0.0105	0.0030	0.0076
69	0.0106	0.0030	0.0076
70	0.0106	0.0030	0.0076
71	0.0107	0.0030	0.0077
72	0.0107	0.0030	0.0077
73	0.0108	0.0030	0.0077
74	0.0108	0.0030	0.0078
75	0.0109	0.0031	0.0078
76	0.0109	0.0031	0.0078
77	0.0110	0.0031	0.0079
78	0.0110	0.0031	0.0079
79	0.0111	0.0031	0.0079
80	0.0111	0.0031	0.0080
81	0.0112	0.0031	0.0080
82	0.0112	0.0031	0.0080
83	0.0113	0.0032	0.0081
84	0.0113	0.0032	0.0081
85	0.0114	0.0032	0.0082
86	0.0114	0.0032	0.0082
87	0.0115	0.0032	0.0082
88	0.0115	0.0032	0.0083
89	0.0116	0.0033	0.0083
90	0.0116	0.0033	0.0084
91	0.0117	0.0033	0.0084
92	0.0117	0.0033	0.0084
93	0.0118	0.0033	0.0085
94	0.0118	0.0033	0.0085
95	0.0119	0.0034	0.0086
96	0.0120	0.0034	0.0086
97	0.0121	0.0034	0.0087
98	0.0121	0.0034	0.0087
99	0.0122	0.0034	0.0088
100	0.0122	0.0034	0.0088
101	0.0123	0.0035	0.0089
102	0.0124	0.0035	0.0089
103	0.0124	0.0035	0.0090
104	0.0125	0.0035	0.0090
105	0.0126	0.0035	0.0091
106	0.0126	0.0036	0.0091
107	0.0127	0.0036	0.0092
108	0.0128	0.0036	0.0092
109	0.0129	0.0036	0.0093

110	0.0129	0.0036	0.0093
111	0.0130	0.0037	0.0094
112	0.0131	0.0037	0.0094
113	0.0132	0.0037	0.0095
114	0.0133	0.0037	0.0095
115	0.0134	0.0038	0.0096
116	0.0134	0.0038	0.0097
117	0.0136	0.0038	0.0097
118	0.0136	0.0038	0.0098
119	0.0137	0.0039	0.0099
120	0.0138	0.0039	0.0099
121	0.0139	0.0039	0.0100
122	0.0140	0.0039	0.0101
123	0.0141	0.0040	0.0102
124	0.0142	0.0040	0.0102
125	0.0143	0.0040	0.0103
126	0.0144	0.0040	0.0104
127	0.0145	0.0041	0.0105
128	0.0146	0.0041	0.0105
129	0.0148	0.0042	0.0106
130	0.0149	0.0042	0.0107
131	0.0150	0.0042	0.0108
132	0.0151	0.0042	0.0109
133	0.0153	0.0043	0.0110
134	0.0153	0.0043	0.0110
135	0.0155	0.0044	0.0112
136	0.0156	0.0044	0.0112
137	0.0158	0.0044	0.0114
138	0.0159	0.0045	0.0114
139	0.0161	0.0045	0.0116
140	0.0162	0.0045	0.0116
141	0.0164	0.0046	0.0118
142	0.0165	0.0046	0.0119
143	0.0167	0.0047	0.0120
144	0.0168	0.0047	0.0121
145	0.0131	0.0037	0.0094
146	0.0132	0.0037	0.0095
147	0.0134	0.0038	0.0096
148	0.0135	0.0038	0.0097
149	0.0138	0.0039	0.0099
150	0.0139	0.0039	0.0100
151	0.0142	0.0040	0.0102
152	0.0143	0.0040	0.0103
153	0.0146	0.0041	0.0105
154	0.0148	0.0042	0.0106
155	0.0151	0.0042	0.0109
156	0.0153	0.0043	0.0110
157	0.0156	0.0044	0.0112
158	0.0158	0.0044	0.0114
159	0.0162	0.0045	0.0116

160	0.0164	0.0046	0.0118
161	0.0168	0.0047	0.0121
162	0.0170	0.0048	0.0122
163	0.0175	0.0049	0.0126
164	0.0178	0.0050	0.0128
165	0.0183	0.0051	0.0131
166	0.0186	0.0052	0.0133
167	0.0191	0.0054	0.0138
168	0.0195	0.0055	0.0140
169	0.0204	0.0057	0.0146
170	0.0207	0.0058	0.0149
171	0.0215	0.0060	0.0155
172	0.0219	0.0062	0.0158
173	0.0228	0.0064	0.0164
174	0.0233	0.0065	0.0168
175	0.0244	0.0068	0.0175
176	0.0249	0.0070	0.0179
177	0.0262	0.0074	0.0189
178	0.0269	0.0076	0.0194
179	0.0285	0.0080	0.0205
180	0.0294	0.0083	0.0211
181	0.0314	0.0088	0.0226
182	0.0326	0.0092	0.0234
183	0.0353	0.0099	0.0254
184	0.0369	0.0104	0.0265
185	0.0424	0.0119	0.0305
186	0.0448	0.0126	0.0322
187	0.0508	0.0143	0.0365
188	0.0548	0.0154	0.0394
189	0.0642	0.0181	0.0462
190	0.0726	0.0184	0.0542
191	0.1042	0.0184	0.0858
192	0.1440	0.0184	0.1256
193	0.4598	0.0184	0.4414
194	0.0847	0.0184	0.0663
195	0.0596	0.0167	0.0429
196	0.0475	0.0133	0.0342
197	0.0386	0.0109	0.0278
198	0.0339	0.0095	0.0243
199	0.0304	0.0085	0.0218
200	0.0277	0.0078	0.0199
201	0.0256	0.0072	0.0184
202	0.0238	0.0067	0.0171
203	0.0223	0.0063	0.0161
204	0.0211	0.0059	0.0152
205	0.0198	0.0056	0.0142
206	0.0188	0.0053	0.0135
207	0.0180	0.0051	0.0129
208	0.0173	0.0049	0.0124
209	0.0166	0.0047	0.0119

210	0.0160	0.0045	0.0115
211	0.0154	0.0043	0.0111
212	0.0149	0.0042	0.0107
213	0.0145	0.0041	0.0104
214	0.0141	0.0039	0.0101
215	0.0137	0.0038	0.0098
216	0.0133	0.0037	0.0096
217	0.0170	0.0048	0.0122
218	0.0166	0.0047	0.0119
219	0.0163	0.0046	0.0117
220	0.0160	0.0045	0.0115
221	0.0157	0.0044	0.0113
222	0.0154	0.0043	0.0111
223	0.0152	0.0043	0.0109
224	0.0149	0.0042	0.0107
225	0.0147	0.0041	0.0106
226	0.0145	0.0041	0.0104
227	0.0143	0.0040	0.0103
228	0.0141	0.0039	0.0101
229	0.0139	0.0039	0.0100
230	0.0137	0.0038	0.0098
231	0.0135	0.0038	0.0097
232	0.0133	0.0037	0.0096
233	0.0132	0.0037	0.0095
234	0.0130	0.0037	0.0093
235	0.0128	0.0036	0.0092
236	0.0127	0.0036	0.0091
237	0.0125	0.0035	0.0090
238	0.0124	0.0035	0.0089
239	0.0123	0.0034	0.0088
240	0.0121	0.0034	0.0087
241	0.0120	0.0034	0.0086
242	0.0119	0.0033	0.0085
243	0.0118	0.0033	0.0085
244	0.0117	0.0033	0.0084
245	0.0115	0.0032	0.0083
246	0.0114	0.0032	0.0082
247	0.0113	0.0032	0.0081
248	0.0112	0.0032	0.0081
249	0.0111	0.0031	0.0080
250	0.0110	0.0031	0.0079
251	0.0109	0.0031	0.0079
252	0.0108	0.0030	0.0078
253	0.0107	0.0030	0.0077
254	0.0107	0.0030	0.0077
255	0.0106	0.0030	0.0076
256	0.0105	0.0029	0.0075
257	0.0104	0.0029	0.0075
258	0.0103	0.0029	0.0074
259	0.0102	0.0029	0.0074

260	0.0102	0.0029	0.0073
261	0.0101	0.0028	0.0073
262	0.0100	0.0028	0.0072
263	0.0100	0.0028	0.0072
264	0.0099	0.0028	0.0071
265	0.0098	0.0028	0.0071
266	0.0097	0.0027	0.0070
267	0.0097	0.0027	0.0070
268	0.0096	0.0027	0.0069
269	0.0096	0.0027	0.0069
270	0.0095	0.0027	0.0068
271	0.0094	0.0026	0.0068
272	0.0094	0.0026	0.0067
273	0.0093	0.0026	0.0067
274	0.0093	0.0026	0.0067
275	0.0092	0.0026	0.0066
276	0.0091	0.0026	0.0066
277	0.0091	0.0026	0.0065
278	0.0090	0.0025	0.0065
279	0.0090	0.0025	0.0065
280	0.0089	0.0025	0.0064
281	0.0089	0.0025	0.0064
282	0.0088	0.0025	0.0063
283	0.0088	0.0025	0.0063
284	0.0087	0.0025	0.0063
285	0.0087	0.0024	0.0062
286	0.0086	0.0024	0.0062
287	0.0086	0.0024	0.0062
288	0.0085	0.0024	0.0061

TOTAL STORM RAINFALL(INCHES) = 4.90
TOTAL SOIL-LOSS(INCHES) = 1.23
TOTAL EFFECTIVE RAINFALL(INCHES) = 3.67

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.1441
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 3.4274

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2 4 - 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

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS) VOLUME(AF) Q(CFS) 0. 7.5 15.0 22.5 30.0

0.083	0.0002	0.03	Q	.	.	.	.
0.167	0.0016	0.20	Q	.	.	.	.
0.250	0.0050	0.50	Q	.	.	.	.
0.333	0.0099	0.71	Q	.	.	.	.
0.417	0.0154	0.79	VQ	.	.	.	.
0.500	0.0210	0.82	VQ	.	.	.	.
0.583	0.0267	0.83	VQ	.	.	.	.
0.667	0.0325	0.84	VQ	.	.	.	.
0.750	0.0383	0.84	VQ	.	.	.	.
0.833	0.0441	0.84	VQ	.	.	.	.
0.917	0.0499	0.85	VQ	.	.	.	.
1.000	0.0557	0.85	VQ	.	.	.	.
1.083	0.0616	0.85	VQ	.	.	.	.
1.167	0.0675	0.85	VQ	.	.	.	.
1.250	0.0734	0.86	VQ	.	.	.	.
1.333	0.0793	0.86	VQ	.	.	.	.
1.417	0.0852	0.86	VQ	.	.	.	.
1.500	0.0911	0.86	.Q	.	.	.	.
1.583	0.0971	0.86	.Q	.	.	.	.
1.667	0.1031	0.87	.Q	.	.	.	.
1.750	0.1090	0.87	.Q	.	.	.	.
1.833	0.1151	0.87	.Q	.	.	.	.
1.917	0.1211	0.87	.Q	.	.	.	.
2.000	0.1271	0.88	.Q	.	.	.	.
2.083	0.1332	0.88	.Q	.	.	.	.
2.167	0.1393	0.88	.Q	.	.	.	.
2.250	0.1454	0.89	.Q	.	.	.	.
2.333	0.1515	0.89	.Q	.	.	.	.
2.417	0.1576	0.89	.Q	.	.	.	.
2.500	0.1638	0.89	.Q	.	.	.	.
2.583	0.1699	0.90	.Q	.	.	.	.
2.667	0.1761	0.90	.QV	.	.	.	.
2.750	0.1823	0.90	.QV	.	.	.	.
2.833	0.1886	0.90	.QV	.	.	.	.
2.917	0.1948	0.91	.QV	.	.	.	.
3.000	0.2011	0.91	.QV	.	.	.	.
3.083	0.2074	0.91	.QV	.	.	.	.
3.167	0.2137	0.92	.QV	.	.	.	.
3.250	0.2200	0.92	.QV	.	.	.	.
3.333	0.2263	0.92	.QV	.	.	.	.
3.417	0.2327	0.92	.QV	.	.	.	.
3.500	0.2391	0.93	.QV	.	.	.	.
3.583	0.2455	0.93	.QV	.	.	.	.
3.667	0.2519	0.93	.QV	.	.	.	.
3.750	0.2584	0.94	.Q V	.	.	.	.
3.833	0.2649	0.94	.Q V	.	.	.	.
3.917	0.2713	0.94	.Q V	.	.	.	.
4.000	0.2779	0.95	.Q V	.	.	.	.
4.083	0.2844	0.95	.Q V	.	.	.	.
4.167	0.2910	0.95	.Q V	.	.	.	.

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4.250      0.2976      0.96  .Q V      .         .         .         .
4.333      0.3042      0.96  .Q V      .         .         .         .
4.417      0.3108      0.96  .Q V      .         .         .         .
4.500      0.3174      0.97  .Q V      .         .         .         .
4.583      0.3241      0.97  .Q V      .         .         .         .
4.667      0.3308      0.97  .Q V      .         .         .         .
4.750      0.3375      0.98  .Q V      .         .         .         .
4.833      0.3443      0.98  .Q  V     .         .         .         .
4.917      0.3511      0.98  .Q  V     .         .         .         .
5.000      0.3579      0.99  .Q  V     .         .         .         .
5.083      0.3647      0.99  .Q  V     .         .         .         .
5.167      0.3716      0.99  .Q  V     .         .         .         .
5.250      0.3784      1.00  .Q  V     .         .         .         .
5.333      0.3853      1.00  .Q  V     .         .         .         .
5.417      0.3923      1.01  .Q  V     .         .         .         .
5.500      0.3992      1.01  .Q  V     .         .         .         .
5.583      0.4062      1.01  .Q  V     .         .         .         .
5.667      0.4132      1.02  .Q  V     .         .         .         .
5.750      0.4203      1.02  .Q  V     .         .         .         .
5.833      0.4273      1.03  .Q  V     .         .         .         .
5.917      0.4344      1.03  .Q   V    .         .         .         .
6.000      0.4415      1.03  .Q   V    .         .         .         .
6.083      0.4487      1.04  .Q   V    .         .         .         .
6.167      0.4559      1.04  .Q   V    .         .         .         .
6.250      0.4631      1.05  .Q   V    .         .         .         .
6.333      0.4703      1.05  .Q   V    .         .         .         .
6.417      0.4776      1.06  .Q   V    .         .         .         .
6.500      0.4849      1.06  .Q   V    .         .         .         .
6.583      0.4922      1.07  .Q   V    .         .         .         .
6.667      0.4996      1.07  .Q   V    .         .         .         .
6.750      0.5070      1.07  .Q   V    .         .         .         .
6.833      0.5144      1.08  .Q    V   .         .         .         .
6.917      0.5219      1.08  .Q    V   .         .         .         .
7.000      0.5294      1.09  .Q    V   .         .         .         .
7.083      0.5369      1.09  .Q    V   .         .         .         .
7.167      0.5445      1.10  .Q    V   .         .         .         .
7.250      0.5521      1.10  .Q    V   .         .         .         .
7.333      0.5597      1.11  .Q    V   .         .         .         .
7.417      0.5674      1.11  .Q    V   .         .         .         .
7.500      0.5751      1.12  .Q    V   .         .         .         .
7.583      0.5829      1.12  .Q    V   .         .         .         .
7.667      0.5906      1.13  .Q    V   .         .         .         .
7.750      0.5985      1.14  .Q    V   .         .         .         .
7.833      0.6063      1.14  .Q     V  .         .         .         .
7.917      0.6142      1.15  .Q     V  .         .         .         .
8.000      0.6222      1.15  .Q     V  .         .         .         .
8.083      0.6301      1.16  .Q     V  .         .         .         .
8.167      0.6382      1.16  .Q     V  .         .         .         .
8.250      0.6462      1.17  .Q     V  .         .         .         .
8.333      0.6543      1.18  .Q     V  .         .         .         .
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 8.417      0.6625      1.18  .Q     V  .         .         .         .
 8.500      0.6707      1.19  .Q     V  .         .         .         .
 8.583      0.6789      1.20  .Q     V  .         .         .         .
 8.667      0.6872      1.20  .Q      V .         .         .         .
 8.750      0.6955      1.21  .Q      V .         .         .         .
 8.833      0.7039      1.22  .Q      V .         .         .         .
 8.917      0.7123      1.22  .Q      V .         .         .         .
 9.000      0.7208      1.23  .Q      V .         .         .         .
 9.083      0.7293      1.24  .Q      V .         .         .         .
 9.167      0.7379      1.24  .Q      V .         .         .         .
 9.250      0.7465      1.25  .Q      V .         .         .         .
 9.333      0.7551      1.26  .Q      V .         .         .         .
 9.417      0.7639      1.27  .Q      V .         .         .         .
 9.500      0.7726      1.27  .Q       V.         .         .         .
 9.583      0.7815      1.28  .Q       V.         .         .         .
 9.667      0.7904      1.29  .Q       V.         .         .         .
 9.750      0.7993      1.30  .Q       V.         .         .         .
 9.833      0.8083      1.31  .Q       V.         .         .         .
 9.917      0.8174      1.32  .Q       V.         .         .         .
10.000      0.8265      1.32  .Q       V.         .         .         .
10.083      0.8357      1.33  .Q       V.         .         .         .
10.167      0.8449      1.34  .Q       V.         .         .         .
10.250      0.8542      1.35  .Q       V.         .         .         .
10.333      0.8636      1.36  .Q        V         .         .         .
10.417      0.8730      1.37  .Q        V         .         .         .
10.500      0.8825      1.38  .Q        V         .         .         .
10.583      0.8921      1.39  .Q        V         .         .         .
10.667      0.9017      1.40  .Q        V         .         .         .
10.750      0.9115      1.41  .Q        V         .         .         .
10.833      0.9213      1.42  .Q        V         .         .         .
10.917      0.9311      1.43  .Q        V         .         .         .
11.000      0.9411      1.44  .Q        V         .         .         .
11.083      0.9511      1.46  .Q        .V        .         .         .
11.167      0.9612      1.47  .Q        .V        .         .         .
11.250      0.9714      1.48  .Q        .V        .         .         .
11.333      0.9817      1.49  .Q        .V        .         .         .
11.417      0.9921      1.51  . Q       .V        .         .         .
11.500      1.0025      1.52  . Q       .V        .         .         .
11.583      1.0131      1.53  . Q       .V        .         .         .
11.667      1.0237      1.55  . Q       .V        .         .         .
11.750      1.0344      1.56  . Q       . V       .         .         .
11.833      1.0453      1.57  . Q       . V       .         .         .
11.917      1.0562      1.59  . Q       . V       .         .         .
12.000      1.0673      1.60  . Q       . V       .         .         .
12.083      1.0784      1.61  . Q       . V       .         .         .
12.167      1.0890      1.54  . Q       . V       .         .         .
12.250      1.0987      1.42  .Q        . V       .         .         .
12.333      1.1080      1.34  .Q        . V       .         .         .
12.417      1.1170      1.32  .Q        .  V      .         .         .
12.500      1.1261      1.32  .Q        .  V      .         .         .
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12.583	1.1353	1.34	.Q . V . . .
12.667	1.1447	1.35	.Q . V . . .
12.750	1.1541	1.37	.Q . V . . .
12.833	1.1637	1.39	.Q . V . . .
12.917	1.1734	1.41	.Q . V . . .
13.000	1.1833	1.44	.Q . V . . .
13.083	1.1934	1.46	.Q . V . . .
13.167	1.2036	1.48	.Q . V . . .
13.250	1.2140	1.51	. Q . V . . .
13.333	1.2246	1.54	. Q . V . . .
13.417	1.2353	1.56	. Q . V . . .
13.500	1.2463	1.59	. Q . V . . .
13.583	1.2575	1.62	. Q . V . . .
13.667	1.2689	1.65	. Q . V . . .
13.750	1.2805	1.69	. Q . V . . .
13.833	1.2924	1.72	. Q . V . . .
13.917	1.3045	1.76	. Q . V . . .
14.000	1.3169	1.80	. Q . V . . .
14.083	1.3296	1.84	. Q . V . . .
14.167	1.3426	1.89	. Q . V . . .
14.250	1.3561	1.95	. Q . V . . .
14.333	1.3699	2.01	. Q . V . . .
14.417	1.3841	2.07	. Q . V . . .
14.500	1.3988	2.13	. Q . V . . .
14.583	1.4138	2.19	. Q . V . . .
14.667	1.4294	2.26	. Q . V . . .
14.750	1.4455	2.34	. Q . V . . .
14.833	1.4622	2.42	. Q . V . . .
14.917	1.4795	2.51	. Q . V . . .
15.000	1.4975	2.61	. Q . V . . .
15.083	1.5162	2.73	. Q . V . . .
15.167	1.5359	2.85	. Q . V . . .
15.250	1.5565	3.00	. Q . V . . .
15.333	1.5783	3.16	. Q . V . . .
15.417	1.6014	3.36	. Q . V . . .
15.500	1.6263	3.62	. Q . V . . .
15.583	1.6535	3.95	. Q . V. . .
15.667	1.6833	4.33	. Q . V. . .
15.750	1.7162	4.77	. Q . V . .
15.833	1.7529	5.33	. Q . V . .
15.917	1.7957	6.21	. Q . V . .
16.000	1.8507	7.99	. Q .V . .
16.083	1.9373	12.58	. . Q . V . .
16.167	2.0943	22.79	. . . V Q .
16.250	2.2934	28.91	. . . V . Q .
16.333	2.4439	21.85	. . . VQ. .
16.417	2.5270	12.07	. . Q . V. .
16.500	2.5755	7.05	. Q. . V .
16.583	2.6087	4.82	. Q . . V .
16.667	2.6358	3.93	. Q . . V .

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16.750      2.6587      3.33  .   Q     .         .         .V        .
16.833      2.6787      2.90  .  Q      .         .         .V        .
16.917      2.6966      2.60  .  Q      .         .         .V        .
17.000      2.7132      2.41  .  Q      .         .         .V        .
17.083      2.7286      2.25  . Q       .         .         .V        .
17.167      2.7432      2.11  . Q       .         .         . V       .
17.250      2.7568      1.98  . Q       .         .         . V       .
17.333      2.7698      1.88  . Q       .         .         . V       .
17.417      2.7821      1.79  . Q       .         .         . V       .
17.500      2.7939      1.71  . Q       .         .         . V       .
17.583      2.8052      1.64  . Q       .         .         . V       .
17.667      2.8161      1.58  . Q       .         .         . V       .
17.750      2.8266      1.53  . Q       .         .         . V       .
17.833      2.8368      1.48  .Q        .         .         .  V      .
17.917      2.8466      1.43  .Q        .         .         .  V      .
18.000      2.8562      1.39  .Q        .         .         .  V      .
18.083      2.8655      1.36  .Q        .         .         .  V      .
18.167      2.8752      1.40  .Q        .         .         .  V      .
18.250      2.8856      1.51  . Q       .         .         .  V      .
18.333      2.8964      1.57  . Q       .         .         .  V      .
18.417      2.9073      1.58  . Q       .         .         .  V      .
18.500      2.9180      1.56  . Q       .         .         .   V     .
18.583      2.9286      1.54  . Q       .         .         .   V     .
18.667      2.9390      1.51  . Q       .         .         .   V     .
18.750      2.9493      1.49  .Q        .         .         .   V     .
18.833      2.9594      1.46  .Q        .         .         .   V     .
18.917      2.9693      1.44  .Q        .         .         .   V     .
19.000      2.9790      1.42  .Q        .         .         .   V     .
19.083      2.9887      1.40  .Q        .         .         .   V     .
19.167      2.9981      1.38  .Q        .         .         .   V     .
19.250      3.0075      1.36  .Q        .         .         .    V    .
19.333      3.0167      1.34  .Q        .         .         .    V    .
19.417      3.0258      1.32  .Q        .         .         .    V    .
19.500      3.0348      1.30  .Q        .         .         .    V    .
19.583      3.0436      1.29  .Q        .         .         .    V    .
19.667      3.0524      1.27  .Q        .         .         .    V    .
19.750      3.0610      1.26  .Q        .         .         .    V    .
19.833      3.0696      1.24  .Q        .         .         .    V    .
19.917      3.0780      1.23  .Q        .         .         .    V    .
20.000      3.0864      1.21  .Q        .         .         .     V   .
20.083      3.0946      1.20  .Q        .         .         .     V   .
20.167      3.1028      1.19  .Q        .         .         .     V   .
20.250      3.1109      1.17  .Q        .         .         .     V   .
20.333      3.1189      1.16  .Q        .         .         .     V   .
20.417      3.1268      1.15  .Q        .         .         .     V   .
20.500      3.1347      1.14  .Q        .         .         .     V   .
20.583      3.1424      1.13  .Q        .         .         .     V   .
20.667      3.1501      1.12  .Q        .         .         .     V   .
20.750      3.1578      1.11  .Q        .         .         .     V   .
20.833      3.1653      1.10  .Q        .         .         .     V   .
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20.917      3.1728      1.09  .Q        .         .         .      V  .
21.000      3.1802      1.08  .Q        .         .         .      V  .
21.083      3.1876      1.07  .Q        .         .         .      V  .
21.167      3.1949      1.06  .Q        .         .         .      V  .
21.250      3.2021      1.05  .Q        .         .         .      V  .
21.333      3.2093      1.04  .Q        .         .         .      V  .
21.417      3.2164      1.03  .Q        .         .         .      V  .
21.500      3.2234      1.02  .Q        .         .         .      V  .
21.583      3.2304      1.02  .Q        .         .         .      V  .
21.667      3.2374      1.01  .Q        .         .         .      V  .
21.750      3.2443      1.00  .Q        .         .         .      V  .
21.833      3.2511      0.99  .Q        .         .         .      V  .
21.917      3.2579      0.99  .Q        .         .         .       V .
22.000      3.2646      0.98  .Q        .         .         .       V .
22.083      3.2713      0.97  .Q        .         .         .       V .
22.167      3.2780      0.96  .Q        .         .         .       V .
22.250      3.2846      0.96  .Q        .         .         .       V .
22.333      3.2911      0.95  .Q        .         .         .       V .
22.417      3.2976      0.94  .Q        .         .         .       V .
22.500      3.3041      0.94  .Q        .         .         .       V .
22.583      3.3105      0.93  .Q        .         .         .       V .
22.667      3.3169      0.93  .Q        .         .         .       V .
22.750      3.3232      0.92  .Q        .         .         .       V .
22.833      3.3295      0.91  .Q        .         .         .       V .
22.917      3.3358      0.91  .Q        .         .         .       V .
23.000      3.3420      0.90  .Q        .         .         .        V.
23.083      3.3482      0.90  .Q        .         .         .        V.
23.167      3.3543      0.89  .Q        .         .         .        V.
23.250      3.3604      0.89  .Q        .         .         .        V.
23.333      3.3665      0.88  .Q        .         .         .        V.
23.417      3.3725      0.88  .Q        .         .         .        V.
23.500      3.3785      0.87  .Q        .         .         .        V.
23.583      3.3845      0.87  .Q        .         .         .        V.
23.667      3.3904      0.86  .Q        .         .         .        V.
23.750      3.3963      0.86  .Q        .         .         .        V.
23.833      3.4022      0.85  .Q        .         .         .        V.
23.917      3.4080      0.85  .Q        .         .         .        V.
24.000      3.4138      0.84  .Q        .         .         .        V.
24.083      3.4194      0.81  .Q        .         .         .        V.
24.167      3.4237      0.63  Q         .         .         .        V.
24.250      3.4261      0.34  Q         .         .         .        V.
24.333      3.4269      0.12  Q         .         .         .        V.
24.417      3.4272      0.04  Q         .         .         .        V.
24.500      3.4273      0.01  Q         .         .         .        V.
24.583      3.4274      0.01  Q         .         .         .        V.
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)
```

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1475.0
10%	100.0
20%	40.0
30%	25.0
40%	25.0
50%	15.0
60%	15.0
70%	15.0
80%	5.0
90%	5.0

```
*****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE = 3.1
-----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #2<<<<<
=============================================================================

                    INFLOW
                  (STREAM 2)
                       |
                       |
                       V                __effective depth
                  -----------           |   (and volume)
                 |           |    |    |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                       |          |  dead   |   basin outlet
                       V          | storage |
                    OUTFLOW        ---------
                  (STREAM 2)


        ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 2
        THROUGH A FLOW-THROUGH DETENTION BASIN
        SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
          DEAD STORAGE(AF) =      0.000
          SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
          SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
          DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.00


        BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:
```

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.50	4.80	0.140
3	1.00	13.50	0.282
4	1.50	18.80	0.432

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.03	0.00	0.00	0.0	0.000
0.167	0.000	0.20	0.00	0.01	0.0	0.001
0.250	0.000	0.50	0.00	0.01	0.1	0.004
0.333	0.000	0.71	0.00	0.03	0.2	0.008
0.417	0.000	0.79	0.00	0.04	0.3	0.011
0.500	0.000	0.82	0.00	0.05	0.4	0.014
0.583	0.000	0.83	0.00	0.06	0.5	0.016
0.667	0.000	0.84	0.00	0.06	0.6	0.018
0.750	0.000	0.84	0.00	0.07	0.6	0.019
0.833	0.000	0.84	0.00	0.07	0.7	0.020
0.917	0.000	0.85	0.00	0.08	0.7	0.021
1.000	0.000	0.85	0.00	0.08	0.7	0.022
1.083	0.000	0.85	0.00	0.08	0.8	0.023
1.167	0.000	0.85	0.00	0.08	0.8	0.023
1.250	0.000	0.86	0.00	0.08	0.8	0.023
1.333	0.000	0.86	0.00	0.08	0.8	0.024
1.417	0.000	0.86	0.00	0.09	0.8	0.024
1.500	0.000	0.86	0.00	0.09	0.8	0.024
1.583	0.000	0.86	0.00	0.09	0.8	0.024
1.667	0.000	0.87	0.00	0.09	0.8	0.025
1.750	0.000	0.87	0.00	0.09	0.8	0.025
1.833	0.000	0.87	0.00	0.09	0.9	0.025
1.917	0.000	0.87	0.00	0.09	0.9	0.025
2.000	0.000	0.88	0.00	0.09	0.9	0.025
2.083	0.000	0.88	0.00	0.09	0.9	0.025
2.167	0.000	0.88	0.00	0.09	0.9	0.025
2.250	0.000	0.89	0.00	0.09	0.9	0.025
2.333	0.000	0.89	0.00	0.09	0.9	0.026
2.417	0.000	0.89	0.00	0.09	0.9	0.026
2.500	0.000	0.89	0.00	0.09	0.9	0.026
2.583	0.000	0.90	0.00	0.09	0.9	0.026
2.667	0.000	0.90	0.00	0.09	0.9	0.026
2.750	0.000	0.90	0.00	0.09	0.9	0.026

2.833	0.000	0.90	0.00	0.09	0.9	0.026
2.917	0.000	0.91	0.00	0.09	0.9	0.026
3.000	0.000	0.91	0.00	0.09	0.9	0.026
3.083	0.000	0.91	0.00	0.09	0.9	0.026
3.167	0.000	0.92	0.00	0.09	0.9	0.026
3.250	0.000	0.92	0.00	0.09	0.9	0.026
3.333	0.000	0.92	0.00	0.09	0.9	0.027
3.417	0.000	0.92	0.00	0.10	0.9	0.027
3.500	0.000	0.93	0.00	0.10	0.9	0.027
3.583	0.000	0.93	0.00	0.10	0.9	0.027
3.667	0.000	0.93	0.00	0.10	0.9	0.027
3.750	0.000	0.94	0.00	0.10	0.9	0.027
3.833	0.000	0.94	0.00	0.10	0.9	0.027
3.917	0.000	0.94	0.00	0.10	0.9	0.027
4.000	0.000	0.95	0.00	0.10	0.9	0.027
4.083	0.000	0.95	0.00	0.10	0.9	0.027
4.167	0.000	0.95	0.00	0.10	0.9	0.027
4.250	0.000	0.96	0.00	0.10	0.9	0.028
4.333	0.000	0.96	0.00	0.10	0.9	0.028
4.417	0.000	0.96	0.00	0.10	0.9	0.028
4.500	0.000	0.97	0.00	0.10	1.0	0.028
4.583	0.000	0.97	0.00	0.10	1.0	0.028
4.667	0.000	0.97	0.00	0.10	1.0	0.028
4.750	0.000	0.98	0.00	0.10	1.0	0.028
4.833	0.000	0.98	0.00	0.10	1.0	0.028
4.917	0.000	0.98	0.00	0.10	1.0	0.028
5.000	0.000	0.99	0.00	0.10	1.0	0.028
5.083	0.000	0.99	0.00	0.10	1.0	0.029
5.167	0.000	0.99	0.00	0.10	1.0	0.029
5.250	0.000	1.00	0.00	0.10	1.0	0.029
5.333	0.000	1.00	0.00	0.10	1.0	0.029
5.417	0.000	1.01	0.00	0.10	1.0	0.029
5.500	0.000	1.01	0.00	0.10	1.0	0.029
5.583	0.000	1.01	0.00	0.10	1.0	0.029
5.667	0.000	1.02	0.00	0.10	1.0	0.029
5.750	0.000	1.02	0.00	0.10	1.0	0.029
5.833	0.000	1.03	0.00	0.11	1.0	0.030
5.917	0.000	1.03	0.00	0.11	1.0	0.030
6.000	0.000	1.03	0.00	0.11	1.0	0.030
6.083	0.000	1.04	0.00	0.11	1.0	0.030
6.167	0.000	1.04	0.00	0.11	1.0	0.030
6.250	0.000	1.05	0.00	0.11	1.0	0.030
6.333	0.000	1.05	0.00	0.11	1.0	0.030
6.417	0.000	1.06	0.00	0.11	1.0	0.030
6.500	0.000	1.06	0.00	0.11	1.0	0.030
6.583	0.000	1.07	0.00	0.11	1.0	0.031
6.667	0.000	1.07	0.00	0.11	1.1	0.031
6.750	0.000	1.07	0.00	0.11	1.1	0.031
6.833	0.000	1.08	0.00	0.11	1.1	0.031
6.917	0.000	1.08	0.00	0.11	1.1	0.031

7.000	0.000	1.09	0.00	0.11	1.1	0.031
7.083	0.000	1.09	0.00	0.11	1.1	0.031
7.167	0.000	1.10	0.00	0.11	1.1	0.032
7.250	0.000	1.10	0.00	0.11	1.1	0.032
7.333	0.000	1.11	0.00	0.11	1.1	0.032
7.417	0.000	1.11	0.00	0.11	1.1	0.032
7.500	0.000	1.12	0.00	0.11	1.1	0.032
7.583	0.000	1.12	0.00	0.12	1.1	0.032
7.667	0.000	1.13	0.00	0.12	1.1	0.032
7.750	0.000	1.14	0.00	0.12	1.1	0.033
7.833	0.000	1.14	0.00	0.12	1.1	0.033
7.917	0.000	1.15	0.00	0.12	1.1	0.033
8.000	0.000	1.15	0.00	0.12	1.1	0.033
8.083	0.000	1.16	0.00	0.12	1.1	0.033
8.167	0.000	1.16	0.00	0.12	1.1	0.033
8.250	0.000	1.17	0.00	0.12	1.1	0.034
8.333	0.000	1.18	0.00	0.12	1.2	0.034
8.417	0.000	1.18	0.00	0.12	1.2	0.034
8.500	0.000	1.19	0.00	0.12	1.2	0.034
8.583	0.000	1.20	0.00	0.12	1.2	0.034
8.667	0.000	1.20	0.00	0.12	1.2	0.034
8.750	0.000	1.21	0.00	0.12	1.2	0.035
8.833	0.000	1.22	0.00	0.12	1.2	0.035
8.917	0.000	1.22	0.00	0.12	1.2	0.035
9.000	0.000	1.23	0.00	0.13	1.2	0.035
9.083	0.000	1.24	0.00	0.13	1.2	0.035
9.167	0.000	1.24	0.00	0.13	1.2	0.036
9.250	0.000	1.25	0.00	0.13	1.2	0.036
9.333	0.000	1.26	0.00	0.13	1.2	0.036
9.417	0.000	1.27	0.00	0.13	1.2	0.036
9.500	0.000	1.27	0.00	0.13	1.2	0.036
9.583	0.000	1.28	0.00	0.13	1.3	0.037
9.667	0.000	1.29	0.00	0.13	1.3	0.037
9.750	0.000	1.30	0.00	0.13	1.3	0.037
9.833	0.000	1.31	0.00	0.13	1.3	0.037
9.917	0.000	1.32	0.00	0.13	1.3	0.037
10.000	0.000	1.32	0.00	0.13	1.3	0.038
10.083	0.000	1.33	0.00	0.14	1.3	0.038
10.167	0.000	1.34	0.00	0.14	1.3	0.038
10.250	0.000	1.35	0.00	0.14	1.3	0.038
10.333	0.000	1.36	0.00	0.14	1.3	0.039
10.417	0.000	1.37	0.00	0.14	1.3	0.039
10.500	0.000	1.38	0.00	0.14	1.3	0.039
10.583	0.000	1.39	0.00	0.14	1.4	0.040
10.667	0.000	1.40	0.00	0.14	1.4	0.040
10.750	0.000	1.41	0.00	0.14	1.4	0.040
10.833	0.000	1.42	0.00	0.14	1.4	0.040
10.917	0.000	1.43	0.00	0.15	1.4	0.041
11.000	0.000	1.44	0.00	0.15	1.4	0.041
11.083	0.000	1.46	0.00	0.15	1.4	0.041

11.167	0.000	1.47	0.00	0.15	1.4	0.042
11.250	0.000	1.48	0.00	0.15	1.4	0.042
11.333	0.000	1.49	0.00	0.15	1.4	0.042
11.417	0.000	1.51	0.00	0.15	1.5	0.043
11.500	0.000	1.52	0.00	0.15	1.5	0.043
11.583	0.000	1.53	0.00	0.15	1.5	0.043
11.667	0.000	1.55	0.00	0.16	1.5	0.044
11.750	0.000	1.56	0.00	0.16	1.5	0.044
11.833	0.000	1.57	0.00	0.16	1.5	0.044
11.917	0.000	1.59	0.00	0.16	1.5	0.045
12.000	0.000	1.60	0.00	0.16	1.5	0.045
12.083	0.000	1.61	0.00	0.16	1.6	0.046
12.167	0.000	1.54	0.00	0.16	1.6	0.045
12.250	0.000	1.42	0.00	0.16	1.5	0.045
12.333	0.000	1.34	0.00	0.16	1.5	0.043
12.417	0.000	1.32	0.00	0.15	1.5	0.042
12.500	0.000	1.32	0.00	0.15	1.4	0.042
12.583	0.000	1.34	0.00	0.15	1.4	0.041
12.667	0.000	1.35	0.00	0.15	1.4	0.041
12.750	0.000	1.37	0.00	0.14	1.4	0.041
12.833	0.000	1.39	0.00	0.14	1.4	0.041
12.917	0.000	1.41	0.00	0.15	1.4	0.041
13.000	0.000	1.44	0.00	0.15	1.4	0.041
13.083	0.000	1.46	0.00	0.15	1.4	0.041
13.167	0.000	1.48	0.00	0.15	1.4	0.042
13.250	0.000	1.51	0.00	0.15	1.4	0.042
13.333	0.000	1.54	0.00	0.15	1.5	0.043
13.417	0.000	1.56	0.00	0.15	1.5	0.043
13.500	0.000	1.59	0.00	0.16	1.5	0.044
13.583	0.000	1.62	0.00	0.16	1.5	0.045
13.667	0.000	1.65	0.00	0.16	1.5	0.045
13.750	0.000	1.69	0.00	0.17	1.6	0.046
13.833	0.000	1.72	0.00	0.17	1.6	0.047
13.917	0.000	1.76	0.00	0.17	1.6	0.048
14.000	0.000	1.80	0.00	0.17	1.7	0.049
14.083	0.000	1.84	0.00	0.18	1.7	0.050
14.167	0.000	1.89	0.00	0.18	1.7	0.051
14.250	0.000	1.95	0.00	0.19	1.8	0.052
14.333	0.000	2.01	0.00	0.19	1.8	0.054
14.417	0.000	2.07	0.00	0.20	1.9	0.055
14.500	0.000	2.13	0.00	0.20	1.9	0.057
14.583	0.000	2.19	0.00	0.21	2.0	0.058
14.667	0.000	2.26	0.00	0.21	2.0	0.060
14.750	0.000	2.34	0.00	0.22	2.1	0.061
14.833	0.000	2.42	0.00	0.23	2.1	0.063
14.917	0.000	2.51	0.00	0.23	2.2	0.065
15.000	0.000	2.61	0.00	0.24	2.3	0.068
15.083	0.000	2.73	0.00	0.25	2.4	0.070
15.167	0.000	2.85	0.00	0.26	2.5	0.073
15.250	0.000	3.00	0.00	0.27	2.6	0.076

15.333	0.000	3.16	0.00	0.28	2.7	0.079
15.417	0.000	3.36	0.00	0.30	2.8	0.083
15.500	0.000	3.62	0.00	0.31	2.9	0.088
15.583	0.000	3.95	0.00	0.33	3.1	0.094
15.667	0.000	4.33	0.00	0.36	3.3	0.101
15.750	0.000	4.77	0.00	0.39	3.6	0.109
15.833	0.000	5.33	0.00	0.42	3.9	0.119
15.917	0.000	6.21	0.00	0.47	4.3	0.132
16.000	0.000	7.99	0.00	0.54	5.0	0.152
16.083	0.000	12.58	0.00	0.68	6.8	0.192
16.167	0.000	22.79	0.00	0.98	10.6	0.276
16.250	0.000	28.91	0.00	1.30	14.9	0.373
16.333	0.000	21.85	0.00	1.41	17.3	0.404
16.417	0.000	12.07	0.00	1.29	17.2	0.369
16.500	0.000	7.05	0.00	1.09	15.5	0.310
16.583	0.000	4.82	0.00	0.90	13.1	0.253
16.667	0.000	3.93	0.00	0.74	10.4	0.209
16.750	0.000	3.33	0.00	0.63	8.0	0.176
16.833	0.000	2.90	0.00	0.55	6.3	0.153
16.917	0.000	2.60	0.00	0.48	5.1	0.136
17.000	0.000	2.41	0.00	0.44	4.4	0.122
17.083	0.000	2.25	0.00	0.39	4.0	0.110
17.167	0.000	2.11	0.00	0.36	3.6	0.100
17.250	0.000	1.98	0.00	0.32	3.3	0.091
17.333	0.000	1.88	0.00	0.30	3.0	0.083
17.417	0.000	1.79	0.00	0.27	2.7	0.077
17.500	0.000	1.71	0.00	0.25	2.5	0.071
17.583	0.000	1.64	0.00	0.24	2.4	0.066
17.667	0.000	1.58	0.00	0.22	2.2	0.062
17.750	0.000	1.53	0.00	0.21	2.1	0.058
17.833	0.000	1.48	0.00	0.20	1.9	0.055
17.917	0.000	1.43	0.00	0.19	1.8	0.052
18.000	0.000	1.39	0.00	0.18	1.7	0.050
18.083	0.000	1.36	0.00	0.17	1.7	0.048
18.167	0.000	1.40	0.00	0.16	1.6	0.046
18.250	0.000	1.51	0.00	0.16	1.6	0.046
18.333	0.000	1.57	0.00	0.16	1.6	0.046
18.417	0.000	1.58	0.00	0.16	1.6	0.046
18.500	0.000	1.56	0.00	0.16	1.6	0.046
18.583	0.000	1.54	0.00	0.16	1.6	0.046
18.667	0.000	1.51	0.00	0.16	1.6	0.045
18.750	0.000	1.49	0.00	0.16	1.5	0.045
18.833	0.000	1.46	0.00	0.16	1.5	0.044
18.917	0.000	1.44	0.00	0.16	1.5	0.044
19.000	0.000	1.42	0.00	0.15	1.5	0.043
19.083	0.000	1.40	0.00	0.15	1.5	0.043
19.167	0.000	1.38	0.00	0.15	1.5	0.042
19.250	0.000	1.36	0.00	0.15	1.4	0.042
19.333	0.000	1.34	0.00	0.15	1.4	0.041
19.417	0.000	1.32	0.00	0.14	1.4	0.041

19.500	0.000	1.30	0.00	0.14	1.4	0.040
19.583	0.000	1.29	0.00	0.14	1.4	0.040
19.667	0.000	1.27	0.00	0.14	1.3	0.039
19.750	0.000	1.26	0.00	0.14	1.3	0.038
19.833	0.000	1.24	0.00	0.14	1.3	0.038
19.917	0.000	1.23	0.00	0.13	1.3	0.038
20.000	0.000	1.21	0.00	0.13	1.3	0.037
20.083	0.000	1.20	0.00	0.13	1.3	0.037
20.167	0.000	1.19	0.00	0.13	1.2	0.036
20.250	0.000	1.17	0.00	0.13	1.2	0.036
20.333	0.000	1.16	0.00	0.13	1.2	0.035
20.417	0.000	1.15	0.00	0.13	1.2	0.035
20.500	0.000	1.14	0.00	0.12	1.2	0.035
20.583	0.000	1.13	0.00	0.12	1.2	0.034
20.667	0.000	1.12	0.00	0.12	1.2	0.034
20.750	0.000	1.11	0.00	0.12	1.2	0.034
20.833	0.000	1.10	0.00	0.12	1.1	0.033
20.917	0.000	1.09	0.00	0.12	1.1	0.033
21.000	0.000	1.08	0.00	0.12	1.1	0.033
21.083	0.000	1.07	0.00	0.12	1.1	0.032
21.167	0.000	1.06	0.00	0.11	1.1	0.032
21.250	0.000	1.05	0.00	0.11	1.1	0.032
21.333	0.000	1.04	0.00	0.11	1.1	0.031
21.417	0.000	1.03	0.00	0.11	1.1	0.031
21.500	0.000	1.02	0.00	0.11	1.1	0.031
21.583	0.000	1.02	0.00	0.11	1.1	0.031
21.667	0.000	1.01	0.00	0.11	1.0	0.030
21.750	0.000	1.00	0.00	0.11	1.0	0.030
21.833	0.000	0.99	0.00	0.11	1.0	0.030
21.917	0.000	0.99	0.00	0.11	1.0	0.030
22.000	0.000	0.98	0.00	0.11	1.0	0.029
22.083	0.000	0.97	0.00	0.10	1.0	0.029
22.167	0.000	0.96	0.00	0.10	1.0	0.029
22.250	0.000	0.96	0.00	0.10	1.0	0.029
22.333	0.000	0.95	0.00	0.10	1.0	0.029
22.417	0.000	0.94	0.00	0.10	1.0	0.028
22.500	0.000	0.94	0.00	0.10	1.0	0.028
22.583	0.000	0.93	0.00	0.10	1.0	0.028
22.667	0.000	0.93	0.00	0.10	1.0	0.028
22.750	0.000	0.92	0.00	0.10	0.9	0.028
22.833	0.000	0.91	0.00	0.10	0.9	0.027
22.917	0.000	0.91	0.00	0.10	0.9	0.027
23.000	0.000	0.90	0.00	0.10	0.9	0.027
23.083	0.000	0.90	0.00	0.10	0.9	0.027
23.167	0.000	0.89	0.00	0.10	0.9	0.027
23.250	0.000	0.89	0.00	0.09	0.9	0.026
23.333	0.000	0.88	0.00	0.09	0.9	0.026
23.417	0.000	0.88	0.00	0.09	0.9	0.026
23.500	0.000	0.87	0.00	0.09	0.9	0.026
23.583	0.000	0.87	0.00	0.09	0.9	0.026

23.667	0.000	0.86	0.00	0.09	0.9	0.026
23.750	0.000	0.86	0.00	0.09	0.9	0.026
23.833	0.000	0.85	0.00	0.09	0.9	0.025
23.917	0.000	0.85	0.00	0.09	0.9	0.025

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 3.427 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 3.427 AF
LOSS VOLUME = 0.000 AF

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FLOW PROCESS FROM NODE 6.00 TO NODE 4.00 IS CODE = 4

>>>>>MODEL PIPEFLOW ROUTING OF STREAM #2<<<<<

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MODEL PIPEFLOW ROUTING OF STREAM 2 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 918.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1206.00
DOWNSTREAM ELEVATION(FT) = 1200.60
PIPE DIAMETER(FT) = 3.00

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.50	0.00	0.000
0.167	0.03	0.50	0.00	0.000
0.250	0.10	0.50	0.00	0.000
0.333	0.20	0.50	0.00	0.000
0.417	0.32	0.50	0.00	0.000
0.500	0.42	0.62	0.00	0.000
0.583	0.51	0.74	0.00	0.000
0.667	0.58	0.85	0.02	0.000
0.750	0.63	0.93	0.09	0.000
0.833	0.68	0.99	0.21	0.000
0.917	0.71	1.05	1.37	0.000

1.000	0.74	1.09	0.89	0.000
1.083	0.76	1.12	0.86	0.000
1.167	0.78	1.15	0.85	0.000
1.250	0.80	1.17	0.81	0.000
1.333	0.81	1.19	0.82	0.000
1.417	0.82	1.21	0.83	0.000
1.500	0.83	1.22	0.83	0.000
1.583	0.84	1.23	0.84	0.000
1.667	0.84	1.24	0.85	0.000
1.750	0.85	1.25	0.85	0.000
1.833	0.85	1.25	0.86	0.000
1.917	0.86	1.26	0.86	0.000
2.000	0.86	1.27	0.86	0.000
2.083	0.86	1.27	0.87	0.000
2.167	0.87	1.28	0.87	0.000
2.250	0.87	1.28	0.87	0.000
2.333	0.87	1.29	0.88	0.000
2.417	0.88	1.29	0.88	0.000
2.500	0.88	1.30	0.88	0.000
2.583	0.88	1.30	0.88	0.000
2.667	0.89	1.30	0.89	0.000
2.750	0.89	1.31	0.89	0.000
2.833	0.89	1.31	0.89	0.000
2.917	0.90	1.32	0.90	0.000
3.000	0.90	1.32	0.90	0.000
3.083	0.90	1.33	0.90	0.000
3.167	0.90	1.33	0.90	0.000
3.250	0.91	1.33	0.91	0.000
3.333	0.91	1.34	0.91	0.000
3.417	0.91	1.34	0.91	0.000
3.500	0.92	1.35	0.92	0.000
3.583	0.92	1.35	0.92	0.000
3.667	0.92	1.36	0.92	0.000
3.750	0.92	1.36	0.92	0.000
3.833	0.93	1.36	0.93	0.000
3.917	0.93	1.37	0.93	0.000
4.000	0.93	1.37	0.93	0.000
4.083	0.94	1.38	0.94	0.000
4.167	0.94	1.38	0.94	0.000
4.250	0.94	1.39	0.94	0.000
4.333	0.95	1.39	0.95	0.000
4.417	0.95	1.40	0.95	0.000
4.500	0.95	1.40	0.95	0.000
4.583	0.96	1.41	0.96	0.000
4.667	0.96	1.41	0.96	0.000
4.750	0.96	1.42	0.96	0.000
4.833	0.97	1.42	0.97	0.000
4.917	0.97	1.43	0.97	0.000
5.000	0.97	1.43	0.97	0.000
5.083	0.98	1.44	0.98	0.000

5.167	0.98	1.44	0.98	0.000
5.250	0.98	1.45	0.98	0.000
5.333	0.99	1.45	0.99	0.000
5.417	0.99	1.46	0.99	0.000
5.500	0.99	1.46	0.99	0.000
5.583	1.00	1.47	1.00	0.000
5.667	1.00	1.47	1.00	0.000
5.750	1.01	1.48	1.01	0.000
5.833	1.01	1.49	1.01	0.000
5.917	1.01	1.49	1.01	0.000
6.000	1.02	1.50	1.02	0.000
6.083	1.02	1.50	1.02	0.000
6.167	1.03	1.51	1.03	0.000
6.250	1.03	1.51	1.03	0.000
6.333	1.03	1.52	1.03	0.000
6.417	1.04	1.53	1.04	0.000
6.500	1.04	1.53	1.04	0.000
6.583	1.05	1.54	1.05	0.000
6.667	1.05	1.55	1.05	0.000
6.750	1.06	1.55	1.06	0.000
6.833	1.06	1.56	1.06	0.000
6.917	1.06	1.57	1.06	0.000
7.000	1.07	1.57	1.07	0.000
7.083	1.07	1.58	1.07	0.000
7.167	1.08	1.59	1.08	0.000
7.250	1.08	1.59	1.08	0.000
7.333	1.09	1.60	1.09	0.000
7.417	1.09	1.61	1.09	0.000
7.500	1.10	1.62	1.10	0.000
7.583	1.10	1.62	1.10	0.000
7.667	1.11	1.63	1.11	0.000
7.750	1.11	1.64	1.11	0.000
7.833	1.12	1.65	1.12	0.000
7.917	1.12	1.65	1.12	0.000
8.000	1.13	1.66	1.13	0.000
8.083	1.14	1.67	1.13	0.000
8.167	1.14	1.68	1.14	0.000
8.250	1.15	1.69	1.15	0.000
8.333	1.15	1.70	1.15	0.000
8.417	1.16	1.70	1.16	0.000
8.500	1.16	1.71	1.16	0.000
8.583	1.17	1.72	1.17	0.000
8.667	1.18	1.73	1.18	0.000
8.750	1.18	1.74	1.18	0.000
8.833	1.19	1.75	1.19	0.000
8.917	1.20	1.76	1.19	0.000
9.000	1.20	1.77	1.20	0.000
9.083	1.21	1.78	1.21	0.000
9.167	1.22	1.79	1.21	0.000
9.250	1.22	1.80	1.22	0.000

9.333	1.23	1.81	1.23	0.000
9.417	1.24	1.82	1.24	0.000
9.500	1.24	1.83	1.24	0.000
9.583	1.25	1.84	1.25	0.000
9.667	1.26	1.85	1.26	0.000
9.750	1.27	1.86	1.27	0.000
9.833	1.27	1.87	1.27	0.000
9.917	1.28	1.89	1.28	0.000
10.000	1.29	1.90	1.29	0.000
10.083	1.30	1.91	1.30	0.000
10.167	1.31	1.92	1.31	0.000
10.250	1.31	1.93	1.31	0.000
10.333	1.32	1.95	1.32	0.000
10.417	1.33	1.96	1.33	0.000
10.500	1.34	1.97	1.34	0.000
10.583	1.35	1.99	1.35	0.000
10.667	1.36	2.00	1.36	0.000
10.750	1.37	2.02	1.37	0.000
10.833	1.38	2.03	1.38	0.000
10.917	1.39	2.04	1.39	0.000
11.000	1.40	2.06	1.40	0.000
11.083	1.41	2.08	1.41	0.000
11.167	1.42	2.09	1.42	0.000
11.250	1.43	2.11	1.43	0.000
11.333	1.44	2.12	1.44	0.000
11.417	1.46	2.14	1.46	0.000
11.500	1.47	2.16	1.47	0.000
11.583	1.48	2.18	1.48	0.000
11.667	1.49	2.20	1.49	0.000
11.750	1.50	2.21	1.50	0.000
11.833	1.52	2.23	1.52	0.000
11.917	1.53	2.25	1.53	0.000
12.000	1.55	2.27	1.55	0.000
12.083	1.56	2.29	1.56	0.000
12.167	1.56	2.30	1.57	0.000
12.250	1.54	2.27	1.56	0.000
12.333	1.51	2.22	1.53	0.000
12.417	1.47	2.16	1.47	0.000
12.500	1.44	2.12	1.43	0.000
12.583	1.42	2.08	1.41	0.000
12.667	1.40	2.06	1.39	0.000
12.750	1.39	2.05	1.39	0.000
12.833	1.39	2.05	1.38	0.000
12.917	1.39	2.05	1.39	0.000
13.000	1.40	2.06	1.40	0.000
13.083	1.41	2.07	1.41	0.000
13.167	1.42	2.09	1.42	0.000
13.250	1.44	2.12	1.44	0.000
13.333	1.46	2.14	1.45	0.000
13.417	1.48	2.17	1.47	0.000

13.500	1.50	2.20	1.50	0.000
13.583	1.52	2.24	1.52	0.000
13.667	1.55	2.27	1.54	0.000
13.750	1.57	2.31	1.57	0.000
13.833	1.60	2.35	1.60	0.000
13.917	1.63	2.40	1.63	0.000
14.000	1.66	2.45	1.66	0.000
14.083	1.70	2.50	1.69	0.000
14.167	1.73	2.55	1.73	0.000
14.250	1.77	2.61	1.77	0.000
14.333	1.82	2.67	1.81	0.000
14.417	1.86	2.74	1.86	0.000
14.500	1.91	2.81	1.91	0.000
14.583	1.96	2.89	1.96	0.000
14.667	2.02	2.97	2.02	0.000
14.750	2.08	3.06	2.07	0.000
14.833	2.14	3.15	2.20	0.000
14.917	2.21	3.25	2.21	0.000
15.000	2.28	3.36	2.28	0.000
15.083	2.37	3.48	2.37	0.000
15.167	2.45	3.61	2.45	0.000
15.250	2.55	3.76	2.55	0.000
15.333	2.66	3.80	2.60	0.000
15.417	2.79	3.84	2.71	0.000
15.500	2.94	3.88	2.85	0.000
15.583	3.12	3.94	3.01	0.000
15.667	3.33	4.00	3.21	0.000
15.750	3.59	4.08	3.45	0.000
15.833	3.90	4.18	3.73	0.000
15.917	4.30	4.30	4.10	0.000
16.000	5.03	4.53	4.69	0.000
16.083	6.77	4.96	5.99	0.000
16.167	10.57	5.70	9.07	0.000
16.250	14.93	6.31	13.37	0.000
16.333	17.26	6.54	16.42	0.000
16.417	17.19	6.54	17.22	0.000
16.500	15.54	6.39	16.14	0.000
16.583	13.12	6.07	13.95	0.000
16.667	10.38	5.67	11.39	0.000
16.750	8.03	5.24	8.94	0.000
16.833	6.31	4.85	7.02	0.000
16.917	5.12	4.56	5.67	0.000
17.000	4.41	4.34	4.74	0.000
17.083	3.97	4.20	4.19	0.000
17.167	3.59	4.09	3.79	0.000
17.250	3.27	3.98	3.45	0.000
17.333	2.98	3.90	3.15	0.000
17.417	2.74	3.82	2.89	0.000
17.500	2.53	3.73	2.65	0.000
17.583	2.35	3.46	2.35	0.000

17.667	2.20	3.23	2.20	0.000
17.750	2.06	3.03	2.08	0.000
17.833	1.94	2.86	2.04	0.000
17.917	1.84	2.71	1.82	0.000
18.000	1.75	2.57	1.74	0.000
18.083	1.67	2.45	1.66	0.000
18.167	1.61	2.37	1.59	0.000
18.250	1.58	2.32	1.55	0.000
18.333	1.57	2.31	1.54	0.000
18.417	1.57	2.31	1.56	0.000
18.500	1.57	2.31	1.57	0.000
18.583	1.57	2.30	1.57	0.000
18.667	1.56	2.29	1.56	0.000
18.750	1.54	2.27	1.55	0.000
18.833	1.53	2.25	1.53	0.000
18.917	1.51	2.23	1.52	0.000
19.000	1.50	2.20	1.50	0.000
19.083	1.48	2.17	1.48	0.000
19.167	1.46	2.14	1.46	0.000
19.250	1.44	2.12	1.44	0.000
19.333	1.42	2.09	1.42	0.000
19.417	1.40	2.06	1.40	0.000
19.500	1.38	2.03	1.38	0.000
19.583	1.36	2.01	1.36	0.000
19.667	1.35	1.98	1.35	0.000
19.750	1.33	1.95	1.33	0.000
19.833	1.31	1.93	1.31	0.000
19.917	1.29	1.91	1.29	0.000
20.000	1.28	1.88	1.28	0.000
20.083	1.26	1.86	1.26	0.000
20.167	1.25	1.84	1.25	0.000
20.250	1.23	1.82	1.23	0.000
20.333	1.22	1.80	1.22	0.000
20.417	1.21	1.78	1.21	0.000
20.500	1.19	1.76	1.19	0.000
20.583	1.18	1.74	1.18	0.000
20.667	1.17	1.72	1.17	0.000
20.750	1.16	1.70	1.16	0.000
20.833	1.15	1.68	1.14	0.000
20.917	1.13	1.67	1.13	0.000
21.000	1.12	1.65	1.12	0.000
21.083	1.11	1.64	1.11	0.000
21.167	1.10	1.62	1.10	0.000
21.250	1.09	1.61	1.09	0.000
21.333	1.08	1.59	1.08	0.000
21.417	1.07	1.58	1.07	0.000
21.500	1.06	1.56	1.06	0.000
21.583	1.05	1.55	1.05	0.000
21.667	1.05	1.54	1.05	0.000
21.750	1.04	1.53	1.04	0.000

21.833	1.03	1.51	1.03	0.000
21.917	1.02	1.50	1.03	0.000
22.000	1.01	1.49	1.01	0.000
22.083	1.00	1.48	1.00	0.000
22.167	1.00	1.47	1.00	0.000
22.250	0.99	1.46	0.99	0.000
22.333	0.98	1.44	0.98	0.000
22.417	0.97	1.43	0.97	0.000
22.500	0.97	1.42	0.97	0.000
22.583	0.96	1.41	0.96	0.000
22.667	0.95	1.40	0.95	0.000
22.750	0.95	1.39	0.95	0.000
22.833	0.94	1.38	0.94	0.000
22.917	0.94	1.38	0.93	0.000
23.000	0.93	1.37	0.93	0.000
23.083	0.92	1.36	0.92	0.000
23.167	0.92	1.35	0.92	0.000
23.250	0.91	1.34	0.91	0.000
23.333	0.91	1.33	0.91	0.000
23.417	0.90	1.32	0.90	0.000
23.500	0.89	1.32	0.89	0.000
23.583	0.89	1.31	0.89	0.000
23.667	0.88	1.30	0.88	0.000
23.750	0.88	1.29	0.88	0.000
23.833	0.87	1.28	0.87	0.000
23.917	0.87	1.28	0.87	0.000
24.000	0.86	1.27	0.86	0.000

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****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>STREAM NUMBER 2 ADDED TO STREAM NUMBER 1<<<<<
============================================================================


****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      9.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================


         MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
         STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
         VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
         EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
         OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
         UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
         (0.938)(DIAMETER):
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PIPELENGTH(FT) = 156.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1200.60
DOWNSTREAM ELEVATION(FT) = 1199.80
PIPE DIAMETER(FT) = 3.00

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.50	0.00	0.000
0.667	0.02	0.50	0.00	0.000
0.750	0.31	0.50	0.02	0.000
0.833	3.37	3.82	3.20	0.000
0.917	4.07	4.04	4.02	0.000
1.000	2.94	3.69	3.05	0.000
1.083	3.19	3.76	3.17	0.000
1.167	2.84	3.65	2.88	0.000
1.250	2.68	3.61	2.70	0.000
1.333	2.69	3.61	2.69	0.000
1.417	2.70	3.61	2.70	0.000
1.500	2.71	3.61	2.71	0.000
1.583	2.72	3.62	2.72	0.000
1.667	2.73	3.62	2.73	0.000
1.750	2.74	3.62	2.74	0.000
1.833	2.75	3.63	2.75	0.000
1.917	2.76	3.63	2.76	0.000
2.000	2.77	3.63	2.77	0.000
2.083	2.78	3.64	2.78	0.000
2.167	2.79	3.64	2.79	0.000
2.250	2.80	3.64	2.80	0.000
2.333	2.80	3.64	2.80	0.000
2.417	2.81	3.65	2.81	0.000
2.500	2.82	3.65	2.82	0.000
2.583	2.83	3.65	2.83	0.000
2.667	2.84	3.65	2.84	0.000
2.750	2.85	3.66	2.85	0.000
2.833	2.86	3.66	2.86	0.000
2.917	2.87	3.66	2.87	0.000
3.000	2.87	3.67	2.87	0.000
3.083	2.88	3.67	2.88	0.000

3.167	2.89	3.67	2.89	0.000
3.250	2.90	3.67	2.90	0.000
3.333	2.91	3.68	2.91	0.000
3.417	2.92	3.68	2.92	0.000
3.500	2.93	3.68	2.93	0.000
3.583	2.94	3.69	2.94	0.000
3.667	2.95	3.69	2.95	0.000
3.750	2.96	3.69	2.96	0.000
3.833	2.97	3.69	2.97	0.000
3.917	2.98	3.70	2.98	0.000
4.000	2.99	3.70	2.99	0.000
4.083	3.00	3.70	3.00	0.000
4.167	3.01	3.71	3.01	0.000
4.250	3.04	3.72	3.03	0.000
4.333	3.03	3.71	3.03	0.000
4.417	3.04	3.72	3.04	0.000
4.500	3.05	3.72	3.05	0.000
4.583	3.06	3.72	3.06	0.000
4.667	3.07	3.73	3.07	0.000
4.750	3.08	3.73	3.08	0.000
4.833	3.09	3.73	3.09	0.000
4.917	3.10	3.74	3.10	0.000
5.000	3.12	3.74	3.12	0.000
5.083	3.13	3.74	3.13	0.000
5.167	3.14	3.75	3.14	0.000
5.250	3.15	3.75	3.15	0.000
5.333	3.16	3.75	3.16	0.000
5.417	3.17	3.76	3.17	0.000
5.500	3.19	3.76	3.19	0.000
5.583	3.20	3.77	3.20	0.000
5.667	3.21	3.77	3.21	0.000
5.750	3.22	3.77	3.22	0.000
5.833	3.24	3.78	3.23	0.000
5.917	3.25	3.78	3.25	0.000
6.000	3.26	3.79	3.26	0.000
6.083	3.27	3.79	3.27	0.000
6.167	3.29	3.79	3.29	0.000
6.250	3.30	3.80	3.30	0.000
6.333	3.32	3.80	3.31	0.000
6.417	3.33	3.81	3.33	0.000
6.500	3.34	3.81	3.34	0.000
6.583	3.36	3.82	3.36	0.000
6.667	3.37	3.82	3.37	0.000
6.750	3.39	3.82	3.38	0.000
6.833	3.40	3.83	3.40	0.000
6.917	3.42	3.83	3.41	0.000
7.000	3.43	3.84	3.43	0.000
7.083	3.45	3.84	3.44	0.000
7.167	3.46	3.85	3.46	0.000
7.250	3.48	3.85	3.47	0.000

7.333	3.49	3.86	3.49	0.000
7.417	3.51	3.86	3.51	0.000
7.500	3.52	3.87	3.52	0.000
7.583	3.54	3.87	3.54	0.000
7.667	3.56	3.88	3.56	0.000
7.750	3.57	3.88	3.57	0.000
7.833	3.59	3.89	3.59	0.000
7.917	3.61	3.89	3.61	0.000
8.000	3.63	3.90	3.63	0.000
8.083	3.65	3.90	3.64	0.000
8.167	3.66	3.91	3.66	0.000
8.250	3.68	3.92	3.68	0.000
8.333	3.70	3.92	3.70	0.000
8.417	3.72	3.93	3.72	0.000
8.500	3.74	3.93	3.74	0.000
8.583	3.76	3.94	3.76	0.000
8.667	3.78	3.95	3.78	0.000
8.750	3.80	3.95	3.80	0.000
8.833	3.82	3.96	3.82	0.000
8.917	3.84	3.97	3.84	0.000
9.000	3.86	3.97	3.86	0.000
9.083	3.88	3.98	3.88	0.000
9.167	3.91	3.99	3.90	0.000
9.250	3.93	3.99	3.93	0.000
9.333	3.95	4.00	3.95	0.000
9.417	3.98	4.01	3.97	0.000
9.500	4.00	4.02	4.00	0.000
9.583	4.02	4.02	4.02	0.000
9.667	4.05	4.03	4.05	0.000
9.750	4.07	4.04	4.07	0.000
9.833	4.10	4.05	4.10	0.000
9.917	4.13	4.05	4.12	0.000
10.000	4.15	4.06	4.15	0.000
10.083	4.18	4.07	4.18	0.000
10.167	4.21	4.08	4.20	0.000
10.250	4.23	4.09	4.23	0.000
10.333	4.26	4.10	4.26	0.000
10.417	4.29	4.11	4.29	0.000
10.500	4.32	4.12	4.32	0.000
10.583	4.35	4.13	4.35	0.000
10.667	4.38	4.13	4.38	0.000
10.750	4.42	4.14	4.41	0.000
10.833	4.45	4.16	4.45	0.000
10.917	4.48	4.17	4.48	0.000
11.000	4.53	4.18	4.53	0.000
11.083	4.58	4.20	4.58	0.000
11.167	4.59	4.20	4.59	0.000
11.250	4.62	4.21	4.62	0.000
11.333	4.66	4.22	4.66	0.000
11.417	4.70	4.23	4.70	0.000

11.500	4.74	4.25	4.74	0.000
11.583	4.78	4.26	4.78	0.000
11.667	4.82	4.27	4.82	0.000
11.750	4.86	4.28	4.86	0.000
11.833	4.91	4.29	4.90	0.000
11.917	4.95	4.30	4.95	0.000
12.000	5.00	4.31	5.00	0.000
12.083	5.05	4.32	5.04	0.000
12.167	5.07	4.33	5.07	0.000
12.250	4.98	4.31	4.99	0.000
12.333	4.72	4.24	4.74	0.000
12.417	4.46	4.16	4.48	0.000
12.500	4.45	4.16	4.45	0.000
12.583	4.33	4.12	4.34	0.000
12.667	4.23	4.09	4.23	0.000
12.750	4.28	4.10	4.28	0.000
12.833	4.34	4.12	4.33	0.000
12.917	4.39	4.14	4.39	0.000
13.000	4.45	4.16	4.45	0.000
13.083	4.51	4.17	4.51	0.000
13.167	4.64	4.22	4.63	0.000
13.250	4.68	4.23	4.67	0.000
13.333	4.72	4.24	4.72	0.000
13.417	4.80	4.26	4.79	0.000
13.500	4.88	4.28	4.87	0.000
13.583	4.97	4.30	4.96	0.000
13.667	5.06	4.32	5.05	0.000
13.750	5.15	4.35	5.14	0.000
13.833	5.25	4.37	5.24	0.000
13.917	5.36	4.40	5.35	0.000
14.000	5.47	4.42	5.46	0.000
14.083	5.59	4.45	5.58	0.000
14.167	5.71	4.48	5.70	0.000
14.250	5.86	4.52	5.85	0.000
14.333	6.02	4.56	6.01	0.000
14.417	6.19	4.60	6.18	0.000
14.500	6.37	4.64	6.35	0.000
14.583	6.55	4.68	6.53	0.000
14.667	6.74	4.73	6.72	0.000
14.750	6.95	4.78	6.93	0.000
14.833	7.23	4.84	7.21	0.000
14.917	7.42	4.88	7.40	0.000
15.000	7.68	4.93	7.66	0.000
15.083	7.98	4.98	7.95	0.000
15.167	8.30	5.04	8.28	0.000
15.250	8.66	5.11	8.64	0.000
15.333	9.28	5.22	9.24	0.000
15.417	9.54	5.27	9.52	0.000
15.500	10.08	5.35	10.04	0.000
15.583	10.79	5.45	10.74	0.000

15.667	11.65	5.58	11.59	0.000
15.750	12.59	5.71	12.53	0.000
15.833	13.41	5.82	13.36	0.000
15.917	14.91	6.00	14.81	0.000
16.000	17.30	6.22	17.15	0.000
16.083	22.05	6.60	21.76	0.000
16.167	32.00	7.22	31.43	0.000
16.250	45.27	7.67	44.51	0.000
16.333	53.65	7.70	47.61	0.041
16.417	54.49	7.70	47.76	0.087
16.500	50.25	7.70	47.76	0.104
16.583	43.42	7.70	47.76	0.074
16.667	35.35	7.68	46.20	0.000
16.750	27.95	7.02	29.00	0.000
16.833	21.79	6.58	22.13	0.000
16.917	17.13	6.20	17.41	0.000
17.000	13.13	5.78	13.39	0.000
17.083	10.84	5.46	10.99	0.000
17.167	9.96	5.33	10.02	0.000
17.250	8.84	5.14	8.92	0.000
17.333	7.71	4.93	7.79	0.000
17.417	7.16	4.83	7.21	0.000
17.500	6.69	4.72	6.72	0.000
17.583	6.20	4.60	6.24	0.000
17.667	5.87	4.52	5.90	0.000
17.750	5.61	4.46	5.63	0.000
17.833	5.44	4.42	5.45	0.000
17.917	5.10	4.34	5.13	0.000
18.000	4.91	4.29	4.92	0.000
18.083	4.73	4.24	4.74	0.000
18.167	4.59	4.20	4.60	0.000
18.250	4.63	4.21	4.62	0.000
18.333	4.69	4.23	4.68	0.000
18.417	4.98	4.31	4.96	0.000
18.500	5.00	4.31	5.00	0.000
18.583	4.98	4.31	4.98	0.000
18.667	4.93	4.29	4.93	0.000
18.750	4.87	4.28	4.87	0.000
18.833	4.80	4.26	4.81	0.000
18.917	4.73	4.24	4.74	0.000
19.000	4.66	4.22	4.67	0.000
19.083	4.59	4.20	4.60	0.000
19.167	4.53	4.18	4.53	0.000
19.250	4.49	4.17	4.49	0.000
19.333	4.46	4.16	4.47	0.000
19.417	4.34	4.12	4.35	0.000
19.500	4.28	4.10	4.28	0.000
19.583	4.22	4.08	4.23	0.000
19.667	4.17	4.07	4.17	0.000
19.750	4.12	4.05	4.12	0.000

19.833	4.07	4.04	4.07	0.000
19.917	4.02	4.02	4.02	0.000
20.000	3.97	4.01	3.97	0.000
20.083	3.92	3.99	3.93	0.000
20.167	3.88	3.98	3.88	0.000
20.250	3.84	3.96	3.84	0.000
20.333	3.79	3.95	3.80	0.000
20.417	3.75	3.94	3.76	0.000
20.500	3.71	3.93	3.72	0.000
20.583	3.68	3.91	3.68	0.000
20.667	3.64	3.90	3.64	0.000
20.750	3.60	3.89	3.61	0.000
20.833	3.57	3.88	3.57	0.000
20.917	3.54	3.87	3.54	0.000
21.000	3.50	3.86	3.51	0.000
21.083	3.47	3.85	3.47	0.000
21.167	3.44	3.84	3.44	0.000
21.250	3.41	3.83	3.41	0.000
21.333	3.38	3.82	3.38	0.000
21.417	3.35	3.81	3.36	0.000
21.500	3.32	3.81	3.33	0.000
21.583	3.30	3.80	3.30	0.000
21.667	3.27	3.79	3.27	0.000
21.750	3.25	3.78	3.25	0.000
21.833	3.23	3.77	3.23	0.000
21.917	3.21	3.77	3.21	0.000
22.000	3.17	3.76	3.17	0.000
22.083	3.15	3.75	3.15	0.000
22.167	3.12	3.74	3.13	0.000
22.250	3.10	3.74	3.10	0.000
22.333	3.08	3.73	3.08	0.000
22.417	3.06	3.72	3.06	0.000
22.500	3.04	3.72	3.04	0.000
22.583	3.02	3.71	3.02	0.000
22.667	2.99	3.70	3.00	0.000
22.750	2.98	3.70	2.98	0.000
22.833	2.99	3.70	2.99	0.000
22.917	2.94	3.68	2.94	0.000
23.000	2.92	3.68	2.92	0.000
23.083	2.90	3.67	2.90	0.000
23.167	2.88	3.67	2.88	0.000
23.250	2.86	3.66	2.86	0.000
23.333	2.85	3.66	2.85	0.000
23.417	2.83	3.65	2.83	0.000
23.500	2.81	3.65	2.81	0.000
23.583	2.79	3.64	2.80	0.000
23.667	2.78	3.64	2.78	0.000
23.750	2.76	3.63	2.76	0.000
23.833	2.75	3.63	2.75	0.000
23.917	2.73	3.62	2.73	0.000

```
          24.000      2.72      3.62      2.72        0.000

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #3)

         WATERSHED AREA =      55.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.279
         LOW LOSS FRACTION = 0.344
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.46
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.93
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.23
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.88
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.45
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  4.90

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.369


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                 2.593                 17.469
```

2	17.076	97.557
3	43.597	178.653
4	72.304	193.378
5	88.291	107.688
6	95.315	47.316
7	98.055	18.460
8	98.849	5.345
9	99.440	3.982
10	99.776	2.264
11	99.944	1.132
12	100.000	0.377

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0085	0.0029	0.0056
2	0.0085	0.0029	0.0056
3	0.0086	0.0029	0.0056
4	0.0086	0.0029	0.0056
5	0.0086	0.0030	0.0056
6	0.0086	0.0030	0.0057
7	0.0087	0.0030	0.0057
8	0.0087	0.0030	0.0057
9	0.0087	0.0030	0.0057
10	0.0087	0.0030	0.0057
11	0.0087	0.0030	0.0057
12	0.0088	0.0030	0.0057
13	0.0088	0.0030	0.0058
14	0.0088	0.0030	0.0058
15	0.0088	0.0030	0.0058
16	0.0089	0.0030	0.0058
17	0.0089	0.0031	0.0058
18	0.0089	0.0031	0.0058
19	0.0089	0.0031	0.0059
20	0.0090	0.0031	0.0059
21	0.0090	0.0031	0.0059
22	0.0090	0.0031	0.0059
23	0.0090	0.0031	0.0059
24	0.0091	0.0031	0.0059
25	0.0091	0.0031	0.0060
26	0.0091	0.0031	0.0060
27	0.0092	0.0032	0.0060
28	0.0092	0.0032	0.0060
29	0.0092	0.0032	0.0060
30	0.0092	0.0032	0.0061
31	0.0093	0.0032	0.0061

32	0.0093	0.0032	0.0061
33	0.0093	0.0032	0.0061
34	0.0093	0.0032	0.0061
35	0.0094	0.0032	0.0062
36	0.0094	0.0032	0.0062
37	0.0094	0.0032	0.0062
38	0.0095	0.0033	0.0062
39	0.0095	0.0033	0.0062
40	0.0095	0.0033	0.0063
41	0.0096	0.0033	0.0063
42	0.0096	0.0033	0.0063
43	0.0096	0.0033	0.0063
44	0.0097	0.0033	0.0063
45	0.0097	0.0033	0.0064
46	0.0097	0.0033	0.0064
47	0.0098	0.0034	0.0064
48	0.0098	0.0034	0.0064
49	0.0098	0.0034	0.0065
50	0.0099	0.0034	0.0065
51	0.0099	0.0034	0.0065
52	0.0099	0.0034	0.0065
53	0.0100	0.0034	0.0065
54	0.0100	0.0034	0.0066
55	0.0100	0.0035	0.0066
56	0.0101	0.0035	0.0066
57	0.0101	0.0035	0.0066
58	0.0101	0.0035	0.0067
59	0.0102	0.0035	0.0067
60	0.0102	0.0035	0.0067
61	0.0103	0.0035	0.0067
62	0.0103	0.0035	0.0068
63	0.0104	0.0036	0.0068
64	0.0104	0.0036	0.0068
65	0.0104	0.0036	0.0068
66	0.0105	0.0036	0.0069
67	0.0105	0.0036	0.0069
68	0.0105	0.0036	0.0069
69	0.0106	0.0036	0.0070
70	0.0106	0.0037	0.0070
71	0.0107	0.0037	0.0070
72	0.0107	0.0037	0.0070
73	0.0108	0.0037	0.0071
74	0.0108	0.0037	0.0071
75	0.0109	0.0037	0.0071
76	0.0109	0.0037	0.0071
77	0.0110	0.0038	0.0072
78	0.0110	0.0038	0.0072
79	0.0111	0.0038	0.0073
80	0.0111	0.0038	0.0073
81	0.0112	0.0038	0.0073

82	0.0112	0.0038	0.0073
83	0.0113	0.0039	0.0074
84	0.0113	0.0039	0.0074
85	0.0114	0.0039	0.0075
86	0.0114	0.0039	0.0075
87	0.0115	0.0039	0.0075
88	0.0115	0.0040	0.0075
89	0.0116	0.0040	0.0076
90	0.0116	0.0040	0.0076
91	0.0117	0.0040	0.0077
92	0.0117	0.0040	0.0077
93	0.0118	0.0041	0.0077
94	0.0118	0.0041	0.0078
95	0.0119	0.0041	0.0078
96	0.0120	0.0041	0.0079
97	0.0121	0.0041	0.0079
98	0.0121	0.0042	0.0079
99	0.0122	0.0042	0.0080
100	0.0122	0.0042	0.0080
101	0.0123	0.0042	0.0081
102	0.0124	0.0043	0.0081
103	0.0124	0.0043	0.0082
104	0.0125	0.0043	0.0082
105	0.0126	0.0043	0.0083
106	0.0126	0.0043	0.0083
107	0.0127	0.0044	0.0084
108	0.0128	0.0044	0.0084
109	0.0129	0.0044	0.0085
110	0.0129	0.0045	0.0085
111	0.0130	0.0045	0.0086
112	0.0131	0.0045	0.0086
113	0.0132	0.0045	0.0087
114	0.0133	0.0046	0.0087
115	0.0134	0.0046	0.0088
116	0.0134	0.0046	0.0088
117	0.0136	0.0047	0.0089
118	0.0136	0.0047	0.0089
119	0.0137	0.0047	0.0090
120	0.0138	0.0047	0.0090
121	0.0139	0.0048	0.0091
122	0.0140	0.0048	0.0092
123	0.0141	0.0049	0.0093
124	0.0142	0.0049	0.0093
125	0.0143	0.0049	0.0094
126	0.0144	0.0050	0.0094
127	0.0145	0.0050	0.0095
128	0.0146	0.0050	0.0096
129	0.0148	0.0051	0.0097
130	0.0148	0.0051	0.0097
131	0.0150	0.0052	0.0098

132	0.0151	0.0052	0.0099
133	0.0153	0.0052	0.0100
134	0.0153	0.0053	0.0101
135	0.0155	0.0053	0.0102
136	0.0156	0.0054	0.0102
137	0.0158	0.0054	0.0104
138	0.0159	0.0055	0.0104
139	0.0161	0.0055	0.0106
140	0.0162	0.0056	0.0106
141	0.0164	0.0056	0.0108
142	0.0165	0.0057	0.0108
143	0.0167	0.0058	0.0110
144	0.0168	0.0058	0.0110
145	0.0131	0.0045	0.0086
146	0.0132	0.0045	0.0086
147	0.0134	0.0046	0.0088
148	0.0135	0.0047	0.0089
149	0.0138	0.0047	0.0090
150	0.0139	0.0048	0.0091
151	0.0142	0.0049	0.0093
152	0.0143	0.0049	0.0094
153	0.0146	0.0050	0.0096
154	0.0148	0.0051	0.0097
155	0.0151	0.0052	0.0099
156	0.0153	0.0053	0.0100
157	0.0156	0.0054	0.0103
158	0.0158	0.0054	0.0104
159	0.0162	0.0056	0.0106
160	0.0164	0.0056	0.0108
161	0.0168	0.0058	0.0110
162	0.0170	0.0059	0.0112
163	0.0175	0.0060	0.0115
164	0.0178	0.0061	0.0116
165	0.0183	0.0063	0.0120
166	0.0186	0.0064	0.0122
167	0.0191	0.0066	0.0126
168	0.0195	0.0067	0.0128
169	0.0204	0.0070	0.0134
170	0.0208	0.0072	0.0136
171	0.0216	0.0074	0.0141
172	0.0220	0.0076	0.0144
173	0.0229	0.0079	0.0150
174	0.0234	0.0080	0.0153
175	0.0244	0.0084	0.0160
176	0.0250	0.0086	0.0164
177	0.0263	0.0090	0.0173
178	0.0270	0.0093	0.0177
179	0.0286	0.0098	0.0188
180	0.0295	0.0101	0.0193
181	0.0315	0.0108	0.0207

182	0.0327	0.0112	0.0214
183	0.0353	0.0122	0.0232
184	0.0369	0.0127	0.0242
185	0.0423	0.0146	0.0277
186	0.0447	0.0154	0.0293
187	0.0507	0.0174	0.0332
188	0.0547	0.0188	0.0359
189	0.0641	0.0221	0.0421
190	0.0725	0.0232	0.0493
191	0.1040	0.0232	0.0807
192	0.1437	0.0232	0.1205
193	0.4589	0.0233	0.4356
194	0.0845	0.0232	0.0612
195	0.0595	0.0205	0.0390
196	0.0474	0.0163	0.0311
197	0.0387	0.0133	0.0254
198	0.0339	0.0117	0.0223
199	0.0305	0.0105	0.0200
200	0.0278	0.0096	0.0182
201	0.0256	0.0088	0.0168
202	0.0239	0.0082	0.0157
203	0.0224	0.0077	0.0147
204	0.0212	0.0073	0.0139
205	0.0198	0.0068	0.0130
206	0.0188	0.0065	0.0124
207	0.0180	0.0062	0.0118
208	0.0173	0.0059	0.0113
209	0.0166	0.0057	0.0109
210	0.0160	0.0055	0.0105
211	0.0154	0.0053	0.0101
212	0.0149	0.0051	0.0098
213	0.0145	0.0050	0.0095
214	0.0141	0.0048	0.0092
215	0.0137	0.0047	0.0090
216	0.0133	0.0046	0.0087
217	0.0170	0.0058	0.0111
218	0.0166	0.0057	0.0109
219	0.0163	0.0056	0.0107
220	0.0160	0.0055	0.0105
221	0.0157	0.0054	0.0103
222	0.0154	0.0053	0.0101
223	0.0152	0.0052	0.0100
224	0.0149	0.0051	0.0098
225	0.0147	0.0051	0.0096
226	0.0145	0.0050	0.0095
227	0.0143	0.0049	0.0094
228	0.0141	0.0048	0.0092
229	0.0139	0.0048	0.0091
230	0.0137	0.0047	0.0090
231	0.0135	0.0046	0.0089

232	0.0133	0.0046	0.0087
233	0.0132	0.0045	0.0086
234	0.0130	0.0045	0.0085
235	0.0128	0.0044	0.0084
236	0.0127	0.0044	0.0083
237	0.0125	0.0043	0.0082
238	0.0124	0.0043	0.0081
239	0.0123	0.0042	0.0080
240	0.0121	0.0042	0.0080
241	0.0120	0.0041	0.0079
242	0.0119	0.0041	0.0078
243	0.0118	0.0040	0.0077
244	0.0117	0.0040	0.0076
245	0.0115	0.0040	0.0076
246	0.0114	0.0039	0.0075
247	0.0113	0.0039	0.0074
248	0.0112	0.0039	0.0074
249	0.0111	0.0038	0.0073
250	0.0110	0.0038	0.0072
251	0.0109	0.0038	0.0072
252	0.0108	0.0037	0.0071
253	0.0107	0.0037	0.0070
254	0.0107	0.0037	0.0070
255	0.0106	0.0036	0.0069
256	0.0105	0.0036	0.0069
257	0.0104	0.0036	0.0068
258	0.0103	0.0036	0.0068
259	0.0102	0.0035	0.0067
260	0.0102	0.0035	0.0067
261	0.0101	0.0035	0.0066
262	0.0100	0.0034	0.0066
263	0.0100	0.0034	0.0065
264	0.0099	0.0034	0.0065
265	0.0098	0.0034	0.0064
266	0.0097	0.0034	0.0064
267	0.0097	0.0033	0.0063
268	0.0096	0.0033	0.0063
269	0.0096	0.0033	0.0063
270	0.0095	0.0033	0.0062
271	0.0094	0.0032	0.0062
272	0.0094	0.0032	0.0061
273	0.0093	0.0032	0.0061
274	0.0093	0.0032	0.0061
275	0.0092	0.0032	0.0060
276	0.0091	0.0031	0.0060
277	0.0091	0.0031	0.0060
278	0.0090	0.0031	0.0059
279	0.0090	0.0031	0.0059
280	0.0089	0.0031	0.0059
281	0.0089	0.0031	0.0058

282	0.0088	0.0030	0.0058
283	0.0088	0.0030	0.0058
284	0.0087	0.0030	0.0057
285	0.0087	0.0030	0.0057
286	0.0086	0.0030	0.0057
287	0.0086	0.0030	0.0056
288	0.0085	0.0029	0.0056

TOTAL STORM RAINFALL(INCHES) = 4.90
TOTAL SOIL-LOSS(INCHES) = 1.50
TOTAL EFFECTIVE RAINFALL(INCHES) = 3.39

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 6.9838
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 15.7497

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2 4 - 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

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	50.0	100.0	150.0	200.0
0.083	0.0007	0.10	Q	.	.	.	.
0.167	0.0051	0.64	Q	.	.	.	.
0.250	0.0164	1.64	Q	.	.	.	.
0.333	0.0352	2.73	Q	.	.	.	.
0.417	0.0581	3.33	Q	.	.	.	.
0.500	0.0830	3.61	Q	.	.	.	.
0.583	0.1086	3.72	Q	.	.	.	.
0.667	0.1345	3.76	Q	.	.	.	.
0.750	0.1606	3.79	Q	.	.	.	.
0.833	0.1869	3.81	Q	.	.	.	.
0.917	0.2132	3.83	Q	.	.	.	.
1.000	0.2397	3.84	Q	.	.	.	.
1.083	0.2663	3.85	Q	.	.	.	.
1.167	0.2929	3.86	Q	.	.	.	.
1.250	0.3196	3.88	Q	.	.	.	.
1.333	0.3463	3.89	Q	.	.	.	.
1.417	0.3732	3.90	Q	.	.	.	.
1.500	0.4001	3.91	QV	.	.	.	.
1.583	0.4271	3.92	QV	.	.	.	.
1.667	0.4541	3.93	QV	.	.	.	.
1.750	0.4813	3.94	QV	.	.	.	.
1.833	0.5085	3.95	QV	.	.	.	.

1.917	0.5358	3.96	QV	.	.	.	.
2.000	0.5632	3.98	QV	.	.	.	.
2.083	0.5906	3.99	QV	.	.	.	.
2.167	0.6182	4.00	QV	.	.	.	.
2.250	0.6458	4.01	QV	.	.	.	.
2.333	0.6735	4.02	QV	.	.	.	.
2.417	0.7013	4.03	QV	.	.	.	.
2.500	0.7292	4.05	QV	.	.	.	.
2.583	0.7571	4.06	QV	.	.	.	.
2.667	0.7852	4.07	QV	.	.	.	.
2.750	0.8133	4.08	Q V	.	.	.	.
2.833	0.8415	4.10	Q V	.	.	.	.
2.917	0.8698	4.11	Q V	.	.	.	.
3.000	0.8982	4.12	Q V	.	.	.	.
3.083	0.9267	4.14	Q V	.	.	.	.
3.167	0.9552	4.15	Q V	.	.	.	.
3.250	0.9839	4.16	Q V	.	.	.	.
3.333	1.0127	4.17	Q V	.	.	.	.
3.417	1.0415	4.19	Q V	.	.	.	.
3.500	1.0704	4.20	Q V	.	.	.	.
3.583	1.0995	4.22	Q V	.	.	.	.
3.667	1.1286	4.23	Q V	.	.	.	.
3.750	1.1578	4.24	Q V	.	.	.	.
3.833	1.1871	4.26	Q V	.	.	.	.
3.917	1.2166	4.27	Q V	.	.	.	.
4.000	1.2461	4.29	Q V	.	.	.	.
4.083	1.2757	4.30	Q V	.	.	.	.
4.167	1.3054	4.32	Q V	.	.	.	.
4.250	1.3353	4.33	Q V	.	.	.	.
4.333	1.3652	4.35	Q V	.	.	.	.
4.417	1.3952	4.36	Q V	.	.	.	.
4.500	1.4254	4.38	Q V	.	.	.	.
4.583	1.4556	4.39	Q V	.	.	.	.
4.667	1.4860	4.41	Q V	.	.	.	.
4.750	1.5164	4.42	Q V	.	.	.	.
4.833	1.5470	4.44	Q V	.	.	.	.
4.917	1.5777	4.46	Q V	.	.	.	.
5.000	1.6085	4.47	Q V	.	.	.	.
5.083	1.6394	4.49	Q V	.	.	.	.
5.167	1.6704	4.51	Q V	.	.	.	.
5.250	1.7016	4.52	Q V	.	.	.	.
5.333	1.7328	4.54	Q V	.	.	.	.
5.417	1.7642	4.56	Q V	.	.	.	.
5.500	1.7957	4.57	Q V	.	.	.	.
5.583	1.8273	4.59	Q V	.	.	.	.
5.667	1.8591	4.61	Q V	.	.	.	.
5.750	1.8910	4.63	Q V	.	.	.	.
5.833	1.9230	4.65	Q V	.	.	.	.
5.917	1.9551	4.66	Q V	.	.	.	.
6.000	1.9873	4.68	Q V	.	.	.	.

6.083	2.0197	4.70	Q	V	.	.	.	.
6.167	2.0523	4.72	Q	V	.	.	.	.
6.250	2.0849	4.74	Q	V	.	.	.	.
6.333	2.1177	4.76	Q	V	.	.	.	.
6.417	2.1506	4.78	Q	V	.	.	.	.
6.500	2.1837	4.80	Q	V	.	.	.	.
6.583	2.2169	4.82	Q	V	.	.	.	.
6.667	2.2503	4.84	Q	V	.	.	.	.
6.750	2.2838	4.86	Q	V	.	.	.	.
6.833	2.3174	4.89	Q	V	.	.	.	.
6.917	2.3512	4.91	Q	V	.	.	.	.
7.000	2.3852	4.93	Q	V	.	.	.	.
7.083	2.4193	4.95	Q	V	.	.	.	.
7.167	2.4535	4.97	Q	V	.	.	.	.
7.250	2.4879	5.00	Q	V	.	.	.	.
7.333	2.5225	5.02	.Q	V	.	.	.	.
7.417	2.5572	5.04	.Q	V	.	.	.	.
7.500	2.5921	5.07	.Q	V	.	.	.	.
7.583	2.6272	5.09	.Q	V	.	.	.	.
7.667	2.6624	5.12	.Q	V	.	.	.	.
7.750	2.6978	5.14	.Q	V	.	.	.	.
7.833	2.7334	5.17	.Q	V	.	.	.	.
7.917	2.7692	5.19	.Q	V	.	.	.	.
8.000	2.8051	5.22	.Q	V	.	.	.	.
8.083	2.8412	5.24	.Q	V	.	.	.	.
8.167	2.8775	5.27	.Q	V	.	.	.	.
8.250	2.9140	5.30	.Q	V	.	.	.	.
8.333	2.9507	5.33	.Q	V	.	.	.	.
8.417	2.9875	5.35	.Q	V	.	.	.	.
8.500	3.0246	5.38	.Q	V	.	.	.	.
8.583	3.0619	5.41	.Q	V	.	.	.	.
8.667	3.0993	5.44	.Q	V	.	.	.	.
8.750	3.1370	5.47	.Q	V	.	.	.	.
8.833	3.1749	5.50	.Q	V	.	.	.	.
8.917	3.2130	5.53	.Q	V	.	.	.	.
9.000	3.2513	5.56	.Q	V	.	.	.	.
9.083	3.2898	5.59	.Q	V	.	.	.	.
9.167	3.3286	5.63	.Q	V	.	.	.	.
9.250	3.3676	5.66	.Q	V	.	.	.	.
9.333	3.4068	5.69	.Q	V	.	.	.	.
9.417	3.4463	5.73	.Q	V	.	.	.	.
9.500	3.4860	5.76	.Q	V	.	.	.	.
9.583	3.5259	5.80	.Q	V	.	.	.	.
9.667	3.5661	5.84	.Q	V.		.	.	.
9.750	3.6065	5.87	.Q	V.		.	.	.
9.833	3.6473	5.91	.Q	V.		.	.	.
9.917	3.6882	5.95	.Q	V.		.	.	.
10.000	3.7295	5.99	.Q	V.		.	.	.
10.083	3.7710	6.03	.Q	V.		.	.	.
10.167	3.8128	6.07	.Q	V.		.	.	.

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10.250      3.8549      6.11  .Q       V.          .          .          .
10.333      3.8972      6.15  .Q       V.          .          .          .
10.417      3.9399      6.20  .Q        V          .          .          .
10.500      3.9829      6.24  .Q        V          .          .          .
10.583      4.0262      6.29  .Q        V          .          .          .
10.667      4.0698      6.33  .Q        V          .          .          .
10.750      4.1137      6.38  .Q        V          .          .          .
10.833      4.1580      6.43  .Q        V          .          .          .
10.917      4.2026      6.48  .Q        V          .          .          .
11.000      4.2476      6.53  .Q        V          .          .          .
11.083      4.2929      6.58  .Q        V          .          .          .
11.167      4.3386      6.63  .Q        .V         .          .          .
11.250      4.3846      6.69  .Q        .V         .          .          .
11.333      4.4311      6.74  .Q        .V         .          .          .
11.417      4.4779      6.80  .Q        .V         .          .          .
11.500      4.5252      6.86  .Q        .V         .          .          .
11.583      4.5728      6.92  .Q        .V         .          .          .
11.667      4.6209      6.98  .Q        .V         .          .          .
11.750      4.6694      7.05  .Q        .V         .          .          .
11.833      4.7184      7.11  .Q        .V         .          .          .
11.917      4.7678      7.18  .Q        . V        .          .          .
12.000      4.8178      7.25  .Q        . V        .          .          .
12.083      4.8678      7.27  .Q        . V        .          .          .
12.167      4.9167      7.09  .Q        . V        .          .          .
12.250      4.9628      6.69  .Q        . V        .          .          .
12.333      5.0059      6.26  .Q        . V        .          .          .
12.417      5.0476      6.06  .Q        . V        .          .          .
12.500      5.0890      6.01  .Q        . V        .          .          .
12.583      5.1307      6.05  .Q        .  V       .          .          .
12.667      5.1728      6.12  .Q        .  V       .          .          .
12.750      5.2154      6.19  .Q        .  V       .          .          .
12.833      5.2587      6.28  .Q        .  V       .          .          .
12.917      5.3026      6.37  .Q        .  V       .          .          .
13.000      5.3471      6.47  .Q        .  V       .          .          .
13.083      5.3924      6.57  .Q        .  V       .          .          .
13.167      5.4384      6.68  .Q        .  V       .          .          .
13.250      5.4852      6.79  .Q        .  V       .          .          .
13.333      5.5328      6.91  .Q        .   V      .          .          .
13.417      5.5812      7.03  .Q        .   V      .          .          .
13.500      5.6305      7.16  .Q        .   V      .          .          .
13.583      5.6808      7.30  .Q        .   V      .          .          .
13.667      5.7320      7.44  .Q        .   V      .          .          .
13.750      5.7842      7.59  .Q        .   V      .          .          .
13.833      5.8376      7.75  .Q        .   V      .          .          .
13.917      5.8921      7.91  .Q        .   V      .          .          .
14.000      5.9478      8.09  .Q        .    V     .          .          .
14.083      6.0048      8.28  .Q        .    V     .          .          .
14.167      6.0633      8.50  .Q        .    V     .          .          .
14.250      6.1235      8.74  .Q        .    V     .          .          .
14.333      6.1855      9.01  .Q        .    V     .          .          .
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14.417	6.2494	9.27	.Q . V . . .
14.500	6.3151	9.54	.Q . V . . .
14.583	6.3828	9.83	.Q . V . . .
14.667	6.4526	10.14	. Q . V . . .
14.750	6.5247	10.47	. Q . V . . .
14.833	6.5993	10.83	. Q . V . . .
14.917	6.6766	11.23	. Q . V . . .
15.000	6.7570	11.67	. Q . V . . .
15.083	6.8407	12.15	. Q . V . . .
15.167	6.9282	12.70	. Q . V . . .
15.250	7.0199	13.31	. Q . V . . .
15.333	7.1165	14.02	. Q . V . . .
15.417	7.2187	14.85	. Q . V . . .
15.500	7.3283	15.91	. Q . V . . .
15.583	7.4469	17.22	. Q . V . . .
15.667	7.5766	18.83	. Q . V. . .
15.750	7.7190	20.67	. Q . V. . .
15.833	7.8774	23.00	. Q . V . .
15.917	8.0595	26.45	. Q . V . .
16.000	8.2883	33.22	. Q . .V . .
16.083	8.6361	50.51	. Q .V . .
16.167	9.2495	89.05	. . Q . V . .
16.250	10.0760	120.01	. . . QV . .
16.333	10.8867	117.72	. . . Q V . .
16.417	11.4167	76.96	. . Q . V . .
16.500	11.7347	46.18	. Q. . V. .
16.583	11.9369	29.35	. Q . . V .
16.667	12.0784	20.54	. Q . . V .
16.750	12.1976	17.32	. Q . . V .
16.833	12.2996	14.81	. Q . . .V .
16.917	12.3891	12.99	. Q . . .V .
17.000	12.4692	11.63	. Q . . .V .
17.083	12.5425	10.64	. Q . . .V .
17.167	12.6109	9.93	.Q . . . V .
17.250	12.6751	9.32	.Q . . . V .
17.333	12.7356	8.79	.Q . . . V .
17.417	12.7931	8.35	.Q . . . V .
17.500	12.8480	7.96	.Q . . . V .
17.583	12.9005	7.63	.Q . . . V .
17.667	12.9510	7.33	.Q . . . V .
17.750	12.9996	7.06	.Q . . . V .
17.833	13.0466	6.82	.Q . . . V .
17.917	13.0920	6.59	.Q . . . V .
18.000	13.1360	6.39	.Q . . . V .
18.083	13.1790	6.25	.Q . . . V .
18.167	13.2226	6.33	.Q . . . V .
18.250	13.2683	6.63	.Q . . . V .
18.333	13.3164	6.99	.Q . . . V .
18.417	13.3654	7.12	.Q . . . V .
18.500	13.4144	7.10	.Q . . . V .

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18.583     13.4627      7.02  .Q        .         .         .   V     .
18.667     13.5103      6.91  .Q        .         .         .   V     .
18.750     13.5571      6.80  .Q        .         .         .   V     .
18.833     13.6032      6.69  .Q        .         .         .   V     .
18.917     13.6485      6.59  .Q        .         .         .   V     .
19.000     13.6932      6.48  .Q        .         .         .   V     .
19.083     13.7372      6.39  .Q        .         .         .   V     .
19.167     13.7805      6.29  .Q        .         .         .   V     .
19.250     13.8232      6.20  .Q        .         .         .    V    .
19.333     13.8653      6.12  .Q        .         .         .    V    .
19.417     13.9069      6.03  .Q        .         .         .    V    .
19.500     13.9479      5.95  .Q        .         .         .    V    .
19.583     13.9884      5.88  .Q        .         .         .    V    .
19.667     14.0283      5.80  .Q        .         .         .    V    .
19.750     14.0678      5.73  .Q        .         .         .    V    .
19.833     14.1068      5.66  .Q        .         .         .    V    .
19.917     14.1454      5.60  .Q        .         .         .    V    .
20.000     14.1835      5.53  .Q        .         .         .     V   .
20.083     14.2212      5.47  .Q        .         .         .     V   .
20.167     14.2585      5.41  .Q        .         .         .     V   .
20.250     14.2954      5.36  .Q        .         .         .     V   .
20.333     14.3319      5.30  .Q        .         .         .     V   .
20.417     14.3680      5.25  .Q        .         .         .     V   .
20.500     14.4038      5.19  .Q        .         .         .     V   .
20.583     14.4392      5.14  .Q        .         .         .     V   .
20.667     14.4743      5.09  .Q        .         .         .     V   .
20.750     14.5090      5.05  .Q        .         .         .     V   .
20.833     14.5434      5.00  Q         .         .         .     V   .
20.917     14.5776      4.95  Q         .         .         .      V  .
21.000     14.6114      4.91  Q         .         .         .      V  .
21.083     14.6449      4.87  Q         .         .         .      V  .
21.167     14.6781      4.82  Q         .         .         .      V  .
21.250     14.7111      4.78  Q         .         .         .      V  .
21.333     14.7437      4.74  Q         .         .         .      V  .
21.417     14.7761      4.70  Q         .         .         .      V  .
21.500     14.8083      4.67  Q         .         .         .      V  .
21.583     14.8401      4.63  Q         .         .         .      V  .
21.667     14.8718      4.59  Q         .         .         .      V  .
21.750     14.9032      4.56  Q         .         .         .      V  .
21.833     14.9343      4.52  Q         .         .         .      V  .
21.917     14.9652      4.49  Q         .         .         .       V .
22.000     14.9959      4.46  Q         .         .         .       V .
22.083     15.0264      4.42  Q         .         .         .       V .
22.167     15.0567      4.39  Q         .         .         .       V .
22.250     15.0867      4.36  Q         .         .         .       V .
22.333     15.1165      4.33  Q         .         .         .       V .
22.417     15.1462      4.30  Q         .         .         .       V .
22.500     15.1756      4.27  Q         .         .         .       V .
22.583     15.2048      4.24  Q         .         .         .       V .
22.667     15.2339      4.22  Q         .         .         .       V .
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  22.750     15.2627      4.19  Q         .         .         .       V .
  22.833     15.2914      4.16  Q         .         .         .       V .
  22.917     15.3199      4.14  Q         .         .         .       V .
  23.000     15.3482      4.11  Q         .         .         .       V .
  23.083     15.3763      4.08  Q         .         .         .        V.
  23.167     15.4043      4.06  Q         .         .         .        V.
  23.250     15.4321      4.04  Q         .         .         .        V.
  23.333     15.4597      4.01  Q         .         .         .        V.
  23.417     15.4872      3.99  Q         .         .         .        V.
  23.500     15.5145      3.96  Q         .         .         .        V.
  23.583     15.5416      3.94  Q         .         .         .        V.
  23.667     15.5686      3.92  Q         .         .         .        V.
  23.750     15.5955      3.90  Q         .         .         .        V.
  23.833     15.6221      3.88  Q         .         .         .        V.
  23.917     15.6487      3.85  Q         .         .         .        V.
  24.000     15.6751      3.83  Q         .         .         .        V.
  24.083     15.7007      3.72  Q         .         .         .        V.
  24.167     15.7224      3.15  Q         .         .         .        V.
  24.250     15.7371      2.14  Q         .         .         .        V.
  24.333     15.7444      1.05  Q         .         .         .        V.
  24.417     15.7474      0.44  Q         .         .         .        V.
  24.500     15.7486      0.18  Q         .         .         .        V.
  24.583     15.7491      0.07  Q         .         .         .        V.
  24.667     15.7494      0.04  Q         .         .         .        V.
  24.750     15.7496      0.02  Q         .         .         .        V.
  24.833     15.7497      0.01  Q         .         .         .        V.
----------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    =======================                 =========
              0%                             1490.0
             10%                              115.0
             20%                               45.0
             30%                               30.0
             40%                               25.0
             50%                               20.0
             60%                               20.0
             70%                               15.0
             80%                               10.0
             90%                               10.0


****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #3<<<<<
```

```
==============================================================================

                    INFLOW
                  (STREAM 3)
                       |
                       |
                       V                __effective depth
                  -----------           |   (and volume)
                 |           |    |    |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                       |          |  dead   |   basin outlet
                       V          | storage |
                    OUTFLOW        ---------
                  (STREAM 3)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 3
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.000
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.00


          BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

           INTERVAL    DEPTH      OUTFLOW     STORAGE
            NUMBER      (FT)       (CFS)        (AF)
                1        0.00        0.00       0.000
                2        0.90        7.70       0.514
                3        1.90       14.60       1.112
                4        2.90       18.70       1.750
                5        3.90       22.10       2.429
                6        4.90       25.10       3.151
                7        5.90       27.70       3.889


==============================================================================
 MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
 (Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
        MEAN OUTFLOW is the average value during the unit interval.)

            CLOCK                                                MEAN
             TIME  DEAD-STORAGE  INFLOW    LOSS   EFFECTIVE OUTFLOW  EFFECTIVE
            (HRS)   FILLED(AF)    (CFS)    (CFS)  DEPTH(FT)  (CFS)   VOLUME(AF)
```

0.083	0.000	0.10	0.00	0.00	0.0	0.001
0.167	0.000	0.64	0.00	0.01	0.0	0.005
0.250	0.000	1.64	0.00	0.03	0.1	0.015
0.333	0.000	2.73	0.00	0.06	0.3	0.031
0.417	0.000	3.33	0.00	0.09	0.6	0.050
0.500	0.000	3.61	0.00	0.12	0.9	0.069
0.583	0.000	3.72	0.00	0.15	1.2	0.086
0.667	0.000	3.76	0.00	0.18	1.4	0.103
0.750	0.000	3.79	0.00	0.21	1.6	0.117
0.833	0.000	3.81	0.00	0.23	1.9	0.131
0.917	0.000	3.83	0.00	0.25	2.1	0.143
1.000	0.000	3.84	0.00	0.27	2.2	0.154
1.083	0.000	3.85	0.00	0.29	2.4	0.164
1.167	0.000	3.86	0.00	0.30	2.5	0.174
1.250	0.000	3.88	0.00	0.32	2.7	0.182
1.333	0.000	3.89	0.00	0.33	2.8	0.189
1.417	0.000	3.90	0.00	0.34	2.9	0.196
1.500	0.000	3.91	0.00	0.35	3.0	0.203
1.583	0.000	3.92	0.00	0.37	3.1	0.209
1.667	0.000	3.93	0.00	0.37	3.2	0.214
1.750	0.000	3.94	0.00	0.38	3.2	0.219
1.833	0.000	3.95	0.00	0.39	3.3	0.223
1.917	0.000	3.96	0.00	0.40	3.4	0.227
2.000	0.000	3.98	0.00	0.40	3.4	0.231
2.083	0.000	3.99	0.00	0.41	3.5	0.234
2.167	0.000	4.00	0.00	0.42	3.5	0.238
2.250	0.000	4.01	0.00	0.42	3.6	0.241
2.333	0.000	4.02	0.00	0.43	3.6	0.243
2.417	0.000	4.03	0.00	0.43	3.7	0.246
2.500	0.000	4.05	0.00	0.43	3.7	0.248
2.583	0.000	4.06	0.00	0.44	3.7	0.250
2.667	0.000	4.07	0.00	0.44	3.8	0.253
2.750	0.000	4.08	0.00	0.45	3.8	0.255
2.833	0.000	4.10	0.00	0.45	3.8	0.256
2.917	0.000	4.11	0.00	0.45	3.9	0.258
3.000	0.000	4.12	0.00	0.45	3.9	0.260
3.083	0.000	4.14	0.00	0.46	3.9	0.261
3.167	0.000	4.15	0.00	0.46	3.9	0.263
3.250	0.000	4.16	0.00	0.46	3.9	0.264
3.333	0.000	4.17	0.00	0.47	4.0	0.266
3.417	0.000	4.19	0.00	0.47	4.0	0.267
3.500	0.000	4.20	0.00	0.47	4.0	0.268
3.583	0.000	4.22	0.00	0.47	4.0	0.270
3.667	0.000	4.23	0.00	0.47	4.0	0.271
3.750	0.000	4.24	0.00	0.48	4.1	0.272
3.833	0.000	4.26	0.00	0.48	4.1	0.273
3.917	0.000	4.27	0.00	0.48	4.1	0.275
4.000	0.000	4.29	0.00	0.48	4.1	0.276
4.083	0.000	4.30	0.00	0.48	4.1	0.277

4.167	0.000	4.32	0.00	0.49	4.2	0.278
4.250	0.000	4.33	0.00	0.49	4.2	0.279
4.333	0.000	4.35	0.00	0.49	4.2	0.280
4.417	0.000	4.36	0.00	0.49	4.2	0.281
4.500	0.000	4.38	0.00	0.49	4.2	0.282
4.583	0.000	4.39	0.00	0.50	4.2	0.283
4.667	0.000	4.41	0.00	0.50	4.3	0.284
4.750	0.000	4.42	0.00	0.50	4.3	0.285
4.833	0.000	4.44	0.00	0.50	4.3	0.287
4.917	0.000	4.46	0.00	0.50	4.3	0.288
5.000	0.000	4.47	0.00	0.51	4.3	0.289
5.083	0.000	4.49	0.00	0.51	4.3	0.290
5.167	0.000	4.51	0.00	0.51	4.3	0.291
5.250	0.000	4.52	0.00	0.51	4.4	0.292
5.333	0.000	4.54	0.00	0.51	4.4	0.293
5.417	0.000	4.56	0.00	0.51	4.4	0.294
5.500	0.000	4.57	0.00	0.52	4.4	0.295
5.583	0.000	4.59	0.00	0.52	4.4	0.296
5.667	0.000	4.61	0.00	0.52	4.4	0.297
5.750	0.000	4.63	0.00	0.52	4.5	0.299
5.833	0.000	4.65	0.00	0.52	4.5	0.300
5.917	0.000	4.66	0.00	0.53	4.5	0.301
6.000	0.000	4.68	0.00	0.53	4.5	0.302
6.083	0.000	4.70	0.00	0.53	4.5	0.303
6.167	0.000	4.72	0.00	0.53	4.6	0.304
6.250	0.000	4.74	0.00	0.54	4.6	0.306
6.333	0.000	4.76	0.00	0.54	4.6	0.307
6.417	0.000	4.78	0.00	0.54	4.6	0.308
6.500	0.000	4.80	0.00	0.54	4.6	0.309
6.583	0.000	4.82	0.00	0.54	4.6	0.310
6.667	0.000	4.84	0.00	0.55	4.7	0.312
6.750	0.000	4.86	0.00	0.55	4.7	0.313
6.833	0.000	4.89	0.00	0.55	4.7	0.314
6.917	0.000	4.91	0.00	0.55	4.7	0.316
7.000	0.000	4.93	0.00	0.55	4.7	0.317
7.083	0.000	4.95	0.00	0.56	4.8	0.318
7.167	0.000	4.97	0.00	0.56	4.8	0.320
7.250	0.000	5.00	0.00	0.56	4.8	0.321
7.333	0.000	5.02	0.00	0.56	4.8	0.322
7.417	0.000	5.04	0.00	0.57	4.8	0.324
7.500	0.000	5.07	0.00	0.57	4.9	0.325
7.583	0.000	5.09	0.00	0.57	4.9	0.327
7.667	0.000	5.12	0.00	0.57	4.9	0.328
7.750	0.000	5.14	0.00	0.58	4.9	0.330
7.833	0.000	5.17	0.00	0.58	4.9	0.331
7.917	0.000	5.19	0.00	0.58	5.0	0.333
8.000	0.000	5.22	0.00	0.59	5.0	0.334
8.083	0.000	5.24	0.00	0.59	5.0	0.336
8.167	0.000	5.27	0.00	0.59	5.0	0.337
8.250	0.000	5.30	0.00	0.59	5.1	0.339

8.333	0.000	5.33	0.00	0.60	5.1	0.340
8.417	0.000	5.35	0.00	0.60	5.1	0.342
8.500	0.000	5.38	0.00	0.60	5.1	0.344
8.583	0.000	5.41	0.00	0.61	5.2	0.346
8.667	0.000	5.44	0.00	0.61	5.2	0.347
8.750	0.000	5.47	0.00	0.61	5.2	0.349
8.833	0.000	5.50	0.00	0.61	5.2	0.351
8.917	0.000	5.53	0.00	0.62	5.3	0.353
9.000	0.000	5.56	0.00	0.62	5.3	0.354
9.083	0.000	5.59	0.00	0.62	5.3	0.356
9.167	0.000	5.63	0.00	0.63	5.4	0.358
9.250	0.000	5.66	0.00	0.63	5.4	0.360
9.333	0.000	5.69	0.00	0.63	5.4	0.362
9.417	0.000	5.73	0.00	0.64	5.4	0.364
9.500	0.000	5.76	0.00	0.64	5.5	0.366
9.583	0.000	5.80	0.00	0.64	5.5	0.368
9.667	0.000	5.84	0.00	0.65	5.5	0.370
9.750	0.000	5.87	0.00	0.65	5.6	0.372
9.833	0.000	5.91	0.00	0.66	5.6	0.375
9.917	0.000	5.95	0.00	0.66	5.6	0.377
10.000	0.000	5.99	0.00	0.66	5.7	0.379
10.083	0.000	6.03	0.00	0.67	5.7	0.381
10.167	0.000	6.07	0.00	0.67	5.7	0.384
10.250	0.000	6.11	0.00	0.68	5.8	0.386
10.333	0.000	6.15	0.00	0.68	5.8	0.388
10.417	0.000	6.20	0.00	0.68	5.8	0.391
10.500	0.000	6.24	0.00	0.69	5.9	0.393
10.583	0.000	6.29	0.00	0.69	5.9	0.396
10.667	0.000	6.33	0.00	0.70	6.0	0.399
10.750	0.000	6.38	0.00	0.70	6.0	0.401
10.833	0.000	6.43	0.00	0.71	6.0	0.404
10.917	0.000	6.48	0.00	0.71	6.1	0.407
11.000	0.000	6.53	0.00	0.72	6.1	0.410
11.083	0.000	6.58	0.00	0.72	6.2	0.413
11.167	0.000	6.63	0.00	0.73	6.2	0.416
11.250	0.000	6.69	0.00	0.73	6.2	0.419
11.333	0.000	6.74	0.00	0.74	6.3	0.422
11.417	0.000	6.80	0.00	0.74	6.3	0.425
11.500	0.000	6.86	0.00	0.75	6.4	0.428
11.583	0.000	6.92	0.00	0.76	6.4	0.431
11.667	0.000	6.98	0.00	0.76	6.5	0.435
11.750	0.000	7.05	0.00	0.77	6.5	0.438
11.833	0.000	7.11	0.00	0.77	6.6	0.442
11.917	0.000	7.18	0.00	0.78	6.6	0.446
12.000	0.000	7.25	0.00	0.79	6.7	0.449
12.083	0.000	7.27	0.00	0.79	6.8	0.453
12.167	0.000	7.09	0.00	0.80	6.8	0.455
12.250	0.000	6.69	0.00	0.80	6.8	0.454
12.333	0.000	6.26	0.00	0.79	6.8	0.451
12.417	0.000	6.06	0.00	0.78	6.7	0.446

12.500	0.000	6.01	0.00	0.77	6.6	0.442
12.583	0.000	6.05	0.00	0.77	6.6	0.438
12.667	0.000	6.12	0.00	0.76	6.5	0.435
12.750	0.000	6.19	0.00	0.76	6.5	0.433
12.833	0.000	6.28	0.00	0.76	6.5	0.432
12.917	0.000	6.37	0.00	0.75	6.5	0.431
13.000	0.000	6.47	0.00	0.75	6.5	0.431
13.083	0.000	6.57	0.00	0.76	6.5	0.432
13.167	0.000	6.68	0.00	0.76	6.5	0.433
13.250	0.000	6.79	0.00	0.76	6.5	0.435
13.333	0.000	6.91	0.00	0.77	6.5	0.438
13.417	0.000	7.03	0.00	0.77	6.6	0.441
13.500	0.000	7.16	0.00	0.78	6.6	0.444
13.583	0.000	7.30	0.00	0.79	6.7	0.449
13.667	0.000	7.44	0.00	0.79	6.8	0.453
13.750	0.000	7.59	0.00	0.80	6.8	0.459
13.833	0.000	7.75	0.00	0.81	6.9	0.464
13.917	0.000	7.91	0.00	0.82	7.0	0.471
14.000	0.000	8.09	0.00	0.84	7.1	0.477
14.083	0.000	8.28	0.00	0.85	7.2	0.485
14.167	0.000	8.50	0.00	0.86	7.3	0.493
14.250	0.000	8.74	0.00	0.88	7.4	0.502
14.333	0.000	9.01	0.00	0.90	7.6	0.511
14.417	0.000	9.27	0.00	0.91	7.7	0.522
14.500	0.000	9.54	0.00	0.93	7.9	0.534
14.583	0.000	9.83	0.00	0.95	8.0	0.546
14.667	0.000	10.14	0.00	0.98	8.2	0.560
14.750	0.000	10.47	0.00	1.00	8.3	0.575
14.833	0.000	10.83	0.00	1.03	8.5	0.591
14.917	0.000	11.23	0.00	1.06	8.7	0.608
15.000	0.000	11.67	0.00	1.09	8.9	0.627
15.083	0.000	12.15	0.00	1.12	9.1	0.648
15.167	0.000	12.70	0.00	1.16	9.4	0.671
15.250	0.000	13.31	0.00	1.20	9.7	0.696
15.333	0.000	14.02	0.00	1.25	10.0	0.724
15.417	0.000	14.85	0.00	1.30	10.3	0.756
15.500	0.000	15.91	0.00	1.36	10.7	0.791
15.583	0.000	17.22	0.00	1.43	11.1	0.833
15.667	0.000	18.83	0.00	1.52	11.7	0.883
15.750	0.000	20.67	0.00	1.61	12.3	0.940
15.833	0.000	23.00	0.00	1.73	13.0	1.009
15.917	0.000	26.45	0.00	1.87	13.9	1.096
16.000	0.000	33.22	0.00	2.07	14.9	1.222
16.083	0.000	50.51	0.00	2.44	16.1	1.459
16.167	0.000	89.05	0.00	3.19	18.3	1.947
16.250	0.000	120.01	0.00	4.17	21.3	2.627
16.333	0.000	117.72	0.00	5.06	24.2	3.270
16.417	0.000	76.96	0.00	5.54	26.1	3.620
16.500	0.000	46.18	0.00	5.72	27.0	3.753
16.583	0.000	29.35	0.00	5.73	27.2	3.767

16.667	0.000	20.54	0.00	5.67	27.2	3.721
16.750	0.000	17.32	0.00	5.58	27.0	3.655
16.833	0.000	14.81	0.00	5.47	26.7	3.573
16.917	0.000	12.99	0.00	5.35	26.4	3.480
17.000	0.000	11.63	0.00	5.21	26.1	3.381
17.083	0.000	10.64	0.00	5.07	25.7	3.277
17.167	0.000	9.93	0.00	4.93	25.4	3.170
17.250	0.000	9.32	0.00	4.78	25.0	3.063
17.333	0.000	8.79	0.00	4.63	24.5	2.955
17.417	0.000	8.35	0.00	4.48	24.1	2.846
17.500	0.000	7.96	0.00	4.33	23.6	2.739
17.583	0.000	7.63	0.00	4.18	23.2	2.632
17.667	0.000	7.33	0.00	4.03	22.7	2.526
17.750	0.000	7.06	0.00	3.89	22.3	2.421
17.833	0.000	6.82	0.00	3.74	21.8	2.318
17.917	0.000	6.59	0.00	3.59	21.3	2.216
18.000	0.000	6.39	0.00	3.44	20.8	2.117
18.083	0.000	6.25	0.00	3.30	20.3	2.020
18.167	0.000	6.33	0.00	3.16	19.8	1.928
18.250	0.000	6.63	0.00	3.03	19.4	1.840
18.333	0.000	6.99	0.00	2.91	18.9	1.757
18.417	0.000	7.12	0.00	2.79	18.5	1.679
18.500	0.000	7.10	0.00	2.67	18.0	1.604
18.583	0.000	7.02	0.00	2.56	17.5	1.532
18.667	0.000	6.91	0.00	2.45	17.1	1.462
18.750	0.000	6.80	0.00	2.34	16.6	1.394
18.833	0.000	6.69	0.00	2.24	16.2	1.329
18.917	0.000	6.59	0.00	2.14	15.8	1.265
19.000	0.000	6.48	0.00	2.04	15.4	1.204
19.083	0.000	6.39	0.00	1.95	15.0	1.145
19.167	0.000	6.29	0.00	1.86	14.6	1.088
19.250	0.000	6.20	0.00	1.77	14.0	1.034
19.333	0.000	6.12	0.00	1.69	13.4	0.984
19.417	0.000	6.03	0.00	1.61	12.8	0.937
19.500	0.000	5.95	0.00	1.53	12.3	0.893
19.583	0.000	5.88	0.00	1.46	11.8	0.852
19.667	0.000	5.80	0.00	1.40	11.4	0.813
19.750	0.000	5.73	0.00	1.34	10.9	0.777
19.833	0.000	5.66	0.00	1.28	10.5	0.744
19.917	0.000	5.60	0.00	1.23	10.2	0.712
20.000	0.000	5.53	0.00	1.18	9.8	0.683
20.083	0.000	5.47	0.00	1.14	9.5	0.655
20.167	0.000	5.41	0.00	1.09	9.2	0.629
20.250	0.000	5.36	0.00	1.05	8.9	0.605
20.333	0.000	5.30	0.00	1.01	8.6	0.582
20.417	0.000	5.25	0.00	0.98	8.4	0.561
20.500	0.000	5.19	0.00	0.94	8.1	0.540
20.583	0.000	5.14	0.00	0.91	7.9	0.521
20.667	0.000	5.09	0.00	0.88	7.7	0.504
20.750	0.000	5.05	0.00	0.85	7.4	0.487

20.833	0.000	5.00	0.00	0.83	7.2	0.472
20.917	0.000	4.95	0.00	0.80	7.0	0.458
21.000	0.000	4.91	0.00	0.78	6.8	0.446
21.083	0.000	4.87	0.00	0.76	6.6	0.434
21.167	0.000	4.82	0.00	0.74	6.4	0.423
21.250	0.000	4.78	0.00	0.72	6.3	0.413
21.333	0.000	4.74	0.00	0.71	6.1	0.403
21.417	0.000	4.70	0.00	0.69	6.0	0.394
21.500	0.000	4.67	0.00	0.68	5.8	0.386
21.583	0.000	4.63	0.00	0.66	5.7	0.379
21.667	0.000	4.59	0.00	0.65	5.6	0.372
21.750	0.000	4.56	0.00	0.64	5.5	0.365
21.833	0.000	4.52	0.00	0.63	5.4	0.359
21.917	0.000	4.49	0.00	0.62	5.3	0.353
22.000	0.000	4.46	0.00	0.61	5.2	0.348
22.083	0.000	4.42	0.00	0.60	5.2	0.342
22.167	0.000	4.39	0.00	0.59	5.1	0.338
22.250	0.000	4.36	0.00	0.58	5.0	0.333
22.333	0.000	4.33	0.00	0.58	5.0	0.329
22.417	0.000	4.30	0.00	0.57	4.9	0.325
22.500	0.000	4.27	0.00	0.56	4.8	0.321
22.583	0.000	4.24	0.00	0.56	4.8	0.317
22.667	0.000	4.22	0.00	0.55	4.7	0.314
22.750	0.000	4.19	0.00	0.54	4.7	0.310
22.833	0.000	4.16	0.00	0.54	4.6	0.307
22.917	0.000	4.14	0.00	0.53	4.6	0.304
23.000	0.000	4.11	0.00	0.53	4.5	0.301
23.083	0.000	4.08	0.00	0.52	4.5	0.298
23.167	0.000	4.06	0.00	0.52	4.4	0.296
23.250	0.000	4.04	0.00	0.51	4.4	0.293
23.333	0.000	4.01	0.00	0.51	4.4	0.291
23.417	0.000	3.99	0.00	0.50	4.3	0.288
23.500	0.000	3.96	0.00	0.50	4.3	0.286
23.583	0.000	3.94	0.00	0.50	4.3	0.284
23.667	0.000	3.92	0.00	0.49	4.2	0.282
23.750	0.000	3.90	0.00	0.49	4.2	0.279
23.833	0.000	3.88	0.00	0.49	4.2	0.277
23.917	0.000	3.85	0.00	0.48	4.1	0.275

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  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =     15.750 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =     15.750 AF
    LOSS    VOLUME =      0.000 AF


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  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #3<<<<<
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MODEL PIPEFLOW ROUTING OF STREAM 3 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 133.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1209.00
DOWNSTREAM ELEVATION(FT) = 1199.80
PIPE DIAMETER(FT) = 3.00

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.50	0.00	0.000
0.167	0.04	0.50	0.01	0.000
0.250	0.15	0.50	0.05	0.000
0.333	0.35	0.51	0.18	0.000
0.417	0.61	0.90	0.61	0.000
0.500	0.89	1.31	0.89	0.000
0.583	1.16	1.71	1.16	0.000
0.667	1.42	2.08	1.42	0.000
0.750	1.65	2.42	1.65	0.000
0.833	1.86	2.74	1.86	0.000
0.917	2.05	3.02	2.05	0.000
1.000	2.23	3.28	2.23	0.000
1.083	2.39	3.51	2.39	0.000
1.167	2.53	3.72	2.53	0.000
1.250	2.66	3.92	2.66	0.000
1.333	2.78	4.09	2.78	0.000
1.417	2.89	4.25	2.89	0.000
1.500	2.99	4.40	2.99	0.000
1.583	3.08	4.53	3.08	0.000
1.667	3.16	4.65	3.16	0.000
1.750	3.24	4.77	3.24	0.000
1.833	3.31	4.87	3.31	0.000
1.917	3.37	4.96	3.37	0.000
2.000	3.43	5.05	3.43	0.000
2.083	3.48	5.13	3.48	0.000
2.167	3.53	5.20	3.53	0.000
2.250	3.58	5.27	3.58	0.000

2.333	3.62	5.33	3.62	0.000
2.417	3.66	5.39	3.66	0.000
2.500	3.70	5.44	3.70	0.000
2.583	3.73	5.50	3.73	0.000
2.667	3.77	5.54	3.77	0.000
2.750	3.80	5.59	3.80	0.000
2.833	3.83	5.63	3.83	0.000
2.917	3.85	5.67	3.85	0.000
3.000	3.88	5.71	3.88	0.000
3.083	3.90	5.74	3.90	0.000
3.167	3.93	5.78	3.93	0.000
3.250	3.95	5.81	3.95	0.000
3.333	3.97	5.84	3.97	0.000
3.417	3.99	5.87	3.99	0.000
3.500	4.01	5.90	4.01	0.000
3.583	4.03	5.93	4.03	0.000
3.667	4.05	5.96	4.05	0.000
3.750	4.07	5.99	4.07	0.000
3.833	4.09	6.01	4.09	0.000
3.917	4.10	6.04	4.10	0.000
4.000	4.12	6.06	4.12	0.000
4.083	4.14	6.09	4.14	0.000
4.167	4.15	6.11	4.15	0.000
4.250	4.17	6.14	4.17	0.000
4.333	4.19	6.16	4.19	0.000
4.417	4.20	6.18	4.20	0.000
4.500	4.22	6.21	4.22	0.000
4.583	4.24	6.23	4.24	0.000
4.667	4.25	6.26	4.25	0.000
4.750	4.27	6.28	4.27	0.000
4.833	4.28	6.30	4.28	0.000
4.917	4.30	6.33	4.30	0.000
5.000	4.32	6.35	4.32	0.000
5.083	4.33	6.37	4.33	0.000
5.167	4.35	6.40	4.35	0.000
5.250	4.36	6.42	4.36	0.000
5.333	4.38	6.45	4.38	0.000
5.417	4.40	6.47	4.40	0.000
5.500	4.41	6.49	4.41	0.000
5.583	4.43	6.52	4.43	0.000
5.667	4.45	6.54	4.45	0.000
5.750	4.46	6.57	4.46	0.000
5.833	4.48	6.59	4.48	0.000
5.917	4.50	6.62	4.50	0.000
6.000	4.52	6.64	4.52	0.000
6.083	4.53	6.67	4.53	0.000
6.167	4.55	6.70	4.55	0.000
6.250	4.57	6.72	4.57	0.000
6.333	4.59	6.75	4.59	0.000
6.417	4.60	6.77	4.60	0.000

6.500	4.62	6.80	4.62	0.000
6.583	4.64	6.83	4.64	0.000
6.667	4.66	6.86	4.66	0.000
6.750	4.68	6.88	4.68	0.000
6.833	4.70	6.91	4.70	0.000
6.917	4.72	6.94	4.72	0.000
7.000	4.74	6.97	4.74	0.000
7.083	4.76	7.00	4.76	0.000
7.167	4.78	7.03	4.78	0.000
7.250	4.80	7.06	4.80	0.000
7.333	4.82	7.09	4.82	0.000
7.417	4.84	7.12	4.84	0.000
7.500	4.86	7.15	4.86	0.000
7.583	4.88	7.18	4.88	0.000
7.667	4.90	7.21	4.90	0.000
7.750	4.93	7.25	4.93	0.000
7.833	4.95	7.28	4.95	0.000
7.917	4.97	7.31	4.97	0.000
8.000	4.99	7.35	4.99	0.000
8.083	5.02	7.38	5.02	0.000
8.167	5.04	7.42	5.04	0.000
8.250	5.06	7.45	5.06	0.000
8.333	5.09	7.49	5.09	0.000
8.417	5.11	7.52	5.11	0.000
8.500	5.14	7.56	5.14	0.000
8.583	5.16	7.60	5.16	0.000
8.667	5.19	7.63	5.19	0.000
8.750	5.22	7.67	5.22	0.000
8.833	5.24	7.71	5.24	0.000
8.917	5.27	7.75	5.27	0.000
9.000	5.30	7.79	5.30	0.000
9.083	5.32	7.83	5.32	0.000
9.167	5.35	7.87	5.35	0.000
9.250	5.38	7.92	5.38	0.000
9.333	5.41	7.96	5.41	0.000
9.417	5.44	8.00	5.44	0.000
9.500	5.47	8.05	5.47	0.000
9.583	5.50	8.09	5.50	0.000
9.667	5.53	8.14	5.53	0.000
9.750	5.56	8.18	5.56	0.000
9.833	5.60	8.23	5.60	0.000
9.917	5.63	8.28	5.63	0.000
10.000	5.66	8.33	5.66	0.000
10.083	5.70	8.38	5.70	0.000
10.167	5.73	8.43	5.73	0.000
10.250	5.77	8.48	5.77	0.000
10.333	5.80	8.54	5.80	0.000
10.417	5.84	8.59	5.84	0.000
10.500	5.88	8.64	5.88	0.000
10.583	5.91	8.70	5.91	0.000

10.667	5.95	8.76	5.95	0.000
10.750	5.99	8.82	5.99	0.000
10.833	6.03	8.88	6.03	0.000
10.917	6.07	8.94	6.07	0.000
11.000	6.12	9.00	6.12	0.000
11.083	6.16	9.06	6.16	0.000
11.167	6.20	9.13	6.20	0.000
11.250	6.25	9.19	6.25	0.000
11.333	6.29	9.26	6.29	0.000
11.417	6.34	9.33	6.34	0.000
11.500	6.39	9.40	6.39	0.000
11.583	6.44	9.47	6.44	0.000
11.667	6.49	9.55	6.49	0.000
11.750	6.54	9.62	6.54	0.000
11.833	6.59	9.70	6.59	0.000
11.917	6.65	9.78	6.65	0.000
12.000	6.70	9.86	6.70	0.000
12.083	6.76	9.94	6.76	0.000
12.167	6.80	10.00	6.80	0.000
12.250	6.81	10.02	6.81	0.000
12.333	6.78	9.97	6.78	0.000
12.417	6.72	9.88	6.72	0.000
12.500	6.65	9.78	6.65	0.000
12.583	6.59	9.69	6.59	0.000
12.667	6.54	9.62	6.54	0.000
12.750	6.50	9.56	6.50	0.000
12.833	6.47	9.53	6.47	0.000
12.917	6.46	9.50	6.46	0.000
13.000	6.46	9.50	6.46	0.000
13.083	6.46	9.51	6.46	0.000
13.167	6.48	9.53	6.48	0.000
13.250	6.50	9.57	6.50	0.000
13.333	6.54	9.62	6.54	0.000
13.417	6.58	9.68	6.58	0.000
13.500	6.63	9.76	6.63	0.000
13.583	6.69	9.84	6.69	0.000
13.667	6.76	9.94	6.76	0.000
13.750	6.83	10.05	6.83	0.000
13.833	6.91	10.17	6.91	0.000
13.917	7.00	10.30	7.00	0.000
14.000	7.10	10.45	7.10	0.000
14.083	7.21	10.60	7.21	0.000
14.167	7.32	10.77	7.32	0.000
14.250	7.45	10.96	7.45	0.000
14.333	7.59	11.17	7.59	0.000
14.417	7.73	11.37	7.73	0.000
14.500	7.86	11.57	7.86	0.000
14.583	8.00	11.77	8.00	0.000
14.667	8.15	11.99	8.15	0.000
14.750	8.32	12.24	8.32	0.000

14.833	8.49	12.50	8.49	0.000
14.917	8.69	12.78	8.69	0.000
15.000	8.90	12.95	8.90	0.000
15.083	9.13	13.02	9.12	0.000
15.167	9.38	13.10	9.37	0.000
15.250	9.66	13.18	9.65	0.000
15.333	9.97	13.28	9.96	0.000
15.417	10.31	13.38	10.30	0.000
15.500	10.69	13.50	10.68	0.000
15.583	11.14	13.64	11.13	0.000
15.667	11.67	13.81	11.66	0.000
15.750	12.29	14.00	12.27	0.000
15.833	13.02	14.23	13.00	0.000
15.917	13.91	14.51	13.89	0.000
16.000	14.86	14.80	14.84	0.000
16.083	16.07	15.18	16.04	0.000
16.167	18.26	15.81	18.22	0.000
16.250	21.30	16.54	21.24	0.000
16.333	24.22	17.24	24.17	0.000
16.417	26.14	17.70	26.11	0.000
16.500	26.99	17.87	26.97	0.000
16.583	27.25	17.92	27.24	0.000
16.667	27.19	17.91	27.19	0.000
16.750	26.99	17.87	27.00	0.000
16.833	26.73	17.82	26.73	0.000
16.917	26.42	17.76	26.43	0.000
17.000	26.08	17.69	26.09	0.000
17.083	25.73	17.60	25.73	0.000
17.167	25.36	17.51	25.36	0.000
17.250	24.95	17.42	24.96	0.000
17.333	24.51	17.31	24.52	0.000
17.417	24.06	17.20	24.07	0.000
17.500	23.61	17.09	23.62	0.000
17.583	23.16	16.99	23.17	0.000
17.667	22.72	16.88	22.73	0.000
17.750	22.28	16.77	22.29	0.000
17.833	21.80	16.66	21.81	0.000
17.917	21.29	16.54	21.30	0.000
18.000	20.79	16.42	20.80	0.000
18.083	20.30	16.30	20.31	0.000
18.167	19.82	16.18	19.83	0.000
18.250	19.37	16.07	19.38	0.000
18.333	18.94	15.97	18.95	0.000
18.417	18.49	15.86	18.50	0.000
18.500	18.00	15.75	18.01	0.000
18.583	17.53	15.63	17.54	0.000
18.667	17.07	15.49	17.08	0.000
18.750	16.63	15.35	16.64	0.000
18.833	16.20	15.22	16.21	0.000
18.917	15.79	15.09	15.80	0.000

19.000	15.39	14.96	15.40	0.000
19.083	15.00	14.84	15.01	0.000
19.167	14.56	14.71	14.57	0.000
19.250	14.01	14.53	14.02	0.000
19.333	13.41	14.35	13.42	0.000
19.417	12.85	14.17	12.86	0.000
19.500	12.32	14.01	12.34	0.000
19.583	11.83	13.86	11.84	0.000
19.667	11.38	13.72	11.39	0.000
19.750	10.95	13.58	10.96	0.000
19.833	10.55	13.46	10.56	0.000
19.917	10.17	13.34	10.18	0.000
20.000	9.82	13.23	9.83	0.000
20.083	9.49	13.13	9.50	0.000
20.167	9.18	13.03	9.19	0.000
20.250	8.89	12.94	8.90	0.000
20.333	8.62	12.68	8.62	0.000
20.417	8.36	12.30	8.36	0.000
20.500	8.12	11.95	8.12	0.000
20.583	7.90	11.62	7.90	0.000
20.667	7.67	11.28	7.67	0.000
20.750	7.42	10.92	7.42	0.000
20.833	7.19	10.58	7.19	0.000
20.917	6.97	10.26	6.97	0.000
21.000	6.77	9.96	6.77	0.000
21.083	6.59	9.69	6.59	0.000
21.167	6.42	9.44	6.42	0.000
21.250	6.26	9.21	6.26	0.000
21.333	6.11	8.99	6.11	0.000
21.417	5.97	8.79	5.97	0.000
21.500	5.85	8.60	5.85	0.000
21.583	5.73	8.43	5.73	0.000
21.667	5.62	8.27	5.62	0.000
21.750	5.52	8.12	5.52	0.000
21.833	5.42	7.98	5.42	0.000
21.917	5.33	7.85	5.33	0.000
22.000	5.25	7.72	5.25	0.000
22.083	5.17	7.61	5.17	0.000
22.167	5.09	7.50	5.09	0.000
22.250	5.02	7.39	5.02	0.000
22.333	4.96	7.29	4.96	0.000
22.417	4.89	7.20	4.89	0.000
22.500	4.84	7.11	4.84	0.000
22.583	4.78	7.03	4.78	0.000
22.667	4.72	6.95	4.72	0.000
22.750	4.67	6.88	4.67	0.000
22.833	4.62	6.80	4.62	0.000
22.917	4.58	6.74	4.58	0.000
23.000	4.53	6.67	4.53	0.000
23.083	4.49	6.61	4.49	0.000

23.167	4.45	6.55	4.45	0.000
23.250	4.41	6.49	4.41	0.000
23.333	4.37	6.43	4.37	0.000
23.417	4.34	6.38	4.34	0.000
23.500	4.30	6.33	4.30	0.000
23.583	4.27	6.28	4.27	0.000
23.667	4.23	6.23	4.23	0.000
23.750	4.20	6.18	4.20	0.000
23.833	4.17	6.14	4.17	0.000
23.917	4.14	6.09	4.14	0.000
24.000	4.11	6.05	4.11	0.000

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****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>STREAM NUMBER 3 ADDED TO STREAM NUMBER 1<<<<<
============================================================================


****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================


         MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
         STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
         VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
         EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
         OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
         UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
         (0.938)(DIAMETER):


         PIPELENGTH(FT) =     400.00     MANNINGS FACTOR = 0.013
         UPSTREAM ELEVATION(FT) =    1199.80
         DOWNSTREAM ELEVATION(FT) =    1197.80
         PIPE DIAMETER(FT) =   4.00



         NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

           TIME      INFLOW   VELOCITY   OUTFLOW    UPSTREAM
          (HRS)       (CFS)     (FPS)     (CFS)    PONDING(AF)
           0.083      0.00      0.00      0.00        0.000
           0.167      0.01      0.50      0.00        0.000
           0.250      0.05      0.50      0.00        0.000
```

0.333	0.18	0.50	0.00	0.000
0.417	0.61	0.51	0.02	0.000
0.500	0.89	0.74	0.09	0.000
0.583	1.16	0.96	0.52	0.000
0.667	1.42	1.17	1.82	0.000
0.750	1.67	1.38	1.73	0.000
0.833	5.06	4.19	5.25	0.000
0.917	6.07	4.38	5.83	0.000
1.000	5.28	4.24	5.47	0.000
1.083	5.55	4.29	5.49	0.000
1.167	5.41	4.26	5.44	0.000
1.250	5.36	4.25	5.37	0.000
1.333	5.47	4.27	5.45	0.000
1.417	5.59	4.29	5.56	0.000
1.500	5.70	4.31	5.67	0.000
1.583	5.80	4.33	5.78	0.000
1.667	5.89	4.35	5.87	0.000
1.750	5.98	4.36	5.96	0.000
1.833	6.06	4.37	6.04	0.000
1.917	6.13	4.39	6.12	0.000
2.000	6.20	4.40	6.18	0.000
2.083	6.26	4.41	6.25	0.000
2.167	6.32	4.42	6.31	0.000
2.250	6.38	4.43	6.36	0.000
2.333	6.43	4.44	6.42	0.000
2.417	6.48	4.45	6.47	0.000
2.500	6.52	4.46	6.51	0.000
2.583	6.56	4.46	6.56	0.000
2.667	6.61	4.47	6.60	0.000
2.750	6.65	4.48	6.64	0.000
2.833	6.68	4.48	6.67	0.000
2.917	6.72	4.49	6.71	0.000
3.000	6.75	4.50	6.75	0.000
3.083	6.79	4.50	6.78	0.000
3.167	6.82	4.51	6.81	0.000
3.250	6.85	4.51	6.84	0.000
3.333	6.88	4.52	6.87	0.000
3.417	6.91	4.52	6.90	0.000
3.500	6.94	4.53	6.93	0.000
3.583	6.97	4.53	6.96	0.000
3.667	7.00	4.54	6.99	0.000
3.750	7.03	4.54	7.02	0.000
3.833	7.05	4.55	7.05	0.000
3.917	7.08	4.55	7.08	0.000
4.000	7.11	4.56	7.10	0.000
4.083	7.14	4.56	7.13	0.000
4.167	7.16	4.57	7.16	0.000
4.250	7.20	4.58	7.20	0.000
4.333	7.22	4.58	7.22	0.000
4.417	7.24	4.58	7.24	0.000

4.500	7.27	4.59	7.26	0.000
4.583	7.30	4.59	7.29	0.000
4.667	7.32	4.60	7.32	0.000
4.750	7.35	4.60	7.34	0.000
4.833	7.38	4.61	7.37	0.000
4.917	7.40	4.61	7.40	0.000
5.000	7.43	4.62	7.43	0.000
5.083	7.46	4.62	7.45	0.000
5.167	7.49	4.62	7.48	0.000
5.250	7.51	4.63	7.51	0.000
5.333	7.54	4.63	7.54	0.000
5.417	7.57	4.64	7.56	0.000
5.500	7.60	4.64	7.59	0.000
5.583	7.63	4.65	7.62	0.000
5.667	7.66	4.65	7.65	0.000
5.750	7.69	4.66	7.68	0.000
5.833	7.72	4.66	7.71	0.000
5.917	7.75	4.67	7.74	0.000
6.000	7.78	4.68	7.77	0.000
6.083	7.81	4.68	7.80	0.000
6.167	7.84	4.69	7.83	0.000
6.250	7.87	4.69	7.86	0.000
6.333	7.90	4.70	7.89	0.000
6.417	7.93	4.70	7.93	0.000
6.500	7.96	4.71	7.96	0.000
6.583	8.00	4.71	7.99	0.000
6.667	8.03	4.72	8.03	0.000
6.750	8.06	4.73	8.06	0.000
6.833	8.10	4.73	8.09	0.000
6.917	8.13	4.74	8.12	0.000
7.000	8.17	4.74	8.16	0.000
7.083	8.20	4.75	8.19	0.000
7.167	8.24	4.76	8.23	0.000
7.250	8.27	4.76	8.27	0.000
7.333	8.31	4.77	8.30	0.000
7.417	8.35	4.78	8.34	0.000
7.500	8.38	4.78	8.38	0.000
7.583	8.42	4.79	8.41	0.000
7.667	8.46	4.80	8.45	0.000
7.750	8.50	4.80	8.49	0.000
7.833	8.54	4.81	8.53	0.000
7.917	8.58	4.82	8.57	0.000
8.000	8.62	4.82	8.61	0.000
8.083	8.66	4.83	8.65	0.000
8.167	8.70	4.84	8.69	0.000
8.250	8.74	4.85	8.74	0.000
8.333	8.79	4.85	8.78	0.000
8.417	8.83	4.86	8.82	0.000
8.500	8.88	4.87	8.87	0.000
8.583	8.92	4.88	8.91	0.000

8.667	8.97	4.88	8.96	0.000
8.750	9.01	4.89	9.00	0.000
8.833	9.06	4.90	9.05	0.000
8.917	9.11	4.91	9.10	0.000
9.000	9.16	4.92	9.15	0.000
9.083	9.21	4.93	9.20	0.000
9.167	9.26	4.93	9.25	0.000
9.250	9.31	4.94	9.30	0.000
9.333	9.36	4.95	9.35	0.000
9.417	9.41	4.96	9.40	0.000
9.500	9.47	4.97	9.46	0.000
9.583	9.52	4.98	9.51	0.000
9.667	9.58	4.99	9.57	0.000
9.750	9.63	5.00	9.62	0.000
9.833	9.69	5.01	9.68	0.000
9.917	9.75	5.02	9.74	0.000
10.000	9.81	5.03	9.80	0.000
10.083	9.87	5.04	9.86	0.000
10.167	9.93	5.05	9.92	0.000
10.250	10.00	5.06	9.99	0.000
10.333	10.06	5.08	10.05	0.000
10.417	10.13	5.09	10.12	0.000
10.500	10.20	5.10	10.18	0.000
10.583	10.26	5.11	10.25	0.000
10.667	10.33	5.12	10.32	0.000
10.750	10.41	5.13	10.39	0.000
10.833	10.48	5.14	10.46	0.000
10.917	10.55	5.15	10.54	0.000
11.000	10.65	5.16	10.63	0.000
11.083	10.74	5.17	10.72	0.000
11.167	10.79	5.18	10.78	0.000
11.250	10.87	5.19	10.85	0.000
11.333	10.95	5.20	10.94	0.000
11.417	11.04	5.21	11.02	0.000
11.500	11.13	5.22	11.11	0.000
11.583	11.22	5.24	11.20	0.000
11.667	11.31	5.25	11.29	0.000
11.750	11.40	5.26	11.38	0.000
11.833	11.50	5.27	11.48	0.000
11.917	11.60	5.29	11.58	0.000
12.000	11.70	5.30	11.68	0.000
12.083	11.80	5.31	11.78	0.000
12.167	11.87	5.32	11.86	0.000
12.250	11.80	5.31	11.81	0.000
12.333	11.52	5.28	11.57	0.000
12.417	11.20	5.23	11.26	0.000
12.500	11.10	5.22	11.12	0.000
12.583	10.93	5.20	10.96	0.000
12.667	10.77	5.18	10.80	0.000
12.750	10.78	5.18	10.78	0.000

12.833	10.80	5.18	10.80	0.000
12.917	10.85	5.19	10.84	0.000
13.000	10.90	5.19	10.89	0.000
13.083	10.97	5.20	10.96	0.000
13.167	11.11	5.22	11.09	0.000
13.250	11.18	5.23	11.17	0.000
13.333	11.26	5.24	11.24	0.000
13.417	11.37	5.26	11.35	0.000
13.500	11.50	5.27	11.48	0.000
13.583	11.65	5.29	11.62	0.000
13.667	11.80	5.32	11.78	0.000
13.750	11.97	5.34	11.94	0.000
13.833	12.15	5.36	12.12	0.000
13.917	12.35	5.39	12.32	0.000
14.000	12.56	5.42	12.52	0.000
14.083	12.78	5.45	12.75	0.000
14.167	13.03	5.48	12.99	0.000
14.250	13.30	5.52	13.25	0.000
14.333	13.60	5.56	13.55	0.000
14.417	13.91	5.60	13.86	0.000
14.500	14.21	5.64	14.16	0.000
14.583	14.53	5.68	14.48	0.000
14.667	14.88	5.73	14.82	0.000
14.750	15.25	5.78	15.19	0.000
14.833	15.70	5.83	15.63	0.000
14.917	16.09	5.87	16.03	0.000
15.000	16.56	5.92	16.48	0.000
15.083	17.08	5.97	17.00	0.000
15.167	17.65	6.03	17.56	0.000
15.250	18.29	6.10	18.19	0.000
15.333	19.19	6.19	19.06	0.000
15.417	19.82	6.25	19.73	0.000
15.500	20.72	6.34	20.59	0.000
15.583	21.87	6.43	21.70	0.000
15.667	23.25	6.55	23.05	0.000
15.750	24.80	6.68	24.58	0.000
15.833	26.36	6.80	26.14	0.000
15.917	28.70	6.98	28.39	0.000
16.000	31.99	7.19	31.54	0.000
16.083	37.80	7.49	37.00	0.000
16.167	49.65	8.03	48.13	0.000
16.250	65.76	8.56	63.76	0.000
16.333	71.78	8.75	71.07	0.000
16.417	73.87	8.80	73.61	0.000
16.500	74.73	8.82	74.63	0.000
16.583	75.00	8.82	74.97	0.000
16.667	73.40	8.78	73.59	0.000
16.750	55.99	8.29	58.13	0.000
16.833	48.87	7.99	49.72	0.000
16.917	43.84	7.77	44.47	0.000

17.000	39.48	7.58	40.06	0.000
17.083	36.72	7.43	37.08	0.000
17.167	35.39	7.36	35.56	0.000
17.250	33.88	7.29	34.08	0.000
17.333	32.31	7.21	32.53	0.000
17.417	31.27	7.15	31.42	0.000
17.500	30.34	7.10	30.48	0.000
17.583	29.41	7.03	29.53	0.000
17.667	28.63	6.97	28.73	0.000
17.750	27.92	6.92	28.01	0.000
17.833	27.26	6.87	27.35	0.000
17.917	26.43	6.80	26.54	0.000
18.000	25.72	6.75	25.82	0.000
18.083	25.05	6.70	25.14	0.000
18.167	24.43	6.65	24.52	0.000
18.250	24.00	6.61	24.06	0.000
18.333	23.63	6.58	23.69	0.000
18.417	23.46	6.56	23.48	0.000
18.500	23.01	6.53	23.08	0.000
18.583	22.52	6.49	22.59	0.000
18.667	22.01	6.45	22.09	0.000
18.750	21.51	6.40	21.59	0.000
18.833	21.02	6.36	21.09	0.000
18.917	20.53	6.32	20.61	0.000
19.000	20.06	6.28	20.13	0.000
19.083	19.61	6.23	19.67	0.000
19.167	19.11	6.18	19.18	0.000
19.250	18.51	6.12	18.60	0.000
19.333	17.89	6.05	17.98	0.000
19.417	17.21	5.98	17.31	0.000
19.500	16.62	5.92	16.71	0.000
19.583	16.07	5.87	16.16	0.000
19.667	15.56	5.81	15.64	0.000
19.750	15.08	5.76	15.16	0.000
19.833	14.63	5.70	14.69	0.000
19.917	14.20	5.64	14.27	0.000
20.000	13.80	5.59	13.86	0.000
20.083	13.42	5.53	13.48	0.000
20.167	13.07	5.49	13.13	0.000
20.250	12.74	5.44	12.79	0.000
20.333	12.42	5.40	12.47	0.000
20.417	12.12	5.36	12.17	0.000
20.500	11.84	5.32	11.89	0.000
20.583	11.58	5.28	11.62	0.000
20.667	11.31	5.25	11.36	0.000
20.750	11.03	5.21	11.08	0.000
20.833	10.76	5.17	10.81	0.000
20.917	10.51	5.14	10.56	0.000
21.000	10.28	5.11	10.32	0.000
21.083	10.06	5.08	10.10	0.000

21.167	9.86	5.04	9.89	0.000
21.250	9.67	5.01	9.70	0.000
21.333	9.50	4.98	9.53	0.000
21.417	9.33	4.95	9.36	0.000
21.500	9.18	4.92	9.20	0.000
21.583	9.03	4.90	9.06	0.000
21.667	8.89	4.87	8.92	0.000
21.750	8.77	4.85	8.79	0.000
21.833	8.65	4.83	8.67	0.000
21.917	8.54	4.81	8.56	0.000
22.000	8.42	4.79	8.44	0.000
22.083	8.32	4.77	8.34	0.000
22.167	8.22	4.75	8.24	0.000
22.250	8.13	4.74	8.15	0.000
22.333	8.04	4.72	8.06	0.000
22.417	7.95	4.71	7.97	0.000
22.500	7.87	4.69	7.89	0.000
22.583	7.80	4.68	7.81	0.000
22.667	7.72	4.67	7.74	0.000
22.750	7.65	4.65	7.67	0.000
22.833	7.62	4.65	7.62	0.000
22.917	7.52	4.63	7.54	0.000
23.000	7.45	4.62	7.47	0.000
23.083	7.39	4.61	7.40	0.000
23.167	7.33	4.60	7.34	0.000
23.250	7.27	4.59	7.29	0.000
23.333	7.22	4.58	7.23	0.000
23.417	7.17	4.57	7.18	0.000
23.500	7.11	4.56	7.12	0.000
23.583	7.06	4.55	7.07	0.000
23.667	7.01	4.54	7.02	0.000
23.750	6.97	4.53	6.98	0.000
23.833	6.92	4.53	6.93	0.000
23.917	6.87	4.52	6.88	0.000
24.000	6.83	4.51	6.84	0.000

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****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
============================================================================

            STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
----------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.       20.0      40.0      60.0      80.0
----------------------------------------------------------------------------
   0.083      0.0000      0.00  Q         .         .         .         .
   0.167      0.0000      0.00  Q         .         .         .         .
```

0.250	0.0000	0.00	Q	.	.	.	.
0.333	0.0000	0.00	Q	.	.	.	.
0.417	0.0002	0.02	Q	.	.	.	.
0.500	0.0008	0.09	Q	.	.	.	.
0.583	0.0044	0.52	Q	.	.	.	.
0.667	0.0169	1.82	Q	.	.	.	.
0.750	0.0289	1.73	Q	.	.	.	.
0.833	0.0651	5.25	V Q	.	.	.	.
0.917	0.1052	5.83	V Q	.	.	.	.
1.000	0.1429	5.47	V Q	.	.	.	.
1.083	0.1807	5.49	V Q	.	.	.	.
1.167	0.2181	5.44	V Q	.	.	.	.
1.250	0.2551	5.37	V Q	.	.	.	.
1.333	0.2927	5.45	V Q	.	.	.	.
1.417	0.3310	5.56	V Q	.	.	.	.
1.500	0.3700	5.67	V Q	.	.	.	.
1.583	0.4098	5.78	V Q	.	.	.	.
1.667	0.4503	5.87	V Q	.	.	.	.
1.750	0.4913	5.96	V Q	.	.	.	.
1.833	0.5329	6.04	V Q	.	.	.	.
1.917	0.5750	6.12	V Q	.	.	.	.
2.000	0.6176	6.18	V Q	.	.	.	.
2.083	0.6607	6.25	V Q	.	.	.	.
2.167	0.7041	6.31	.V Q	.	.	.	.
2.250	0.7479	6.36	.V Q	.	.	.	.
2.333	0.7921	6.42	.V Q	.	.	.	.
2.417	0.8366	6.47	.V Q	.	.	.	.
2.500	0.8815	6.51	.V Q	.	.	.	.
2.583	0.9266	6.56	.V Q	.	.	.	.
2.667	0.9721	6.60	.V Q	.	.	.	.
2.750	1.0178	6.64	.V Q	.	.	.	.
2.833	1.0637	6.67	.V Q	.	.	.	.
2.917	1.1100	6.71	.V Q	.	.	.	.
3.000	1.1564	6.75	.V Q	.	.	.	.
3.083	1.2031	6.78	.V Q	.	.	.	.
3.167	1.2500	6.81	.V Q	.	.	.	.
3.250	1.2972	6.84	.V Q	.	.	.	.
3.333	1.3445	6.87	. VQ	.	.	.	.
3.417	1.3921	6.90	. VQ	.	.	.	.
3.500	1.4398	6.93	. VQ	.	.	.	.
3.583	1.4878	6.96	. VQ	.	.	.	.
3.667	1.5359	6.99	. VQ	.	.	.	.
3.750	1.5843	7.02	. VQ	.	.	.	.
3.833	1.6328	7.05	. VQ	.	.	.	.
3.917	1.6815	7.08	. VQ	.	.	.	.
4.000	1.7304	7.10	. VQ	.	.	.	.
4.083	1.7795	7.13	. VQ	.	.	.	.
4.167	1.8288	7.16	. VQ	.	.	.	.
4.250	1.8784	7.20	. VQ	.	.	.	.
4.333	1.9281	7.22	. VQ	.	.	.	.

4.417	1.9779	7.24	.	VQ	.	.	.	.
4.500	2.0280	7.26	.	Q	.	.	.	.
4.583	2.0782	7.29	.	Q	.	.	.	.
4.667	2.1286	7.32	.	Q	.	.	.	.
4.750	2.1791	7.34	.	Q	.	.	.	.
4.833	2.2299	7.37	.	Q	.	.	.	.
4.917	2.2809	7.40	.	Q	.	.	.	.
5.000	2.3320	7.43	.	Q	.	.	.	.
5.083	2.3833	7.45	.	Q	.	.	.	.
5.167	2.4349	7.48	.	Q	.	.	.	.
5.250	2.4866	7.51	.	Q	.	.	.	.
5.333	2.5385	7.54	.	Q	.	.	.	.
5.417	2.5906	7.56	.	Q	.	.	.	.
5.500	2.6429	7.59	.	Q	.	.	.	.
5.583	2.6954	7.62	.	QV	.	.	.	.
5.667	2.7481	7.65	.	QV	.	.	.	.
5.750	2.8009	7.68	.	QV	.	.	.	.
5.833	2.8540	7.71	.	QV	.	.	.	.
5.917	2.9074	7.74	.	QV	.	.	.	.
6.000	2.9609	7.77	.	QV	.	.	.	.
6.083	3.0146	7.80	.	QV	.	.	.	.
6.167	3.0685	7.83	.	QV	.	.	.	.
6.250	3.1227	7.86	.	QV	.	.	.	.
6.333	3.1770	7.89	.	QV	.	.	.	.
6.417	3.2316	7.93	.	QV	.	.	.	.
6.500	3.2864	7.96	.	QV	.	.	.	.
6.583	3.3415	7.99	.	Q V	.	.	.	.
6.667	3.3968	8.03	.	QV	.	.	.	.
6.750	3.4523	8.06	.	QV	.	.	.	.
6.833	3.5080	8.09	.	QV	.	.	.	.
6.917	3.5639	8.12	.	QV	.	.	.	.
7.000	3.6201	8.16	.	QV	.	.	.	.
7.083	3.6766	8.19	.	QV	.	.	.	.
7.167	3.7332	8.23	.	QV	.	.	.	.
7.250	3.7902	8.27	.	QV	.	.	.	.
7.333	3.8473	8.30	.	QV	.	.	.	.
7.417	3.9048	8.34	.	QV	.	.	.	.
7.500	3.9625	8.38	.	QV	.	.	.	.
7.583	4.0204	8.41	.	Q V	.	.	.	.
7.667	4.0786	8.45	.	Q V	.	.	.	.
7.750	4.1371	8.49	.	Q V	.	.	.	.
7.833	4.1959	8.53	.	Q V	.	.	.	.
7.917	4.2549	8.57	.	Q V	.	.	.	.
8.000	4.3142	8.61	.	Q V	.	.	.	.
8.083	4.3738	8.65	.	Q V	.	.	.	.
8.167	4.4337	8.69	.	Q V	.	.	.	.
8.250	4.4938	8.74	.	Q V	.	.	.	.
8.333	4.5543	8.78	.	Q V	.	.	.	.
8.417	4.6151	8.82	.	Q V	.	.	.	.
8.500	4.6761	8.87	.	Q V	.	.	.	.

8.583	4.7375	8.91	.	Q	V	.	.	.	.
8.667	4.7992	8.96	.	Q	V	.	.	.	.
8.750	4.8612	9.00	.	Q	V	.	.	.	.
8.833	4.9236	9.05	.	Q	V	.	.	.	.
8.917	4.9862	9.10	.	Q	V	.	.	.	.
9.000	5.0493	9.15	.	Q	V	.	.	.	.
9.083	5.1126	9.20	.	Q	V	.	.	.	.
9.167	5.1763	9.25	.	Q	V	.	.	.	.
9.250	5.2403	9.30	.	Q	V	.	.	.	.
9.333	5.3047	9.35	.	Q	V	.	.	.	.
9.417	5.3695	9.40	.	Q		V .	.	.	.
9.500	5.4346	9.46	.	Q		V .	.	.	.
9.583	5.5001	9.51	.	Q		V .	.	.	.
9.667	5.5660	9.57	.	Q		V .	.	.	.
9.750	5.6323	9.62	.	Q		V .	.	.	.
9.833	5.6990	9.68	.	Q		V .	.	.	.
9.917	5.7661	9.74	.	Q		V .	.	.	.
10.000	5.8336	9.80	.	Q		V .	.	.	.
10.083	5.9015	9.86	.	Q		V .	.	.	.
10.167	5.9698	9.92	.	Q		V .	.	.	.
10.250	6.0386	9.99	.	Q		V.	.	.	.
10.333	6.1078	10.05	.		Q	V.	.	.	.
10.417	6.1775	10.12	.		Q	V.	.	.	.
10.500	6.2476	10.18	.		Q	V.	.	.	.
10.583	6.3182	10.25	.		Q	V.	.	.	.
10.667	6.3893	10.32	.		Q	V.	.	.	.
10.750	6.4609	10.39	.		Q	V.	.	.	.
10.833	6.5329	10.46	.		Q	V.	.	.	.
10.917	6.6055	10.54	.		Q	V.	.	.	.
11.000	6.6787	10.63	.		Q	V	.	.	.
11.083	6.7526	10.72	.		Q	V	.	.	.
11.167	6.8268	10.78	.		Q	V	.	.	.
11.250	6.9016	10.85	.		Q	V	.	.	.
11.333	6.9769	10.94	.		Q	V	.	.	.
11.417	7.0528	11.02	.		Q	V	.	.	.
11.500	7.1293	11.11	.		Q	V	.	.	.
11.583	7.2064	11.20	.		Q	V	.	.	.
11.667	7.2842	11.29	.		Q	V	.	.	.
11.750	7.3626	11.38	.		Q	.V	.	.	.
11.833	7.4417	11.48	.		Q	.V	.	.	.
11.917	7.5214	11.58	.		Q	.V	.	.	.
12.000	7.6019	11.68	.		Q	.V	.	.	.
12.083	7.6830	11.78	.		Q	.V	.	.	.
12.167	7.7647	11.86	.		Q	.V	.	.	.
12.250	7.8460	11.81	.		Q	.V	.	.	.
12.333	7.9256	11.57	.		Q	.V	.	.	.
12.417	8.0032	11.26	.		Q	. V	.	.	.
12.500	8.0797	11.12	.		Q	. V	.	.	.
12.583	8.1552	10.96	.		Q	. V	.	.	.
12.667	8.2296	10.80	.		Q	. V	.	.	.

12.750	8.3038	10.78	. Q . V . . .
12.833	8.3782	10.80	. Q . V . . .
12.917	8.4528	10.84	. Q . V . . .
13.000	8.5278	10.89	. Q . V . . .
13.083	8.6033	10.96	. Q . V . . .
13.167	8.6796	11.09	. Q . V . . .
13.250	8.7565	11.17	. Q . V . . .
13.333	8.8340	11.24	. Q . V . . .
13.417	8.9121	11.35	. Q . V . . .
13.500	8.9912	11.48	. Q . V . . .
13.583	9.0713	11.62	. Q . V . . .
13.667	9.1524	11.78	. Q . V . . .
13.750	9.2346	11.94	. Q . V . . .
13.833	9.3181	12.12	. Q . V . . .
13.917	9.4029	12.32	. Q . V . . .
14.000	9.4892	12.52	. Q . V . . .
14.083	9.5770	12.75	. Q . V . . .
14.167	9.6664	12.99	. Q . V . . .
14.250	9.7577	13.25	. Q . V . . .
14.333	9.8510	13.55	. Q . V . . .
14.417	9.9464	13.86	. Q . V . . .
14.500	10.0440	14.16	. Q . V . . .
14.583	10.1437	14.48	. Q . V . . .
14.667	10.2458	14.82	. Q . V . . .
14.750	10.3504	15.19	. Q . V . . .
14.833	10.4580	15.63	. Q . V . . .
14.917	10.5684	16.03	. Q . V . . .
15.000	10.6820	16.48	. Q . V . . .
15.083	10.7990	17.00	. Q . V . . .
15.167	10.9200	17.56	. Q . V . . .
15.250	11.0453	18.19	. Q. V . . .
15.333	11.1765	19.06	. Q. V . . .
15.417	11.3124	19.73	. Q. V . . .
15.500	11.4542	20.59	. Q V . . .
15.583	11.6036	21.70	. Q V . . .
15.667	11.7624	23.05	. .Q V . . .
15.750	11.9317	24.58	. . Q V . . .
15.833	12.1117	26.14	. . Q V . . .
15.917	12.3072	28.39	. . Q V . . .
16.000	12.5244	31.54	. . Q V . . .
16.083	12.7793	37.00	. . QV. . .
16.167	13.1108	48.13	. . V. Q . .
16.250	13.5499	63.76	. . V .Q .
16.333	14.0394	71.07	. . .V . Q .
16.417	14.5464	73.61	. . .V . Q .
16.500	15.0603	74.63	. . . V . Q .
16.583	15.5767	74.97	. . . V . Q .
16.667	16.0835	73.59	. . . V . Q .
16.750	16.4838	58.13	. . . V Q. .
16.833	16.8263	49.72	. . . QV . .

16.917	17.1325	44.47	. . . Q V . .
17.000	17.4084	40.06	. . Q V . .
17.083	17.6637	37.08	. . Q . V . .
17.167	17.9087	35.56	. . Q . V . .
17.250	18.1434	34.08	. . Q . V . .
17.333	18.3675	32.53	. . Q . V . .
17.417	18.5839	31.42	. . Q . V . .
17.500	18.7937	30.48	. . Q . V . .
17.583	18.9971	29.53	. . Q . V . .
17.667	19.1950	28.73	. . Q . V . .
17.750	19.3879	28.01	. . Q . V. .
17.833	19.5763	27.35	. . Q . V. .
17.917	19.7591	26.54	. . Q . V. .
18.000	19.9369	25.82	. . Q . V. .
18.083	20.1100	25.14	. . Q . V .
18.167	20.2789	24.52	. . Q . V .
18.250	20.4446	24.06	. . Q . V .
18.333	20.6077	23.69	. .Q . V .
18.417	20.7695	23.48	. .Q . .V .
18.500	20.9284	23.08	. .Q . .V .
18.583	21.0840	22.59	. .Q . .V .
18.667	21.2361	22.09	. .Q . .V .
18.750	21.3848	21.59	. Q . . V .
18.833	21.5301	21.09	. Q . . V .
18.917	21.6720	20.61	. Q . . V .
19.000	21.8106	20.13	. Q . . V .
19.083	21.9461	19.67	. Q. . . V .
19.167	22.0782	19.18	. Q. . . V .
19.250	22.2063	18.60	. Q. . . V .
19.333	22.3302	17.98	. Q . . . V .
19.417	22.4494	17.31	. Q . . . V .
19.500	22.5645	16.71	. Q . . . V .
19.583	22.6758	16.16	. Q . . . V .
19.667	22.7835	15.64	. Q . . . V .
19.750	22.8879	15.16	. Q . . . V .
19.833	22.9891	14.69	. Q . . . V .
19.917	23.0874	14.27	. Q . . . V .
20.000	23.1828	13.86	. Q . . . V .
20.083	23.2757	13.48	. Q . . . V .
20.167	23.3661	13.13	. Q . . . V .
20.250	23.4542	12.79	. Q . . . V .
20.333	23.5401	12.47	. Q . . . V .
20.417	23.6239	12.17	. Q . . . V .
20.500	23.7058	11.89	. Q . . . V .
20.583	23.7859	11.62	. Q . . . V .
20.667	23.8641	11.36	. Q . . . V .
20.750	23.9404	11.08	. Q . . . V .
20.833	24.0149	10.81	. Q . . . V .
20.917	24.0876	10.56	. Q . . . V .
21.000	24.1587	10.32	. Q . . . V .

```
   21.083     24.2282     10.10  .    Q    .         .         .     V   .
   21.167     24.2964      9.89  .   Q     .         .         .     V   .
   21.250     24.3632      9.70  .   Q     .         .         .     V   .
   21.333     24.4288      9.53  .   Q     .         .         .     V   .
   21.417     24.4933      9.36  .   Q     .         .         .     V   .
   21.500     24.5567      9.20  .   Q     .         .         .     V   .
   21.583     24.6191      9.06  .   Q     .         .         .     V   .
   21.667     24.6805      8.92  .   Q     .         .         .      V  .
   21.750     24.7410      8.79  .   Q     .         .         .      V  .
   21.833     24.8008      8.67  .   Q     .         .         .      V  .
   21.917     24.8597      8.56  .   Q     .         .         .      V  .
   22.000     24.9179      8.44  .   Q     .         .         .      V  .
   22.083     24.9753      8.34  .   Q     .         .         .      V  .
   22.167     25.0321      8.24  .   Q     .         .         .      V  .
   22.250     25.0882      8.15  .   Q     .         .         .      V  .
   22.333     25.1436      8.06  .   Q     .         .         .      V  .
   22.417     25.1985      7.97  .  Q      .         .         .      V  .
   22.500     25.2529      7.89  .  Q      .         .         .      V  .
   22.583     25.3067      7.81  .  Q      .         .         .      V  .
   22.667     25.3600      7.74  .  Q      .         .         .       V .
   22.750     25.4128      7.67  .  Q      .         .         .       V .
   22.833     25.4653      7.62  .  Q      .         .         .       V .
   22.917     25.5172      7.54  .  Q      .         .         .       V .
   23.000     25.5686      7.47  .  Q      .         .         .       V .
   23.083     25.6196      7.40  .  Q      .         .         .       V .
   23.167     25.6702      7.34  .  Q      .         .         .       V .
   23.250     25.7204      7.29  .  Q      .         .         .       V .
   23.333     25.7702      7.23  .  Q      .         .         .       V .
   23.417     25.8196      7.18  .  Q      .         .         .       V .
   23.500     25.8687      7.12  .  Q      .         .         .       V .
   23.583     25.9174      7.07  .  Q      .         .         .       V .
   23.667     25.9658      7.02  .  Q      .         .         .       V .
   23.750     26.0138      6.98  .  Q      .         .         .        V.
   23.833     26.0615      6.93  .  Q      .         .         .        V.
   23.917     26.1089      6.88  .  Q      .         .         .        V.
   24.000     26.1560      6.84  .  Q      .         .         .        V.
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    =======================                 =========
               0%                            1445.0
              10%                            1065.0
              20%                             305.0
              30%                             180.0
              40%                              95.0
              50%                              55.0
```

```
            60%                                 45.0
            70%                                 35.0
            80%                                 30.0
            90%                                 25.0
==============================================================================

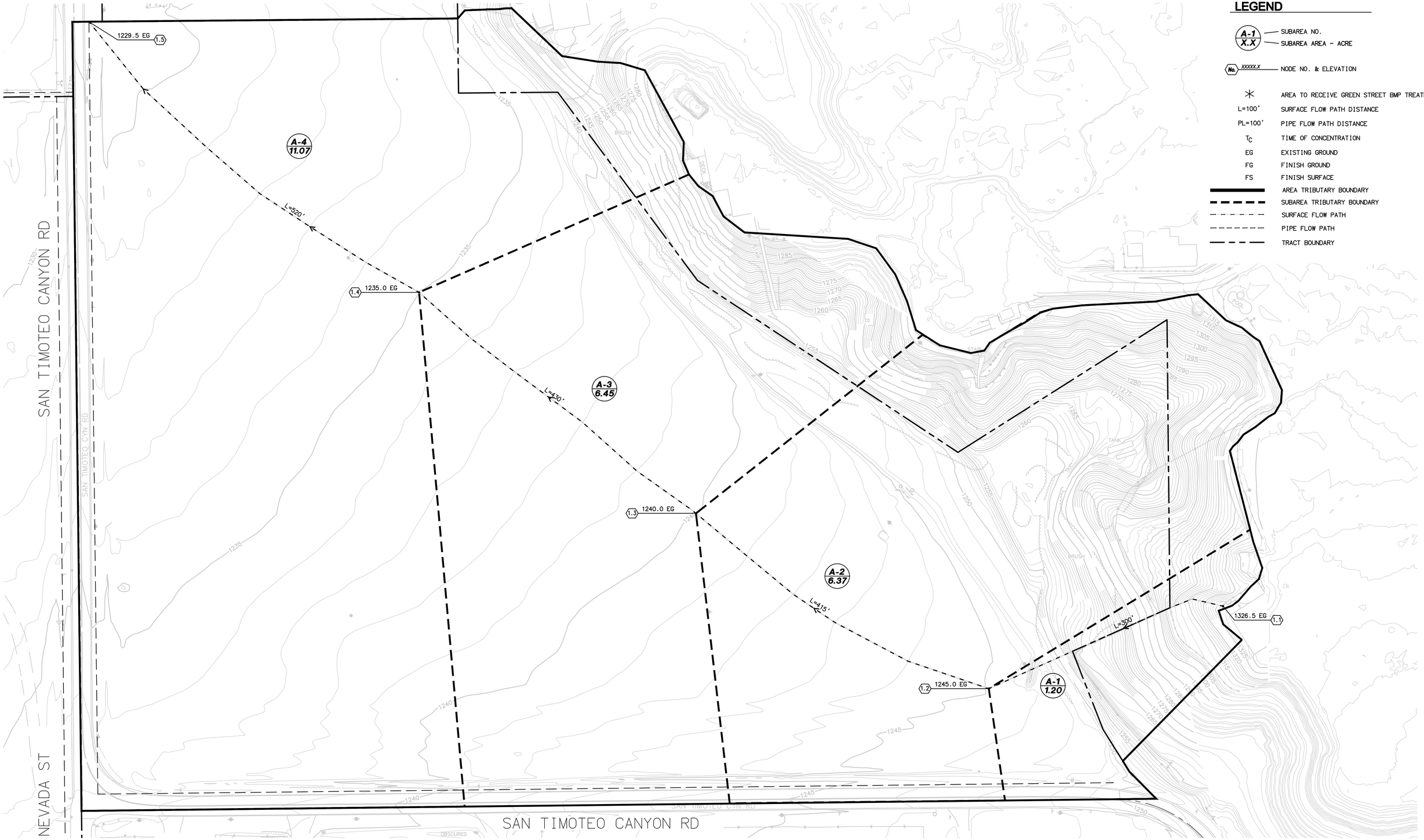
  END OF FLOODSCx ROUTING ANALYSIS
```

LINE "A" WSPGW CALCULATIONS

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1029.000	1198.030	13.970	1212.000	74.97	6.49	.65	1212.65	.00	2.73	.00	4.000	.000	.00	1 .0
39.270	.0046					.0032	.13	13.97	.00	2.80	.013	.00	.00	PIPE
1068.270	1198.210	13.916	1212.126	74.97	6.49	.65	1212.78	.00	2.73	.00	4.000	.000	.00	1 .0
33.560	.0051					.0032	.11	.00	.00	2.70	.013	.00	.00	PIPE
1101.830	1198.380	13.945	1212.324	74.97	6.49	.65	1212.98	.00	2.73	.00	4.000	.000	.00	1 .0
229.210	.0048					.0032	.74	13.94	.00	2.76	.013	.00	.00	PIPE
1331.040	1199.470	13.592	1213.062	74.97	6.49	.65	1213.72	.00	2.73	.00	4.000	.000	.00	1 .0

APPENDIX C – RATIONAL METHOD CALCULATIONS & HYDROLOGY MAPS

EXISTING RATIONAL METHOD HYDROLOGY MAP (TRACTS 20402, 20403, 20404)



Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
or
1-800-422-4133

50 0 50 100 150

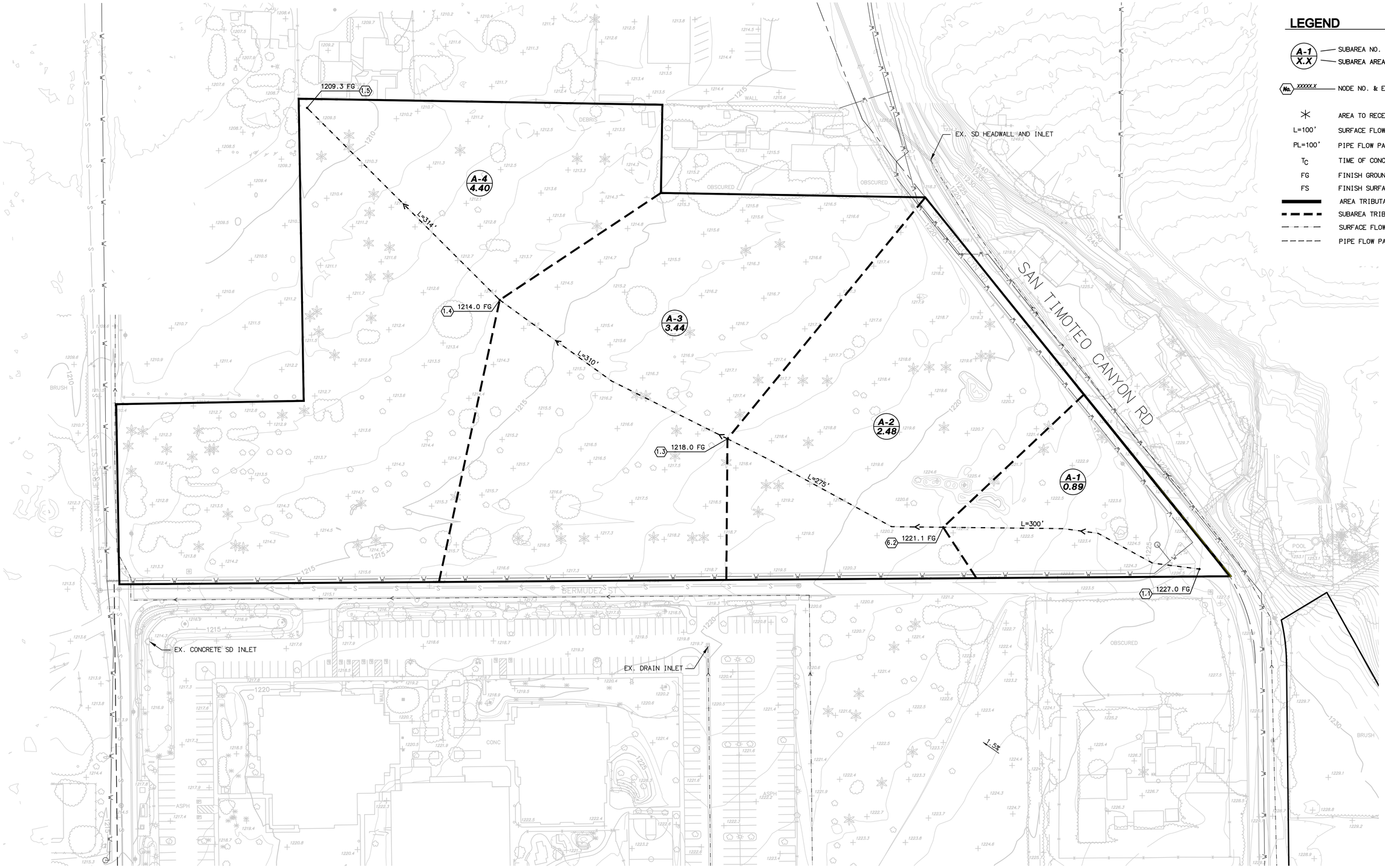
SCALE:	1"=50'
DESIGN:	CE
DRAWN:	CE
CHECKED:	SG
APPROVED:	

PREPARED BY:
PROACTIVE
ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

CITY OF REDLANDS

TTM 20402
EXISTING HYDROLOGY MAP

SHEET NO.
1 OF 1



LEGEND

A-1 / X.X	SUBAREA NO. / SUBAREA AREA - ACRE
No. XXXXX.X	NODE NO. & ELEVATION
✳	AREA TO RECEIVE GREEN STREET BMP TREATMENT
L=100'	SURFACE FLOW PATH DISTANCE
PL=100'	PIPE FLOW PATH DISTANCE
T_C	TIME OF CONCENTRATION
FG	FINISH GROUND
FS	FINISH SURFACE
━━━	AREA TRIBUTARY BOUNDARY
- - -	SUBAREA TRIBUTARY BOUNDARY
—·—·—	SURFACE FLOW PATH
— — —	PIPE FLOW PATH

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-422-4133

50 0 50 100 150

SCALE:	1"=50'
DESIGN:	CE
DRAWN:	CE
CHECKED:	SG
APPROVED:	

PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

CITY OF LOMA LINDA

TTM 20403
EXISTING HYDROLOGY MAP

SHEET NO.
1 OF 1

BARTON RD

EX. 36" SD

EX. SD HEADWALL AND INLET

SAN TIMOTEO CANYON RD

BERMUDEZ ST

EX. CONCRETE SD INLET

EX. DRAIN INLET

EX. DRAIN INLET

NEW JERSEY ST

1.5%

1.4%

1.3%

1.4%

1.3%

2.0%

1.0%

1217.5 FG (1.6)

L=420'

1218.3 FG (4.5)

L=307'

1219.4 FG (4.4)

L=355'

1222.5 FG (4.3)

L=400'

1227.0 FG (4.2)

L=300'

1231.0 FG (4.1)

L=718'

1222.0 FG (1.5)

L=467'

1225.5 FG (3.4)

L=544'

1230.5 FG (3.3)

L=507'

L=835'

1238.0 FG (3.2)

L=300'

1232.0 FG (1.4)

L=450'

1238.3 FG (2.3)

L=619'

L=346'

1242.4 FG (2.2)

L=300'

1242.0 FG (3.1)

1245.5 FG (2.1)

1240.4 FG (1.3)

L=430'

1246.7 FG

L=300'

1251.0 FG (1.1)

A-10 1.52

A-14 5.42

A-13 4.76

A-12 4.53

A-11 3.72

A-9 7.43

A-8 7.34

A-7 5.36

A-6 1.45

A-5 3.65

A-4 2.54

A-3 1.77

A-2 4.10

A-1 2.12

SAN TIMOTEO CANYON RD

NEVADA ST

LEGEND

A-1 / X.X	SUBAREA NO. / SUBAREA AREA - ACRE
No. XXXXX.X	NODE NO. & ELEVATION
L=100'	SURFACE FLOW PATH DISTANCE
PL=100'	PIPE FLOW PATH DISTANCE
T_C	TIME OF CONCENTRATION
FG	FINISH GROUND
FS	FINISH SURFACE
	AREA TRIBUTARY BOUNDARY
	SUBAREA TRIBUTARY BOUNDARY
	SURFACE FLOW PATH
	PIPE FLOW PATH

150 0 150 300 450

SCALE:	1"=150'
DESIGN:	CE
DRAWN:	CE
CHECKED:	SG
APPROVED:	

PREPARED BY:

PROACTIVE ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

CITY OF LOMA LINDA

CANYON RANCH
EXISTING HYDROLOGY

SHEET NO.

1 OF 1

25-YR EXISTING RATIONAL METHOD HYDROLOGY (TRACTS 20402, 20403, 20404)

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20402 - EXISTING CONDITION                                         *
* 25 YEAR                                                                *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 02EX25.DAT
  TIME/DATE OF STUDY: 15:43 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1326.50  DOWNSTREAM(FEET) =   1245.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.671
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.474
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.71      0.42     1.000    78    6.67
  NATURAL POOR COVER
  "GRASS"                    B        0.49      0.42     1.000    78    6.67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.30
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.30

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1245.00  DOWNSTREAM(FEET) =   1240.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   415.00   CHANNEL SLOPE =  0.0120
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.30
  FLOW VELOCITY(FEET/SEC) =   2.11 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.28   Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     715.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
```

```
  "GRASS"                    B        6.37      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.37      SUBAREA RUNOFF(CFS) =   13.28
  EFFECTIVE AREA(ACRES) =      7.57   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        7.6       PEAK FLOW RATE(CFS) =      15.78

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1240.00  DOWNSTREAM(FEET) =   1235.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.00   CHANNEL SLOPE =  0.0116
  CHANNEL FLOW THRU SUBAREA(CFS) =      15.78
  FLOW VELOCITY(FEET/SEC) =   3.03 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.36   Tc(MIN.) =   12.32
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.32
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.405
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        6.45      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.45      SUBAREA RUNOFF(CFS) =   11.54
  EFFECTIVE AREA(ACRES) =     14.02   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      25.09

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1235.00  DOWNSTREAM(FEET) =   1229.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0106
  CHANNEL FLOW THRU SUBAREA(CFS) =      25.09
  FLOW VELOCITY(FEET/SEC) =   3.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =   14.96
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.140
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     B       11.07      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.07      SUBAREA RUNOFF(CFS) =   17.17
  EFFECTIVE AREA(ACRES) =     25.09   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      38.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       25.1  TC(MIN.) =     14.96
  EFFECTIVE AREA(ACRES) =     25.09  AREA-AVERAGED Fm(INCH/HR)=  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      38.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

🡅

```
****************************************************************************
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20403 - EXISTING CONDITION                                         *
* 25 YEAR                                                                *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 03EX25.DAT
  TIME/DATE OF STUDY: 10:46 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1227.00  DOWNSTREAM(FEET) =   1221.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.279
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.535
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.89      0.42     1.000    78   11.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.89   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1221.10  DOWNSTREAM(FEET) =   1218.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0113
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.70
  FLOW VELOCITY(FEET/SEC) =   1.77 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =   13.87
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.239
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        2.48      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    4.07
  EFFECTIVE AREA(ACRES) =      3.37   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       5.53

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1218.00  DOWNSTREAM(FEET) =   1214.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.0129
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.53
  FLOW VELOCITY(FEET/SEC) =   2.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =   15.98
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.057
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        3.44      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.44      SUBAREA RUNOFF(CFS) =    5.08
  EFFECTIVE AREA(ACRES) =      6.81   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.8       PEAK FLOW RATE(CFS) =      10.06

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1214.00  DOWNSTREAM(FEET) =   1209.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   314.00   CHANNEL SLOPE =  0.0150
  CHANNEL FLOW THRU SUBAREA(CFS) =      10.06
  FLOW VELOCITY(FEET/SEC) =   3.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =   17.69
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    1199.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.69
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.935
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.40      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    6.02
  EFFECTIVE AREA(ACRES) =     11.21   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      15.33
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.2  TC(MIN.) =     17.69
  EFFECTIVE AREA(ACRES) =     11.21  AREA-AVERAGED Fm(INCH/HR)=  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      15.33
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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```
****************************************************************************
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20404 - EXISTING CONDITION                                         *
* 25 YEAR                                                                *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 04EX25.DAT
  TIME/DATE OF STUDY: 10:47 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1251.00  DOWNSTREAM(FEET) =   1246.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.015
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.441
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        2.12      0.42     1.000    78   12.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.86
  TOTAL AREA(ACRES) =      2.12   PEAK FLOW RATE(CFS) =      3.86

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1246.70  DOWNSTREAM(FEET) =   1240.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.00   CHANNEL SLOPE =  0.0147
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.86
  FLOW VELOCITY(FEET/SEC) =   2.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =   14.99
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.99
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.137
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.10      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =    6.35
  EFFECTIVE AREA(ACRES) =      6.22   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.2       PEAK FLOW RATE(CFS) =       9.63

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1240.40  DOWNSTREAM(FEET) =   1232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   619.00   CHANNEL SLOPE =  0.0136
  CHANNEL FLOW THRU SUBAREA(CFS) =       9.63
  FLOW VELOCITY(FEET/SEC) =   2.88 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.58   Tc(MIN.) =   18.57
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    1349.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.57
  RAINFALL INTENSITY(INCH/HR) =   1.88
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.63

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1245.50  DOWNSTREAM(FEET) =   1242.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.828
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.347
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  NATURAL POOR COVER
  "GRASS"                    B        1.77      0.42     1.000    78   12.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.08
  TOTAL AREA(ACRES) =      1.77   PEAK FLOW RATE(CFS) =      3.08

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1242.40  DOWNSTREAM(FEET) =   1238.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   346.00   CHANNEL SLOPE =  0.0118
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.08
  FLOW VELOCITY(FEET/SEC) =   2.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.81   Tc(MIN.) =   15.63
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      2.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.084
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        2.54      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.54      SUBAREA RUNOFF(CFS) =    3.81
  EFFECTIVE AREA(ACRES) =      4.31   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        4.3       PEAK FLOW RATE(CFS) =       6.47

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1238.30  DOWNSTREAM(FEET) =   1232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0140
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.47
  FLOW VELOCITY(FEET/SEC) =   2.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.83   Tc(MIN.) =   18.46
```

```
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.40 =    1096.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.46
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.886
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        3.65      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =    4.83
  EFFECTIVE AREA(ACRES) =      7.96   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      10.53

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.46
  RAINFALL INTENSITY(INCH/HR) =   1.89
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       7.96
  TOTAL STREAM AREA(ACRES) =       7.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.63   18.57    1.880  0.42( 0.42) 1.00       6.2       1.10
      2       10.53   18.46    1.886  0.42( 0.42) 1.00       8.0       2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
     1       20.16   18.46    1.886  0.42( 0.42) 1.00      14.1       2.10
     2       20.12   18.57    1.880  0.42( 0.42) 1.00      14.2       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.16    Tc(MIN.) =    18.46
  EFFECTIVE AREA(ACRES) =      14.14   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    1349.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1232.00  DOWNSTREAM(FEET) =   1222.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   835.00   CHANNEL SLOPE =  0.0120
  CHANNEL FLOW THRU SUBAREA(CFS) =      20.16
  FLOW VELOCITY(FEET/SEC) =   3.29 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.24   Tc(MIN.) =   22.69
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    2184.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.69
  RAINFALL INTENSITY(INCH/HR) =   1.67
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      14.14
  TOTAL STREAM AREA(ACRES) =      14.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.16

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1242.00  DOWNSTREAM(FEET) =   1238.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.190
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.420
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.45      0.42     1.000    78   12.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.61
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      2.61

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1238.00  DOWNSTREAM(FEET) =   1230.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   507.00   CHANNEL SLOPE =  0.0148
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.61
  FLOW VELOCITY(FEET/SEC) =   2.22 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.81   Tc(MIN.) =   16.00
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =     807.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.055
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        5.36      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.36      SUBAREA RUNOFF(CFS) =    7.91
  EFFECTIVE AREA(ACRES) =      6.81   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.8       PEAK FLOW RATE(CFS) =      10.05

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1230.50  DOWNSTREAM(FEET) =   1225.50
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   544.00   CHANNEL SLOPE =  0.0092
  CHANNEL FLOW THRU SUBAREA(CFS) =      10.05
  FLOW VELOCITY(FEET/SEC) =   2.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.78   Tc(MIN.) =   19.78
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.40 =    1351.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      3.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        7.34      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.34      SUBAREA RUNOFF(CFS) =    9.21
  EFFECTIVE AREA(ACRES) =     14.15   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =      17.75

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1225.50  DOWNSTREAM(FEET) =   1222.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   467.00   CHANNEL SLOPE =  0.0075
  CHANNEL FLOW THRU SUBAREA(CFS) =      17.75
  FLOW VELOCITY(FEET/SEC) =   2.51 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   22.88
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      1.50 =    1818.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.658
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        7.43      0.42     1.000    78
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =    8.31
  EFFECTIVE AREA(ACRES) =     21.58   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       21.6       PEAK FLOW RATE(CFS) =      24.13

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.88
  RAINFALL INTENSITY(INCH/HR) =   1.66
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      21.58
  TOTAL STREAM AREA(ACRES) =      21.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.13

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.16   22.69    1.667  0.42( 0.42) 1.00      14.1       2.10
      1       20.12   22.81    1.662  0.42( 0.42) 1.00      14.2       1.10
      2       24.13   22.88    1.658  0.42( 0.42) 1.00      21.6       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       44.25   22.69    1.667  0.42( 0.42) 1.00      35.5       2.10
      2       44.23   22.81    1.662  0.42( 0.42) 1.00      35.7       1.10
      3       44.20   22.88    1.658  0.42( 0.42) 1.00      35.8       3.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.25    Tc(MIN.) =    22.69
  EFFECTIVE AREA(ACRES) =      35.55   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    2184.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1222.00  DOWNSTREAM(FEET) =   1217.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   718.00   CHANNEL SLOPE =  0.0063
  CHANNEL FLOW THRU SUBAREA(CFS) =      44.25
  FLOW VELOCITY(FEET/SEC) =   2.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.04   Tc(MIN.) =   26.74
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    2902.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   26.74
  RAINFALL INTENSITY(INCH/HR) =   1.51
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      35.55
  TOTAL STREAM AREA(ACRES) =      35.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      44.25

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1231.00  DOWNSTREAM(FEET) =   1227.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.190
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.420
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.52      0.42     1.000    78   12.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.74
  TOTAL AREA(ACRES) =      1.52   PEAK FLOW RATE(CFS) =      2.74

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

```
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1227.00  DOWNSTREAM(FEET) =   1222.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0113
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.74
  FLOW VELOCITY(FEET/SEC) =   1.95 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.41   Tc(MIN.) =   15.60
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.087
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        3.72      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.72      SUBAREA RUNOFF(CFS) =    5.59
  EFFECTIVE AREA(ACRES) =      5.24   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =       7.88

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1222.50  DOWNSTREAM(FEET) =   1219.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   355.00   CHANNEL SLOPE =  0.0087
  CHANNEL FLOW THRU SUBAREA(CFS) =       7.88
  FLOW VELOCITY(FEET/SEC) =   2.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   18.29
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.40 =    1055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      4.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.897
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.53      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.53      SUBAREA RUNOFF(CFS) =    6.04
  EFFECTIVE AREA(ACRES) =      9.77   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =      13.02

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      4.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1219.40  DOWNSTREAM(FEET) =   1218.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   307.00   CHANNEL SLOPE =  0.0036
  CHANNEL FLOW THRU SUBAREA(CFS) =      13.02
  FLOW VELOCITY(FEET/SEC) =   1.60 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.20   Tc(MIN.) =   21.49
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.50 =    1362.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.50 TO NODE      4.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.722
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.76      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.76      SUBAREA RUNOFF(CFS) =    5.59
  EFFECTIVE AREA(ACRES) =     14.53   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.5       PEAK FLOW RATE(CFS) =      17.08

****************************************************************************
  FLOW PROCESS FROM NODE      4.50 TO NODE      1.60 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1218.30  DOWNSTREAM(FEET) =   1217.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0019
  CHANNEL FLOW THRU SUBAREA(CFS) =      17.08
  FLOW VELOCITY(FEET/SEC) =   1.25 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.58   Tc(MIN.) =   27.07
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.60 =    1782.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   27.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.499
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        5.42      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.42      SUBAREA RUNOFF(CFS) =    5.28
  EFFECTIVE AREA(ACRES) =     19.95   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       20.0       PEAK FLOW RATE(CFS) =      19.45

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.07
  RAINFALL INTENSITY(INCH/HR) =   1.50
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      19.95
  TOTAL STREAM AREA(ACRES) =      19.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       44.25   26.74    1.510  0.42( 0.42) 1.00      35.5       2.10
      1       44.23   26.85    1.506  0.42( 0.42) 1.00      35.7       1.10
      1       44.20   26.93    1.504  0.42( 0.42) 1.00      35.8       3.10
```

```
    2       19.45   27.07    1.499  0.42( 0.42) 1.00      20.0       4.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       63.65   26.74    1.510  0.42( 0.42) 1.00      55.2       2.10
      2       63.65   26.85    1.506  0.42( 0.42) 1.00      55.5       1.10
      3       63.63   26.93    1.504  0.42( 0.42) 1.00      55.6       3.10
      4       63.45   27.07    1.499  0.42( 0.42) 1.00      55.7       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.65    Tc(MIN.) =    26.85
  EFFECTIVE AREA(ACRES) =      55.48   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       55.7
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    2902.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       55.7  TC(MIN.) =     26.85
  EFFECTIVE AREA(ACRES) =     55.48  AREA-AVERAGED Fm(INCH/HR)=  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      63.65

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       63.65   26.74    1.510  0.42( 0.42) 1.00      55.2       2.10
      2       63.65   26.85    1.506  0.42( 0.42) 1.00      55.5       1.10
      3       63.63   26.93    1.504  0.42( 0.42) 1.00      55.6       3.10
      4       63.45   27.07    1.499  0.42( 0.42) 1.00      55.7       4.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

🡅

25-YR PROPOSED RATIONAL METHOD HYDROLOGY (TRACTS 20402, 20403, 20404)

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20402 - PROPOSED CONDITION                                         *
* 25 YEAR                                                                *
* 12/07/2021                                                             *
 ************************************************************************

  FILE NAME: 02PR25.DAT
  TIME/DATE OF STUDY: 14:45 12/09/2021
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1316.50  DOWNSTREAM(FEET) =   1295.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.750
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.952
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.38      0.42     1.000    78    8.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      1.38   PEAK FLOW RATE(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1295.50  DOWNSTREAM(FEET) =   1241.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.3843
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.808
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.10      0.42     1.000    78
  NATURAL POOR COVER
  "GRASS"                    B        0.92      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    9.51
  SUBAREA AREA(ACRES) =     1.02       SUBAREA RUNOFF(CFS) =    2.20
  EFFECTIVE AREA(ACRES) =      2.40     AREA-AVERAGED Fm(INCH/HR) =   0.42
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.42  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   3.09
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.51
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       2.40
  TOTAL STREAM AREA(ACRES) =       2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      1.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =   1300.00  DOWNSTREAM(FEET) =   1241.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.415
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.261
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.02      0.42     1.000    78    7.42
  NATURAL POOR COVER
  "GRASS"                    B        0.22      0.42     1.000    78    7.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.42
  RAINFALL INTENSITY(INCH/HR) =   3.26
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.17    9.51    2.808  0.42( 0.42) 1.00       2.4       1.10
      2        0.61    7.42    3.261  0.42( 0.42) 1.00       0.2       2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.40    7.42    3.261  0.42( 0.42) 1.00       2.1       2.10
      2        5.68    9.51    2.808  0.42( 0.42) 1.00       2.6       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.68    Tc(MIN.) =     9.51
  EFFECTIVE AREA(ACRES) =       2.64   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.6
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1241.70  DOWNSTREAM ELEVATION(FEET) = 1240.90
  STREET LENGTH(FEET) =    90.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =   10.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.710
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.28      0.75     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.44  AREA-AVERAGED Ap =  0.96
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       6.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  2.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1240.90  DOWNSTREAM ELEVATION(FEET) = 1237.80
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.19
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   11.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.531
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.29      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.29      SUBAREA RUNOFF(CFS) =    2.33
  EFFECTIVE AREA(ACRES) =      4.21    AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.51  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =       7.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.82
  FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.98    9.21    2.864  0.53( 0.46) 0.86       3.7       2.10
      2        7.88   11.31    2.531  0.51( 0.45) 0.88       4.2       1.10
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =       7.98  Tc(MIN.) =    9.21
  AREA-AVERAGED Fm(INCH/HR) =  0.46  AREA-AVERAGED Fp(INCH/HR) =  0.53
  AREA-AVERAGED Ap =  0.86  EFFECTIVE AREA(ACRES) =       3.68
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.46
  AREA-AVERAGED Fp(INCH/HR) =  0.53
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       4.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.98
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =   1295.00  DOWNSTREAM(FEET) =   1250.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.152
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.057
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.31      0.42     1.000    78    5.15
  NATURAL POOR COVER
  "GRASS"                    B        0.45      0.42     1.000    78    5.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1250.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1239.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00
  "V" GUTTER WIDTH(FEET) =   2.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.200   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   1.01
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.971
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.01      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.49
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    2.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =    5.34
  SUBAREA AREA(ACRES) =    0.01       SUBAREA RUNOFF(CFS) =    0.03
  EFFECTIVE AREA(ACRES) =    0.77     AREA-AVERAGED Fm(INCH/HR) =   0.42
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.42  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.49
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    2.00
  FLOW VELOCITY(FEET/SEC.) =  12.49   DEPTH*VELOCITY(FT*FT/SEC) =   9.99
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      1.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.50  DOWNSTREAM ELEVATION(FEET) = 1237.80
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    7.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.21      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    0.60
  EFFECTIVE AREA(ACRES) =      0.98    AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.56
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.29
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      1.50 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.47
  RAINFALL INTENSITY(INCH/HR) =   3.25
  AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       0.98
  TOTAL STREAM AREA(ACRES) =       0.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.98    9.21    2.864  0.53( 0.46) 0.86       3.7       2.10
      1        7.88   11.31    2.531  0.51( 0.45) 0.88       4.2       1.10
      2        2.56    7.47    3.246  0.42( 0.34) 0.81       1.0       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.06    7.47    3.246  0.50( 0.43) 0.85       4.0       3.10
      2       10.20    9.21    2.864  0.51( 0.43) 0.85       4.7       2.10
      3        9.81   11.31    2.531  0.50( 0.43) 0.87       5.2       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.20    Tc(MIN.) =     9.21
  EFFECTIVE AREA(ACRES) =       4.66   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.51  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) = 1237.80  DOWNSTREAM ELEVATION(FEET) = 1236.80
  STREET LENGTH(FEET) =    60.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   0.27   Tc(MIN.) =    9.48
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.815
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.01      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.02
  EFFECTIVE AREA(ACRES) =      4.67    AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.51  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      10.20
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.73
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.51
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       4.67
  TOTAL STREAM AREA(ACRES) =       5.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.20

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1242.70  DOWNSTREAM(FEET) =   1239.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.773
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.606
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.72      0.75     0.700    56   10.77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      1.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.70  DOWNSTREAM ELEVATION(FEET) = 1236.80
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   5.89   Tc(MIN.) =   16.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.006
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.98      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.98      SUBAREA RUNOFF(CFS) =    2.64
  EFFECTIVE AREA(ACRES) =      2.70    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       3.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.18
  FLOW VELOCITY(FEET/SEC.) =  1.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.60 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.66
  RAINFALL INTENSITY(INCH/HR) =   2.01
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       2.70
  TOTAL STREAM AREA(ACRES) =       2.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.60

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.06    7.74    3.178  0.50( 0.43) 0.85       4.0       3.10
      1       10.20    9.48    2.815  0.51( 0.43) 0.85       4.7       2.10
      1        9.81   11.58    2.496  0.50( 0.43) 0.87       5.2       1.10
      2        3.60   16.66    2.006  0.75( 0.52) 0.70       2.7       4.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.06    7.74    3.178  0.55( 0.45) 0.81       5.2       3.10
      2       13.37    9.48    2.815  0.56( 0.45) 0.81       6.2       2.10
      3       13.14   11.58    2.496  0.55( 0.45) 0.82       7.1       1.10
      4       11.09   16.66    2.006  0.57( 0.46) 0.81       7.9       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.37    Tc(MIN.) =     9.48
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.56  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.60 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.70 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1236.80  DOWNSTREAM ELEVATION(FEET) = 1235.10
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.55
    HALFSTREET FLOOD WIDTH(FEET) =   21.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =   10.48
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.649
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.13      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.30
```

```
  EFFECTIVE AREA(ACRES) =      6.34    AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.56  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      13.37
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.29
  FLOW VELOCITY(FEET/SEC.) =  3.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.70 =    1090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.80 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1235.10  DOWNSTREAM ELEVATION(FEET) = 1227.00
  STREET LENGTH(FEET) =   320.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.25
  STREET FLOW TRAVEL TIME(MIN.) =   1.13   Tc(MIN.) =   11.61
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.491
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.72      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.28
  EFFECTIVE AREA(ACRES) =      7.06    AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.58  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        8.8        PEAK FLOW RATE(CFS) =      13.37
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.30
  FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   2.20
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.80 =    1410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1227.00  DOWNSTREAM(FEET) =  1226.70
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.37
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.63
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.90 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.63
  RAINFALL INTENSITY(INCH/HR) =   2.49
  AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.58
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =       7.06
  TOTAL STREAM AREA(ACRES) =       8.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.37

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =   1326.50  DOWNSTREAM(FEET) =   1257.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.292
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.293
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                   B        0.07      0.42     1.000    78    7.29
  NATURAL POOR COVER
  "GRASS"                   B        0.31      0.42     1.000    78    7.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1257.00  DOWNSTREAM ELEVATION(FEET) = 1237.40
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    8.84
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.934
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"        B        2.48      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    5.38
  EFFECTIVE AREA(ACRES) =      2.86    AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.69  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       6.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
  FLOW VELOCITY(FEET/SEC.) =  4.98   DEPTH*VELOCITY(FT*FT/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =     745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.30 TO NODE      5.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1237.40  DOWNSTREAM ELEVATION(FEET) = 1227.50
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   10.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.642
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        4.26      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    4.26      SUBAREA RUNOFF(CFS) =    8.12
  EFFECTIVE AREA(ACRES) =      7.12    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        7.1        PEAK FLOW RATE(CFS) =      13.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.77
  FLOW VELOCITY(FEET/SEC.) =  4.51   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.40 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.40 TO NODE      1.90 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1227.50  DOWNSTREAM(FEET) =  1226.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.61
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      1.90 =    1220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.72
  AREA-AVERAGED Ap =  0.72
  EFFECTIVE STREAM AREA(ACRES) =       7.12
  TOTAL STREAM AREA(ACRES) =       7.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.06    9.90    2.741  0.58( 0.45) 0.78       6.1       3.10
      1       13.37   11.63    2.489  0.58( 0.45) 0.79       7.1       2.10
      1       13.14   13.74    2.252  0.57( 0.45) 0.80       7.9       1.10
      1       11.09   18.91    1.859  0.58( 0.46) 0.79       8.8       4.10
      2       13.61   10.61    2.629  0.72( 0.52) 0.72       7.1       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.43    9.90    2.741  0.65( 0.49) 0.75      12.7       3.10
      2       26.80   10.61    2.629  0.65( 0.49) 0.75      13.6       5.10
      3       26.07   11.63    2.489  0.65( 0.49) 0.75      14.2       2.10
      4       24.32   13.74    2.252  0.64( 0.48) 0.76      15.0       1.10
      5       19.74   18.91    1.859  0.64( 0.49) 0.76      15.9       4.10
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.80    Tc(MIN.) =    10.61
  EFFECTIVE AREA(ACRES) =      13.60   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.65  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       15.9
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.90 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.70  DOWNSTREAM(FEET) =  1226.00
  FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.80
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.10 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1294.00  DOWNSTREAM(FEET) =   1242.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.298
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.292
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.51      0.42     1.000    78    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.32
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1242.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1231.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00
  "V" GUTTER WIDTH(FEET) =   2.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.200   MANNING'S N = .0120
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   1.01
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.168
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.27      0.42     1.000    78
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        0.65      0.75     0.800    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.63
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.859
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.74
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    2.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.48   Tc(MIN.) =    7.78
  SUBAREA AREA(ACRES) =    0.92       SUBAREA RUNOFF(CFS) =    2.17
  EFFECTIVE AREA(ACRES) =    1.43     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.55  AREA-AVERAGED Ap =   0.91
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.44

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    2.00
  FLOW VELOCITY(FEET/SEC.) =  10.74   DEPTH*VELOCITY(FT*FT/SEC) =   8.59
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.30 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.30 TO NODE      6.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.00  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.28
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    8.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.969
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.08      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.08      SUBAREA RUNOFF(CFS) =    2.38
  EFFECTIVE AREA(ACRES) =      2.51    AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.62  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       5.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.07
  FLOW VELOCITY(FEET/SEC.) =  3.72   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.40 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      6.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.67
  RAINFALL INTENSITY(INCH/HR) =   2.97
  AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.62
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       2.51
  TOTAL STREAM AREA(ACRES) =       2.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.56
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1234.60  DOWNSTREAM(FEET) =   1231.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.387
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.664
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.53      0.75     0.700    56   10.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      6.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.00  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =   10.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.580
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.52      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    0.96
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       1.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.16
  FLOW VELOCITY(FEET/SEC.) =  3.65   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.40 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      6.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.94

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.56    8.67    2.969  0.62( 0.51) 0.82       2.5       6.10
      2        1.94   10.95    2.580  0.75( 0.52) 0.70       1.0       7.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.38    8.67    2.969  0.65( 0.51) 0.79       3.3       6.10
      2        6.62   10.95    2.580  0.66( 0.51) 0.78       3.6       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       7.38    Tc(MIN.) =     8.67
  EFFECTIVE AREA(ACRES) =       3.34   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.65  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        3.6
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.40 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.50  DOWNSTREAM(FEET) =  1226.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.38
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.10 =     855.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.38    8.82    2.938  0.65( 0.51) 0.79       3.3       6.10
      2        6.62   11.11    2.559  0.66( 0.51) 0.78       3.6       7.10
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.10 =     855.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.43   10.68    2.620  0.65( 0.49) 0.75      12.7       3.10
      2       26.80   11.39    2.521  0.65( 0.49) 0.75      13.6       5.10
      3       26.07   12.40    2.395  0.65( 0.49) 0.75      14.2       2.10
      4       24.32   14.52    2.179  0.64( 0.48) 0.76      15.0       1.10
      5       19.74   19.74    1.812  0.64( 0.49) 0.76      15.9       4.10
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.10 =    1665.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       32.47    8.82    2.938  0.65( 0.49) 0.76      13.9       6.10
      2       33.19   10.68    2.620  0.65( 0.49) 0.76      16.2       3.10
      3       33.27   11.11    2.559  0.65( 0.49) 0.76      16.8       7.10
```

```
      4       33.29   11.39    2.521  0.65( 0.49) 0.76      17.2       5.10
      5       32.17   12.40    2.395  0.65( 0.49) 0.76      17.7       2.10
      6       29.71   14.52    2.179  0.64( 0.49) 0.76      18.6       1.10
      7       23.94   19.74    1.812  0.65( 0.49) 0.76      19.4       4.10
    TOTAL AREA(ACRES) =        19.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       33.29  Tc(MIN.) =   11.387
  EFFECTIVE AREA(ACRES) =     17.16  AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.65  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.10 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.00  DOWNSTREAM(FEET) =  1225.80
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.29
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.44
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.11 =    1690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.44
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.65
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =      17.16
  TOTAL STREAM AREA(ACRES) =      19.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      33.29

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =   1234.20  DOWNSTREAM(FEET) =   1231.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.203
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.692
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.52      0.75     0.700    56   10.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      1.01

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.00  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =   11.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.513
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.79      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
```

```
  SUBAREA AREA(ACRES) =    0.79      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       2.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.16
  FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.50  DOWNSTREAM(FEET) =  1225.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.35
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.46
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      1.11 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.46
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.35

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1234.70  DOWNSTREAM(FEET) =   1231.30
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.506
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.645
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.53      0.75     0.700    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.01

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.30  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   0.52   Tc(MIN.) =   11.02
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.571
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.69      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      1.22    AREA-AVERAGED Fm(INCH/HR) =  0.52
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.59
  FLOW VELOCITY(FEET/SEC.) =  3.86   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.30 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.50  DOWNSTREAM(FEET) =  1225.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.25
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.12
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      1.11 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.12
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.22
  TOTAL STREAM AREA(ACRES) =       1.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       32.47    8.87    2.928  0.65( 0.49) 0.76      13.9       6.10
      1       33.19   10.73    2.613  0.65( 0.49) 0.76      16.2       3.10
      1       33.27   11.16    2.552  0.65( 0.49) 0.76      16.8       7.10
      1       33.29   11.44    2.514  0.65( 0.49) 0.76      17.2       5.10
      1       32.17   12.45    2.389  0.65( 0.49) 0.76      17.7       2.10
      1       29.71   14.57    2.174  0.64( 0.49) 0.76      18.6       1.10
```

```
     1       23.94   19.79    1.809  0.65( 0.49) 0.76      19.4       4.10
     2        2.35   11.46    2.511  0.75( 0.52) 0.70       1.3       8.10
     3        2.25   11.12    2.557  0.75( 0.52) 0.70       1.2       9.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       36.79    8.87    2.928  0.66( 0.50) 0.75      15.8       6.10
     2       37.73   10.73    2.613  0.66( 0.50) 0.75      18.6       3.10
     3       37.84   11.12    2.557  0.66( 0.50) 0.75      19.3       9.10
     4       37.84   11.16    2.552  0.66( 0.50) 0.75      19.3       7.10
     5       37.84   11.44    2.514  0.66( 0.50) 0.75      19.7       5.10
     6       37.81   11.46    2.511  0.66( 0.50) 0.75      19.7       8.10
     7       36.43   12.45    2.389  0.66( 0.50) 0.75      20.3       2.10
     8       33.48   14.57    2.174  0.65( 0.49) 0.76      21.1       1.10
     9       26.88   19.79    1.809  0.66( 0.50) 0.75      22.0       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.84    Tc(MIN.) =    11.16
  EFFECTIVE AREA(ACRES) =      19.31   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.66  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       22.0
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.11 =    1690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1225.80  DOWNSTREAM(FEET) =  1225.20
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.10
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.84
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.12 =    1880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.13 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1225.20  DOWNSTREAM(FEET) =   1225.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.00   CHANNEL SLOPE =  0.0100
```

```
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =      37.84
  FLOW VELOCITY(FEET/SEC.) =   2.27   FLOW DEPTH(FEET) =   0.32
  TRAVEL TIME(MIN.) =   0.15   Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.13 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.82
  RAINFALL INTENSITY(INCH/HR) =   2.46
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.66
  AREA-AVERAGED Ap =  0.75
  EFFECTIVE STREAM AREA(ACRES) =      19.31
  TOTAL STREAM AREA(ACRES) =      21.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.84

****************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1326.50  DOWNSTREAM(FEET) =   1251.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.774
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.442
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.17      0.42     1.000    78    6.77
  NATURAL POOR COVER
  "GRASS"                    B        0.25      0.42     1.000    78    6.77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.14
  TOTAL AREA(ACRES) =      0.42   PEAK FLOW RATE(CFS) =      1.14

****************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.30 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) = 1251.00  DOWNSTREAM ELEVATION(FEET) = 1244.00
  STREET LENGTH(FEET) =   540.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.90   Tc(MIN.) =   10.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.621
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.57      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.31
  EFFECTIVE AREA(ACRES) =      0.99    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.46  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.30 =     840.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.30 TO NODE     10.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) = 1244.00  DOWNSTREAM ELEVATION(FEET) = 1233.50
  STREET LENGTH(FEET) =  1180.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   8.76   Tc(MIN.) =   19.43
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.39      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    2.20
  EFFECTIVE AREA(ACRES) =      2.38    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.52  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       3.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.46
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.40 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.40 TO NODE     10.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1233.50  DOWNSTREAM ELEVATION(FEET) = 1226.00
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.40   Tc(MIN.) =   19.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.807
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.11      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      2.49    AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.53  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       3.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.91
  FLOW VELOCITY(FEET/SEC.) =  4.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.50 =    2140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE      1.13 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.00  DOWNSTREAM(FEET) =  1225.00
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.75
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   19.92
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE      1.13 =    2182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.92
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.802
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    B        0.43      0.42     1.000    78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    0.54
EFFECTIVE AREA(ACRES) =      2.92   AREA-AVERAGED Fm(INCH/HR) =  0.17
AREA-AVERAGED Fp(INCH/HR) =  0.48  AREA-AVERAGED Ap =  0.36
TOTAL AREA(ACRES) =        2.9       PEAK FLOW RATE(CFS) =       4.28

****************************************************************************
FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   19.92
RAINFALL INTENSITY(INCH/HR) =   1.80
AREA-AVERAGED Fm(INCH/HR) =  0.17
AREA-AVERAGED Fp(INCH/HR) =  0.48
AREA-AVERAGED Ap =  0.36
EFFECTIVE STREAM AREA(ACRES) =       2.92
TOTAL STREAM AREA(ACRES) =       2.92
PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.28

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       36.79    9.54    2.803  0.66( 0.50) 0.75      15.8       6.10
    1       37.73   11.39    2.520  0.66( 0.50) 0.75      18.6       3.10
    1       37.84   11.79    2.469  0.66( 0.50) 0.75      19.3       9.10
    1       37.84   11.82    2.464  0.66( 0.50) 0.75      19.3       7.10
    1       37.84   12.10    2.430  0.66( 0.50) 0.75      19.7       5.10
    1       37.81   12.13    2.427  0.66( 0.50) 0.75      19.7       8.10
    1       36.43   13.14    2.313  0.66( 0.50) 0.75      20.3       2.10
    1       33.48   15.27    2.114  0.65( 0.49) 0.76      21.1       1.10
    1       26.88   20.53    1.770  0.66( 0.50) 0.75      22.0       4.10
    2        4.28   19.92    1.802  0.48( 0.17) 0.36       2.9      10.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       40.10    9.54    2.803  0.65( 0.47) 0.72      17.2       6.10
    2       41.25   11.39    2.520  0.65( 0.47) 0.72      20.3       3.10
```

3	41.41	11.79	2.469	0.65(0.47)	0.72	21.0	9.10
4	41.42	11.82	2.464	0.65(0.47)	0.72	21.0	7.10
5	41.44	12.10	2.430	0.65(0.47)	0.72	21.5	5.10
6	41.41	12.13	2.427	0.65(0.47)	0.72	21.5	8.10
7	40.14	13.14	2.313	0.65(0.47)	0.72	22.2	2.10
8	37.39	15.27	2.114	0.64(0.46)	0.72	23.4	1.10
9	31.92	19.92	1.802	0.65(0.46)	0.71	24.8	10.10
10	31.07	20.53	1.770	0.65(0.46)	0.71	24.9	4.10

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 41.44 Tc(MIN.) = 12.10
EFFECTIVE AREA(ACRES) = 21.47 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.65 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 24.9
LONGEST FLOWPATH FROM NODE 10.10 TO NODE 1.13 = 2182.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 24.9 TC(MIN.) = 12.10
EFFECTIVE AREA(ACRES) = 21.47 AREA-AVERAGED Fm(INCH/HR)= 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.65 AREA-AVERAGED Ap = 0.717
PEAK FLOW RATE(CFS) = 41.44

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	40.10	9.54	2.803	0.65(0.47)	0.72	17.2	6.10
2	41.25	11.39	2.520	0.65(0.47)	0.72	20.3	3.10
3	41.41	11.79	2.469	0.65(0.47)	0.72	21.0	9.10
4	41.42	11.82	2.464	0.65(0.47)	0.72	21.0	7.10
5	41.44	12.10	2.430	0.65(0.47)	0.72	21.5	5.10
6	41.41	12.13	2.427	0.65(0.47)	0.72	21.5	8.10
7	40.14	13.14	2.313	0.65(0.47)	0.72	22.2	2.10
8	37.39	15.27	2.114	0.64(0.46)	0.72	23.4	1.10
9	31.92	19.92	1.802	0.65(0.46)	0.71	24.8	10.10
10	31.07	20.53	1.770	0.65(0.46)	0.71	24.9	4.10

==========

==========

END OF RATIONAL METHOD ANALYSIS

🡅

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20403 - PROPOSED CONDITION                                         *
* 25 YEAR                                                                *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 03PR25.DAT
  TIME/DATE OF STUDY: 09:08 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =   1227.00  DOWNSTREAM(FEET) =   1223.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.652
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.837
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.75     0.100    56    5.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1223.40  DOWNSTREAM ELEVATION(FEET) = 1219.60
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    7.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.295
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.23      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =      0.43    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.03
  FLOW VELOCITY(FEET/SEC.) =  2.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1219.60  DOWNSTREAM ELEVATION(FEET) = 1215.00
  STREET LENGTH(FEET) =   234.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.34
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.36   Tc(MIN.) =    8.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.973
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.96      0.75     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA AREA(ACRES) =    0.96      SUBAREA RUNOFF(CFS) =    2.18
  EFFECTIVE AREA(ACRES) =      1.39    AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.91
  FLOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     664.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1215.00  DOWNSTREAM ELEVATION(FEET) = 1211.60
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   2.83   Tc(MIN.) =   11.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.509
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.11      0.75     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.11      SUBAREA RUNOFF(CFS) =    2.13
  EFFECTIVE AREA(ACRES) =      2.50    AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       4.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.26
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1211.60  DOWNSTREAM(FEET) =  1208.50
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.86
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1079.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   337.00
  ELEVATION DATA: UPSTREAM(FEET) =   1222.20  DOWNSTREAM(FEET) =   1215.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.309
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.845
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.78      0.75     0.600    56    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1215.70  DOWNSTREAM ELEVATION(FEET) = 1212.00
  STREET LENGTH(FEET) =   410.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   12.38
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.46      0.75     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    2.56
  EFFECTIVE AREA(ACRES) =      2.24    AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       3.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.85
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     747.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      2.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.38
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.45
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.24
  TOTAL STREAM AREA(ACRES) =       2.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.93

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =   1215.60  DOWNSTREAM(FEET) =   1213.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.983
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.576
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.87      0.75     0.600    56   10.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      2.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1213.30  DOWNSTREAM ELEVATION(FEET) = 1212.00
  STREET LENGTH(FEET) =   126.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =   11.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.445
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.14      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      1.01    AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.78
  FLOW VELOCITY(FEET/SEC.) =  2.11   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      2.30 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      2.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.98
  RAINFALL INTENSITY(INCH/HR) =   2.44
  AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       1.01
  TOTAL STREAM AREA(ACRES) =       1.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.93   12.38    2.398  0.75( 0.45) 0.60       2.2       2.10
      2        1.86   11.98    2.445  0.75( 0.40) 0.53       1.0       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.76   11.98    2.445  0.75( 0.43) 0.58       3.2       3.10
      2        5.75   12.38    2.398  0.75( 0.43) 0.58       3.2       2.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.76    Tc(MIN.) =    11.98
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     747.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      1.70 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1212.00  DOWNSTREAM(FEET) =  1208.70
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.76
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.10
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.70 =     819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.10
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.431
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.75     0.600    56
  COMMERCIAL                 B        0.17      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.538
  SUBAREA AREA(ACRES) =    1.37      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      4.55   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =       8.22

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.60 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.70  DOWNSTREAM(FEET) =  1208.50
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.22
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.60 =     859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.22   12.23    2.415  0.75( 0.42) 0.57       4.5       3.10
      2        8.15   12.63    2.369  0.75( 0.42) 0.57       4.6       2.10
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.60 =     859.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.86   11.49    2.507  0.75( 0.35) 0.47       2.5       1.10
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1079.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.93   11.49    2.507  0.75( 0.40) 0.53       6.8       1.10
      2       12.87   12.23    2.415  0.75( 0.40) 0.53       7.0       3.10
      3       12.70   12.63    2.369  0.75( 0.40) 0.53       7.1       2.10
    TOTAL AREA(ACRES) =         7.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       12.93  Tc(MIN.) =   11.489
  EFFECTIVE AREA(ACRES) =      6.77  AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1079.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.507
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.15      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.33
  EFFECTIVE AREA(ACRES) =      6.92   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        7.3       PEAK FLOW RATE(CFS) =      13.19

******************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.90 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.50  DOWNSTREAM(FEET) =  1208.30
  FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.64
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.19
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   11.73
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    1145.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.73
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       6.92
  TOTAL STREAM AREA(ACRES) =       7.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.19

******************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   306.00
  ELEVATION DATA: UPSTREAM(FEET) =   1224.70  DOWNSTREAM(FEET) =   1221.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.645
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.43      0.75     0.700    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      0.82

****************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1221.10  DOWNSTREAM ELEVATION(FEET) = 1218.70
  STREET LENGTH(FEET) =   249.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   12.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.374
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.88      0.75     0.500    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.88      SUBAREA RUNOFF(CFS) =    1.58
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       2.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.91
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1218.70  DOWNSTREAM ELEVATION(FEET) = 1216.20
  STREET LENGTH(FEET) =   349.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   2.82   Tc(MIN.) =   15.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.102
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.09      0.75     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.09      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =      2.40    AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       3.68
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.09
  FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.40 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1216.20  DOWNSTREAM(FEET) =  1208.30
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.68
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   15.76
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.90 =    1091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.76
  RAINFALL INTENSITY(INCH/HR) =   2.07
  AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.40
  TOTAL STREAM AREA(ACRES) =       2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.68

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.19   11.73    2.477  0.75( 0.39) 0.52       6.9       1.10
      1       13.11   12.47    2.387  0.75( 0.39) 0.52       7.2       3.10
      1       12.94   12.86    2.343  0.75( 0.39) 0.52       7.3       2.10
      2        3.68   15.76    2.074  0.75( 0.40) 0.54       2.4       4.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.59   11.73    2.477  0.75( 0.39) 0.52       8.7       1.10
      2       16.56   12.47    2.387  0.75( 0.39) 0.53       9.1       3.10
      3       16.42   12.86    2.343  0.75( 0.39) 0.53       9.2       2.10
      4       14.83   15.76    2.074  0.75( 0.39) 0.53       9.7       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.59    Tc(MIN.) =    11.73
  EFFECTIVE AREA(ACRES) =       8.71   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.30  DOWNSTREAM(FEET) =  1208.00
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.34
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.59
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.77
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.10 =    1168.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1208.00  DOWNSTREAM(FEET) =   1206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   264.00   CHANNEL SLOPE =  0.0076
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.168
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.48      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
```

```
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   2.87
  Tc(MIN.) =   14.64
  SUBAREA AREA(ACRES) =     0.48       SUBAREA RUNOFF(CFS) =    0.76
  EFFECTIVE AREA(ACRES) =      9.19     AREA-AVERAGED Fm(INCH/HR) =   0.39
  AREA-AVERAGED Fp(INCH/HR) =   0.72  AREA-AVERAGED Ap =   0.55
  TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      16.59
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.11 =    1432.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.64
  RAINFALL INTENSITY(INCH/HR) =   2.17
  AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.72
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       9.19
  TOTAL STREAM AREA(ACRES) =      10.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.59

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   272.00
  ELEVATION DATA: UPSTREAM(FEET) =   1215.50  DOWNSTREAM(FEET) =   1212.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.758
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.765
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.92      0.75     0.600    56    9.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.92
  TOTAL AREA(ACRES) =      0.92   PEAK FLOW RATE(CFS) =      1.92
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1212.80  DOWNSTREAM ELEVATION(FEET) = 1211.50
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =   11.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.482
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.14      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      1.06    AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       1.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.20
  FLOW VELOCITY(FEET/SEC.) =  1.77   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =     477.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.30 TO NODE      5.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1211.50  DOWNSTREAM(FEET) =  1208.00
```

```
  FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.76
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.40 =     521.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.40 TO NODE      1.11 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1208.00  DOWNSTREAM(FEET) =   1206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    15.00   CHANNEL SLOPE =  0.1333
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.99
  FLOW VELOCITY(FEET/SEC.) =   2.19   FLOW DEPTH(FEET) =   0.02
  TRAVEL TIME(MIN.) =   0.11   Tc(MIN.) =   11.87
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      1.11 =     536.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.87
  RAINFALL INTENSITY(INCH/HR) =   2.46
  AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       1.06
  TOTAL STREAM AREA(ACRES) =       1.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.59   14.64    2.168  0.72( 0.39) 0.55       9.2       1.10
      1       16.56   15.39    2.104  0.72( 0.39) 0.55       9.6       3.10
      1       16.42   15.81    2.070  0.72( 0.39) 0.55       9.7       2.10
      1       14.83   18.81    1.865  0.72( 0.39) 0.55      10.1       4.10
      2        1.99   11.87    2.458  0.75( 0.40) 0.53       1.1       5.10
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.64   11.87    2.458  0.72( 0.39) 0.55       8.5       5.10
      2       18.29   14.64    2.168  0.72( 0.39) 0.55      10.2       1.10
      3       18.21   15.39    2.104  0.72( 0.39) 0.55      10.6       3.10
      4       18.03   15.81    2.070  0.72( 0.40) 0.55      10.8       2.10
      5       16.25   18.81    1.865  0.72( 0.40) 0.55      11.2       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.29    Tc(MIN.) =    14.64
  EFFECTIVE AREA(ACRES) =      10.25   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       11.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.11 =    1432.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.2  TC(MIN.) =     14.64
  EFFECTIVE AREA(ACRES) =     10.25  AREA-AVERAGED Fm(INCH/HR)=  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap = 0.547
  PEAK FLOW RATE(CFS)   =      18.29

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.64   11.87    2.458  0.72( 0.39) 0.55       8.5       5.10
      2       18.29   14.64    2.168  0.72( 0.39) 0.55      10.2       1.10
      3       18.21   15.39    2.104  0.72( 0.39) 0.55      10.6       3.10
      4       18.03   15.81    2.070  0.72( 0.40) 0.55      10.8       2.10
      5       16.25   18.81    1.865  0.72( 0.40) 0.55      11.2       4.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

↑

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20404 - PROPOSED CONDITION                                         *
* 25 YEAR                                                                *
* 12/07/2021                                                             *
 ************************************************************************

  FILE NAME: 04PR25.DAT
  TIME/DATE OF STUDY: 14:47 12/09/2021
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.9300

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =   1245.60  DOWNSTREAM(FEET) =   1241.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.884
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.590
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        0.81      0.75     0.800    56   10.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1241.00  DOWNSTREAM ELEVATION(FEET) = 1238.70
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   12.33
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.404
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.06      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      1.87    AREA-AVERAGED Fm(INCH/HR) =  0.56
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  2.45   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     514.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1238.70  DOWNSTREAM ELEVATION(FEET) = 1235.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   1.94   Tc(MIN.) =   14.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.202
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.59      0.75     0.700    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.59      SUBAREA RUNOFF(CFS) =    2.40
  EFFECTIVE AREA(ACRES) =      3.46    AREA-AVERAGED Fm(INCH/HR) =  0.54
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.95
  FLOW VELOCITY(FEET/SEC.) =  2.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1235.50  DOWNSTREAM(FEET) =  1227.80
  FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.17
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   14.29
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     843.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.29
  RAINFALL INTENSITY(INCH/HR) =   2.20
  AREA-AVERAGED Fm(INCH/HR) =  0.54
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.72
  EFFECTIVE STREAM AREA(ACRES) =       3.46
  TOTAL STREAM AREA(ACRES) =       3.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   1243.20  DOWNSTREAM(FEET) =   1239.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.950
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.54      0.75     0.700    56    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.00  DOWNSTREAM ELEVATION(FEET) = 1235.60
  STREET LENGTH(FEET) =   293.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =    9.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   2.09   Tc(MIN.) =   12.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.438
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.59      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
```

```
  SUBAREA AREA(ACRES) =    1.59      SUBAREA RUNOFF(CFS) =    2.74
  EFFECTIVE AREA(ACRES) =      2.13    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       3.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     587.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      1.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1235.60  DOWNSTREAM(FEET) =  1227.80
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.67
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.09
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.50 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.09
  RAINFALL INTENSITY(INCH/HR) =   2.43
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       2.13
  TOTAL STREAM AREA(ACRES) =       2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.67

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.17   14.29    2.200  0.75( 0.54) 0.72       3.5       1.10
      2        3.67   12.09    2.432  0.75( 0.52) 0.70       2.1       2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.66   12.09    2.432  0.75( 0.53) 0.71       5.1       2.10
      2        8.40   14.29    2.200  0.75( 0.53) 0.71       5.6       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.66    Tc(MIN.) =    12.09
  EFFECTIVE AREA(ACRES) =       5.06   AREA-AVERAGED Fm(INCH/HR) =  0.53
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     843.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.432
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.23      0.75     0.100    56
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.64      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    1.87      SUBAREA RUNOFF(CFS) =    3.30
  EFFECTIVE AREA(ACRES) =      6.93   AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =        7.5       PEAK FLOW RATE(CFS) =      11.95

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1227.80  DOWNSTREAM(FEET) =  1222.10
  FLOW LENGTH(FEET) =   482.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.58
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.95
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   13.15
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1325.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.312
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.32      0.75     0.100    56
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.25      0.75     0.700    56
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.73      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.664
  SUBAREA AREA(ACRES) =    5.30      SUBAREA RUNOFF(CFS) =    8.66
  EFFECTIVE AREA(ACRES) =     12.23   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       12.8       PEAK FLOW RATE(CFS) =      19.86

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.70 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1222.10  DOWNSTREAM(FEET) =  1217.40
  FLOW LENGTH(FEET) =   326.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.25
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.86
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   13.74
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.70 =    1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.74
  RAINFALL INTENSITY(INCH/HR) =   2.25
  AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.68
  EFFECTIVE STREAM AREA(ACRES) =      12.23
```

```
  TOTAL STREAM AREA(ACRES) =      12.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.86

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   296.00
  ELEVATION DATA: UPSTREAM(FEET) =   1238.60  DOWNSTREAM(FEET) =   1234.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.854
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.749
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.53      0.75     0.700    56    9.85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.06

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1234.10  DOWNSTREAM ELEVATION(FEET) = 1231.20
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   2.29   Tc(MIN.) =   12.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.425
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.58      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    2.70
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.15
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =     596.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.20  DOWNSTREAM ELEVATION(FEET) = 1225.90
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =   14.43
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.187
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "2 DWELLINGS/ACRE"         B        2.11      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.11      SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      4.22    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =       6.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.40 =     996.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      1.70 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1225.90  DOWNSTREAM(FEET) =  1217.40
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.32
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   14.46
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      1.70 =    1030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.46
  RAINFALL INTENSITY(INCH/HR) =   2.18
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       4.22
  TOTAL STREAM AREA(ACRES) =       4.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.86   13.74    2.252  0.75( 0.51) 0.68      12.2       2.10
```

```
     1       18.35   15.98    2.057  0.75( 0.51) 0.68      12.8       1.10
     2        6.32   14.46    2.184  0.75( 0.52) 0.70       4.2       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       26.11   13.74    2.252  0.75( 0.51) 0.68      16.2       2.10
     2       25.69   14.46    2.184  0.75( 0.51) 0.68      16.6       3.10
     3       24.18   15.98    2.057  0.75( 0.51) 0.69      17.0       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.11    Tc(MIN.) =    13.74
  EFFECTIVE AREA(ACRES) =      16.24   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       17.0
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.70 =    1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.252
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.23      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =     16.47   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       17.2       PEAK FLOW RATE(CFS) =      26.11
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1217.40  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =   844.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      26.11
  PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   15.51
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.80 =    2495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.51
  RAINFALL INTENSITY(INCH/HR) =   2.09
  AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.68
  EFFECTIVE STREAM AREA(ACRES) =      16.47
  TOTAL STREAM AREA(ACRES) =      17.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.11

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =   1228.00  DOWNSTREAM(FEET) =   1223.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.299
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.677
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.69      0.75     0.700    56   10.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1223.00  DOWNSTREAM ELEVATION(FEET) = 1221.00
  STREET LENGTH(FEET) =   352.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   3.49   Tc(MIN.) =   13.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.247
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        3.12      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.12      SUBAREA RUNOFF(CFS) =    4.84
  EFFECTIVE AREA(ACRES) =      3.81    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =       5.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.54
  FLOW VELOCITY(FEET/SEC.) =  1.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =     682.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1221.00  DOWNSTREAM ELEVATION(FEET) = 1218.60
  STREET LENGTH(FEET) =   414.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =   16.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.998
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.22      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.22      SUBAREA RUNOFF(CFS) =    2.95
  EFFECTIVE AREA(ACRES) =      6.03    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =       8.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.95
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.40 =    1096.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      1.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1218.60  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   16.80
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.80 =    1134.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.80
  RAINFALL INTENSITY(INCH/HR) =   2.00
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       6.03
  TOTAL STREAM AREA(ACRES) =       6.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.00

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1224.00  DOWNSTREAM(FEET) =   1221.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.462
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.511
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.62      0.75     0.700    56   11.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1221.80  DOWNSTREAM ELEVATION(FEET) = 1220.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   2.80   Tc(MIN.) =   14.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.202
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.60      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    2.42
  EFFECTIVE AREA(ACRES) =      2.22    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       3.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.09
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.30 TO NODE      5.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1220.00  DOWNSTREAM ELEVATION(FEET) = 1218.00
  STREET LENGTH(FEET) =   314.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   14.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   16.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.002
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.74      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.74      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =      3.96    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =       5.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.66
  FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.40 =     914.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.40 TO NODE      1.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1218.00  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.27
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   16.72
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      1.80 =     929.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.72
  RAINFALL INTENSITY(INCH/HR) =   2.00
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
```

```
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       3.96
  TOTAL STREAM AREA(ACRES) =       3.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.11   15.51    2.094  0.75( 0.51) 0.68      16.5       2.10
      1       25.69   16.24    2.037  0.75( 0.51) 0.68      16.8       3.10
      1       24.18   17.77    1.930  0.75( 0.51) 0.68      17.2       1.10
      2        8.00   16.80    1.996  0.75( 0.52) 0.70       6.0       4.10
      3        5.27   16.72    2.002  0.75( 0.52) 0.70       4.0       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.18   15.51    2.094  0.75( 0.51) 0.68      25.7       2.10
      2       38.88   16.24    2.037  0.75( 0.51) 0.69      26.5       3.10
      3       38.48   16.72    2.002  0.75( 0.51) 0.69      26.9       5.10
      4       38.39   16.80    1.996  0.75( 0.51) 0.69      27.0       4.10
      5       36.84   17.77    1.930  0.75( 0.51) 0.69      27.2       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.18    Tc(MIN.) =    15.51
  EFFECTIVE AREA(ACRES) =      25.71   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       27.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.80 =    2495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1210.30  DOWNSTREAM(FEET) =  1210.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.18
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   15.69
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    2568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =  10
```

```
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =   1250.00  DOWNSTREAM(FEET) =   1245.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.411
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.660
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.57      0.75     0.700    56   10.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1245.60  DOWNSTREAM ELEVATION(FEET) = 1239.30
  STREET LENGTH(FEET) =   303.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   12.10
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.430
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.76      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.76      SUBAREA RUNOFF(CFS) =    3.02
  EFFECTIVE AREA(ACRES) =      2.33    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.74
  FLOW VELOCITY(FEET/SEC.) =  3.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.30 =     625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.30 TO NODE      6.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.30  DOWNSTREAM ELEVATION(FEET) = 1233.80
  STREET LENGTH(FEET) =   386.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   14.17
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.211
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.89      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.89      SUBAREA RUNOFF(CFS) =    4.39
  EFFECTIVE AREA(ACRES) =      5.22    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =       7.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.40 =    1011.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      6.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1233.80  DOWNSTREAM ELEVATION(FEET) = 1226.60
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.63
  STREET FLOW TRAVEL TIME(MIN.) =   2.40   Tc(MIN.) =   16.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.68      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.68      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      7.90    AREA-AVERAGED Fm(INCH/HR) =  0.52
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        7.9        PEAK FLOW RATE(CFS) =      10.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.62
  FLOW VELOCITY(FEET/SEC.) =  3.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.50 =    1511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.50 TO NODE      6.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1226.60  DOWNSTREAM ELEVATION(FEET) = 1220.20
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   2.39   Tc(MIN.) =   18.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.66      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.66      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =     10.56    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       10.6        PEAK FLOW RATE(CFS) =      12.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.49
  FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.80
```

```
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.60 =    2014.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.60 TO NODE      6.70 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1220.20  DOWNSTREAM ELEVATION(FEET) = 1217.90
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.61
  STREET FLOW TRAVEL TIME(MIN.) =   2.15   Tc(MIN.) =   21.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.741
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.23      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.23      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =     12.79    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       12.8        PEAK FLOW RATE(CFS) =      14.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.24
  FLOW VELOCITY(FEET/SEC.) =  2.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.61
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.70 =    2374.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.70 TO NODE      6.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1217.90  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.49
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.01
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   21.11
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.80 =    2386.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.80 TO NODE      6.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.11
  RAINFALL INTENSITY(INCH/HR) =   1.74
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =      12.79
  TOTAL STREAM AREA(ACRES) =      12.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.01

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
  ELEVATION DATA: UPSTREAM(FEET) =   1245.20  DOWNSTREAM(FEET) =   1240.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.001
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.725
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.69      0.75     0.700    56   10.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.37
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.37
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1240.40  DOWNSTREAM ELEVATION(FEET) = 1235.20
  STREET LENGTH(FEET) =   302.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.90   Tc(MIN.) =   11.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.455
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.72      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.25
  EFFECTIVE AREA(ACRES) =      1.41    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       2.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.84
  FLOW VELOCITY(FEET/SEC.) =  2.75   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =     612.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
  UPSTREAM ELEVATION(FEET) = 1235.20  DOWNSTREAM ELEVATION(FEET) = 1228.10
  STREET LENGTH(FEET) =   504.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   11.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   14.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.148
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.36      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.36      SUBAREA RUNOFF(CFS) =    3.45
  EFFECTIVE AREA(ACRES) =      3.77    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.48
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    1116.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1228.10  DOWNSTREAM ELEVATION(FEET) = 1220.80
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
```

```
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   17.42
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.953
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.68      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.68      SUBAREA RUNOFF(CFS) =    3.45
  EFFECTIVE AREA(ACRES) =      6.45    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =       8.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.90
  FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.50 =    1616.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1220.80  DOWNSTREAM ELEVATION(FEET) = 1217.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   20.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.783
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.24      0.75     0.700    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.24      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      7.69    AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =       8.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.10
  FLOW VELOCITY(FEET/SEC.) =  2.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.60 =    2052.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.60 TO NODE      6.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1217.90  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.72
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   20.29
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.80 =    2076.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.80 TO NODE      6.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   20.29
  RAINFALL INTENSITY(INCH/HR) =   1.78
  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       7.69
  TOTAL STREAM AREA(ACRES) =       7.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.01   21.11    1.740  0.75( 0.52) 0.70      12.8       6.10
      2        8.72   20.29    1.783  0.75( 0.52) 0.70       7.7       7.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       22.65   20.29    1.783  0.75( 0.52) 0.70      20.0       7.10
      2       22.44   21.11    1.740  0.75( 0.52) 0.70      20.5       6.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.65    Tc(MIN.) =    20.29
  EFFECTIVE AREA(ACRES) =      19.98   AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       20.5
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.80 =    2386.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1210.30  DOWNSTREAM(FEET) =  1210.00
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.65
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   20.42
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.90 =    2437.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       22.65   20.42    1.776  0.75( 0.52) 0.70      20.0       7.10
      2       22.44   21.24    1.734  0.75( 0.52) 0.70      20.5       6.10
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.90 =    2437.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.18   15.69    2.079  0.75( 0.51) 0.68      25.7       2.10
      2       38.88   16.42    2.024  0.75( 0.51) 0.69      26.5       3.10
      3       38.48   16.90    1.989  0.75( 0.51) 0.69      26.9       5.10
      4       38.39   16.98    1.983  0.75( 0.51) 0.69      27.0       4.10
      5       36.84   17.95    1.918  0.75( 0.51) 0.69      27.2       1.10
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    2568.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       60.81   15.69    2.079  0.75( 0.52) 0.69      41.1       2.10
      2       60.70   16.42    2.024  0.75( 0.52) 0.69      42.6       3.10
      3       60.42   16.90    1.989  0.75( 0.52) 0.69      43.5       5.10
      4       60.35   16.98    1.983  0.75( 0.52) 0.69      43.6       4.10
      5       59.02   17.95    1.918  0.75( 0.52) 0.69      44.8       1.10
      6       55.75   20.42    1.776  0.75( 0.52) 0.69      47.2       7.10
      7       54.45   21.24    1.734  0.75( 0.52) 0.69      47.7       6.10
    TOTAL AREA(ACRES) =        47.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       60.81  Tc(MIN.) =   15.694
  EFFECTIVE AREA(ACRES) =     41.07  AREA-AVERAGED Fm(INCH/HR) =  0.52
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       47.7
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    2568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1210.00  DOWNSTREAM(FEET) =  1208.70
  FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.34
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.81
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   16.18
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.10 =    2813.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.041
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.96      0.75     0.700    56
  COMMERCIAL                 B        0.22      0.75     0.100    56
  NATURAL POOR COVER
  "BARREN"                   B        0.30      0.27     1.000    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.66
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.683
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    3.54
  EFFECTIVE AREA(ACRES) =     43.55   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       50.2       PEAK FLOW RATE(CFS) =      60.81
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.70  DOWNSTREAM(FEET) =  1206.50
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.81
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   16.27
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.11 =    2894.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1206.50  DOWNSTREAM(FEET) =   1205.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =      60.81
  FLOW VELOCITY(FEET/SEC.) =   2.75   FLOW DEPTH(FEET) =   0.42
  TRAVEL TIME(MIN.) =   0.61   Tc(MIN.) =   16.88
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.12 =    2994.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.88
  RAINFALL INTENSITY(INCH/HR) =   1.99
  AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      43.55
  TOTAL STREAM AREA(ACRES) =      50.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      60.81

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =   1219.10  DOWNSTREAM(FEET) =   1215.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.892
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.589
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        0.81      0.75     0.800    56   10.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      1.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1215.30  DOWNSTREAM ELEVATION(FEET) = 1215.00
  STREET LENGTH(FEET) =   130.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =   12.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.373
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        1.52      0.75     0.800    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    1.52      SUBAREA RUNOFF(CFS) =    2.43
  EFFECTIVE AREA(ACRES) =      2.33    AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       3.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.76
  FLOW VELOCITY(FEET/SEC.) =  1.38   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1215.00  DOWNSTREAM(FEET) =  1206.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.70
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.40 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      1.12 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1206.50  DOWNSTREAM(FEET) =   1205.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        1.05      0.42     1.000    78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.02
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.63
  Tc(MIN.) =   14.33
  SUBAREA AREA(ACRES) =     1.05       SUBAREA RUNOFF(CFS) =    1.68
  EFFECTIVE AREA(ACRES) =      3.38     AREA-AVERAGED Fm(INCH/HR) =   0.54
  AREA-AVERAGED Fp(INCH/HR) =   0.63  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       5.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      1.12 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.33
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.20
  AREA-AVERAGED Fm(INCH/HR) =  0.54
  AREA-AVERAGED Fp(INCH/HR) =  0.63
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =       3.38
  TOTAL STREAM AREA(ACRES) =       3.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       60.81   16.88    1.991  0.74( 0.51) 0.69      43.5       2.10
      1       60.70   17.60    1.941  0.74( 0.51) 0.69      45.1       3.10
      1       60.42   18.09    1.909  0.74( 0.51) 0.69      45.9       5.10
      1       60.35   18.17    1.904  0.74( 0.51) 0.69      46.1       4.10
      1       59.02   19.15    1.846  0.74( 0.51) 0.69      47.2       1.10
      1       55.75   21.65    1.715  0.74( 0.51) 0.69      49.7       7.10
      1       54.45   22.48    1.676  0.74( 0.51) 0.69      50.2       6.10
      2        5.03   14.33    2.196  0.63( 0.54) 0.86       3.4       8.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       63.84   14.33    2.196  0.73( 0.52) 0.70      40.4       8.10
      2       65.22   16.88    1.991  0.73( 0.51) 0.70      46.9       2.10
      3       64.96   17.60    1.941  0.73( 0.52) 0.70      48.5       3.10
      4       64.58   18.09    1.909  0.73( 0.52) 0.70      49.3       5.10
      5       64.49   18.17    1.904  0.73( 0.52) 0.70      49.5       4.10
      6       62.99   19.15    1.846  0.73( 0.52) 0.70      50.6       1.10
      7       59.32   21.65    1.715  0.73( 0.52) 0.70      53.0       7.10
      8       57.90   22.48    1.676  0.73( 0.52) 0.70      53.5       6.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      65.22    Tc(MIN.) =    16.88
  EFFECTIVE AREA(ACRES) =      46.93   AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.73  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       53.5
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.12 =    2994.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1251.70  DOWNSTREAM(FEET) =   1247.80
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.095
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.348
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.36      0.75     0.100    56    7.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.36   PEAK FLOW RATE(CFS) =      1.06

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1247.80  DOWNSTREAM ELEVATION(FEET) = 1239.90
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   5.36   Tc(MIN.) =   12.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.72      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.50
  EFFECTIVE AREA(ACRES) =      1.08    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       2.25
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.41
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.30 TO NODE      9.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.90  DOWNSTREAM ELEVATION(FEET) = 1223.00
  STREET LENGTH(FEET) =   850.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   5.24   Tc(MIN.) =   17.69
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.935
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.12      0.75     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    1.88
  EFFECTIVE AREA(ACRES) =      2.20    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       3.68

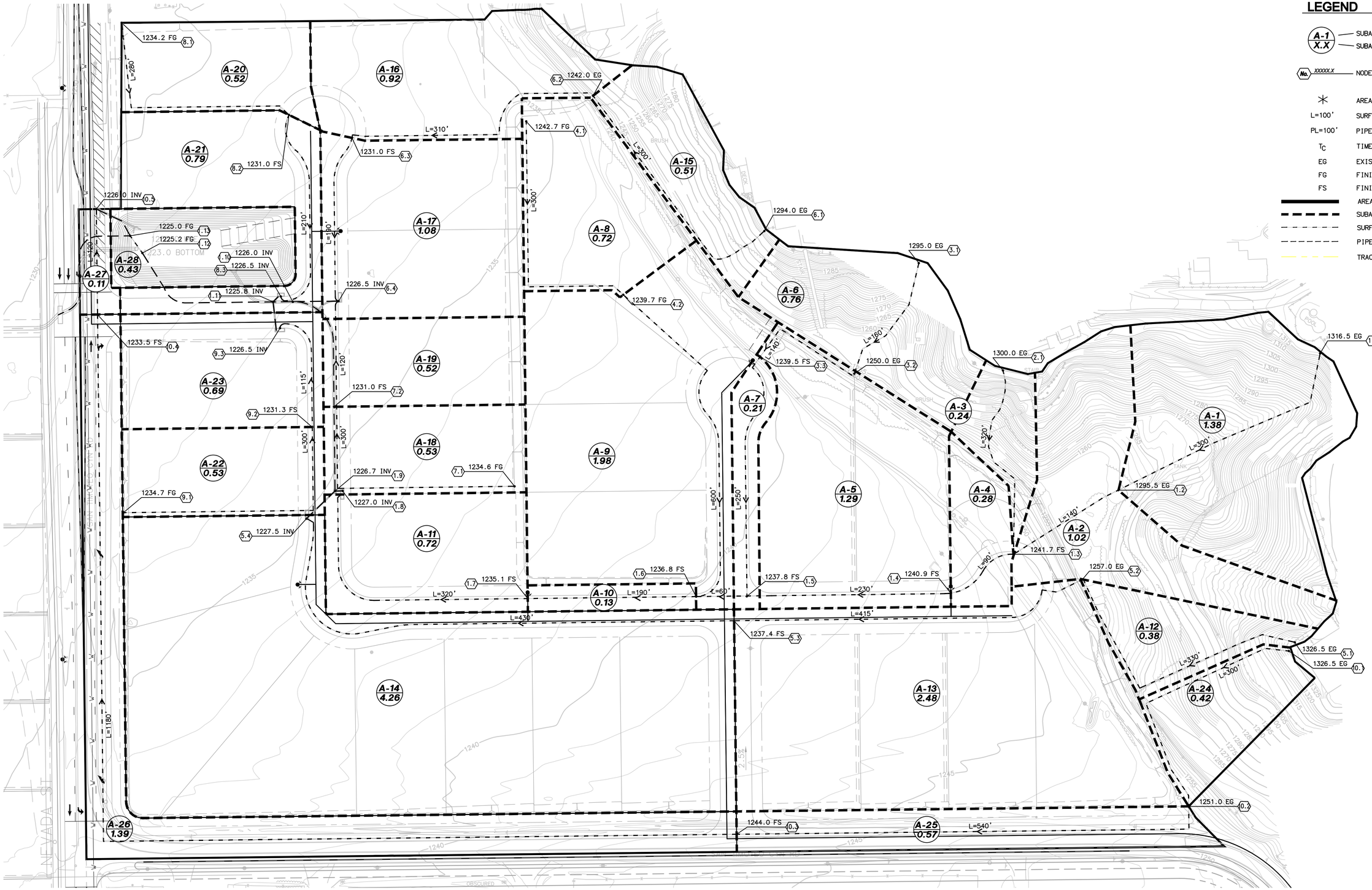
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.28
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.40 =    1850.00 FEET.

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

```
  FLOW PROCESS FROM NODE      9.40 TO NODE      9.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1223.00  DOWNSTREAM(FEET) =  1195.70
  FLOW LENGTH(FEET) =  1540.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.68
  PIPE TRAVEL TIME(MIN.) =   3.92    Tc(MIN.) =   21.61
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.50 =    3390.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.2  TC(MIN.) =     21.61
  EFFECTIVE AREA(ACRES) =      2.20  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       3.68
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

↑

PROPOSED RATIONAL METHOD HYDROLOGY MAP (TRACTS 20402, 20403, 20404)



LEGEND

A-1 / X.X	SUBAREA NO. / SUBAREA AREA - ACRE
No. XXXXX	NODE NO. & ELEVATION
✳	AREA TO RECEIVE GREEN STREET BMP TREATMENT
L=100'	SURFACE FLOW PATH DISTANCE
PL=100'	PIPE FLOW PATH DISTANCE
T_C	TIME OF CONCENTRATION
EG	EXISTING GROUND
FG	FINISH GROUND
FS	FINISH SURFACE
	AREA TRIBUTARY BOUNDARY
	SUBAREA TRIBUTARY BOUNDARY
	SURFACE FLOW PATH
	PIPE FLOW PATH
	TRACT BOUNDARY

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-422-4133

50 0 50 100 150

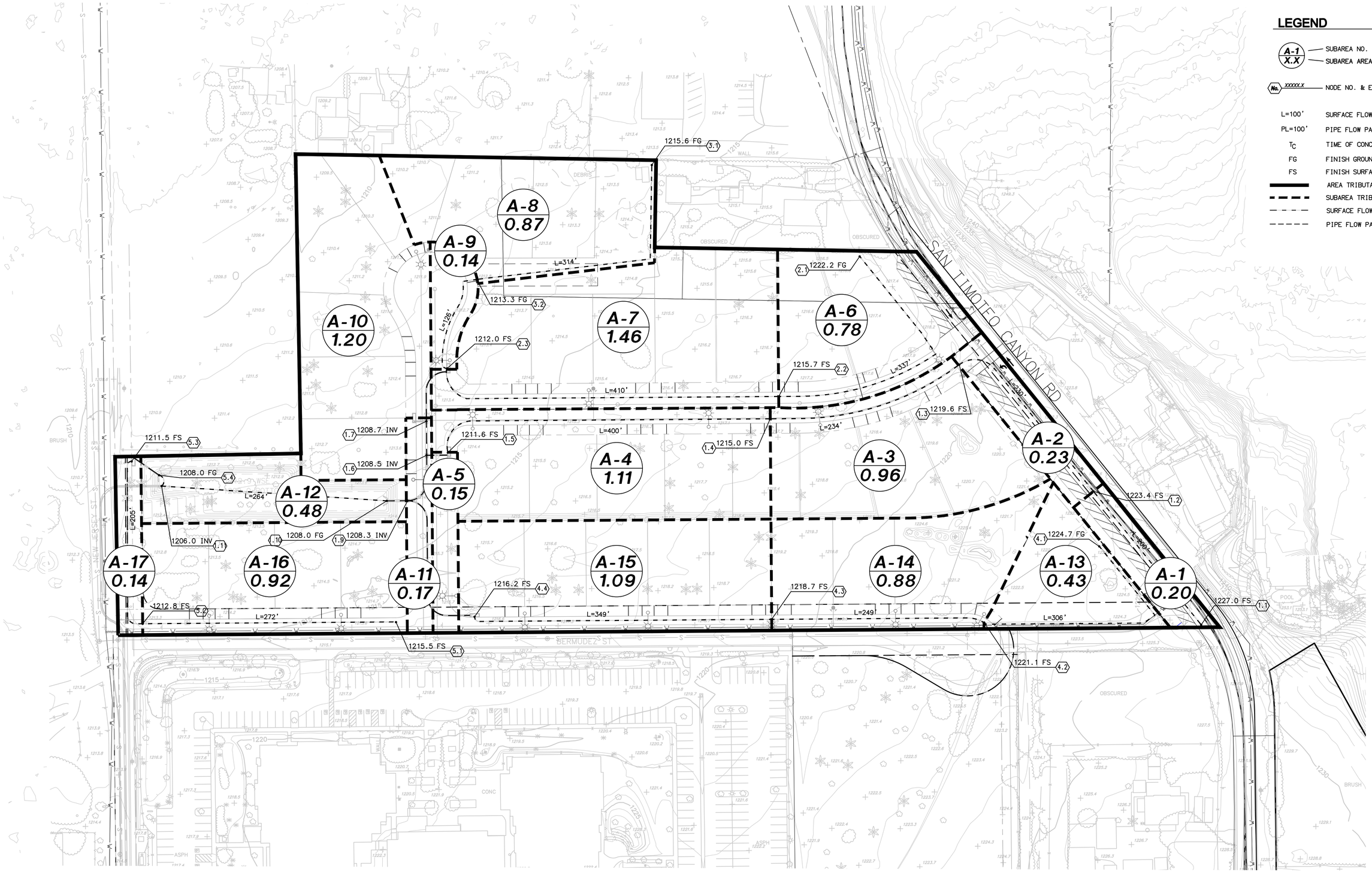
SCALE:	1"=50'
DESIGN:	CE
DRAWN:	CE
CHECKED:	SG
APPROVED:	

PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

CITY OF REDLANDS

TTM 20402
PROPOSED HYDROLOGY MAP

SHEET NO.
1 OF 1



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50 0 50 100 150

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CITY OF LOMA LINDA CALIFORNIA
SERVING MAN
INCORPORATED 1970

CITY OF LOMA LINDA

TTM 20403
PROPOSED HYDROLOGY MAP

SHEET NO.
1 OF 1

LEGEND

A-1 / X.X	SUBAREA NO. / SUBAREA AREA - ACRE
No. XXXXX.X	NODE NO. & ELEVATION
✳	AREA TO RECEIVE GREEN STREET BMP TREATMENT
L=100'	SURFACE FLOW PATH DISTANCE
PL=100'	PIPE FLOW PATH DISTANCE
T_C	TIME OF CONCENTRATION
FG	FINISH GROUND
FS	FINISH SURFACE
━━━	AREA TRIBUTARY BOUNDARY
- - -	SUBAREA TRIBUTARY BOUNDARY
—·—·—	SURFACE FLOW PATH
— — —	PIPE FLOW PATH

100 0 100 200 300

SCALE:	1"=100'
DESIGN:	CE
DRAWN:	CE
CHECKED:	SG
APPROVED:	

PREPARED BY:

PROACTIVE ENGINEERING CONSULTANTS
WWW.PROACTIVEENGINEERING.NET
200 South Main Street, Corona, CA 92882 Suite 300
951•280•3300

CITY OF LOMA LINDA

TTM 20404
PROPOSED HYDROLOGY MAP

SHEET NO.
1 OF 1

100-YR EXISTING RATIONAL METHOD HYDROLOGY (TRACTS 20402, 20403, 20404)

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20402 - EXISTING CONDITION                                         *
* 100 YEAR                                                               *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 02EX100.DAT
  TIME/DATE OF STUDY: 10:46 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2300

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1326.50  DOWNSTREAM(FEET) =   1245.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.671
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.595
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.71      0.18     1.000    93    6.67
  NATURAL POOR COVER
  "GRASS"                    B        0.49      0.18     1.000    93    6.67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.77
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.77

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1245.00  DOWNSTREAM(FEET) =   1240.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   415.00   CHANNEL SLOPE =  0.0120
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.77
  FLOW VELOCITY(FEET/SEC) =   2.29 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =    9.69
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     715.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.673
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
```

```
  "GRASS"                    B        6.37      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.37      SUBAREA RUNOFF(CFS) =   20.02
  EFFECTIVE AREA(ACRES) =      7.57   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        7.6       PEAK FLOW RATE(CFS) =      23.79

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1240.00  DOWNSTREAM(FEET) =   1235.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.00   CHANNEL SLOPE =  0.0116
  CHANNEL FLOW THRU SUBAREA(CFS) =      23.79
  FLOW VELOCITY(FEET/SEC) =   3.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.12   Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.262
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        6.45      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.45      SUBAREA RUNOFF(CFS) =   17.89
  EFFECTIVE AREA(ACRES) =     14.02   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      38.89

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1235.00  DOWNSTREAM(FEET) =   1229.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0106
  CHANNEL FLOW THRU SUBAREA(CFS) =      38.89
  FLOW VELOCITY(FEET/SEC) =   3.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  TRAVEL TIME(MIN.) =   2.34   Tc(MIN.) =   14.15
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.927
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       11.07      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.07      SUBAREA RUNOFF(CFS) =   27.37
  EFFECTIVE AREA(ACRES) =     25.09   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      62.03
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       25.1  TC(MIN.) =     14.15
  EFFECTIVE AREA(ACRES) =     25.09  AREA-AVERAGED Fm(INCH/HR)=  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      62.03
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

🡅

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20403 - EXISTING CONDITION                                         *
* 100 YEAR                                                               *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 03EX100.DAT
  TIME/DATE OF STUDY: 10:46 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2300

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1227.00  DOWNSTREAM(FEET) =   1221.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.279
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.353
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.89      0.18     1.000    93   11.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.54
  TOTAL AREA(ACRES) =      0.89   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1221.10  DOWNSTREAM(FEET) =   1218.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0113
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.54
  FLOW VELOCITY(FEET/SEC) =   1.92 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        2.48      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    6.27
  EFFECTIVE AREA(ACRES) =      3.37   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       8.52

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1218.00  DOWNSTREAM(FEET) =   1214.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00   CHANNEL SLOPE =  0.0129
  CHANNEL FLOW THRU SUBAREA(CFS) =       8.52
  FLOW VELOCITY(FEET/SEC) =   2.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   15.56
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.765
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        3.44      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.44      SUBAREA RUNOFF(CFS) =    8.00
  EFFECTIVE AREA(ACRES) =      6.81   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.8       PEAK FLOW RATE(CFS) =      15.84

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1214.00  DOWNSTREAM(FEET) =   1209.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   314.00   CHANNEL SLOPE =  0.0150
  CHANNEL FLOW THRU SUBAREA(CFS) =      15.84
  FLOW VELOCITY(FEET/SEC) =   3.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   17.08
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    1199.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.614
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.40      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    9.64
  EFFECTIVE AREA(ACRES) =     11.21   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      24.56
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.2  TC(MIN.) =     17.08
  EFFECTIVE AREA(ACRES) =     11.21  AREA-AVERAGED Fm(INCH/HR)=  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      24.56
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

↑

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20404 - EXISTING CONDITION                                         *
* 100 YEAR                                                               *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 04EX100.DAT
  TIME/DATE OF STUDY: 10:47 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2300

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1251.00  DOWNSTREAM(FEET) =   1246.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.015
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.228
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        2.12      0.18     1.000    93   12.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.82
  TOTAL AREA(ACRES) =      2.12   PEAK FLOW RATE(CFS) =      5.82

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1246.70  DOWNSTREAM(FEET) =   1240.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.00   CHANNEL SLOPE =  0.0147
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.82
  FLOW VELOCITY(FEET/SEC) =   2.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.71   Tc(MIN.) =   14.72
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.72
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.858
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.10      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =    9.88
  EFFECTIVE AREA(ACRES) =      6.22   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.2       PEAK FLOW RATE(CFS) =      14.99

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1240.40  DOWNSTREAM(FEET) =   1232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   619.00   CHANNEL SLOPE =  0.0136
  CHANNEL FLOW THRU SUBAREA(CFS) =      14.99
  FLOW VELOCITY(FEET/SEC) =   3.23 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.19   Tc(MIN.) =   17.91
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    1349.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.91
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.99

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1245.50  DOWNSTREAM(FEET) =   1242.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.828
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  NATURAL POOR COVER
  "GRASS"                    B        1.77      0.18     1.000    93   12.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.66
  TOTAL AREA(ACRES) =      1.77   PEAK FLOW RATE(CFS) =      4.66

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1242.40  DOWNSTREAM(FEET) =   1238.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   346.00   CHANNEL SLOPE =  0.0118
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.66
  FLOW VELOCITY(FEET/SEC) =   2.26 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   15.38
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     646.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      2.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        2.54      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.54      SUBAREA RUNOFF(CFS) =    5.95
  EFFECTIVE AREA(ACRES) =      4.31   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        4.3       PEAK FLOW RATE(CFS) =      10.10

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      1.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1238.30  DOWNSTREAM(FEET) =   1232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0140
  CHANNEL FLOW THRU SUBAREA(CFS) =      10.10
  FLOW VELOCITY(FEET/SEC) =   2.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =   17.91
```

```
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.40 =    1096.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        3.65      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.65      SUBAREA RUNOFF(CFS) =    7.75
  EFFECTIVE AREA(ACRES) =      7.96   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      16.91

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.91
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       7.96
  TOTAL STREAM AREA(ACRES) =       7.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.99   17.91    2.540  0.18( 0.18) 1.00       6.2       1.10
      2       16.91   17.91    2.541  0.18( 0.18) 1.00       8.0       2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
     1       31.90   17.91    2.541  0.18( 0.18) 1.00      14.2       2.10
     2       31.90   17.91    2.540  0.18( 0.18) 1.00      14.2       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.90    Tc(MIN.) =    17.91
  EFFECTIVE AREA(ACRES) =      14.18   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    1349.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1232.00  DOWNSTREAM(FEET) =   1222.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   835.00   CHANNEL SLOPE =  0.0120
  CHANNEL FLOW THRU SUBAREA(CFS) =      31.90
  FLOW VELOCITY(FEET/SEC) =   3.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.73   Tc(MIN.) =   21.64
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    2184.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.64
  RAINFALL INTENSITY(INCH/HR) =   2.27
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      14.18
  TOTAL STREAM AREA(ACRES) =      14.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.90

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1242.00  DOWNSTREAM(FEET) =   1238.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.190
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.200
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.45      0.18     1.000    93   12.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.94
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      3.94

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1238.00  DOWNSTREAM(FEET) =   1230.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   507.00   CHANNEL SLOPE =  0.0148
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.94
  FLOW VELOCITY(FEET/SEC) =   2.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.48   Tc(MIN.) =   15.67
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =     807.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.753
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        5.36      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.36      SUBAREA RUNOFF(CFS) =   12.41
  EFFECTIVE AREA(ACRES) =      6.81   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        6.8       PEAK FLOW RATE(CFS) =      15.77

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1230.50  DOWNSTREAM(FEET) =   1225.50
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   544.00   CHANNEL SLOPE =  0.0092
  CHANNEL FLOW THRU SUBAREA(CFS) =      15.77
  FLOW VELOCITY(FEET/SEC) =   2.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =   19.03
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.40 =    1351.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      3.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.450
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        7.34      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.34      SUBAREA RUNOFF(CFS) =   14.99
  EFFECTIVE AREA(ACRES) =     14.15   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.2       PEAK FLOW RATE(CFS) =      28.90

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1225.50  DOWNSTREAM(FEET) =   1222.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   467.00   CHANNEL SLOPE =  0.0075
  CHANNEL FLOW THRU SUBAREA(CFS) =      28.90
  FLOW VELOCITY(FEET/SEC) =   2.87 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.71   Tc(MIN.) =   21.75
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      1.50 =    1818.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.261
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        7.43      0.18     1.000    93
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   13.92
  EFFECTIVE AREA(ACRES) =     21.58   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       21.6       PEAK FLOW RATE(CFS) =      40.42

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.75
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      21.58
  TOTAL STREAM AREA(ACRES) =      21.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.42

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.90   21.64    2.268  0.18( 0.18) 1.00      14.2       2.10
      1       31.90   21.65    2.268  0.18( 0.18) 1.00      14.2       1.10
      2       40.42   21.75    2.261  0.18( 0.18) 1.00      21.6       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.26   21.64    2.268  0.18( 0.18) 1.00      35.7       2.10
      2       72.26   21.65    2.268  0.18( 0.18) 1.00      35.7       1.10
      3       72.23   21.75    2.261  0.18( 0.18) 1.00      35.8       3.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      72.26    Tc(MIN.) =    21.65
  EFFECTIVE AREA(ACRES) =      35.66   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    2184.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1222.00  DOWNSTREAM(FEET) =   1217.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   718.00   CHANNEL SLOPE =  0.0063
  CHANNEL FLOW THRU SUBAREA(CFS) =      72.26
  FLOW VELOCITY(FEET/SEC) =   3.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.51   Tc(MIN.) =   25.16
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    2902.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.16
  RAINFALL INTENSITY(INCH/HR) =   2.07
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      35.66
  TOTAL STREAM AREA(ACRES) =      35.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.26

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1231.00  DOWNSTREAM(FEET) =   1227.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.190
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.200
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.52      0.18     1.000    93   12.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.13
  TOTAL AREA(ACRES) =      1.52   PEAK FLOW RATE(CFS) =      4.13

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

```
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1227.00  DOWNSTREAM(FEET) =   1222.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0113
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.13
  FLOW VELOCITY(FEET/SEC) =   2.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.11   Tc(MIN.) =   15.30
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.792
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        3.72      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.72      SUBAREA RUNOFF(CFS) =    8.74
  EFFECTIVE AREA(ACRES) =      5.24   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =      12.32

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1222.50  DOWNSTREAM(FEET) =   1219.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   355.00   CHANNEL SLOPE =  0.0087
  CHANNEL FLOW THRU SUBAREA(CFS) =      12.32
  FLOW VELOCITY(FEET/SEC) =   2.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.40   Tc(MIN.) =   17.71
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.40 =    1055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      4.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.71
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.558
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.53      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.53      SUBAREA RUNOFF(CFS) =    9.70
  EFFECTIVE AREA(ACRES) =      9.77   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        9.8       PEAK FLOW RATE(CFS) =      20.91

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      4.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1219.40  DOWNSTREAM(FEET) =   1218.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   307.00   CHANNEL SLOPE =  0.0036
  CHANNEL FLOW THRU SUBAREA(CFS) =      20.91
  FLOW VELOCITY(FEET/SEC) =   1.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.82   Tc(MIN.) =   20.53
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.50 =    1362.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.50 TO NODE      4.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.53
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.341
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        4.76      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.76      SUBAREA RUNOFF(CFS) =    9.26
  EFFECTIVE AREA(ACRES) =     14.53   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       14.5       PEAK FLOW RATE(CFS) =      28.26

****************************************************************************
  FLOW PROCESS FROM NODE      4.50 TO NODE      1.60 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1218.30  DOWNSTREAM(FEET) =   1217.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0019
  CHANNEL FLOW THRU SUBAREA(CFS) =      28.26
  FLOW VELOCITY(FEET/SEC) =   1.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.87   Tc(MIN.) =   25.39
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.60 =    1782.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   25.39
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.060
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        5.42      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.42      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =     19.95   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       20.0       PEAK FLOW RATE(CFS) =      33.76

******************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.39
  RAINFALL INTENSITY(INCH/HR) =   2.06
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      19.95
  TOTAL STREAM AREA(ACRES) =      19.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      33.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.26   25.15    2.072  0.18( 0.18) 1.00      35.7       2.10
      1       72.26   25.16    2.072  0.18( 0.18) 1.00      35.7       1.10
      1       72.23   25.25    2.067  0.18( 0.18) 1.00      35.8       3.10
```

```
    2       33.76   25.39    2.060  0.18( 0.18) 1.00      20.0       4.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      105.91   25.15    2.072  0.18( 0.18) 1.00      55.4       2.10
      2      105.91   25.16    2.072  0.18( 0.18) 1.00      55.4       1.10
      3      105.93   25.25    2.067  0.18( 0.18) 1.00      55.6       3.10
      4      105.73   25.39    2.060  0.18( 0.18) 1.00      55.7       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     105.93    Tc(MIN.) =    25.25
  EFFECTIVE AREA(ACRES) =      55.60   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       55.7
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    2902.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       55.7  TC(MIN.) =     25.25
  EFFECTIVE AREA(ACRES) =     55.60  AREA-AVERAGED Fm(INCH/HR)=  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     105.93

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      105.91   25.15    2.072  0.18( 0.18) 1.00      55.4       2.10
      2      105.91   25.16    2.072  0.18( 0.18) 1.00      55.4       1.10
      3      105.93   25.25    2.067  0.18( 0.18) 1.00      55.6       3.10
      4      105.73   25.39    2.060  0.18( 0.18) 1.00      55.7       4.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

🡅

100-YR PROPOSED RATIONAL METHOD HYDROLOGY (TRACTS 20402, 20403, 20404)

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20402 - PROPOSED CONDITION                                         *
* 100 YEAR                                                               *
* 10/07/2021                                                             *
 ************************************************************************

  FILE NAME: 02PR100.DAT
  TIME/DATE OF STUDY: 14:50 12/09/2021
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2300

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1316.50  DOWNSTREAM(FEET) =   1295.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.750
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.905
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.38      0.18     1.000    93    8.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.63
  TOTAL AREA(ACRES) =      1.38   PEAK FLOW RATE(CFS) =      4.63

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1295.50  DOWNSTREAM(FEET) =   1241.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.3843
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.738
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.10      0.18     1.000    93
  NATURAL POOR COVER
  "GRASS"                    B        0.92      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.54
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.66
  Tc(MIN.) =    9.41
  SUBAREA AREA(ACRES) =     1.02       SUBAREA RUNOFF(CFS) =    3.27
  EFFECTIVE AREA(ACRES) =      2.40     AREA-AVERAGED Fm(INCH/HR) =   0.18
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.18  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       7.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   3.73
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   3.74
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       2.40
  TOTAL STREAM AREA(ACRES) =       2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.69

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      1.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =   1300.00  DOWNSTREAM(FEET) =   1241.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.415
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.312
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.02      0.18     1.000    93    7.42
  NATURAL POOR COVER
  "GRASS"                    B        0.22      0.18     1.000    93    7.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.30 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.42
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.69    9.41    3.738  0.18( 0.18) 1.00       2.4       1.10
      2        0.89    7.42    4.312  0.18( 0.18) 1.00       0.2       2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.93    7.42    4.312  0.18( 0.18) 1.00       2.1       2.10
      2        8.45    9.41    3.738  0.18( 0.18) 1.00       2.6       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.45    Tc(MIN.) =     9.41
  EFFECTIVE AREA(ACRES) =       2.64   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.6
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1241.70  DOWNSTREAM ELEVATION(FEET) = 1240.90
  STREET LENGTH(FEET) =    90.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.38
  STREET FLOW TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =    9.94
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.618
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.28      0.42     0.600    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.85
  EFFECTIVE AREA(ACRES) =      2.92    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.19  AREA-AVERAGED Ap =  0.96
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       9.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.24
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1240.90  DOWNSTREAM ELEVATION(FEET) = 1237.80
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.82
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   18.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   11.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.398
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.29      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.29      SUBAREA RUNOFF(CFS) =    3.60
  EFFECTIVE AREA(ACRES) =      4.21    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =      12.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.87
  FLOW VELOCITY(FEET/SEC.) =  3.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.03
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.88
  EFFECTIVE STREAM AREA(ACRES) =       4.21
  TOTAL STREAM AREA(ACRES) =       4.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.04

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =   1295.00  DOWNSTREAM(FEET) =   1250.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.152
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.365
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.31      0.18     1.000    93    5.15
  NATURAL POOR COVER
  "GRASS"                    B        0.45      0.18     1.000    93    5.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.55
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      3.55

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1250.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1239.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00
  "V" GUTTER WIDTH(FEET) =   2.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.200   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   1.01
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.252
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.01      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.49
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    2.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.19   Tc(MIN.) =    5.34
  SUBAREA AREA(ACRES) =    0.01       SUBAREA RUNOFF(CFS) =    0.05
  EFFECTIVE AREA(ACRES) =    0.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.18  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.55
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    2.00
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```
  FLOW VELOCITY(FEET/SEC.) =  12.49   DEPTH*VELOCITY(FT*FT/SEC) =   9.99
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      1.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.50  DOWNSTREAM ELEVATION(FEET) = 1237.80
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    7.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.349
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.21      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =      0.98    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.19  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.32
  FLOW VELOCITY(FEET/SEC.) =  2.08   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      1.50 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.31
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.19
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       0.98
  TOTAL STREAM AREA(ACRES) =       0.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.99    9.05    3.825  0.26( 0.23) 0.87       3.7       2.10
      1       12.04   11.03    3.398  0.25( 0.22) 0.88       4.2       1.10
      2        3.70    7.31    4.349  0.19( 0.15) 0.81       1.0       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.79    7.31    4.349  0.24( 0.21) 0.85       4.0       3.10
      2       15.23    9.05    3.825  0.25( 0.21) 0.85       4.7       2.10
      3       14.90   11.03    3.398  0.24( 0.21) 0.87       5.2       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.23    Tc(MIN.) =     9.05
  EFFECTIVE AREA(ACRES) =       4.68   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1237.80  DOWNSTREAM ELEVATION(FEET) = 1236.80
  STREET LENGTH(FEET) =    60.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.12
  STREET FLOW TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =    9.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.765
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.01      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.03
  EFFECTIVE AREA(ACRES) =      4.69    AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      15.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  19.88
  FLOW VELOCITY(FEET/SEC.) =  4.09   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.30
  RAINFALL INTENSITY(INCH/HR) =   3.76
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       4.69
  TOTAL STREAM AREA(ACRES) =       5.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.23

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1242.70  DOWNSTREAM(FEET) =   1239.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.773
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.447
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.72      0.42     0.700    76   10.77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.04

******************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      1.60 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.70  DOWNSTREAM ELEVATION(FEET) = 1236.80
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   5.31   Tc(MIN.) =   16.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.710
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "2 DWELLINGS/ACRE"         B        1.98      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.98      SUBAREA RUNOFF(CFS) =    4.30
  EFFECTIVE AREA(ACRES) =      2.70    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       5.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.30
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.60 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.08
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       2.70
  TOTAL STREAM AREA(ACRES) =       2.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.87

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.79    7.56    4.263  0.24( 0.21) 0.85       4.0       3.10
      1       15.23    9.30    3.765  0.25( 0.21) 0.85       4.7       2.10
      1       14.90   11.27    3.354  0.24( 0.21) 0.87       5.2       1.10
      2        5.87   16.08    2.710  0.42( 0.30) 0.70       2.7       4.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.32    7.56    4.263  0.28( 0.23) 0.81       5.2       3.10
      2       20.10    9.30    3.765  0.28( 0.23) 0.81       6.3       2.10
      3       20.11   11.27    3.354  0.28( 0.23) 0.82       7.1       1.10
      4       17.72   16.08    2.710  0.29( 0.24) 0.81       7.9       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      20.11    Tc(MIN.) =    11.27
  EFFECTIVE AREA(ACRES) =       7.09   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.60 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.70 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1236.80  DOWNSTREAM ELEVATION(FEET) = 1235.10
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   25.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.13
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   12.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.201
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.13      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.37
  EFFECTIVE AREA(ACRES) =      7.22    AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.28  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      20.11
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  25.04
  FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.70 =    1090.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.80 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1235.10  DOWNSTREAM ELEVATION(FEET) = 1227.00
  STREET LENGTH(FEET) =   320.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =   13.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.050
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.72      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.78
  EFFECTIVE AREA(ACRES) =      7.94    AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        8.8        PEAK FLOW RATE(CFS) =      20.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.43
  FLOW VELOCITY(FEET/SEC.) =  5.13   DEPTH*VELOCITY(FT*FT/SEC.) =   2.71
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.80 =    1410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1227.00  DOWNSTREAM(FEET) =  1226.70
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.13
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   13.22
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.90 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.22
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.29
  AREA-AVERAGED Ap =  0.80
  EFFECTIVE STREAM AREA(ACRES) =       7.94
  TOTAL STREAM AREA(ACRES) =       8.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.13

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =   1326.50  DOWNSTREAM(FEET) =   1257.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.292
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.356
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.07      0.18     1.000    93    7.29
  NATURAL POOR COVER
  "GRASS"                    B        0.31      0.18     1.000    93    7.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.43
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.43

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

```
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1257.00  DOWNSTREAM ELEVATION(FEET) = 1237.40
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    8.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.911
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.48      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    8.07
  EFFECTIVE AREA(ACRES) =      2.86    AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.38  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       9.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.09
  FLOW VELOCITY(FEET/SEC.) =  5.42   DEPTH*VELOCITY(FT*FT/SEC.) =   2.15
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =     745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.30 TO NODE      5.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1237.40  DOWNSTREAM ELEVATION(FEET) = 1227.50
```

```
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.32
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.548
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        4.26      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    4.26      SUBAREA RUNOFF(CFS) =   12.47
  EFFECTIVE AREA(ACRES) =      7.12    AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        7.1        PEAK FLOW RATE(CFS) =      20.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.13
  FLOW VELOCITY(FEET/SEC.) =  4.99   DEPTH*VELOCITY(FT*FT/SEC.) =   2.70
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.40 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.40 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1227.50  DOWNSTREAM(FEET) =  1226.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.88
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.34
```

```
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      1.90 =    1220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.40
  AREA-AVERAGED Ap =  0.72
  EFFECTIVE STREAM AREA(ACRES) =       7.12
  TOTAL STREAM AREA(ACRES) =       7.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.32    9.52    3.711  0.30( 0.23) 0.78       6.1       3.10
      1       20.10   11.25    3.358  0.30( 0.23) 0.79       7.1       2.10
      1       20.13   13.22    3.048  0.29( 0.23) 0.80       7.9       1.10
      1       18.01   18.10    2.525  0.30( 0.24) 0.79       8.8       4.10
      2       20.88   10.34    3.532  0.40( 0.29) 0.72       7.1       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.61    9.52    3.711  0.35( 0.26) 0.75      12.7       3.10
      2       40.57   10.34    3.532  0.35( 0.26) 0.75      13.7       5.10
      3       39.86   11.25    3.358  0.35( 0.26) 0.75      14.2       2.10
      4       37.89   13.22    3.048  0.34( 0.26) 0.76      15.1       1.10
      5       32.39   18.10    2.525  0.35( 0.26) 0.76      15.9       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.57    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =      13.69   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       15.9
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.90 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.70  DOWNSTREAM(FEET) =  1226.00
  FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.57
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.10 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1294.00  DOWNSTREAM(FEET) =   1242.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.298
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.354
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.51      0.18     1.000    93    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.92
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.92

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1242.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1231.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   310.00
  "V" GUTTER WIDTH(FEET) =   2.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.200   MANNING'S N = .0120
```

```
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   1.01
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.190
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.27      0.18     1.000    93
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        0.65      0.42     0.800    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.859
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.74
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    2.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.48   Tc(MIN.) =    7.78
  SUBAREA AREA(ACRES) =    0.92       SUBAREA RUNOFF(CFS) =    3.23
  EFFECTIVE AREA(ACRES) =    1.43     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.28  AREA-AVERAGED Ap =   0.91
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       5.07

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    2.00
  FLOW VELOCITY(FEET/SEC.) =  10.74   DEPTH*VELOCITY(FT*FT/SEC) =   8.59
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.30 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.30 TO NODE      6.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.00  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.84
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.55
  STREET FLOW TRAVEL TIME(MIN.) =   0.81   Tc(MIN.) =    8.59
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.947
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.08      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.08      SUBAREA RUNOFF(CFS) =    3.55
  EFFECTIVE AREA(ACRES) =      2.51    AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.33  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       8.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
  FLOW VELOCITY(FEET/SEC.) =  4.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.40 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      6.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.59
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.33
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       2.51
  TOTAL STREAM AREA(ACRES) =       2.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.30

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1234.60  DOWNSTREAM(FEET) =   1231.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.387
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.53      0.42     0.700    76   10.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.54

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      6.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.00  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =   10.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.52      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.46
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.95
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.97
  FLOW VELOCITY(FEET/SEC.) =  3.88   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.40 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      6.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.93
  RAINFALL INTENSITY(INCH/HR) =   3.42
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.95

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.30    8.59    3.947  0.33( 0.27) 0.82       2.5       6.10
      2        2.95   10.93    3.418  0.42( 0.30) 0.70       1.0       7.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.02    8.59    3.947  0.35( 0.28) 0.79       3.3       6.10
      2       10.06   10.93    3.418  0.36( 0.28) 0.78       3.6       7.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.02    Tc(MIN.) =     8.59
  EFFECTIVE AREA(ACRES) =       3.34   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        3.6
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.40 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.50  DOWNSTREAM(FEET) =  1226.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.02
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.73
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.10 =     855.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.02    8.73    3.910  0.35( 0.28) 0.79       3.3       6.10
      2       10.06   11.07    3.392  0.36( 0.28) 0.78       3.6       7.10
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.10 =     855.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.61   10.22    3.558  0.35( 0.26) 0.75      12.7       3.10
      2       40.57   11.03    3.398  0.35( 0.26) 0.75      13.7       5.10
      3       39.86   11.94    3.240  0.35( 0.26) 0.75      14.2       2.10
      4       37.89   13.92    2.955  0.34( 0.26) 0.76      15.1       1.10
      5       32.39   18.83    2.465  0.35( 0.26) 0.76      15.9       4.10
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.10 =    1665.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.48    8.73    3.910  0.35( 0.27) 0.76      14.1       6.10
      2       50.02   10.22    3.558  0.35( 0.27) 0.76      16.1       3.10
      3       50.64   11.03    3.398  0.35( 0.27) 0.76      17.3       5.10
      4       50.60   11.07    3.392  0.35( 0.27) 0.76      17.3       7.10
      5       49.43   11.94    3.240  0.35( 0.27) 0.76      17.8       2.10
      6       46.54   13.92    2.955  0.34( 0.26) 0.76      18.6       1.10
      7       39.46   18.83    2.465  0.35( 0.27) 0.76      19.4       4.10
    TOTAL AREA(ACRES) =        19.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       50.64  Tc(MIN.) =   11.033
  EFFECTIVE AREA(ACRES) =     17.25  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =       19.4
```

```
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.10 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.00  DOWNSTREAM(FEET) =  1225.80
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.27
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.64
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.11 =    1690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   3.39
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.35
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =      17.25
  TOTAL STREAM AREA(ACRES) =      19.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.64

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =   1234.20  DOWNSTREAM(FEET) =   1231.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.203
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.561
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.52      0.42     0.700    76   10.20
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.53
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      1.53

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.00  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.16   Tc(MIN.) =   11.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.339
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.79      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.79      SUBAREA RUNOFF(CFS) =    2.16
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.12
  FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     490.00 FEET.

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

```
  FLOW PROCESS FROM NODE      8.30 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.50  DOWNSTREAM(FEET) =  1225.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.59
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.38
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      1.11 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.38
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.59

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1234.70  DOWNSTREAM(FEET) =   1231.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.506
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.499
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.53      0.42     0.700    76   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
```

```
  SUBAREA RUNOFF(CFS) =      1.53
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.53

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.30  DOWNSTREAM ELEVATION(FEET) = 1226.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   0.49   Tc(MIN.) =   10.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.405
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.69      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    1.93
  EFFECTIVE AREA(ACRES) =      1.22    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.30 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.50  DOWNSTREAM(FEET) =  1225.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.41
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      1.11 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   3.39
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.22
  TOTAL STREAM AREA(ACRES) =       1.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.48    8.78    3.898  0.35( 0.27) 0.76      14.1       6.10
      1       50.02   10.26    3.548  0.35( 0.27) 0.76      16.1       3.10
      1       50.64   11.08    3.389  0.35( 0.27) 0.76      17.3       5.10
      1       50.60   11.11    3.383  0.35( 0.27) 0.76      17.3       7.10
      1       49.43   11.99    3.233  0.35( 0.27) 0.76      17.8       2.10
      1       46.54   13.97    2.950  0.34( 0.26) 0.76      18.6       1.10
      1       39.46   18.88    2.462  0.35( 0.27) 0.76      19.4       4.10
      2        3.59   11.38    3.336  0.42( 0.30) 0.70       1.3       8.10
      3        3.41   11.08    3.389  0.42( 0.30) 0.70       1.2       9.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       54.91    8.78    3.898  0.36( 0.27) 0.75      16.1       6.10
```

```
     2       56.80   10.26    3.548  0.36( 0.27) 0.75      18.4       3.10
     3       57.61   11.08    3.389  0.36( 0.27) 0.75      19.7       5.10
     4       57.60   11.08    3.389  0.36( 0.27) 0.75      19.7       9.10
     5       57.57   11.11    3.383  0.36( 0.27) 0.75      19.8       7.10
     6       57.19   11.38    3.336  0.36( 0.27) 0.75      20.0       8.10
     7       56.13   11.99    3.233  0.36( 0.27) 0.75      20.3       2.10
     8       52.60   13.97    2.950  0.35( 0.27) 0.76      21.2       1.10
     9       44.40   18.88    2.462  0.36( 0.27) 0.75      22.0       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      57.61    Tc(MIN.) =    11.08
  EFFECTIVE AREA(ACRES) =      19.75   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.36  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       22.0
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.11 =    1690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1225.80  DOWNSTREAM(FEET) =  1225.20
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.61
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.12 =    1880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.13 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1225.20  DOWNSTREAM(FEET) =   1225.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =      57.61
  FLOW VELOCITY(FEET/SEC.) =   2.67   FLOW DEPTH(FEET) =   0.41
  TRAVEL TIME(MIN.) =   0.12   Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.13 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.67
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.36
  AREA-AVERAGED Ap =  0.75
  EFFECTIVE STREAM AREA(ACRES) =      19.75
  TOTAL STREAM AREA(ACRES) =      21.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.61

******************************************************************************
  FLOW PROCESS FROM NODE     10.10 TO NODE     10.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1326.50  DOWNSTREAM(FEET) =   1251.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.774
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.553
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.17      0.18     1.000    93    6.77
  NATURAL POOR COVER
  "GRASS"                    B        0.25      0.18     1.000    93    6.77
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.42   PEAK FLOW RATE(CFS) =      1.65

******************************************************************************
  FLOW PROCESS FROM NODE     10.20 TO NODE     10.30 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1251.00  DOWNSTREAM ELEVATION(FEET) = 1244.00
  STREET LENGTH(FEET) =   540.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   3.63   Tc(MIN.) =   10.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.520
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.57      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.78
  EFFECTIVE AREA(ACRES) =      0.99    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.59
  FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.30 =     840.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.30 TO NODE     10.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1244.00  DOWNSTREAM ELEVATION(FEET) = 1233.50
  STREET LENGTH(FEET) =  1180.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   8.10   Tc(MIN.) =   18.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.491
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.39      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    3.06
  EFFECTIVE AREA(ACRES) =      2.38    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   1.06
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.40 =    2020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.40 TO NODE     10.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1233.50  DOWNSTREAM ELEVATION(FEET) = 1226.00
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   0.37   Tc(MIN.) =   18.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.462
  SUBAREA LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.11      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.24
  EFFECTIVE AREA(ACRES) =      2.49    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.26  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.47
  FLOW VELOCITY(FEET/SEC.) =  5.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE     10.50 =    2140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.50 TO NODE      1.13 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1226.00  DOWNSTREAM(FEET) =  1225.00
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.37
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   18.97
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE      1.13 =    2182.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.455
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.43      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    0.88
  EFFECTIVE AREA(ACRES) =      2.92   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        2.9       PEAK FLOW RATE(CFS) =       6.23
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.97
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.23
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       2.92
  TOTAL STREAM AREA(ACRES) =       2.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       54.91    9.39    3.743  0.36( 0.27) 0.75      16.1       6.10
      1       56.80   10.86    3.431  0.36( 0.27) 0.75      18.4       3.10
      1       57.61   11.67    3.285  0.36( 0.27) 0.75      19.7       5.10
      1       57.60   11.68    3.284  0.36( 0.27) 0.75      19.7       9.10
      1       57.57   11.70    3.279  0.36( 0.27) 0.75      19.8       7.10
      1       57.19   11.97    3.236  0.36( 0.27) 0.75      20.0       8.10
      1       56.13   12.58    3.140  0.36( 0.27) 0.75      20.3       2.10
      1       52.60   14.58    2.874  0.35( 0.27) 0.76      21.2       1.10
      1       44.40   19.53    2.412  0.36( 0.27) 0.75      22.0       4.10
      2        6.23   18.97    2.455  0.23( 0.08) 0.36       2.9      10.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       59.67    9.39    3.743  0.35( 0.25) 0.72      17.6       6.10
      2       61.84   10.86    3.431  0.35( 0.25) 0.72      20.1       3.10
      3       62.79   11.67    3.285  0.35( 0.25) 0.72      21.5       5.10
      4       62.78   11.68    3.284  0.35( 0.25) 0.72      21.5       9.10
      5       62.75   11.70    3.279  0.35( 0.25) 0.72      21.6       7.10
      6       62.42   11.97    3.236  0.35( 0.25) 0.72      21.8       8.10
      7       61.47   12.58    3.140  0.35( 0.25) 0.72      22.2       2.10
      8       58.24   14.58    2.874  0.35( 0.25) 0.72      23.4       1.10
      9       51.57   18.97    2.455  0.35( 0.25) 0.71      24.8      10.10
     10       50.53   19.53    2.412  0.35( 0.25) 0.71      24.9       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.79    Tc(MIN.) =    11.67
```

```
  EFFECTIVE AREA(ACRES) =      21.54   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       24.9
  LONGEST FLOWPATH FROM NODE     10.10 TO NODE      1.13 =    2182.00 FEET.
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       24.9  TC(MIN.) =     11.67
  EFFECTIVE AREA(ACRES) =     21.54  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap = 0.717
  PEAK FLOW RATE(CFS)   =      62.79

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       59.67    9.39    3.743  0.35( 0.25) 0.72      17.6       6.10
      2       61.84   10.86    3.431  0.35( 0.25) 0.72      20.1       3.10
      3       62.79   11.67    3.285  0.35( 0.25) 0.72      21.5       5.10
      4       62.78   11.68    3.284  0.35( 0.25) 0.72      21.5       9.10
      5       62.75   11.70    3.279  0.35( 0.25) 0.72      21.6       7.10
      6       62.42   11.97    3.236  0.35( 0.25) 0.72      21.8       8.10
      7       61.47   12.58    3.140  0.35( 0.25) 0.72      22.2       2.10
      8       58.24   14.58    2.874  0.35( 0.25) 0.72      23.4       1.10
      9       51.57   18.97    2.455  0.35( 0.25) 0.71      24.8      10.10
     10       50.53   19.53    2.412  0.35( 0.25) 0.71      24.9       4.10
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

🡅

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20403 - PROPOSED CONDITION                                         *
* 100 YEAR                                                               *
* 04/11/2022                                                             *
 ************************************************************************

  FILE NAME: 03PR100.DAT
  TIME/DATE OF STUDY: 09:08 04/11/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2300

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =   1227.00  DOWNSTREAM(FEET) =   1223.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.652
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.075
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.42     0.100    76    5.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1223.40  DOWNSTREAM ELEVATION(FEET) = 1219.60
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =    7.24
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.376
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.23      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.90
  EFFECTIVE AREA(ACRES) =      0.43    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.28
  FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1219.60  DOWNSTREAM ELEVATION(FEET) = 1215.00
  STREET LENGTH(FEET) =   234.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =    9.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =    8.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.971
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.96      0.42     0.600    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA AREA(ACRES) =    0.96      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =      1.39    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
  FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     664.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1215.00  DOWNSTREAM ELEVATION(FEET) = 1211.60
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =   11.09
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.387
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.11      0.42     0.500    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.11      SUBAREA RUNOFF(CFS) =    3.17
  EFFECTIVE AREA(ACRES) =      2.50    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       7.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.76
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    1064.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1211.60  DOWNSTREAM(FEET) =  1208.50
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.17
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1079.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   337.00
  ELEVATION DATA: UPSTREAM(FEET) =   1222.20  DOWNSTREAM(FEET) =   1215.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.309
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.762
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.78      0.42     0.600    76    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1215.70  DOWNSTREAM ELEVATION(FEET) = 1212.00
  STREET LENGTH(FEET) =   410.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   2.81   Tc(MIN.) =   12.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.211
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.46      0.42     0.600    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =      2.24    AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.35
  FLOW VELOCITY(FEET/SEC.) =  2.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     747.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      2.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.12
```

```
  RAINFALL INTENSITY(INCH/HR) =   3.21
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.24
  TOTAL STREAM AREA(ACRES) =       2.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.96

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =   1215.60  DOWNSTREAM(FEET) =   1213.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.983
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.407
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.87      0.42     0.600    76   10.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.47
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      2.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1213.30  DOWNSTREAM ELEVATION(FEET) = 1212.00
  STREET LENGTH(FEET) =   126.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   11.90
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.247
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.14      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      1.01    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.59
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      2.30 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      2.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.90
  RAINFALL INTENSITY(INCH/HR) =   3.25
  AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       1.01
  TOTAL STREAM AREA(ACRES) =       1.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.96   12.12    3.211  0.42( 0.25) 0.60       2.2       2.10
      2        2.75   11.90    3.247  0.42( 0.22) 0.53       1.0       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.67   11.90    3.247  0.42( 0.24) 0.58       3.2       3.10
      2        8.68   12.12    3.211  0.42( 0.24) 0.58       3.2       2.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.68    Tc(MIN.) =    12.12
  EFFECTIVE AREA(ACRES) =       3.25   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     747.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      1.70 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1212.00  DOWNSTREAM(FEET) =  1208.70
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.68
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.22
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.70 =     819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.195
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.42     0.600    76
  COMMERCIAL                 B        0.17      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.538
  SUBAREA AREA(ACRES) =    1.37      SUBAREA RUNOFF(CFS) =    3.66
  EFFECTIVE AREA(ACRES) =      4.62   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      12.29

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.33   12.00    3.230  0.42( 0.24) 0.57       4.6       3.10
     2       12.29   12.22    3.195  0.42( 0.24) 0.57       4.6       2.10
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      12.33  Tc(MIN.) =   12.00
  AREA-AVERAGED Fm(INCH/HR) =  0.24  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.57  EFFECTIVE AREA(ACRES) =       4.58

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.70  DOWNSTREAM(FEET) =  1208.50
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.33
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   12.12
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.60 =     859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.33   12.12    3.211  0.42( 0.24) 0.57       4.6       3.10
      2       12.29   12.35    3.176  0.42( 0.24) 0.57       4.6       2.10
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.60 =     859.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.17   11.11    3.384  0.42( 0.20) 0.47       2.5       1.10
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1079.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.12   11.11    3.384  0.42( 0.22) 0.53       6.7       1.10
      2       19.11   12.12    3.211  0.42( 0.23) 0.53       7.1       3.10
      3       18.99   12.35    3.176  0.42( 0.23) 0.53       7.1       2.10
    TOTAL AREA(ACRES) =         7.1
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       19.12  Tc(MIN.) =   11.106
  EFFECTIVE AREA(ACRES) =      6.69  AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1079.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.384
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.15      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =      6.84   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        7.3       PEAK FLOW RATE(CFS) =      19.49

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.50  DOWNSTREAM(FEET) =  1208.30
  FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.49
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   11.32
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.32
  RAINFALL INTENSITY(INCH/HR) =   3.35
  AREA-AVERAGED Fm(INCH/HR) =  0.22
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       6.84
  TOTAL STREAM AREA(ACRES) =       7.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.49

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   306.00
  ELEVATION DATA: UPSTREAM(FEET) =   1224.70  DOWNSTREAM(FEET) =   1221.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.498
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.43      0.42     0.700    76   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1221.10  DOWNSTREAM ELEVATION(FEET) = 1218.70
  STREET LENGTH(FEET) =   249.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =   12.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.88      0.42     0.500    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.88      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  11.91
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1218.70  DOWNSTREAM ELEVATION(FEET) = 1216.20
  STREET LENGTH(FEET) =   349.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =   15.01
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.824
  SUBAREA LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.09      0.42     0.500    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.09      SUBAREA RUNOFF(CFS) =    2.56
  EFFECTIVE AREA(ACRES) =      2.40    AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.66
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.40 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1216.20  DOWNSTREAM(FEET) =  1208.30
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.61
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   15.32
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.90 =    1091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.32
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.40
  TOTAL STREAM AREA(ACRES) =       2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.61

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       19.49   11.32    3.345  0.42( 0.22) 0.52       6.8       1.10
    1       19.45   12.34    3.177  0.42( 0.22) 0.52       7.2       3.10
    1       19.33   12.56    3.143  0.42( 0.22) 0.52       7.3       2.10
    2        5.61   15.32    2.790  0.42( 0.23) 0.54       2.4       4.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       24.54   11.32    3.345  0.42( 0.22) 0.52       8.6       1.10
    2       24.65   12.34    3.177  0.42( 0.22) 0.53       9.2       3.10
    3       24.57   12.56    3.143  0.42( 0.22) 0.53       9.2       2.10
    4       22.61   15.32    2.790  0.42( 0.22) 0.53       9.7       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.65    Tc(MIN.) =    12.34
  EFFECTIVE AREA(ACRES) =       9.16   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.30  DOWNSTREAM(FEET) =  1208.00
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.14
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.65
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   12.38
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.10 =    1168.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1208.00  DOWNSTREAM(FEET) =   1206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   264.00   CHANNEL SLOPE =  0.0076
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.847
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        0.48      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.81
  AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   2.43
  Tc(MIN.) =   14.82
  SUBAREA AREA(ACRES) =     0.48       SUBAREA RUNOFF(CFS) =    1.15
  EFFECTIVE AREA(ACRES) =      9.64     AREA-AVERAGED Fm(INCH/HR) =   0.22
  AREA-AVERAGED Fp(INCH/HR) =   0.40  AREA-AVERAGED Ap =   0.55
  TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      24.65
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.11 =    1432.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.82
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.40
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       9.64
  TOTAL STREAM AREA(ACRES) =      10.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.65

****************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   272.00
  ELEVATION DATA: UPSTREAM(FEET) =   1215.50  DOWNSTREAM(FEET) =   1212.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.758
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.657
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.92      0.42     0.600    76    9.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.82
  TOTAL AREA(ACRES) =      0.92   PEAK FLOW RATE(CFS) =      2.82

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1212.80  DOWNSTREAM ELEVATION(FEET) = 1211.50
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   11.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.310
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.14      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      1.06    AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       2.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.23
```

```
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =     477.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.30 TO NODE      5.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1211.50  DOWNSTREAM(FEET) =  1208.00
  FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.94
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.59
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.40 =     521.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.40 TO NODE      1.11 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1208.00  DOWNSTREAM(FEET) =   1206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    15.00   CHANNEL SLOPE =  0.1333
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.94
  FLOW VELOCITY(FEET/SEC.) =   2.93   FLOW DEPTH(FEET) =   0.02
  TRAVEL TIME(MIN.) =   0.09   Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      1.11 =     536.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       1.06
  TOTAL STREAM AREA(ACRES) =       1.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.94
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       24.54   13.81    2.970  0.40( 0.22) 0.55       9.1       1.10
      1       24.65   14.82    2.847  0.40( 0.22) 0.55       9.6       3.10
      1       24.57   15.05    2.820  0.40( 0.22) 0.55       9.7       2.10
      1       22.61   17.93    2.539  0.40( 0.22) 0.55      10.1       4.10
      2        2.94   11.68    3.284  0.42( 0.23) 0.53       1.1       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.06   11.68    3.284  0.40( 0.22) 0.55       8.8       5.10
      2       27.18   13.81    2.970  0.40( 0.22) 0.55      10.2       1.10
      3       27.17   14.82    2.847  0.40( 0.22) 0.55      10.7       3.10
      4       27.06   15.05    2.820  0.40( 0.22) 0.55      10.8       2.10
      5       24.83   17.93    2.539  0.40( 0.22) 0.55      11.2       4.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.18    Tc(MIN.) =    13.81
  EFFECTIVE AREA(ACRES) =      10.16   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       11.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.11 =    1432.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.2  TC(MIN.) =     13.81
  EFFECTIVE AREA(ACRES) =     10.16  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.40  AREA-AVERAGED Ap = 0.547
  PEAK FLOW RATE(CFS)   =      27.18

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.06   11.68    3.284  0.40( 0.22) 0.55       8.8       5.10
      2       27.18   13.81    2.970  0.40( 0.22) 0.55      10.2       1.10
      3       27.17   14.82    2.847  0.40( 0.22) 0.55      10.7       3.10
      4       27.06   15.05    2.820  0.40( 0.22) 0.55      10.8       2.10
      5       24.83   17.93    2.539  0.40( 0.22) 0.55      11.2       4.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

↑

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* TTM 20404 - PROPOSED CONDITION                                         *
* 100 YEAR                                                               *
* 12/07/2021                                                             *
 ************************************************************************

  FILE NAME: 04PR100.DAT
  TIME/DATE OF STUDY: 14:50 12/09/2021
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.2300

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =   1245.60  DOWNSTREAM(FEET) =   1241.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.884
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        0.81      0.42     0.800    76   10.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1241.00  DOWNSTREAM ELEVATION(FEET) = 1238.70
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =   12.19
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.200
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.06      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    2.77
  EFFECTIVE AREA(ACRES) =      1.87    AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.32
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =     514.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1238.70  DOWNSTREAM ELEVATION(FEET) = 1235.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =   13.94
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.953
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.59      0.42     0.700    76
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.59      SUBAREA RUNOFF(CFS) =    3.80
  EFFECTIVE AREA(ACRES) =      3.46    AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =       8.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.91
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =     814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1235.50  DOWNSTREAM(FEET) =  1227.80
  FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.24
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   13.96
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     843.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.96
  RAINFALL INTENSITY(INCH/HR) =   2.95
  AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.72
  EFFECTIVE STREAM AREA(ACRES) =       3.46
  TOTAL STREAM AREA(ACRES) =       3.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.24

****************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   1243.20  DOWNSTREAM(FEET) =   1239.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.950
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.615
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.54      0.42     0.700    76    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.00  DOWNSTREAM ELEVATION(FEET) = 1235.60
  STREET LENGTH(FEET) =   293.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   11.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.257
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.59      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
```

```
  SUBAREA AREA(ACRES) =    1.59      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      2.13    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.26
  FLOW VELOCITY(FEET/SEC.) =  2.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =     587.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.30 TO NODE      1.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1235.60  DOWNSTREAM(FEET) =  1227.80
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.68
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.88
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      1.50 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.88
  RAINFALL INTENSITY(INCH/HR) =   3.25
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       2.13
  TOTAL STREAM AREA(ACRES) =       2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.68

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.24   13.96    2.950  0.42( 0.31) 0.72       3.5       1.10
      2        5.68   11.88    3.250  0.42( 0.30) 0.70       2.1       2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48   11.88    3.250  0.42( 0.30) 0.71       5.1       2.10
      2       13.34   13.96    2.950  0.42( 0.30) 0.71       5.6       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.48    Tc(MIN.) =    11.88
  EFFECTIVE AREA(ACRES) =       5.07   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =     843.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.250
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.23      0.42     0.100    76
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.64      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    1.87      SUBAREA RUNOFF(CFS) =    5.02
  EFFECTIVE AREA(ACRES) =      6.94   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =        7.5       PEAK FLOW RATE(CFS) =      18.49

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1227.80  DOWNSTREAM(FEET) =  1222.10
  FLOW LENGTH(FEET) =   482.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.42
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.49
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   12.84
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    1325.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.103
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.32      0.42     0.100    76
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.25      0.42     0.700    76
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.73      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.664
  SUBAREA AREA(ACRES) =    5.30      SUBAREA RUNOFF(CFS) =   13.46
  EFFECTIVE AREA(ACRES) =     12.24   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       12.8       PEAK FLOW RATE(CFS) =      31.03

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.70 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1222.10  DOWNSTREAM(FEET) =  1217.40
  FLOW LENGTH(FEET) =   326.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.03
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   13.37
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.70 =    1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.37
  RAINFALL INTENSITY(INCH/HR) =   3.03
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.68
  EFFECTIVE STREAM AREA(ACRES) =      12.24
```

```
  TOTAL STREAM AREA(ACRES) =      12.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.03

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   296.00
  ELEVATION DATA: UPSTREAM(FEET) =   1238.60  DOWNSTREAM(FEET) =   1234.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.854
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.636
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.53      0.42     0.700    76    9.85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.59

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1234.10  DOWNSTREAM ELEVATION(FEET) = 1231.20
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   2.09   Tc(MIN.) =   11.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.239
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.58      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    4.18
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.73
  FLOW VELOCITY(FEET/SEC.) =  2.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =     596.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.30 TO NODE      3.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1231.20  DOWNSTREAM ELEVATION(FEET) = 1225.90
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.46
  STREET FLOW TRAVEL TIME(MIN.) =   2.05   Tc(MIN.) =   14.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.945
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "2 DWELLINGS/ACRE"         B        2.11      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.11      SUBAREA RUNOFF(CFS) =    5.03
  EFFECTIVE AREA(ACRES) =      4.22    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =      10.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.62
  FLOW VELOCITY(FEET/SEC.) =  3.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.40 =     996.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.40 TO NODE      1.70 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1225.90  DOWNSTREAM(FEET) =  1217.40
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.06
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   14.03
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      1.70 =    1030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.03
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       4.22
  TOTAL STREAM AREA(ACRES) =       4.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.06

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.03   13.37    3.028  0.42( 0.29) 0.68      12.2       2.10
```

```
    1       29.24   15.46    2.775  0.42( 0.29) 0.68      12.8       1.10
    2       10.06   14.03    2.942  0.42( 0.30) 0.70       4.2       3.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       40.93   13.37    3.028  0.42( 0.29) 0.68      16.3       2.10
    2       40.53   14.03    2.942  0.42( 0.29) 0.68      16.6       3.10
    3       38.67   15.46    2.775  0.42( 0.29) 0.69      17.0       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.93    Tc(MIN.) =    13.37
  EFFECTIVE AREA(ACRES) =      16.27   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       17.0
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.70 =    1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.23      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.62
  EFFECTIVE AREA(ACRES) =     16.50   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       17.2       PEAK FLOW RATE(CFS) =      40.93
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1217.40  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =   844.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.96
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      40.93
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   14.94
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.80 =    2495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.94
  RAINFALL INTENSITY(INCH/HR) =   2.83
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.68
  EFFECTIVE STREAM AREA(ACRES) =      16.50
  TOTAL STREAM AREA(ACRES) =      17.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.93

****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =   1228.00  DOWNSTREAM(FEET) =   1223.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.299
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.541
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.69      0.42     0.700    76   10.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1223.00  DOWNSTREAM ELEVATION(FEET) = 1221.00
  STREET LENGTH(FEET) =   352.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =   13.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.014
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        3.12      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    3.12      SUBAREA RUNOFF(CFS) =    7.63
  EFFECTIVE AREA(ACRES) =      3.81    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =       9.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.27
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =     682.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.30 TO NODE      4.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1221.00  DOWNSTREAM ELEVATION(FEET) = 1218.60
  STREET LENGTH(FEET) =   414.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.56
    HALFSTREET FLOOD WIDTH(FEET) =   22.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   2.67   Tc(MIN.) =   16.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.704
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.22      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.22      SUBAREA RUNOFF(CFS) =    4.81
  EFFECTIVE AREA(ACRES) =      6.03    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =      13.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  23.01
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.40 =    1096.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.40 TO NODE      1.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1218.60  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.07
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   16.17
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      1.80 =    1134.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.17
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       6.03
  TOTAL STREAM AREA(ACRES) =       6.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.07

******************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1224.00  DOWNSTREAM(FEET) =   1221.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.462
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.321
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.62      0.42     0.700    76   11.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.69

******************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1221.80  DOWNSTREAM ELEVATION(FEET) = 1220.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =   13.98
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.947
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.60      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    3.82
  EFFECTIVE AREA(ACRES) =      2.22    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.90
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.30 TO NODE      5.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1220.00  DOWNSTREAM ELEVATION(FEET) = 1218.00
  STREET LENGTH(FEET) =   314.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   17.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   16.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.700
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.74      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.74      SUBAREA RUNOFF(CFS) =    3.76
  EFFECTIVE AREA(ACRES) =      3.96    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =       8.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.10
  FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.40 =     914.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.40 TO NODE      1.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1218.00  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   16.19
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      1.80 =     929.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.19
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
```

```
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       3.96
  TOTAL STREAM AREA(ACRES) =       3.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.57

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       40.93   14.94    2.833  0.42( 0.29) 0.68      16.5       2.10
      1       40.53   15.60    2.760  0.42( 0.29) 0.68      16.9       3.10
      1       38.67   17.04    2.617  0.42( 0.29) 0.68      17.2       1.10
      2       13.07   16.17    2.701  0.42( 0.30) 0.70       6.0       4.10
      3        8.57   16.19    2.699  0.42( 0.30) 0.70       4.0       5.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       62.00   14.94    2.833  0.42( 0.29) 0.68      25.7       2.10
      2       61.90   15.60    2.760  0.42( 0.29) 0.69      26.5       3.10
      3       61.42   16.17    2.701  0.42( 0.29) 0.69      27.0       4.10
      4       61.39   16.19    2.699  0.42( 0.29) 0.69      27.0       5.10
      5       59.56   17.04    2.617  0.42( 0.29) 0.69      27.2       1.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.00    Tc(MIN.) =    14.94
  EFFECTIVE AREA(ACRES) =      25.72   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       27.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.80 =    2495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1210.30  DOWNSTREAM(FEET) =  1210.00
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.45
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.00
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   15.10
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    2568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =  10
```

```
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =   1250.00  DOWNSTREAM(FEET) =   1245.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.411
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.518
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.57      0.42     0.700    76   10.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1245.60  DOWNSTREAM ELEVATION(FEET) = 1239.30
  STREET LENGTH(FEET) =   303.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.26
```

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    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =   11.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.237
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.76      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.76      SUBAREA RUNOFF(CFS) =    4.66
  EFFECTIVE AREA(ACRES) =      2.33    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       6.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.01
  FLOW VELOCITY(FEET/SEC.) =  3.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.30 =     625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.30 TO NODE      6.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.30  DOWNSTREAM ELEVATION(FEET) = 1233.80
  STREET LENGTH(FEET) =   386.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   16.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   13.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.969
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

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  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.89      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.89      SUBAREA RUNOFF(CFS) =    6.95
  EFFECTIVE AREA(ACRES) =      5.22    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      12.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.95
  FLOW VELOCITY(FEET/SEC.) =  3.69   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.40 =    1011.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.40 TO NODE      6.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1233.80  DOWNSTREAM ELEVATION(FEET) = 1226.60
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.06
  STREET FLOW TRAVEL TIME(MIN.) =   2.14   Tc(MIN.) =   15.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.723
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.68      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.68      SUBAREA RUNOFF(CFS) =    5.85
  EFFECTIVE AREA(ACRES) =      7.90    AREA-AVERAGED Fm(INCH/HR) =  0.30
```

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  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        7.9        PEAK FLOW RATE(CFS) =      17.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.45
  FLOW VELOCITY(FEET/SEC.) =  4.01   DEPTH*VELOCITY(FT*FT/SEC.) =   2.19
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.50 =    1511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.50 TO NODE      6.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1226.60  DOWNSTREAM ELEVATION(FEET) = 1220.20
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.28
  STREET FLOW TRAVEL TIME(MIN.) =   2.12   Tc(MIN.) =   18.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.527
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.66      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.66      SUBAREA RUNOFF(CFS) =    5.34
  EFFECTIVE AREA(ACRES) =     10.56    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       10.6        PEAK FLOW RATE(CFS) =      21.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.59   HALFSTREET FLOOD WIDTH(FEET) =  23.87
  FLOW VELOCITY(FEET/SEC.) =  4.01   DEPTH*VELOCITY(FT*FT/SEC.) =   2.36
```

```
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.60 =    2014.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.60 TO NODE      6.70 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1220.20  DOWNSTREAM ELEVATION(FEET) = 1217.90
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.67
    HALFSTREET FLOOD WIDTH(FEET) =   28.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.90   Tc(MIN.) =   19.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.380
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.23      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.23      SUBAREA RUNOFF(CFS) =    4.18
  EFFECTIVE AREA(ACRES) =     12.79    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       12.8        PEAK FLOW RATE(CFS) =      23.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.67   HALFSTREET FLOOD WIDTH(FEET) =  29.00
  FLOW VELOCITY(FEET/SEC.) =  3.19   DEPTH*VELOCITY(FT*FT/SEC.) =   2.15
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.70 =    2374.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.70 TO NODE      6.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1217.90  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  40.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.99
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =   19.98
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.80 =    2386.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.80 TO NODE      6.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.98
  RAINFALL INTENSITY(INCH/HR) =   2.38
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =      12.79
  TOTAL STREAM AREA(ACRES) =      12.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.99

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
  ELEVATION DATA: UPSTREAM(FEET) =   1245.20  DOWNSTREAM(FEET) =   1240.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.001
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.69      0.42     0.700    76   10.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.05
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.05
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1240.40  DOWNSTREAM ELEVATION(FEET) = 1235.20
  STREET LENGTH(FEET) =   302.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =    9.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   11.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.269
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        0.72      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.93
  EFFECTIVE AREA(ACRES) =      1.41    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
  FLOW VELOCITY(FEET/SEC.) =  3.01   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =     612.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.30 TO NODE      7.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```

```
  UPSTREAM ELEVATION(FEET) = 1235.20  DOWNSTREAM ELEVATION(FEET) = 1228.10
  STREET LENGTH(FEET) =   504.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
  STREET FLOW TRAVEL TIME(MIN.) =   2.66   Tc(MIN.) =   14.43
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.36      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.36      SUBAREA RUNOFF(CFS) =    5.51
  EFFECTIVE AREA(ACRES) =      3.77    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =       8.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.45
  FLOW VELOCITY(FEET/SEC.) =  3.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.40 =    1116.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.40 TO NODE      7.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1228.10  DOWNSTREAM ELEVATION(FEET) = 1220.80
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
```

```
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.79
  STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =   16.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.649
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        2.68      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    2.68      SUBAREA RUNOFF(CFS) =    5.67
  EFFECTIVE AREA(ACRES) =      6.45    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      13.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.49
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.50 =    1616.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.50 TO NODE      7.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1220.80  DOWNSTREAM ELEVATION(FEET) = 1217.90
  STREET LENGTH(FEET) =   436.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =   19.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.435
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.24      0.42     0.700    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA AREA(ACRES) =    1.24      SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =      7.69    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =      14.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.55
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.60 =    2052.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.60 TO NODE      6.80 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1217.90  DOWNSTREAM(FEET) =  1210.30
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.80
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   19.24
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      6.80 =    2076.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.80 TO NODE      6.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   19.24
  RAINFALL INTENSITY(INCH/HR) =   2.43
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       7.69
  TOTAL STREAM AREA(ACRES) =       7.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.99   19.98    2.379  0.42( 0.30) 0.70      12.8       6.10
      2       14.80   19.24    2.433  0.42( 0.30) 0.70       7.7       7.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       38.50   19.24    2.433  0.42( 0.30) 0.70      20.0       7.10
      2       38.41   19.98    2.379  0.42( 0.30) 0.70      20.5       6.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.50    Tc(MIN.) =    19.24
  EFFECTIVE AREA(ACRES) =      20.01   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       20.5
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.80 =    2386.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1210.30  DOWNSTREAM(FEET) =  1210.00
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.50
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   19.36
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.90 =    2437.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       38.50   19.36    2.425  0.42( 0.30) 0.70      20.0       7.10
      2       38.41   20.09    2.371  0.42( 0.30) 0.70      20.5       6.10
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      1.90 =    2437.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       62.00   15.10    2.815  0.42( 0.29) 0.68      25.7       2.10
      2       61.90   15.76    2.743  0.42( 0.29) 0.69      26.5       3.10
      3       61.42   16.34    2.685  0.42( 0.29) 0.69      27.0       4.10
      4       61.39   16.35    2.683  0.42( 0.29) 0.69      27.0       5.10
      5       59.56   17.21    2.602  0.42( 0.29) 0.69      27.2       1.10
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    2568.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       97.54   15.10    2.815  0.42( 0.29) 0.69      41.3       2.10
      2       97.94   15.76    2.743  0.42( 0.29) 0.69      42.8       3.10
      3       97.88   16.34    2.685  0.42( 0.29) 0.69      43.9       4.10
      4       97.87   16.35    2.683  0.42( 0.29) 0.69      43.9       5.10
      5       96.64   17.21    2.602  0.42( 0.29) 0.69      45.0       1.10
      6       93.49   19.36    2.425  0.42( 0.29) 0.69      47.2       7.10
      7       92.02   20.09    2.371  0.42( 0.29) 0.69      47.7       6.10
    TOTAL AREA(ACRES) =        47.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       97.94  Tc(MIN.) =   15.762
  EFFECTIVE AREA(ACRES) =     42.78  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       47.7
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    2568.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1210.00  DOWNSTREAM(FEET) =  1208.70
  FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.94
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   16.20
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.10 =    2813.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.698
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         B        1.96      0.42     0.700    76
  COMMERCIAL                 B        0.22      0.42     0.100    76
  NATURAL POOR COVER
  "BARREN"                   B        0.30      0.11     1.000    97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.37
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.683
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    5.46
  EFFECTIVE AREA(ACRES) =     45.26   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       50.2       PEAK FLOW RATE(CFS) =      98.09

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       97.65   15.54    2.766  0.42( 0.29) 0.69      43.8       2.10
      2       98.09   16.20    2.698  0.42( 0.29) 0.69      45.3       3.10
      3       98.12   16.78    2.642  0.42( 0.29) 0.69      46.4       4.10
      4       98.10   16.80    2.640  0.42( 0.29) 0.69      46.4       5.10
      5       97.10   17.65    2.563  0.42( 0.29) 0.69      47.5       1.10
      6       93.99   19.80    2.392  0.42( 0.29) 0.69      49.7       7.10
      7       92.54   20.53    2.341  0.42( 0.29) 0.69      50.2       6.10
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      98.12  Tc(MIN.) =   16.78
  AREA-AVERAGED Fm(INCH/HR) =  0.29  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.69  EFFECTIVE AREA(ACRES) =      46.35

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1208.70  DOWNSTREAM(FEET) =  1206.50
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.19
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.12
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   16.86
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.11 =    2894.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1206.50  DOWNSTREAM(FEET) =   1205.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =      98.12
  FLOW VELOCITY(FEET/SEC.) =   3.74   FLOW DEPTH(FEET) =   0.50
  TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =   17.30
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.12 =    2994.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.30
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.42
  AREA-AVERAGED Ap =  0.69
  EFFECTIVE STREAM AREA(ACRES) =      46.35
  TOTAL STREAM AREA(ACRES) =      50.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      98.12

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

```
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =   1219.10  DOWNSTREAM(FEET) =   1215.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.892
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.424
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        0.81      0.42     0.800    76   10.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1215.30  DOWNSTREAM ELEVATION(FEET) = 1215.00
  STREET LENGTH(FEET) =   130.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   12.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        1.52      0.42     0.800    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    1.52      SUBAREA RUNOFF(CFS) =    3.87
  EFFECTIVE AREA(ACRES) =      2.33    AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.20
  FLOW VELOCITY(FEET/SEC.) =  1.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.40 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1215.00  DOWNSTREAM(FEET) =  1206.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.93
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   12.51
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.40 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      1.12 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1206.50  DOWNSTREAM(FEET) =   1205.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.958
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B        1.05      0.18     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.24
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.20
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   1.39
  Tc(MIN.) =   13.90
  SUBAREA AREA(ACRES) =     1.05       SUBAREA RUNOFF(CFS) =    2.63
  EFFECTIVE AREA(ACRES) =      3.38     AREA-AVERAGED Fm(INCH/HR) =   0.29
  AREA-AVERAGED Fp(INCH/HR) =   0.34  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       8.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      1.12 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.90
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.34
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =       3.38
  TOTAL STREAM AREA(ACRES) =       3.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.12

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       97.65   16.07    2.712  0.42( 0.29) 0.69      43.8       2.10
      1       98.09   16.73    2.647  0.42( 0.29) 0.69      45.3       3.10
      1       98.12   17.30    2.594  0.42( 0.29) 0.69      46.4       4.10
      1       98.10   17.32    2.592  0.42( 0.29) 0.69      46.4       5.10
      1       97.10   18.18    2.518  0.42( 0.29) 0.69      47.5       1.10
      1       93.99   20.34    2.354  0.42( 0.29) 0.69      49.7       7.10
      1       92.54   21.09    2.304  0.42( 0.29) 0.69      50.2       6.10
      2        8.12   13.90    2.958  0.34( 0.29) 0.86       3.4       8.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      101.17   13.90    2.958  0.41( 0.29) 0.70      41.3       8.10
      2      105.01   16.07    2.712  0.41( 0.29) 0.70      47.2       2.10
      3      105.26   16.73    2.647  0.41( 0.29) 0.70      48.6       3.10
```

```
     4      105.13   17.30    2.594  0.41( 0.29) 0.70      49.7       4.10
     5      105.11   17.32    2.592  0.41( 0.29) 0.70      49.8       5.10
     6      103.88   18.18    2.518  0.41( 0.29) 0.70      50.9       1.10
     7      100.27   20.34    2.354  0.41( 0.29) 0.70      53.1       7.10
     8       98.67   21.09    2.304  0.41( 0.29) 0.70      53.5       6.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     105.26    Tc(MIN.) =    16.73
  EFFECTIVE AREA(ACRES) =      48.64   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.41  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =       53.5
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.12 =    2994.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.10 TO NODE      9.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1251.70  DOWNSTREAM(FEET) =   1247.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.095
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.428
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.36      0.42     0.100    76    7.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.42
  TOTAL AREA(ACRES) =      0.36   PEAK FLOW RATE(CFS) =      1.42

****************************************************************************
  FLOW PROCESS FROM NODE      9.20 TO NODE      9.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1247.80  DOWNSTREAM ELEVATION(FEET) = 1239.90
  STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =    9.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   5.03   Tc(MIN.) =   12.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.211
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.72      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.05
  EFFECTIVE AREA(ACRES) =      1.08    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.30 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.30 TO NODE      9.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1239.90  DOWNSTREAM ELEVATION(FEET) = 1223.00
  STREET LENGTH(FEET) =   850.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.03
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   4.98   Tc(MIN.) =   17.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.12      0.42     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    2.59
  EFFECTIVE AREA(ACRES) =      2.20    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.72
  FLOW VELOCITY(FEET/SEC.) =  2.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.40 =    1850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.40 TO NODE      9.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1223.00  DOWNSTREAM(FEET) =  1195.70
  FLOW LENGTH(FEET) =  1540.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.09
  PIPE TRAVEL TIME(MIN.) =   3.59    Tc(MIN.) =   20.69
  LONGEST FLOWPATH FROM NODE      9.10 TO NODE      9.50 =    3390.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.2  TC(MIN.) =     20.69
  EFFECTIVE AREA(ACRES) =      2.20  AREA-AVERAGED Fm(INCH/HR)=  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       5.09
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

↑

APPENDIX D – SUPPORTING HYDROLOGY CALCULATIONS & MAPS

ISOHYETAL MAP INTENSITY CALCULATIONS

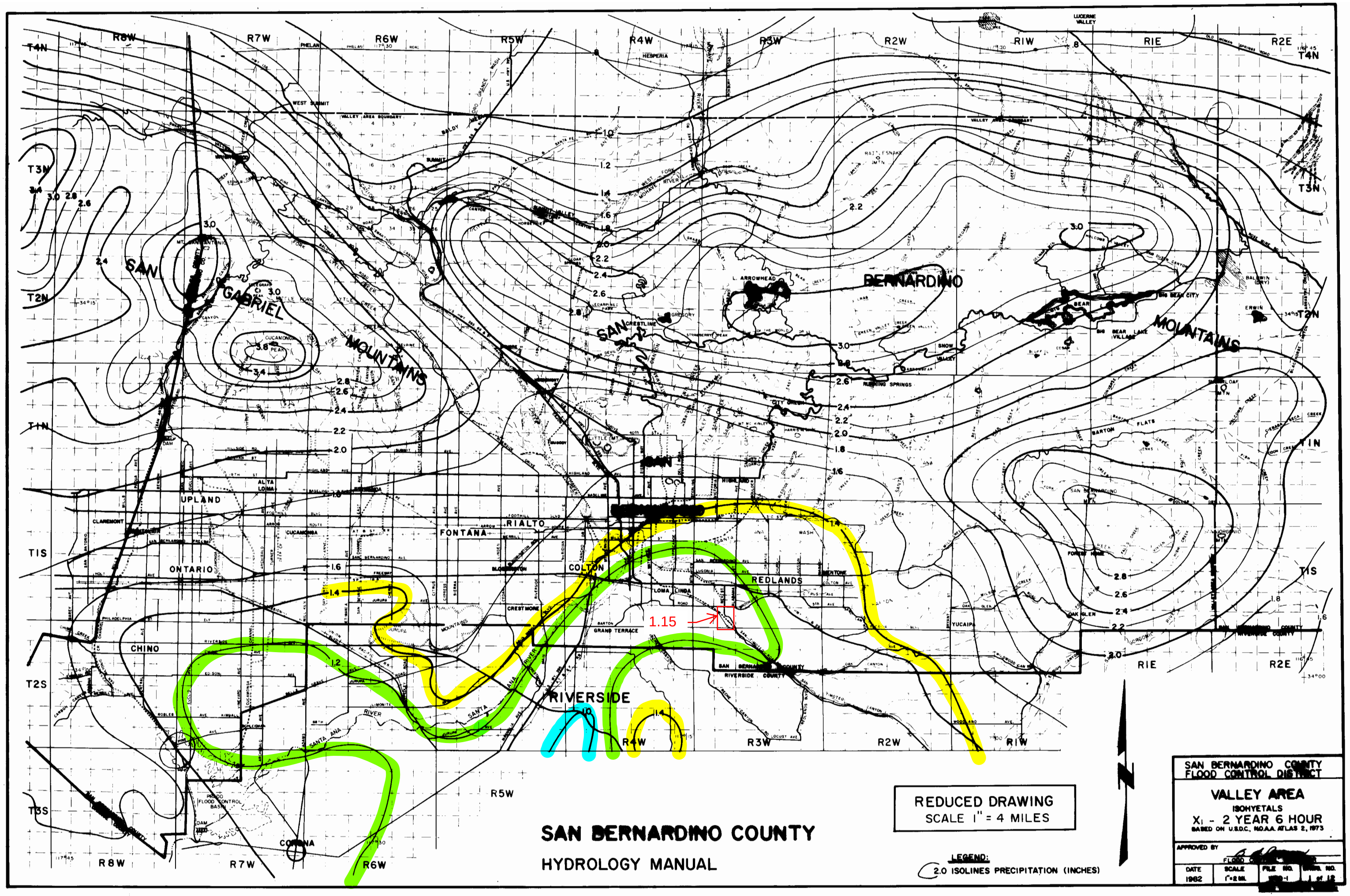

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
2.0 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
X1 - 2 YEAR 6 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
DATE 1982
SCALE 1"=2 MI.
FILE NO.
DWG. NO.
1 of 12
1.15
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
UPLAND
ONTARIO
CHINO
FONTANA
RIALTO
COLTON
REDLANDS
RIVERSIDE
CORONA
LOMA LINDA
GRAND TERRACE
CRESTMORE
YUCAIPA
OAK GLEN
RUNNING SPRINGS
BIG BEAR CITY
BIG BEAR LAKE VILLAGE
L. ARROWHEAD
HESPERIA
LUCERNE VALLEY
CUCAMONGA PEAK
MT. SAN ANTONIO
SAN BERNARDINO MTN.
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E

FIGURE B-1

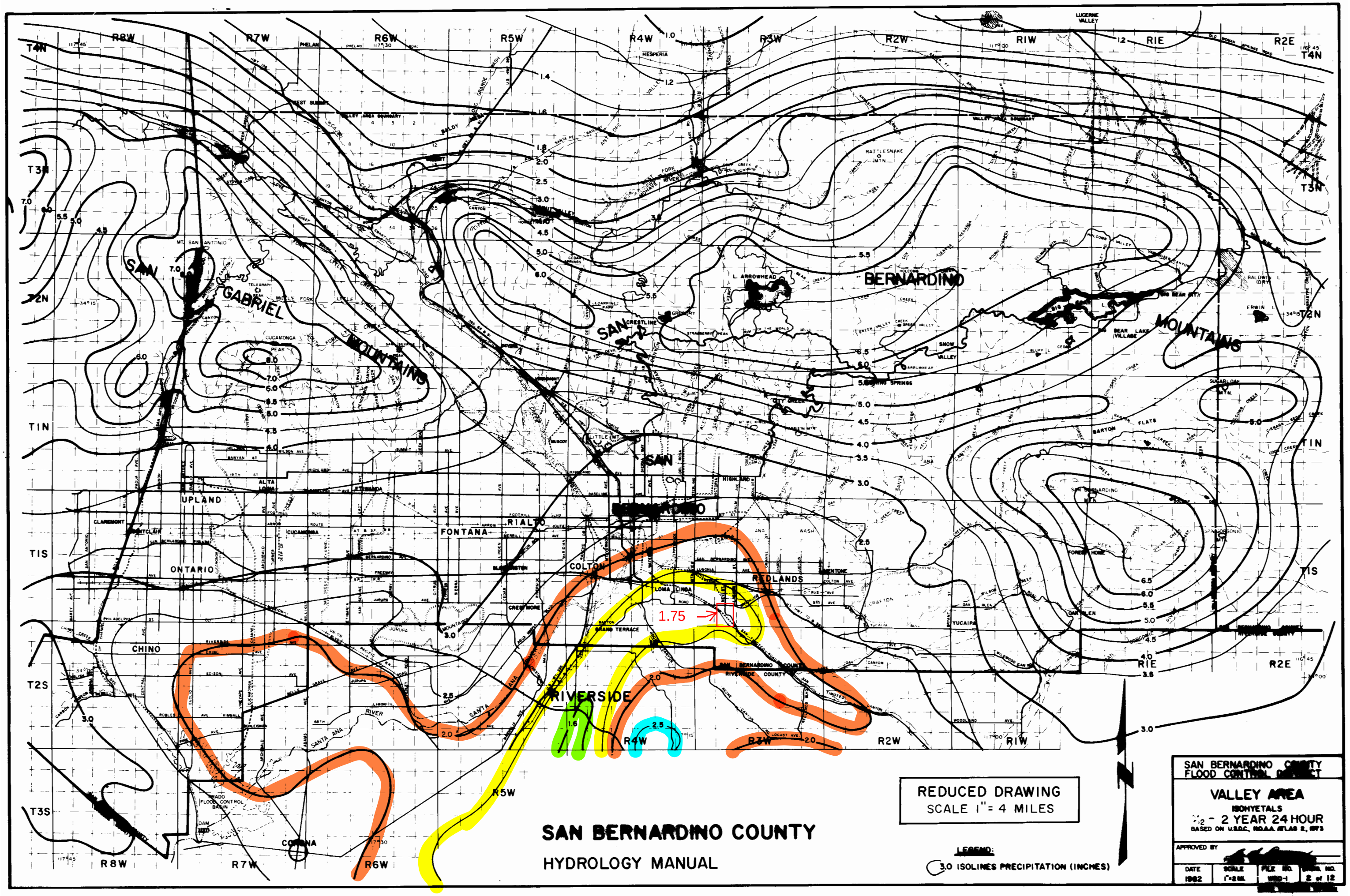

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
3.0 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
1/2 - 2 YEAR 24 HOUR
BASED ON U.S.D.C., NOAA ATLAS 2, 1973
APPROVED BY
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
DWG. NO. 2 of 12
1.75
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
UPLAND
ONTARIO
CHINO
FONTANA
RIALTO
COLTON
REDLANDS
RIVERSIDE
CORONA
SAN BERNARDINO
HESPERIA
BIG BEAR CITY
BIG BEAR LAKE
LAKE ARROWHEAD
SNOW VALLEY
LUCERNE VALLEY
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E

FIGURE B-2

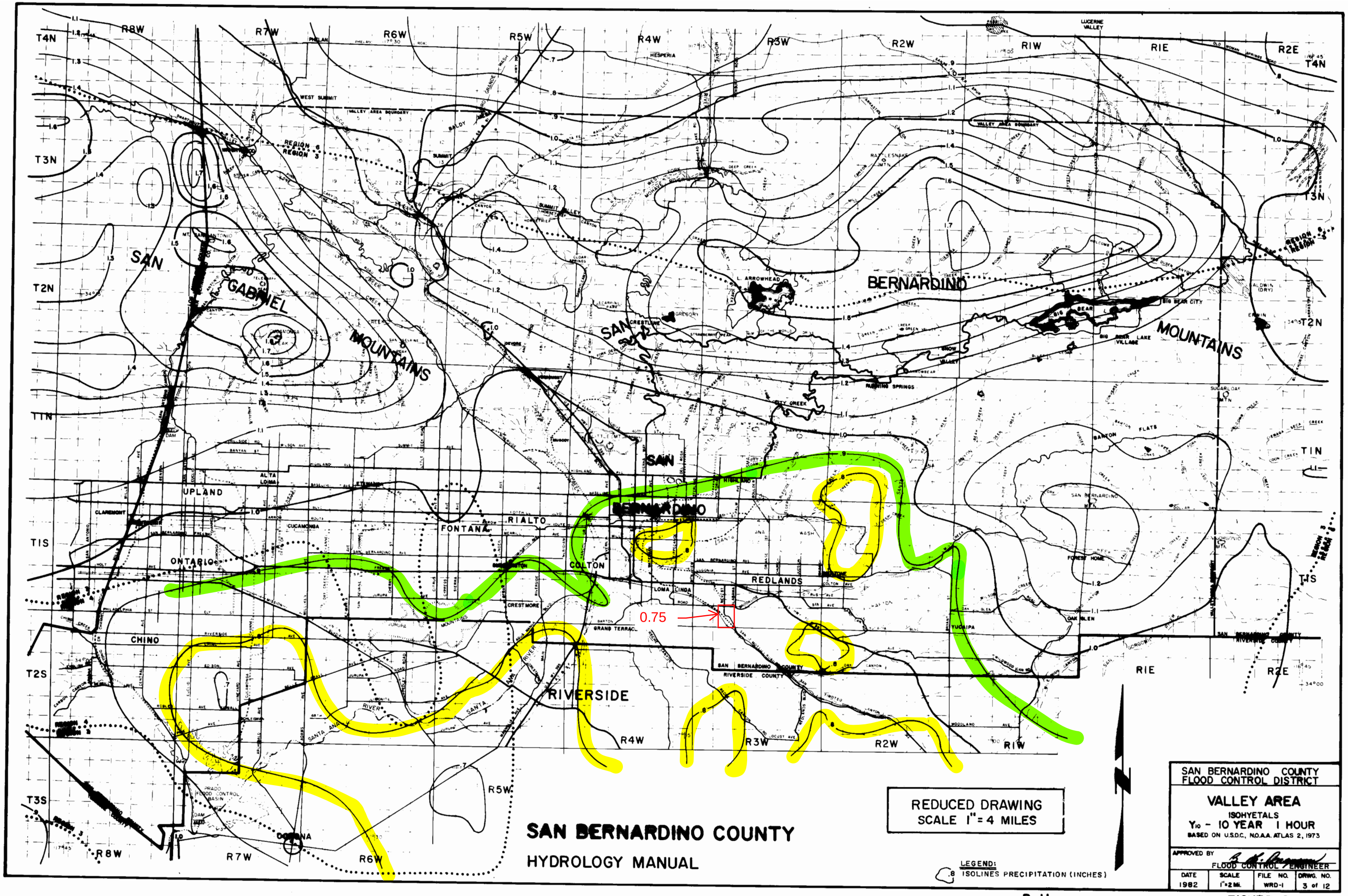

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
.8 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
Y10 - 10 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
FLOOD CONTROL ENGINEER
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
DRWG. NO. 3 of 12
0.75
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
UPLAND
ONTARIO
CHINO
FONTANA
RIALTO
COLTON
REDLANDS
RIVERSIDE
CORONA
HESPERIA
LUCERNE VALLEY
L. ARROWHEAD
BIG BEAR
BIG BEAR CITY
BIG BEAR LAKE VILLAGE
SNOW VALLEY
PLUNGING SPRINGS
YUCAIPA
OAK GLEN
FOREST HOME
SAN BERNARDINO MTN.
SUGARLOAF MTN.
RATTLESNAKE MTN.
CREST MORE
GRAND TERRACE
LOMA LINDA
CLAREMONT
CUCAMONGA
ALTA LOMA
MT. SAN ANTONIO
PRADO FLOOD CONTROL BASIN
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E

FIGURE B-3

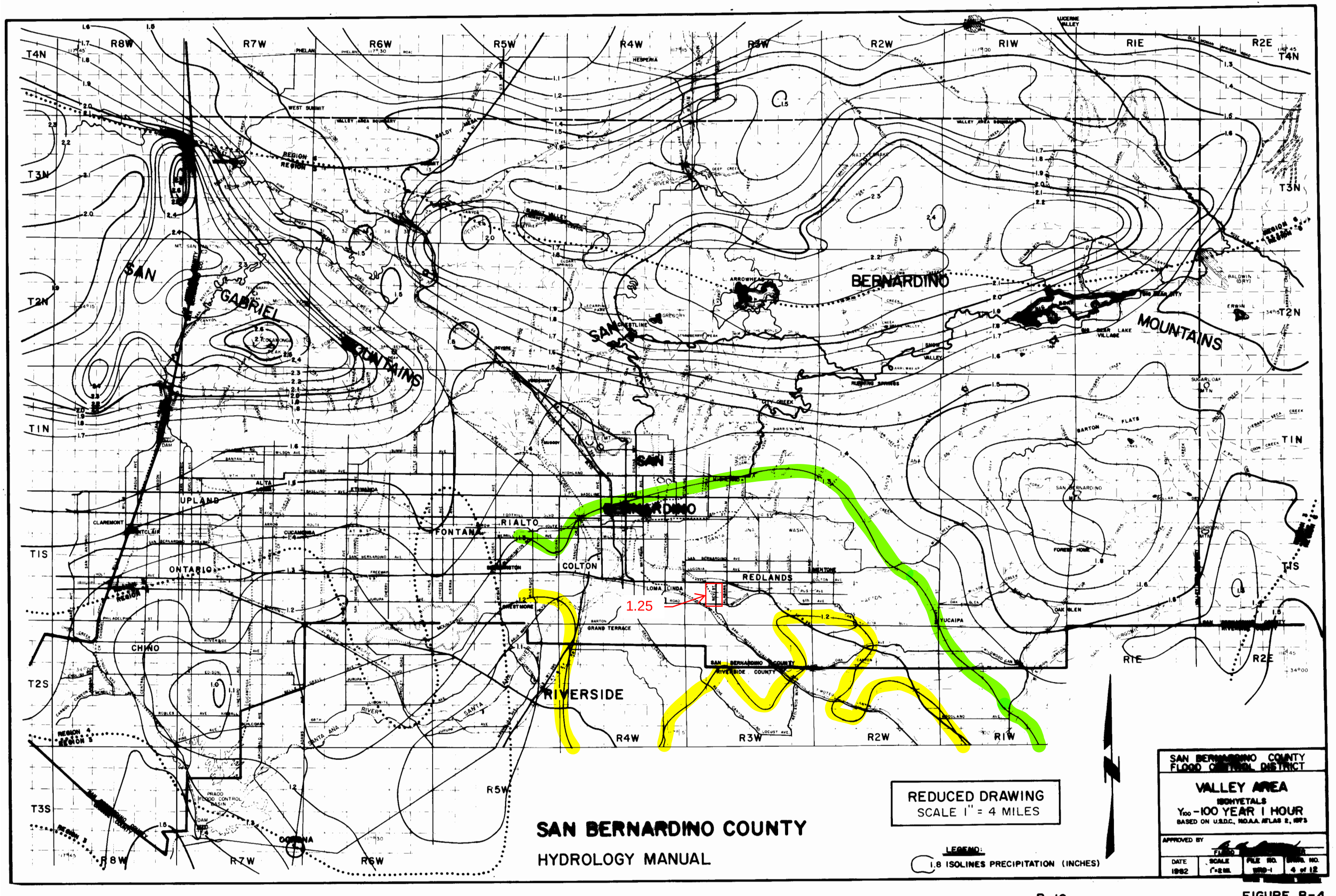

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
1.8 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
Y100 -100 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
DATE 1982
SCALE 1"=2MI.
FILE NO. WRD-1
SHEET NO. 4 of 12
1.25
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO
RIVERSIDE
REDLANDS
RIALTO
FONTANA
COLTON
ONTARIO
CHINO
UPLAND
CLAREMONT
YUCAIPA
HESPERIA
LOMA LINDA
GRAND TERRACE
OAK GLEN
FOREST HOME
BARTON FLATS
SUGARLOAF MTN
SAN BERNARDINO MTN
ARROWHEAD
BIG BEAR LAKE
BIG BEAR CITY
SNOW VALLEY
FLAMING SPRINGS
CITY CREEK
CRESTLINE
GREGORY
WEST SUMMIT
SUMMIT VALLEY
LUCERNE VALLEY
BALDWIN (DRY) L.
ERWIN L.
CORONA
PRADO FLOOD CONTROL BASIN
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
REGION 6
REGION 5
REGION 4
REGION 3
REGION 2
REGION 1
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
T4N
T3N
T2N
T1N
T1S
T2S
T3S

FIGURE B-4

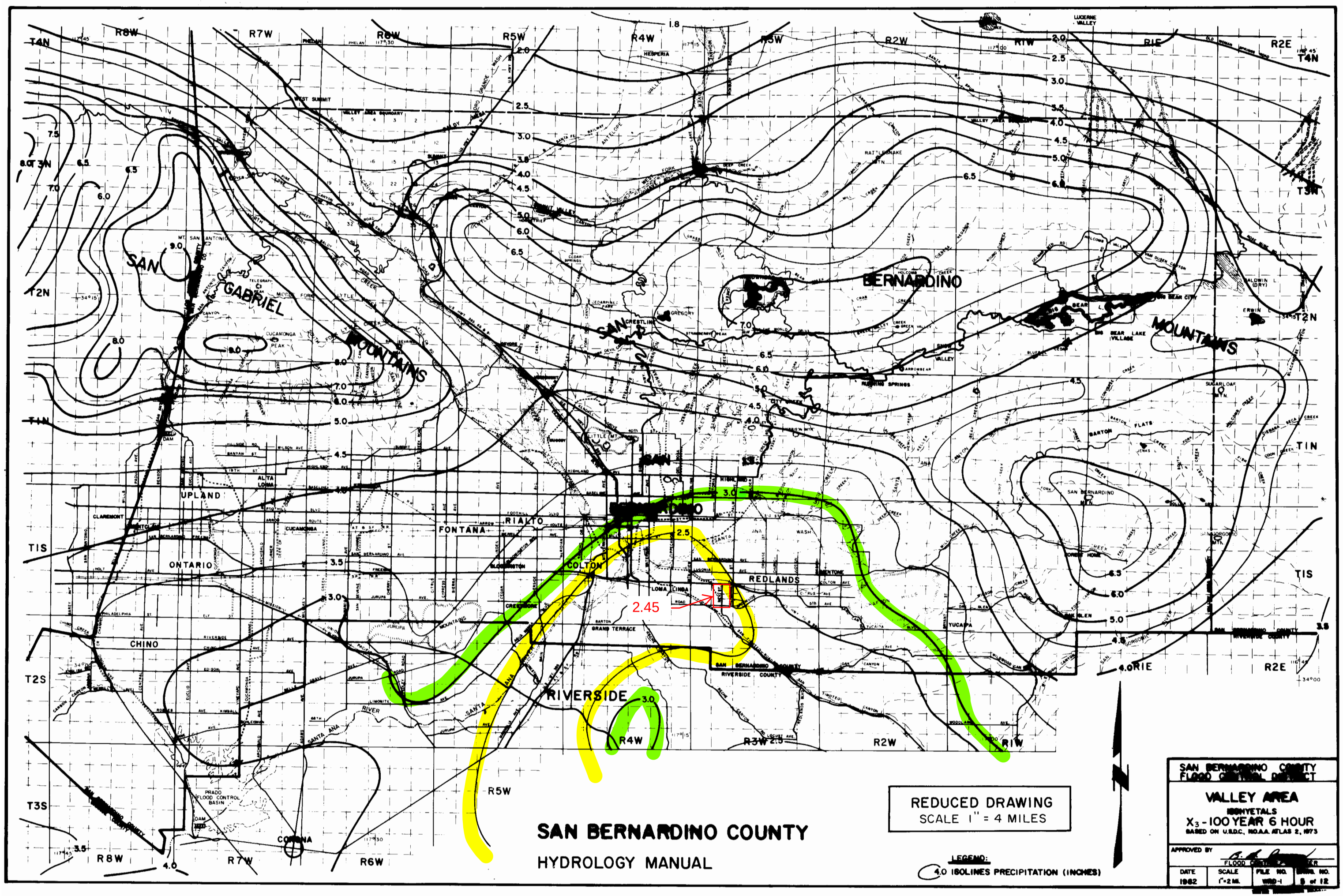

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
4.0 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
X3 - 100 YEAR 6 HOUR
BASED ON U.S.D.C., NO.A.A. ATLAS 2, 1973
APPROVED BY
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
SHEET NO. 8 of 12
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO
RIALTO
FONTANA
UPLAND
ONTARIO
CHINO
COLTON
REDLANDS
RIVERSIDE
CORONA
CLAREMONT
CUCAMONGA
ALTA LOMA
GRAND TERRACE
LOMA LINDA
YUCAIPA
BEAR LAKE VILLAGE
BIG BEAR CITY
PRADO FLOOD CONTROL BASIN
2.45
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
T4N
T3N
T2N
T1N
T1S
T2S
T3S

FIGURE B-5

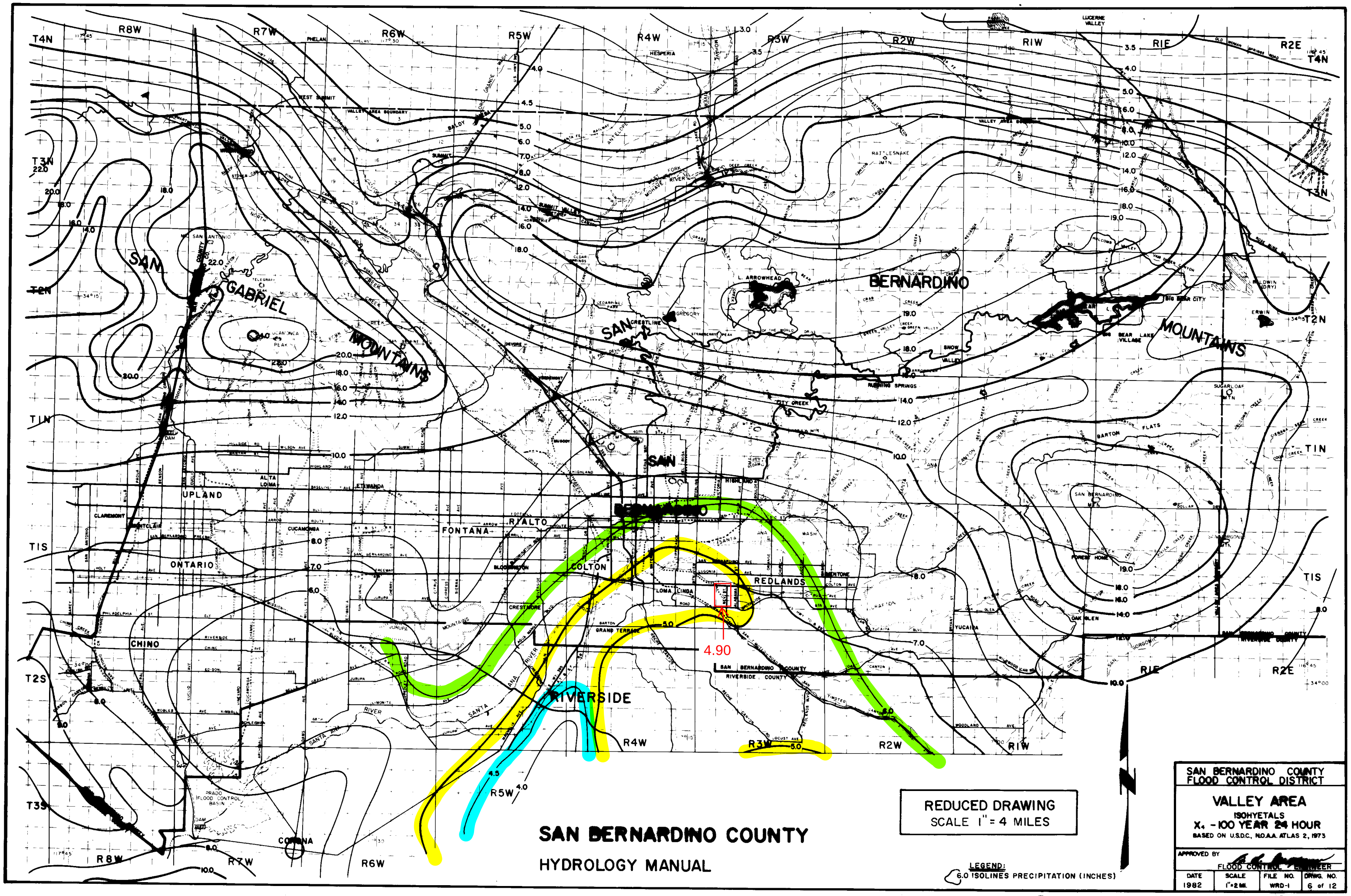
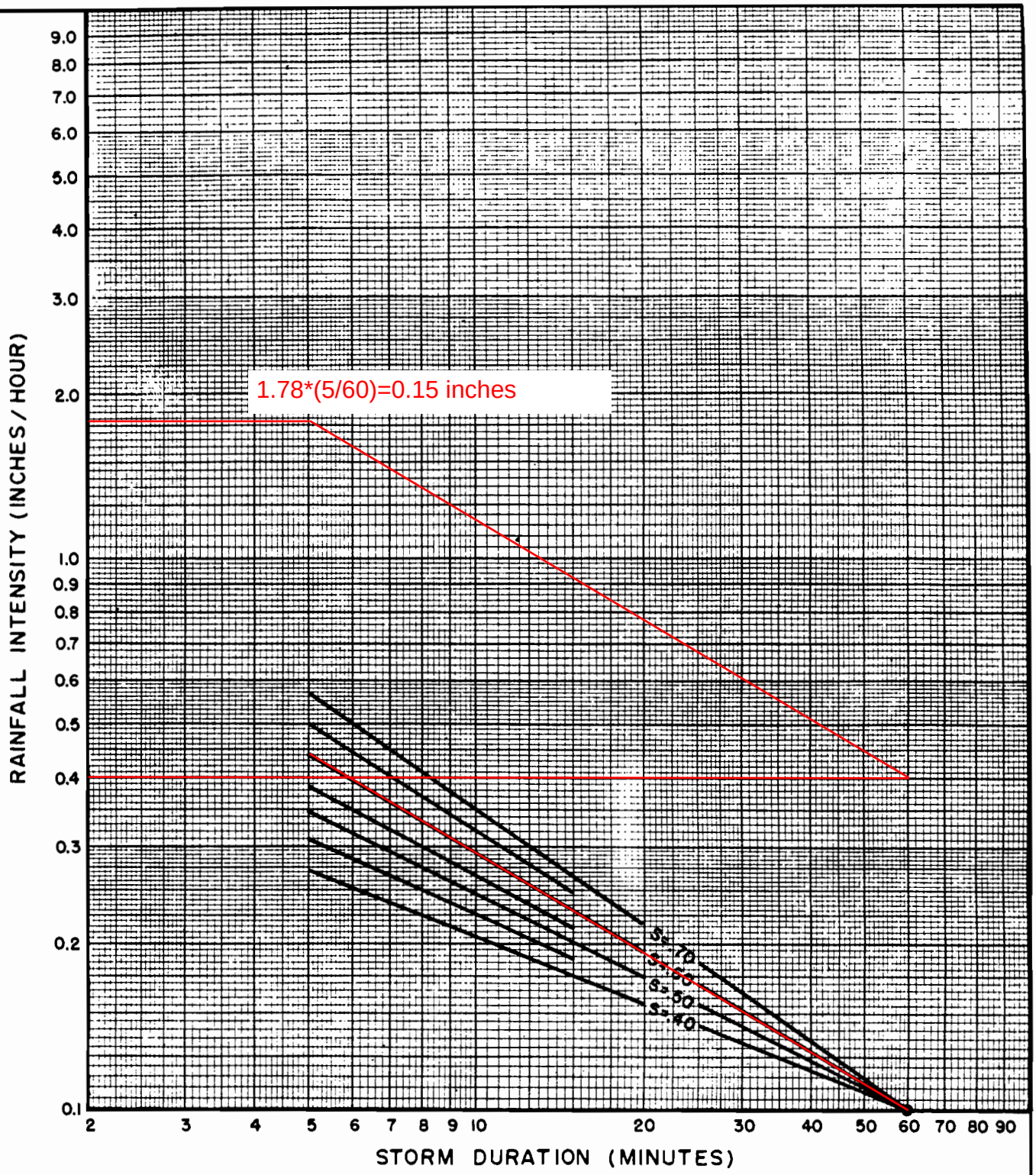

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
6.0 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
X4 - 100 YEAR 24 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
FLOOD CONTROL ENGINEER
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
DRWG. NO. 6 of 12
4.90
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO
RIVERSIDE
UPLAND
ONTARIO
CHINO
FONTANA
RIALTO
COLTON
REDLANDS
LOMA LINDA
CRESTLINE
L. ARROWHEAD
BIG BEAR CITY
BIG BEAR LAKE VILLAGE
SNOW VALLEY
RUNNING SPRINGS
CITY CREEK
SUGARLOAF MTN
BARTON FLATS
SAN BERNARDINO MTN
FOREST HOME
YUCAIPA
OAK GLEN
GRAND TERRACE
CRESTMORE
CUCAMONGA
ALTA LOMA
ETIWANDA
CLAREMONT
MONTCLAIR
PRADO FLOOD CONTROL BASIN
CORONA
HESPERIA
LUCERNE VALLEY
RATTLESNAKE MTN
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E

FIGURE B-6



DESIGN STORM FREQUENCY = 2 YEARS

ONE HOUR POINT RAINFALL = 0.40 INCHES

LOG-LOG SLOPE = 0.6

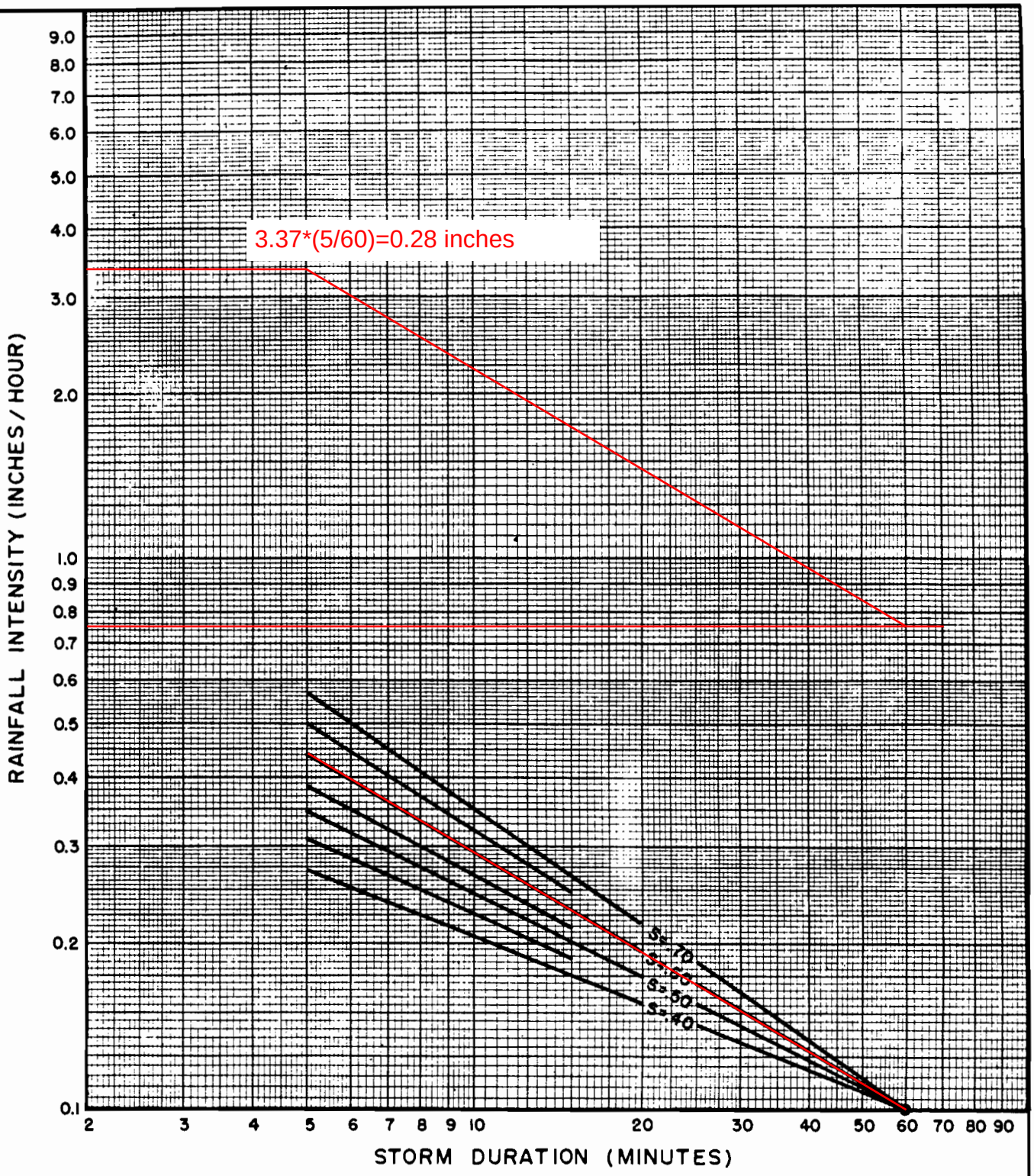
PROJECT LOCATION = Canyon Ranch

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

INTENSITY - DURATION CURVES CALCULATION SHEET

FIGURE D-3



DESIGN STORM FREQUENCY = 10 YEARS

ONE HOUR POINT RAINFALL = 0.75 INCHES

LOG-LOG SLOPE = 0.6

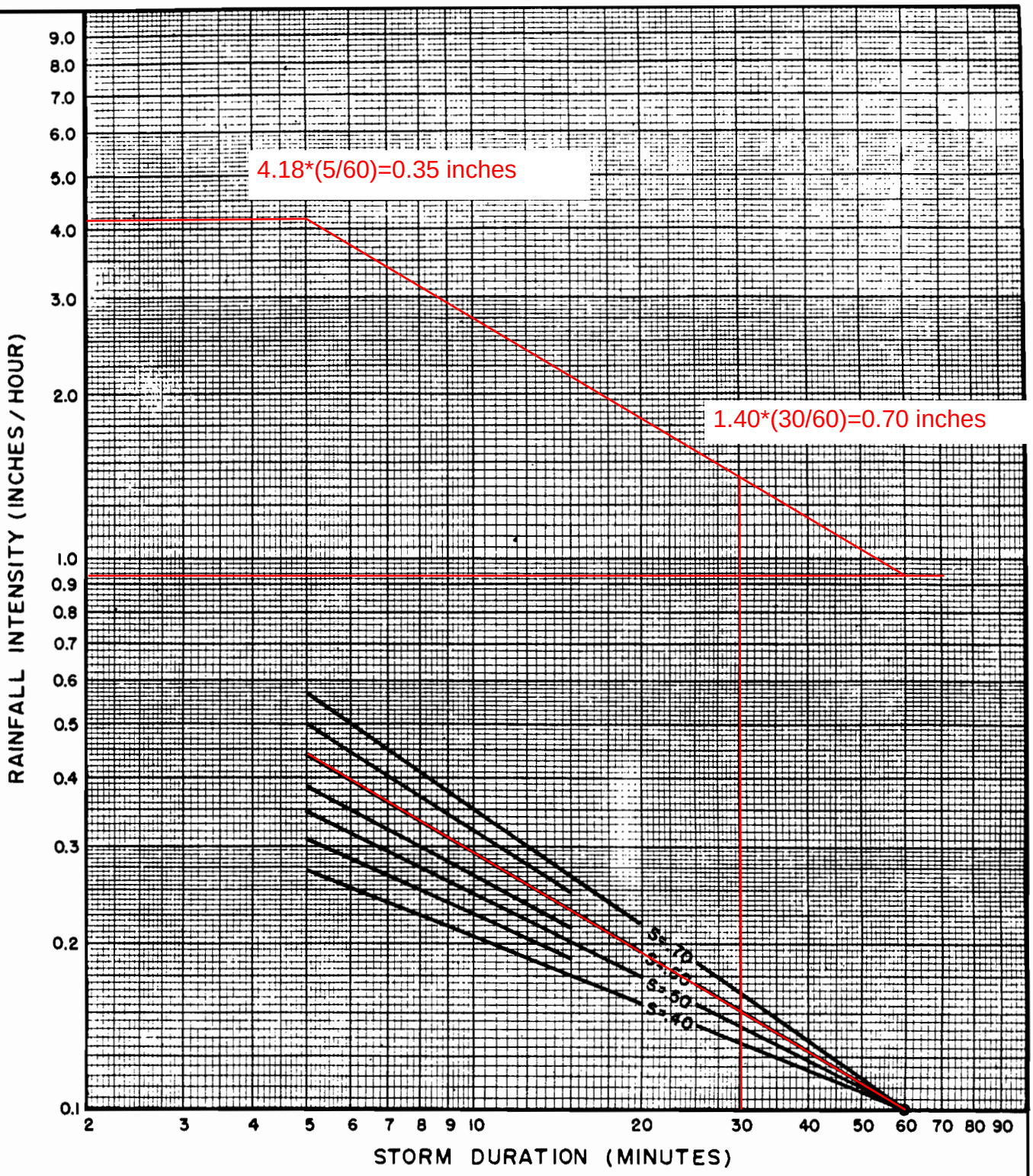
PROJECT LOCATION = Canyon Ranch

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

INTENSITY - DURATION CURVES CALCULATION SHEET

FIGURE D-3



DESIGN STORM FREQUENCY = 25 YEARS

ONE HOUR POINT RAINFALL = 0.93 INCHES

LOG-LOG SLOPE = 0.6

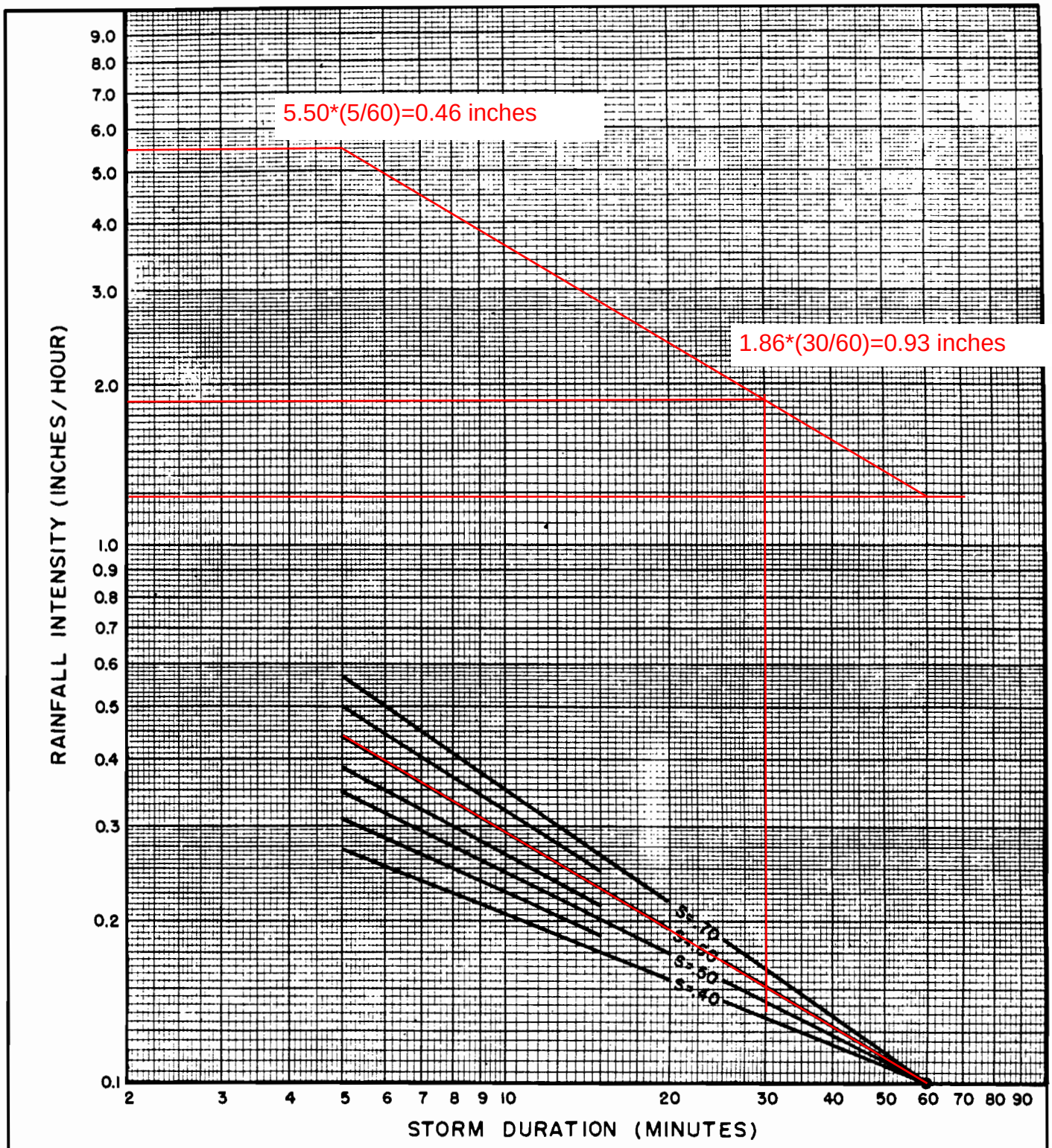
PROJECT LOCATION = Canyon Ranch

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

INTENSITY - DURATION CURVES CALCULATION SHEET

FIGURE D-3



DESIGN STORM FREQUENCY = 100 YEARS

ONE HOUR POINT RAINFALL = 1.23 INCHES

LOG-LOG SLOPE = 0.6

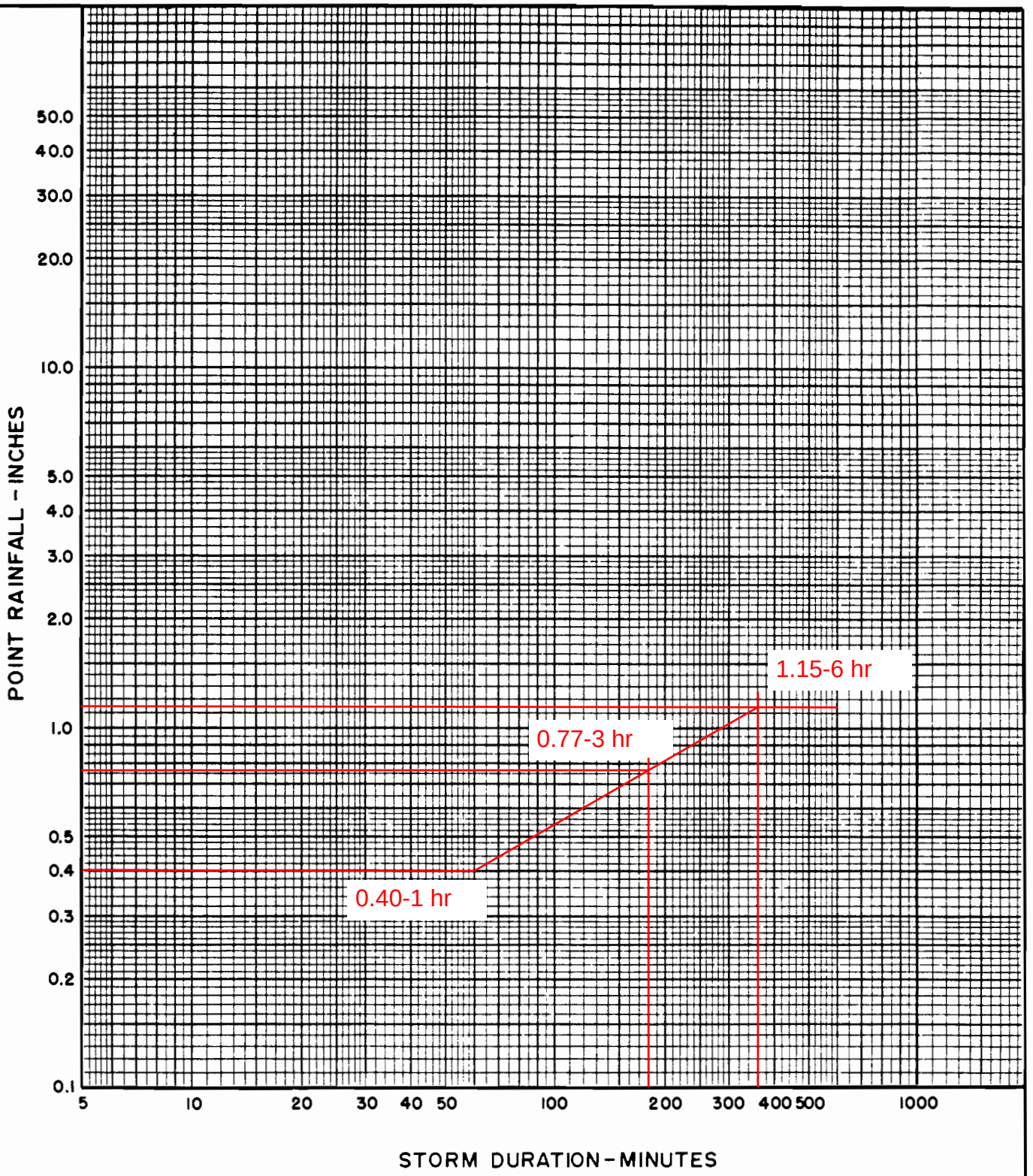
PROJECT LOCATION = Canyon Ranch

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

INTENSITY - DURATION CURVES CALCULATION SHEET

FIGURE D-3



PROJECT LOCATION Canyon Ranch

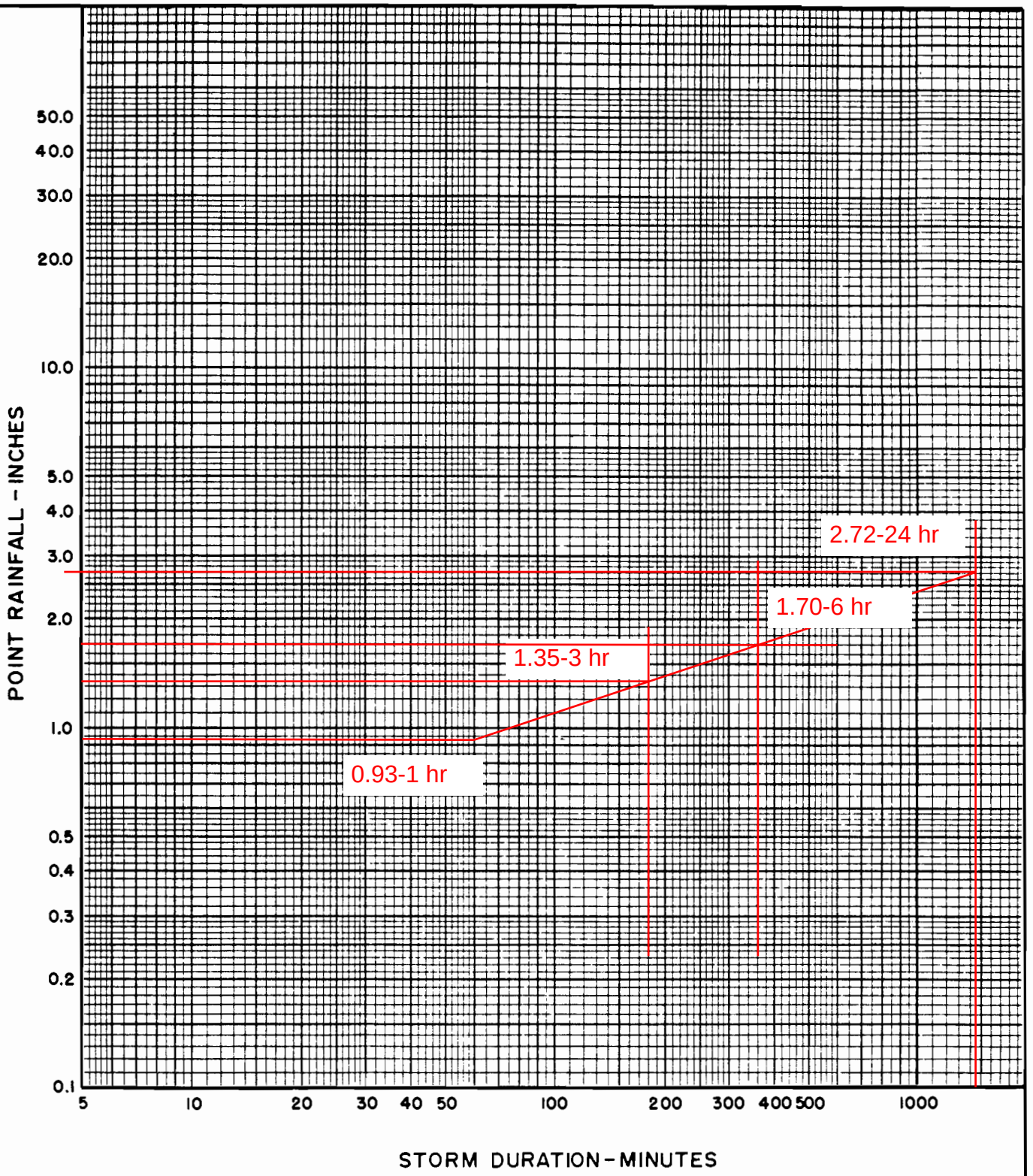
NOTES 2 year storm

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

AREA - AVERAGED MASS RAINFALL PLOTTING SHEET

FIGURE E-8



PROJECT LOCATION Canyon Ranch

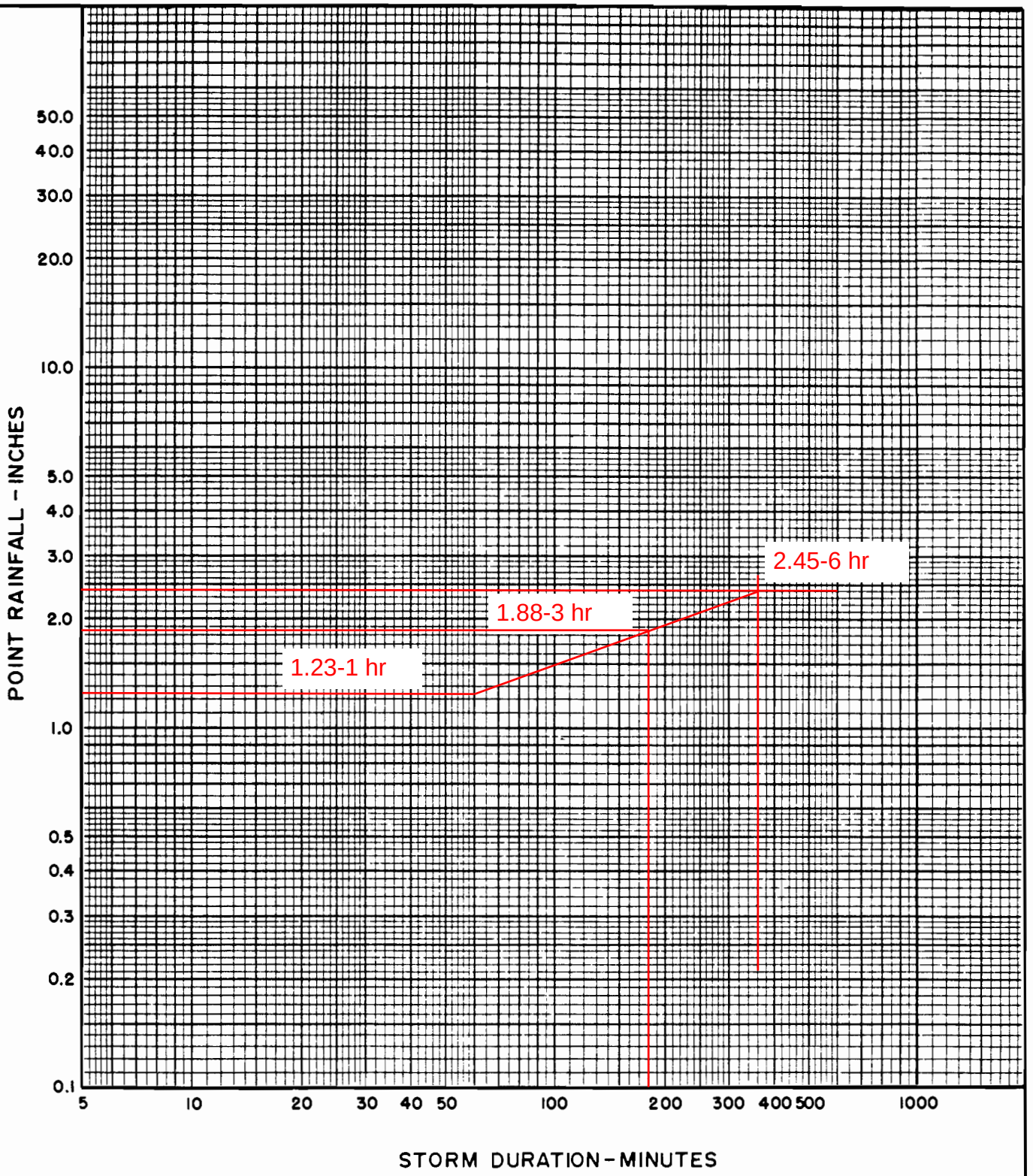
NOTES 25 year storm

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

AREA - AVERAGED MASS RAINFALL PLOTTING SHEET

FIGURE E-8



PROJECT LOCATION Canyon Ranch

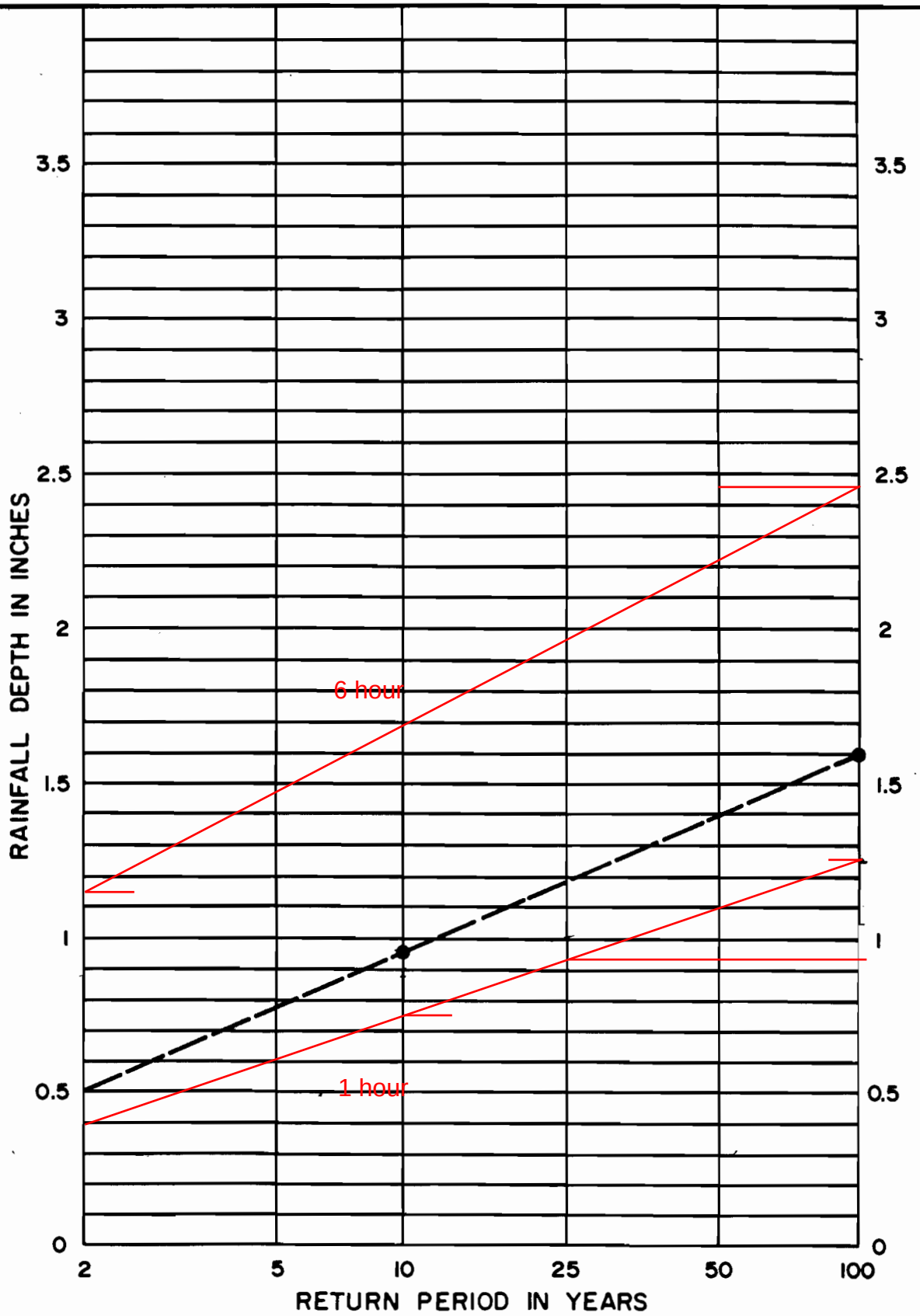
NOTES 100 year storm

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

AREA - AVERAGED MASS RAINFALL PLOTTING SHEET

FIGURE E-8



NOTE:

1. FOR INTERMEDIATE RETURN PERIODS PLOT 10-YEAR AND 100-YEAR ONE HOUR VALUES FROM MAPS, THEN CONNECT POINTS AND READ VALUE FOR DESIRED RETURN PERIOD. FOR EXAMPLE GIVEN 10-YEAR ONE HOUR = 0.95" AND 100-YEAR ONE HOUR = 1.60", 25-YEAR ONE HOUR = 1.18".

REFERENCE: NOAA ATLAS 2, VOLUME XI - CAL., 1973

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

FIGURE D-2

TABLE C.1. CURVE NUMBER RELATIONSHIPS

AMC II:
Poor Grass "B" - 78

AMC III:
Poor Grass "B" - 93

CN for AMC Condition II	Corresponding CN for AMC Condition I	III
100	100	100
95	87	99
90	78	98
85	70	97
80	63	94
75	57	91
70	51	87
65	45	83
60	40	79
55	35	75
50	31	70
45	27	65
40	23	60
35	19	55
30	15	50
25	12	45
20	9	39
15	7	33
10	4	26
5	2	17
0	0	0

C.6. ESTIMATION OF LOSS RATES

In estimating loss rates for design hydrology, a watershed curve number (CN) is determined for each soil-cover complex within the watershed using Figure C-3. The working range of CN values is between 0 and 98, where a low CN indicates low runoff potential (high infiltration), and a high CN indicates high runoff potential (low infiltration). Selection of a CN takes into account the major factors affecting loss rates on pervious surfaces including the hydrologic soil group, cover type and quality, and antecedent moisture condition (AMC).

Also included in the CN selection are the effects of "initial abstraction" (Ia) which represents the combined effects of other effective rainfall losses including depression storage, vegetation interception, evaporation, and transpiration, among other factors.

EXISTING 25-YR AREA-AVERAGED LOSS RATE CALCULATIONS (TRACTS 20402, 20403, 20404)

```
_____________________________________________________________________________
*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                           Analysis prepared by:

            TRACT 20402 - 25 YEAR EXISTING CALCULATIONS



*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:



=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.72 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1          0.71      100.00           78.       0.416       0.343
         2          0.49      100.00           78.       0.416       0.343
         3          3.70      100.00           78.       0.416       0.343
         4          2.67      100.00           78.       0.416       0.343
         5          6.06      100.00           78.       0.416       0.343
         6          0.39      100.00           78.       0.416       0.343
         7         11.07      100.00           78.       0.416       0.343

    TOTAL AREA (Acres) =     25.09

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.416

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.657
=============================================================================
```

```
_____________________________________________________________________________
*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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                          Analysis prepared by:

            TRACT 20403 - 25 YEAR EXISTING CALCULATIONS



*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:



=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.72 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1          0.89      100.00           78.       0.416       0.343
         2          2.48      100.00           78.       0.416       0.343
         3          3.44      100.00           78.       0.416       0.343
         4          4.40      100.00           78.       0.416       0.343

    TOTAL AREA (Acres) =     11.21

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.416

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.657
=============================================================================
```

```
****************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
============================================================================
        (C) Copyright 1989-2015 Advanced Engineering Software (aes)
            Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:
```

TRACT 20404 - 25 YEAR EXISTING CALCULATIONS

```
****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:


============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.72 (inches)
```

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	2.12	100.00	78.	0.416	0.343
2	4.10	100.00	78.	0.416	0.343
3	1.77	100.00	78.	0.416	0.343
4	2.54	100.00	78.	0.416	0.343
5	3.65	100.00	78.	0.416	0.343
6	1.45	100.00	78.	0.416	0.343
7	5.36	100.00	78.	0.416	0.343
8	7.34	100.00	78.	0.416	0.343
9	7.43	100.00	78.	0.416	0.343
10	1.52	100.00	78.	0.416	0.343
11	3.72	100.00	78.	0.416	0.343
12	4.53	100.00	78.	0.416	0.343
13	4.76	100.00	78.	0.416	0.343
14	5.42	100.00	78.	0.416	0.343

TOTAL AREA (Acres) = 55.71

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.416

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.657

==========

EXISTING 100-YR AREA-AVERAGED LOSS RATE CALCULATIONS (TRACTS 20402, 20403, 20404)

```
_____________________________________________________________________________
*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:
```

TRACT 20402 - 100 YEAR EXISTING CALCULATIONS

```
*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:



=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.90 (inches)
```

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	0.71	100.00	78.(AMC II)	0.180	0.837
2	0.49	100.00	78.(AMC II)	0.180	0.837
3	3.70	100.00	78.(AMC II)	0.180	0.837
4	2.67	100.00	78.(AMC II)	0.180	0.837
5	6.06	100.00	78.(AMC II)	0.180	0.837
6	0.39	100.00	78.(AMC II)	0.180	0.837
7	11.07	100.00	78.(AMC II)	0.180	0.837

```
    TOTAL AREA (Acres) =     25.09
```

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.180

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.163

```
=============================================================================
```

```
_____________________________________________________________________________
*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
         (C) Copyright 1989-2015 Advanced Engineering Software (aes)
             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:
```

TRACT 20403 - 100 YEAR EXISTING CALCULATIONS

```
*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:



=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.90 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1          0.89      100.00       78.(AMC II)     0.180       0.837
         2          2.48      100.00       78.(AMC II)     0.180       0.837
         3          3.44      100.00       78.(AMC II)     0.180       0.837
         4          4.40      100.00       78.(AMC II)     0.180       0.837

    TOTAL AREA (Acres) =     11.21

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.180

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.163
=============================================================================
```

```
_____________________________________________________________________________
*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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             Ver. 22.0  Release Date: 07/01/2015  License ID 1673

                          Analysis prepared by:

          TRACT 20404 - 100 YEAR EXISTING CALCULATIONS



*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:



=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.90 (inches)
```

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	2.12	100.00	78.(AMC II)	0.180	0.837
2	4.10	100.00	78.(AMC II)	0.180	0.837
3	1.77	100.00	78.(AMC II)	0.180	0.837
4	2.54	100.00	78.(AMC II)	0.180	0.837
5	3.65	100.00	78.(AMC II)	0.180	0.837
6	1.45	100.00	78.(AMC II)	0.180	0.837
7	5.36	100.00	78.(AMC II)	0.180	0.837
8	7.34	100.00	78.(AMC II)	0.180	0.837
9	7.43	100.00	78.(AMC II)	0.180	0.837
10	1.52	100.00	78.(AMC II)	0.180	0.837
11	3.72	100.00	78.(AMC II)	0.180	0.837
12	4.53	100.00	78.(AMC II)	0.180	0.837
13	4.76	100.00	78.(AMC II)	0.180	0.837
14	5.42	100.00	78.(AMC II)	0.180	0.837

TOTAL AREA (Acres) = 55.71

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.180

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.163

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PROPOSED AREA-AVERAGED LOSS RATE CALCULATIONS (TRACTS 20402, 20403, 20404)

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                         Analysis prepared by:
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TRACT 20402 - 100 YEAR PROPOSED CALCULATIONS

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 Problem Descriptions:


==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.90 (inches)
```

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	1.38	100.00	78.(AMC II)	0.180	0.837
2	0.10	100.00	78.(AMC II)	0.180	0.837
3	0.92	100.00	78.(AMC II)	0.180	0.837
4	0.02	100.00	78.(AMC II)	0.180	0.837
5	0.22	100.00	78.(AMC II)	0.180	0.837
6	0.28	60.00	56.(AMC II)	0.423	0.681
7	1.29	70.00	56.(AMC II)	0.423	0.636
8	0.31	100.00	78.(AMC II)	0.180	0.837
9	0.45	100.00	78.(AMC II)	0.180	0.837
10	0.21	10.00	56.(AMC II)	0.423	0.907
11	0.72	70.00	56.(AMC II)	0.423	0.636
12	1.98	70.00	56.(AMC II)	0.423	0.636
13	0.13	10.00	56.(AMC II)	0.423	0.907
14	0.72	70.00	56.(AMC II)	0.423	0.636
15	0.07	100.00	78.(AMC II)	0.180	0.837
16	0.31	100.00	78.(AMC II)	0.180	0.837
17	2.48	70.00	56.(AMC II)	0.423	0.636
18	4.26	70.00	56.(AMC II)	0.423	0.636
19	0.51	100.00	78.(AMC II)	0.180	0.837
20	0.27	100.00	78.(AMC II)	0.180	0.837

21	0.65	70.00	56.(AMC II)	0.423	0.636
22	1.08	70.00	56.(AMC II)	0.423	0.636
23	0.53	70.00	56.(AMC II)	0.423	0.636
24	0.52	70.00	56.(AMC II)	0.423	0.636
25	0.52	70.00	56.(AMC II)	0.423	0.636
26	0.79	70.00	56.(AMC II)	0.423	0.636
27	0.53	70.00	56.(AMC II)	0.423	0.636
28	0.69	70.00	56.(AMC II)	0.423	0.636
29	0.17	100.00	78.(AMC II)	0.180	0.837
30	0.25	100.00	78.(AMC II)	0.180	0.837
31	0.57	10.00	56.(AMC II)	0.423	0.907
32	1.39	10.00	56.(AMC II)	0.423	0.907
33	0.11	10.00	56.(AMC II)	0.423	0.907
34	0.43	100.00	78.(AMC II)	0.180	0.837

TOTAL AREA (Acres) = 24.86

AREA-AVERAGED LOSS RATE, $\overline{F}m$ (in./hr.) = 0.246

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.294

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_____________________________________________________________________________
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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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```

TRACT 20403 - 100 YEAR PROPOSED CALCULATIONS

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 Problem Descriptions:



=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.90 (inches)
```

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	0.20	10.00	56.(AMC II)	0.423	0.907
2	0.23	10.00	56.(AMC II)	0.423	0.907
3	0.96	60.00	56.(AMC II)	0.423	0.681
4	1.11	50.00	56.(AMC II)	0.423	0.726
5	0.15	10.00	56.(AMC II)	0.423	0.907
6	0.78	60.00	56.(AMC II)	0.423	0.681
7	1.46	60.00	56.(AMC II)	0.423	0.681
8	0.87	60.00	56.(AMC II)	0.423	0.681
9	0.14	10.00	56.(AMC II)	0.423	0.907
10	1.20	60.00	56.(AMC II)	0.423	0.681
11	0.17	10.00	56.(AMC II)	0.423	0.907
12	0.48	100.00	78.(AMC II)	0.180	0.837
13	0.43	70.00	56.(AMC II)	0.423	0.636
14	0.88	50.00	56.(AMC II)	0.423	0.726
15	1.09	50.00	56.(AMC II)	0.423	0.726
16	0.92	60.00	56.(AMC II)	0.423	0.681
17	0.14	10.00	56.(AMC II)	0.423	0.907

```
    TOTAL AREA (Acres) =     11.21
                             _
```

AREA-AVERAGED LOSS RATE, Fm (in./hr.) = 0.221

AREA-AVERAGED LOW LOSS FRACTION, $\bar{Y}$ = 0.281

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                         Analysis prepared by:
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TRACT 20404 - 100 YEAR PROPOSED CALCULATIONS

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 Problem Descriptions:


==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     4.90 (inches)
```

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	0.81	70.00	56.(AMC II)	0.423	0.636
2	1.06	70.00	56.(AMC II)	0.423	0.636
3	1.59	70.00	56.(AMC II)	0.423	0.636
4	0.54	70.00	56.(AMC II)	0.423	0.636
5	1.59	70.00	56.(AMC II)	0.423	0.636
6	0.23	10.00	56.(AMC II)	0.423	0.907
7	1.64	70.00	56.(AMC II)	0.423	0.636
8	0.32	10.00	56.(AMC II)	0.423	0.907
9	2.25	70.00	56.(AMC II)	0.423	0.636
10	2.73	70.00	56.(AMC II)	0.423	0.636
11	0.53	70.00	56.(AMC II)	0.423	0.636
12	1.58	70.00	56.(AMC II)	0.423	0.636
13	2.11	70.00	56.(AMC II)	0.423	0.636
14	0.23	10.00	56.(AMC II)	0.423	0.907
15	0.69	70.00	56.(AMC II)	0.423	0.636
16	3.12	70.00	56.(AMC II)	0.423	0.636
17	2.22	70.00	56.(AMC II)	0.423	0.636
18	0.62	70.00	56.(AMC II)	0.423	0.636
19	1.60	70.00	56.(AMC II)	0.423	0.636
20	1.74	70.00	56.(AMC II)	0.423	0.636

21	0.57	70.00	56.(AMC II)	0.423	0.636
22	1.76	70.00	56.(AMC II)	0.423	0.636
23	2.89	70.00	56.(AMC II)	0.423	0.636
24	2.68	70.00	56.(AMC II)	0.423	0.636
25	2.66	70.00	56.(AMC II)	0.423	0.636
26	2.23	70.00	56.(AMC II)	0.423	0.636
27	0.69	70.00	56.(AMC II)	0.423	0.636
28	0.72	70.00	56.(AMC II)	0.423	0.636
29	2.36	70.00	56.(AMC II)	0.423	0.636
30	2.68	70.00	56.(AMC II)	0.423	0.636
31	1.24	70.00	56.(AMC II)	0.423	0.636
32	1.96	70.00	56.(AMC II)	0.423	0.636
33	0.22	10.00	56.(AMC II)	0.423	0.907
34	0.30	100.00	78.(AMC II)	0.180	0.837
35	0.81	70.00	56.(AMC II)	0.423	0.636
36	1.52	70.00	56.(AMC II)	0.423	0.636
37	1.05	100.00	78.(AMC II)	0.180	0.837
38	0.36	10.00	56.(AMC II)	0.423	0.907
39	0.72	10.00	56.(AMC II)	0.423	0.907
40	1.12	10.00	56.(AMC II)	0.423	0.907

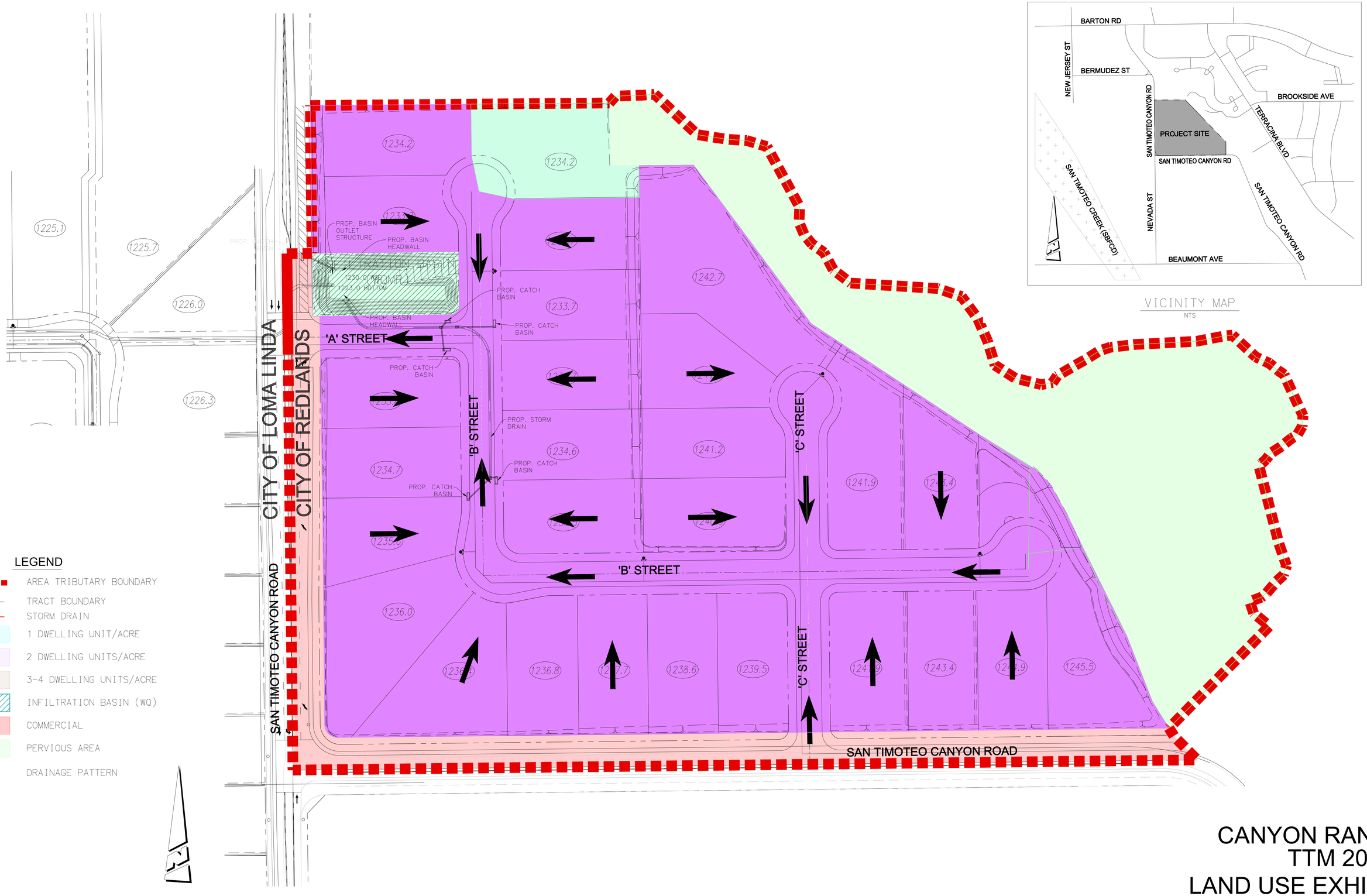
TOTAL AREA (Acres) = 55.74

AREA-AVERAGED LOSS RATE, $\overline{F}m$ (in./hr.) = 0.279

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.344

==========

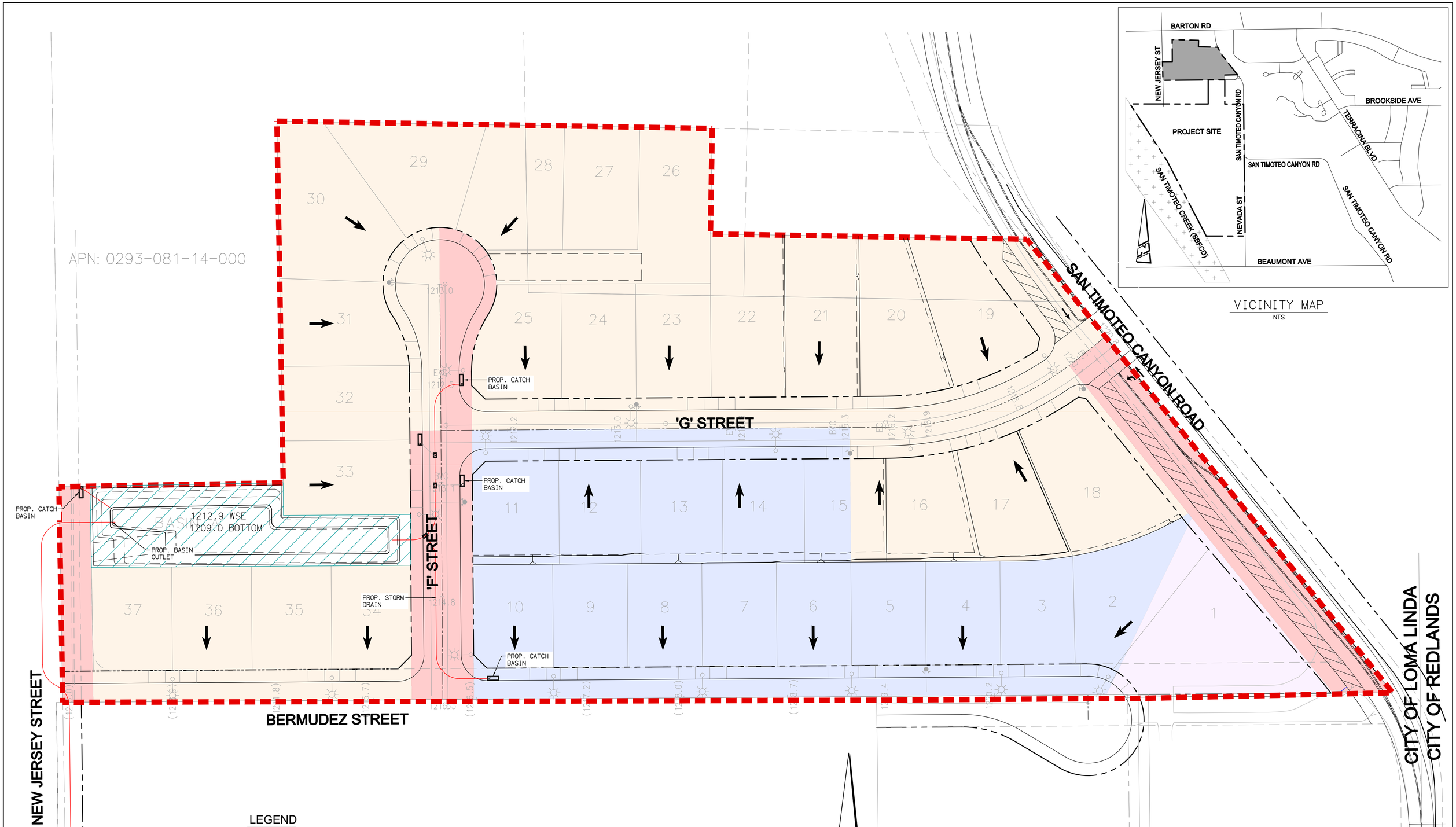
LAND USE MAP (TRACTS 20402, 20403, 20404)



CANYON RANCH
TTM 20402
LAND USE EXHIBIT

PROACTIVE ENGINEERING CONSULTANTS

01/05/2022



CANYON RANCH
TTM 20403
LAND USE EXHIBIT

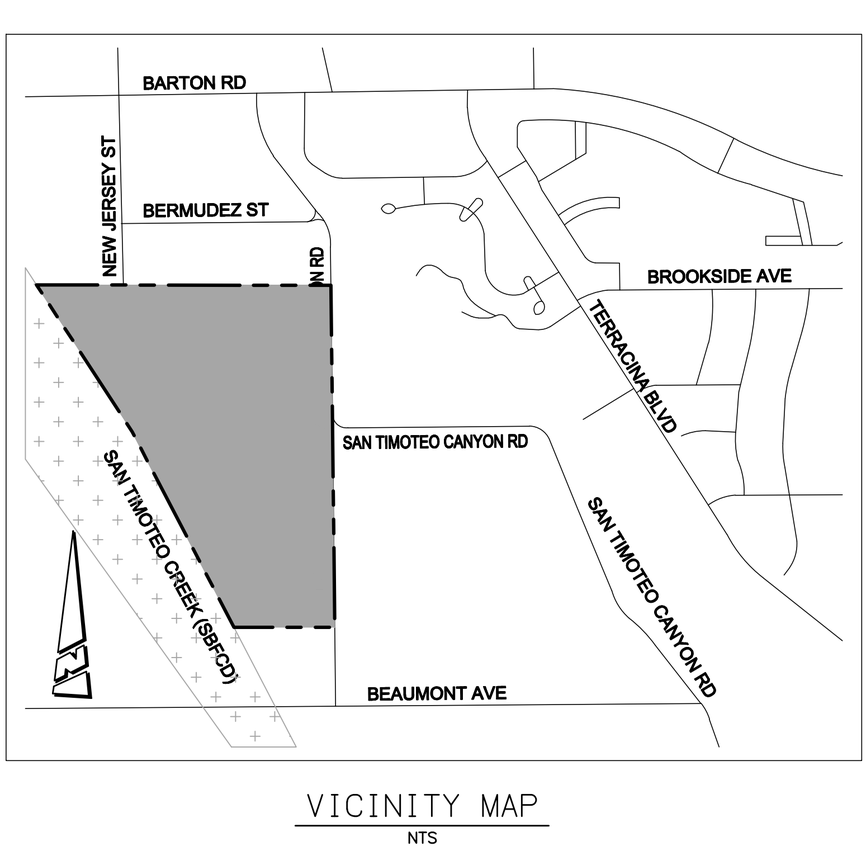
PROACTIVE ENGINEERING CONSULTANTS

01/05/2022

'A' STREET
'B' STREET
'C' STREET
'D' STREET
'E' STREET
SAN TIMOTEO CANYON ROAD
NEVADA STREET
CITY OF LOMA LINDA
CITY OF REDLANDS
SAN TIMOTEO CREEK (SBFCD)
PROP. CATCH BASIN
PROP. STORM DRAIN
PROP. BASIN OUTLET
1216.6 WSE
1207.0 BOTTOM
1230.0 WSE
1223.0 BOTTOM
4-0000
APN: 0293-101-12-0000
APN: 0293-111-19-0000
APN: 0293-111-22-0000
APN: 0293-111-16-0000
APN: 0293-111-15-0000

LEGEND

- AREA TRIBUTARY BOUNDARY
- TRACT BOUNDARY
- STORM DRAIN
- 1 DWELLING UNIT/ACRE
- 2 DWELLING UNITS/ACRE
- INFILTRATION BASIN (WQ)
- COMMERCIAL
- BARREN
- DRAINAGE PATTERN



VICINITY MAP
NTS

100 50 0 100 200 300
SCALE: 1"=100'

CANYON RANCH
TTM 20404
LAND USE EXHIBIT

PROACTIVE ENGINEERING CONSULTANTS

01/05/2022

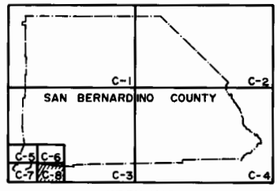
H:\PDATA\136428\CADD\LAND\DLV\HYDRO\HYDROLOGY-EXISTING.DWG TMENG 1/22/16 1:11 pm

SOIL GROUP MAP

SOIL GROUP B

SOURCE: GEOLOGY MAP
SOURCE: 1971 SCS SURVEY

SOURCE: 1971 SCS SURVEY



INDEX MAP

LEGEND

SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

BOUNDARY OF INDICATED SOURCE

SCALE 1:48,000

SCALE REDUCED BY 1/2

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-D AREA

FIGURE C-16