



Engineering ▪ Surveying ▪ Planning ▪ Landscape Architecture

17782 17th Street, Suite 200, Tustin, California 92780-1947
Telephone: (714) 665-4500 • website: www.hfinc.com

Preliminary HYDROLOGY REPORT

City of Colton Super Block

Prepared for
City of Colton
605 N. La Cadena Drive
Colton, CA 92324

Prepared by
Hall & Foreman, Inc.
17782 17th Street, Suite 200
Tustin, CA 92780

August, 2013

HFI Project No. 070645-0000

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DESCRIPTION OF PROJECT AREA

The project area described as the Super Block is located Northerly of the Interstate-10, southerly of San Bernardino Avenue and is bounded by Hermosa Avenue and Riverside Avenue to the east and west respectively. The Super Block is located in the City of Colton, County of San Bernardino. The total gross acreage of the study area is roughly 528 acres. This project area is within two watershed areas 3-3 and 3-5, which are tributary to the Rialto Channel just south of the project.

ANAYLISIS

Analysis of the site was performed using the rational method and unit hydrographs for sub areas where on site retention is possible. Street capacities where also verified for the existing and proposed conditions

The study was done for runoff from a 100-year frequency storm event falling on a saturated watershed (AMC III). Soil class and rain intensities were obtained from San Bernardino Hydrology Manual. The soil classification for the site was determined to be B-C, a soils value of C was used for the study. The 100 year 1-hr intensity is 1.27 inch; the 10 year 1-hr intensity is .90 inch.

HYDROLOGY SOFTWARE

The modeling software used for the Hydrology Analysis for this project is:
Advance Engineering Software (AES) 2003-Rational Method
Civil Design 2004- Unit Hydrograph and Flood Routing
Bentley FlowMaster-Hydraulics

EXISTING CONDITION

The project site has two tributary drainage areas which rely heavily on surface flow for drainage, due to the geography of the site most of the onsite runoff is retained within the watershed. The project site and the sub areas can be seen on the Hydrology Map included in Appendix E.

Area "A", is 155 acres, and makes up 30% of the study area. This area drains to the south west, towards a low point on West Valley Blvd at the intersection of Sycamore. There are two existing catch basins at this location. One catch basin (CB1: W=4') is tributary to the Colton drain an 84" RCP line on Valley that connects to the Rialto channel 1/3 of mile downstream. The other catch basin (CB2: W=7') acts as a culvert to relieve the sump of inundation and directs the run off down Sycamore Ave through a curb opening. Approximately 55% of sub area "A" is developed commercial land use located along side Valley Blvd and Wild Rose Ave. The runoff is conveyed through curb and gutter towards the low point on Valley Blvd. The remaining 45% is composed of open grassland with define earth swales. The run off is conveyed through the open spaces by sheet flow unto Valley Blvd and Wild Rose Ave where it is taken by curb and gutter towards the existing

catch basins at the intersection of Valley Blvd and Sycamore Ave. A total $Q_{100} = 240$ cfs is conveyed towards this sump were it floods the intersections. Street capacity calculations show that Valley Blvd is approximately 1 foot under water. The inlet capacities of CB1 and CB2 are about 14 cfs and 25 cfs respectively, which provide little help in alleviating the flooding on Valley Blvd. The remaining run off ultimately overflows down Sycamore Ave towards Interstate-10. An existing 36" CMP relieves the flooding and conveys the flow across the freeway.

Area "B" is 43.69 acres and makes up 8.0% of the study area. This area drains by sheet flow across the open spaces to the south and along the half width of Pepper Ave towards Valley Blvd. The street flows are conveyed through curb and gutter towards a low point located on Valley Blvd approximately 400 feet west from the intersection of Pepper Ave. Approximately 35% of this sub area is composed of commercial development the remainder is open grass land with defined earth swales. A total $Q_{100} = 76.55$ cfs is conveyed towards the low point on Valley Blvd. The runoff is then conveyed into and adjoining open space just northerly of the low point for retention and infiltration.

Area "C" is 81.88 acres and makes up 16% of the study area. This portion of the site drains to the south east along Valley Blvd via curb and gutter. Approximately 15% of this sub area is commercial use the remainder is open grass land with defined earthen swales and sluggish pools. A total $Q_{100} = 126.97$ cfs makes it way down to the intersection of Valley Blvd and Hermosa Ave and continues downstream.

Area "D" is 64.8 acres and makes up 12% of the study area. This portion of the site has been developed by the hospital and drains to the south east. There is an onsite storm drain system which picks up flows around the property and ultimately discharges into a detention basin with an approximate volume of 10.6 Ac-Ft. A total $Q_{100} = 174.4$ cfs makes it way down to the detention basin with a total volume of 31.20 Ac-Ft. This suggests that the basin must bleed into the 108" line located on Meridian Street.

Areas E, F, G, and H are all located south of West Valley Blvd. They are 7.5 acres, 8.73 acres, 12.40 acres and 5.81 acres respectively. These areas make up 6.5% of the study area and are of commercial land use. These areas drain towards existing 36" CMP culverts which direct flows across Interstate-10. Areas E, F, G, and H have a $Q_{100} = 24$ cfs, 31.74 cfs, 36.91 cfs and 21.21 cfs respectively.

Det-1 is 7.0 acre and makes up 1.5% of the study area; it is currently a detention basin that provides a recreational park at the bottom. Approximately 84 cfs enter the basin from Tracts 13424 & 13471 located just north of San Bernardino Ave. A total $Q_{100} = 96.54$ cfs will confluence at the basin which requires 17.6 Ac-Ft of retention. However the basin provides 17 Ac-ft. Analysis of the capacity of the basin has not been done. However initial inspection suggest that the existing volume of the basin is adequate to detain these flows due to the fact that the basin will bleed out a portion of these flows through the 36" CSP located at the spill way along with a 6' diameter riser with 2' x 3' square holes cut at the sides. See attached plans. These flows will bleed into HYD-2 and HYD-3 where they are spread and retained for percolation.

Hyd-1 is 17.97 acres and makes up 3.5% of the study area and is composed of open grassland. This portion of the site contains a retention basin of approximately 16 Ac-Ft. This sub area receives a $Q_{100} = 51.24$ cfs which requires 8.36 Ac-Ft for retention. It can be seen that no runoff leaves this sub area as it can be fully retain onsite.

Hyd-2 is 70.53 acres and makes up 13.5% of the study area and is currently a golf course. The golf course contains various retention basins thought the site for a total volume of approximately 32 Ac-Ft .This sub area receives a $Q_{100} = 165.84$ cfs which requires 32.42 Ac-Ft for retention. There is a small difference in required volume however; the remaining volume can be spread out on the golf course. Therefore no runoff leaves this sub area as it can be fully retained onsite.

Hyd-3 is 22.36 acres and makes up 4.5% of the study area and is composed of open grass lands with sluggish pools. This portion of the site contains various retention pools for a total volume of approximately 9.7 Ac-Ft .This sub area receives a $Q_{100} = 69.53$ cfs which requires 10.4 Ac-Ft for retention. Due to the geography of this sub area it is possible that the difference in volume could be retained within the site as its spreads out through out the site and infiltrates.

Hyd-4 is 30.94 acres and makes up 5.8% of the study area; this area is currently a cemetery with an onsite retention basin. The basin is approximately 12 Ac-ft in volume. This sub area receives a $Q_{100} = 91.2$ cfs which requires 14.4 Ac-Ft for retention. It is possible that full retention of the 14.4 Ac-ft can be attained by spreading over the cemetery against its block walls.

PROPOSED CONDITION

The drainage pattern for the site will remain unchanged as a result of the proposed improvements. The existing tributary areas and ultimate points of collection for each tributary area will remain the same. As part of the Super Block Master Plan, a storm drain system is being proposed throughout the project area. **In order to minimize deficiencies in the existing drainage system, individual developments will be responsible for detaining all stormwater in excess of the sites existing peak runoff.** These detention requirements are necessary because the existing hydraulic gradient of the 84" Colton drain is approximately at grade with Valley Blvd. The total discharge of the project area to the Colton drain will be $Q_{100} = 135$ cfs. A conceptual storm drain plan has been included in Appendix D of this report. The project site and the tributary drainage areas can be seen on the Proposed Hydrology Map included in Appendix E.

Areas "A", "B", and "J" are all outside of the City of Colton limits, however their flows are still tributary to the low point found on Valley Blvd west of Sycamore Ave (L1). The master plan will still accept these off site flows with some mitigation. **If these areas are developed they will be subject to a 90% reduction from pre existing flows further reducing its impact downstream.**

Area “A” is 19.79 acres and makes up 3.7% of the study area, this area is currently outside of the city limits. This sub area is composed of grassy open space with some define earth swales. It is proposed that this area be picked up by a 30” storm drain lateral tied into the 84” Colton drain running north- south along the city limits. A total $Q_{100} = 34.84$ cfs would be introduced into this existing system. (Need to research capacity of Colton drain, we suspect that this area might be tabled to flow to this area)

Area “B” is 16.47 acres and makes up 3.1% of the study area; this sub area is approximately 50% commercial land use. Area “B” is also located outside the city limits but still tributary to the master plan. A total $Q_{100} = 35.76$ cfs would be introduced into this existing system (Need to research capacity of Colton drain, we suspect that this area might be tabled to flow to this area)

Area “J” is 19.0 acres and makes up 3.6% of the study area, this sub area is composed mainly of commercial land use. A total $Q_{100} = 47.21$ cfs makes its way to the low point on Valley (L1).The flows from sub area “J” will confluence with the street flows coming westerly down Valley Blvd.

Area HYD-2 is 167.28 acres which make up 31.6% of the study area which will be composed of medium to high density residential, open space, a school site as well as business parks fronting on Valley Boulevard. Each of these proposed sites will be required to reduce peak flows with the implementation of detention basins. HYD-2 will be graded to drain to the south west were inlets will be placed at the intersections with Wild Rose Ave. The storm drain system will then run along Wild Rose Avenue and ultimately connecting to the existing 84" Colton drain, as shown in the conceptual storm drain plan. The flow coming down towards the existing Colton drain is $Q_{100} = 219.58$ cfs, stormwater detention required of each new development will reduce the peak flow to 135 cfs which will be introduced to the extension of the Colton drain (I-7).

Area HYD-5 is 125.1 acres which make up 23.7% of the study area. This sub area will be composed of retail, office mixed use and habitat. Runoff will be conveyed through curb and gutter down towards Valley Blvd where a proposed storm drain system will pick up the flows and convey the flows into a retention basin locate in PA 20 with a volume of approximately 60 acre-feet. This basin will be an interim basin until the 108” line is connected downstream. Once the connection is made the retention basin is no longer needed.

The remaining 31.37% of the study area will remain unchanged from the existing conditions (Areas D, E, F, G, H and HYD-4). **If these areas are redeveloped they will be subject to a 90% reduction from pre existing flows further reducing its impact downstream.**

CONCLUSION

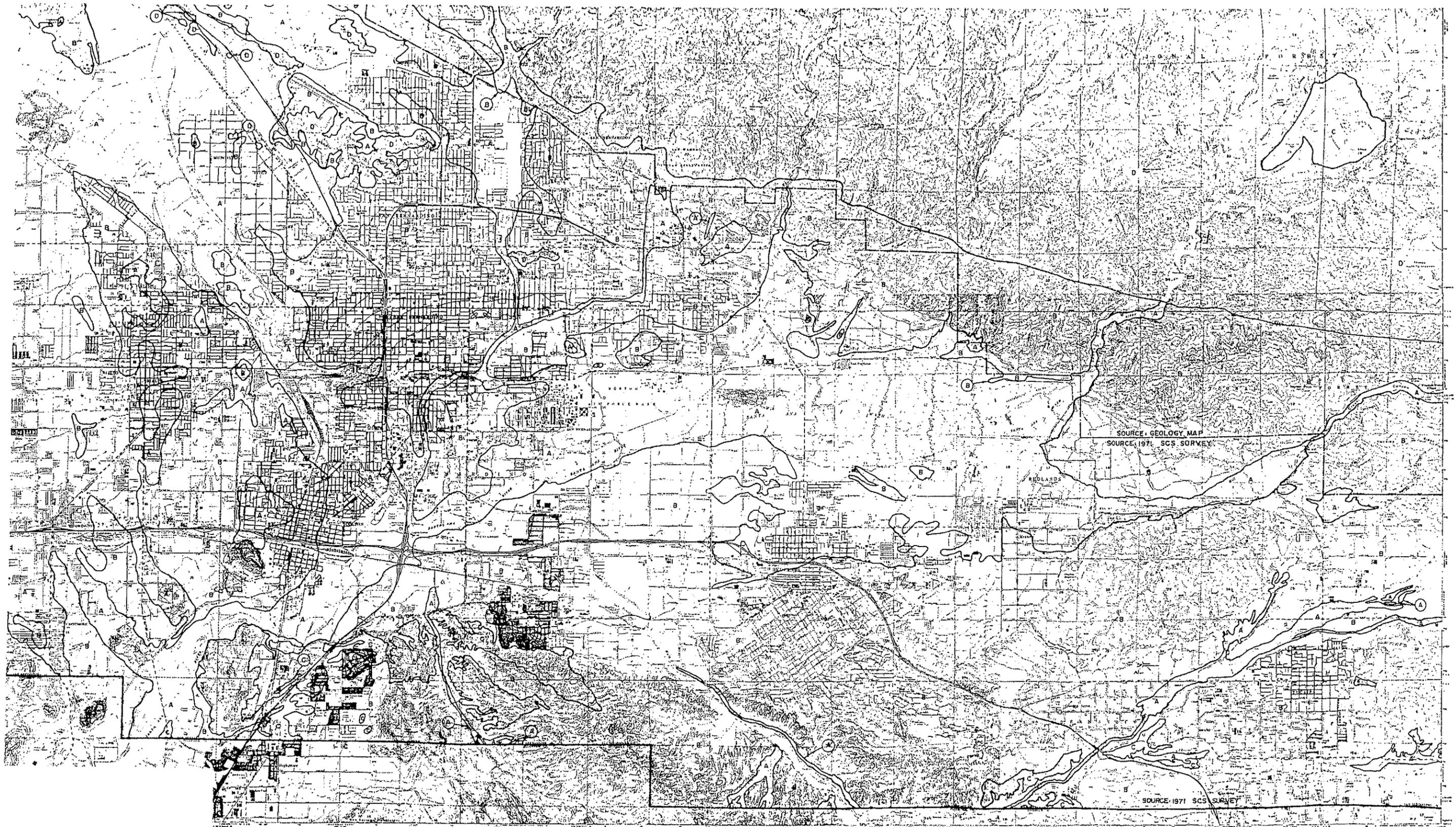
The study of the existing conditions revealed that about 28% of the site is in full retention of its run off, significant retention is visible in the aerial of the site. The remainder of the study area relies heavily on surface and street flows as its drainage system. There are currently 2 storm drain systems serving the two watershed areas. An 84" Colton drain which runs South at the city limits and west on Valley Blvd and connects to the Rialto channel. There are extensions to this storm drain that are proposed per the San Bernardino master plan (Project 3-3) line I-6 and I-7. The other storm drain line is a 108" line running south along Meridian Ave and east on Valley Blvd, which currently does not have an outlet. There are future plans to connect this storm drain to the Rialto channel once funding is provided to cross the Interstate-10 with a culvert. There is also an existing basin which receives flows up stream of our study area, research shows approximately 84 cfs is expected.

Flooding is also reported at the intersections of Valley Blvd at Sycamore Ave and Valley Blvd at Pepper Ave. The flooding is due to a backwater condition caused by the undersized Rialto Channel, no improvements proposed for this project will reduce or eliminate the flooding at these intersections. However, all future development in the Colton Super Block Specific Plan will be required to detain all flows in excess of the sites existing runoff.

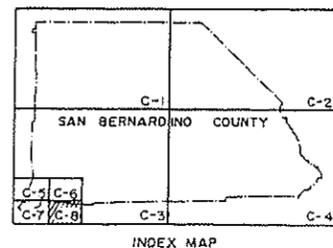
In order to remove the existing detention basin/recreation park and develop PA 12, PA 13 and PA 14 a storm drain line will need to be constructed and connected to the existing 84" Colton Drain with capacity to accept the $Q_{100} = 84$ cfs that is currently being discharge into the basin.

The detailed engineering design for the storm drain system will refine the design currently shown on the conceptual storm drain plans. The facilities will be sized to meet the current requirements for landowners within the project area based on the proposed land uses and will meet the city of Colton's and county of San Bernardino standards.

APPENDIX A



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

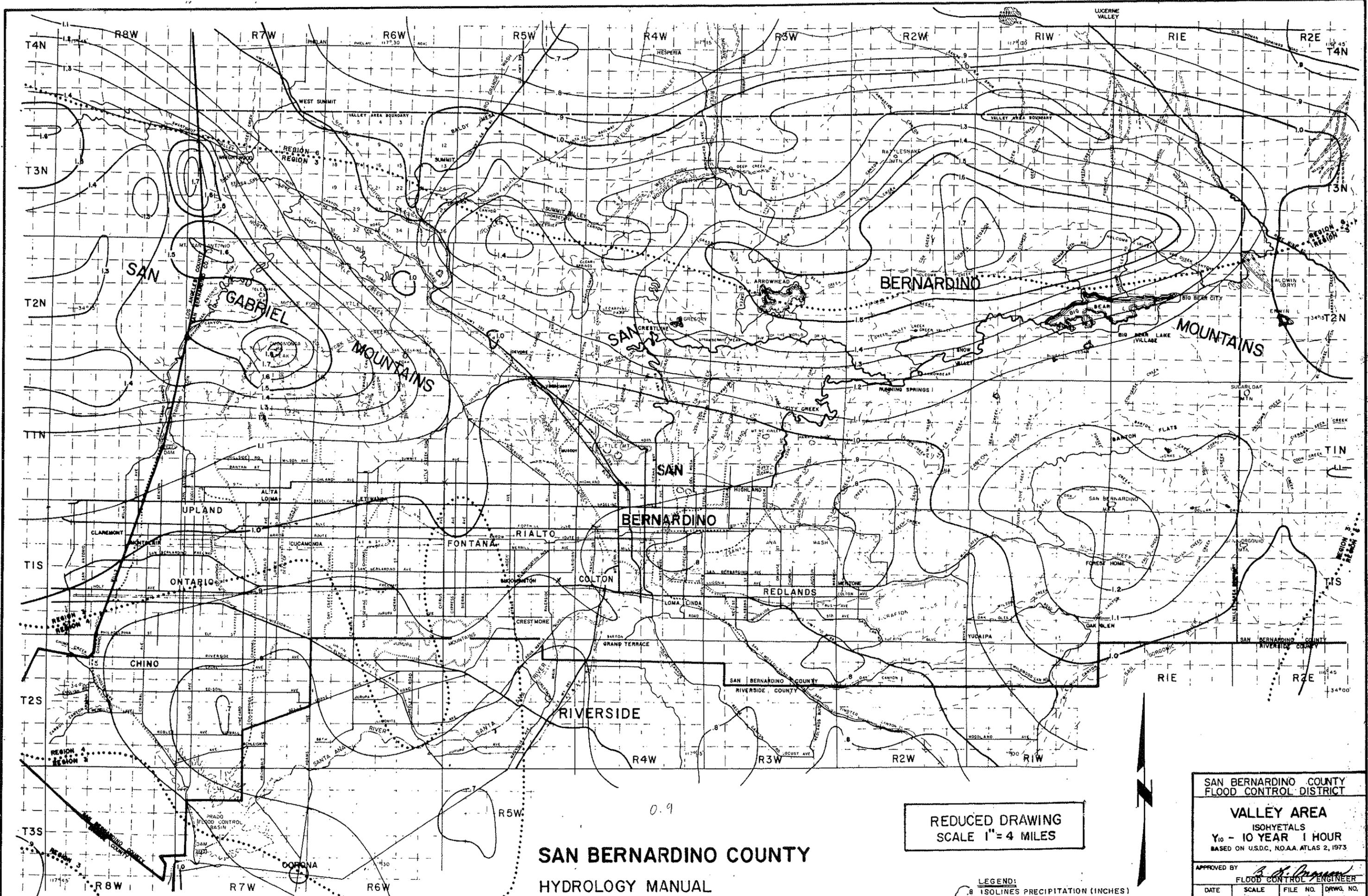


- LEGEND
- SOIL GROUP BOUNDARY
 - A SOIL GROUP DESIGNATION
 - - - BOUNDARY OF INDICATED SOURCE

SOIL B

SCALE 1:48,000
SCALE REDUCED BY 1/2

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-D AREA



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

REDUCED DRAWING
 SCALE 1" = 4 MILES

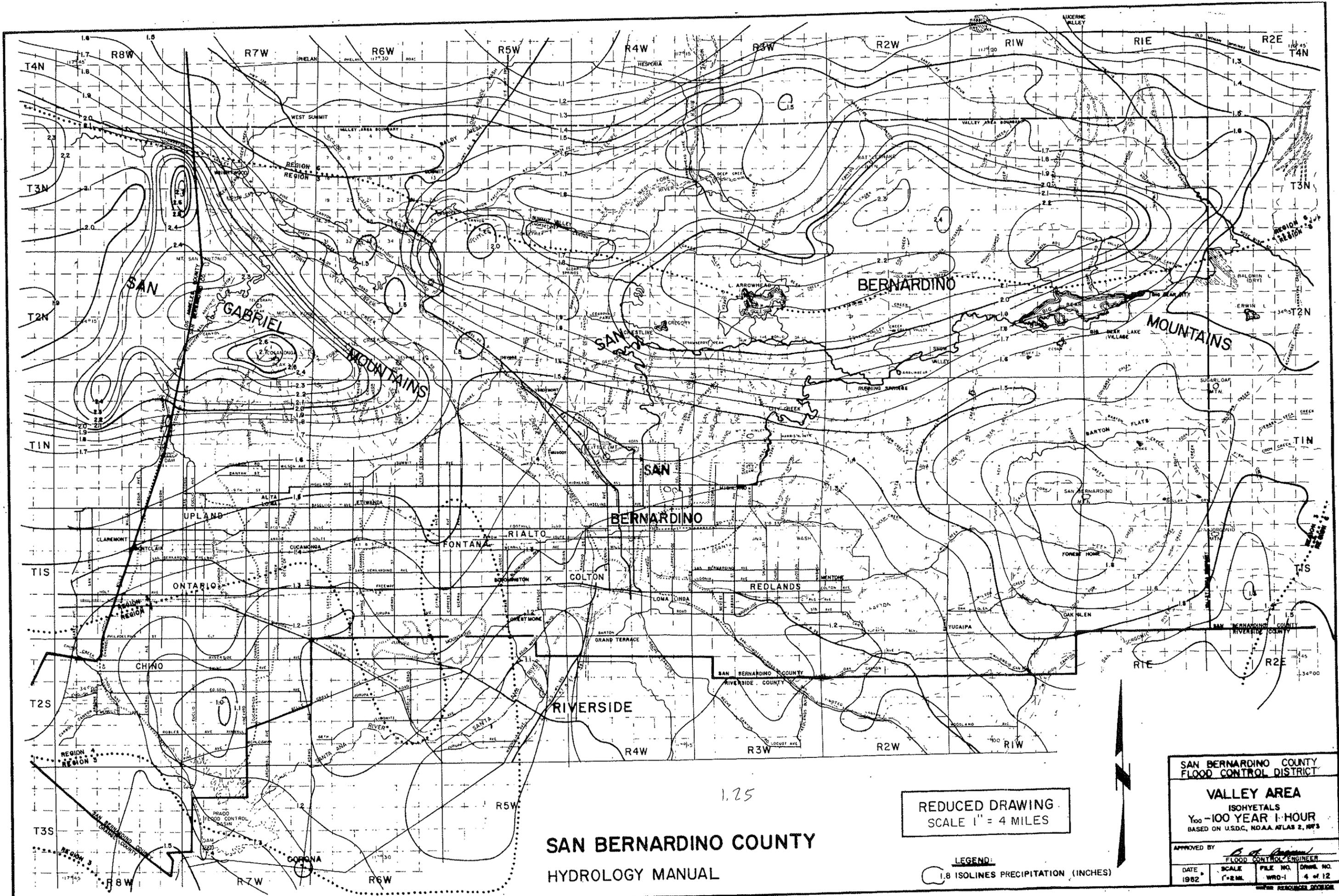
LEGEND:
 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
 FLOOD CONTROL DISTRICT

VALLEY AREA
 ISOHYETALS
 Y₁₀ - 10 YEAR 1 HOUR
 BASED ON U.S.D.C. NOAA ATLAS 2, 1973

APPROVED BY *B. H. Peterson*
 FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1" = 2 MI.	WRD-1	3 of 12



**SAN BERNARDINO COUNTY
HYDROLOGY MANUAL**

**REDUCED DRAWING
SCALE 1" = 4 MILES**

LEGEND:
1.8 ISOLINES PRECIPITATION (INCHES)

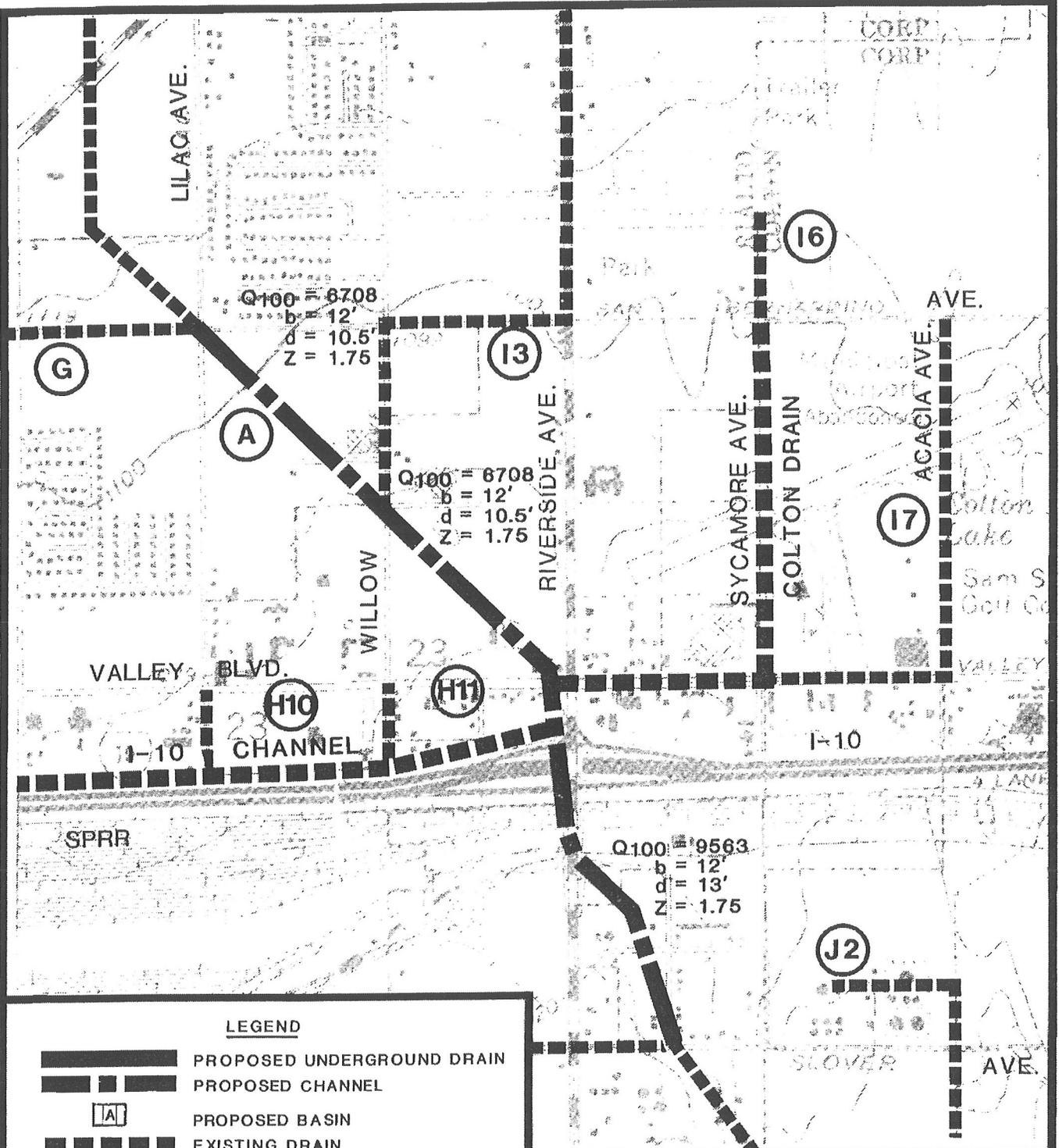
**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

**VALLEY AREA
ISOHYETALS
100-100 YEAR 1 HOUR
BASED ON U.S.D.C. NOAA ATLAS 2, NF3**

APPROVED BY *[Signature]*
FLOOD CONTROL ENGINEER

DATE 1982	SCALE 1"=4M.	FILE NO. WRD-1	DRAW. NO. 4 of 12
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ENGINEERING DIVISION



LEGEND

	PROPOSED UNDERGROUND DRAIN
	PROPOSED CHANNEL
	PROPOSED BASIN
	EXISTING DRAIN
	DRAIN SHOWN ELSEWHERE
	BASIN SHOWN ELSEWHERE

JAMES M. MONTGOMERY,
CONSULTING ENGINEERS, INC. **JMM**

P.O. BOX 7009, 250 N. MADISON AVE., PASADENA, CA. 91109-7009

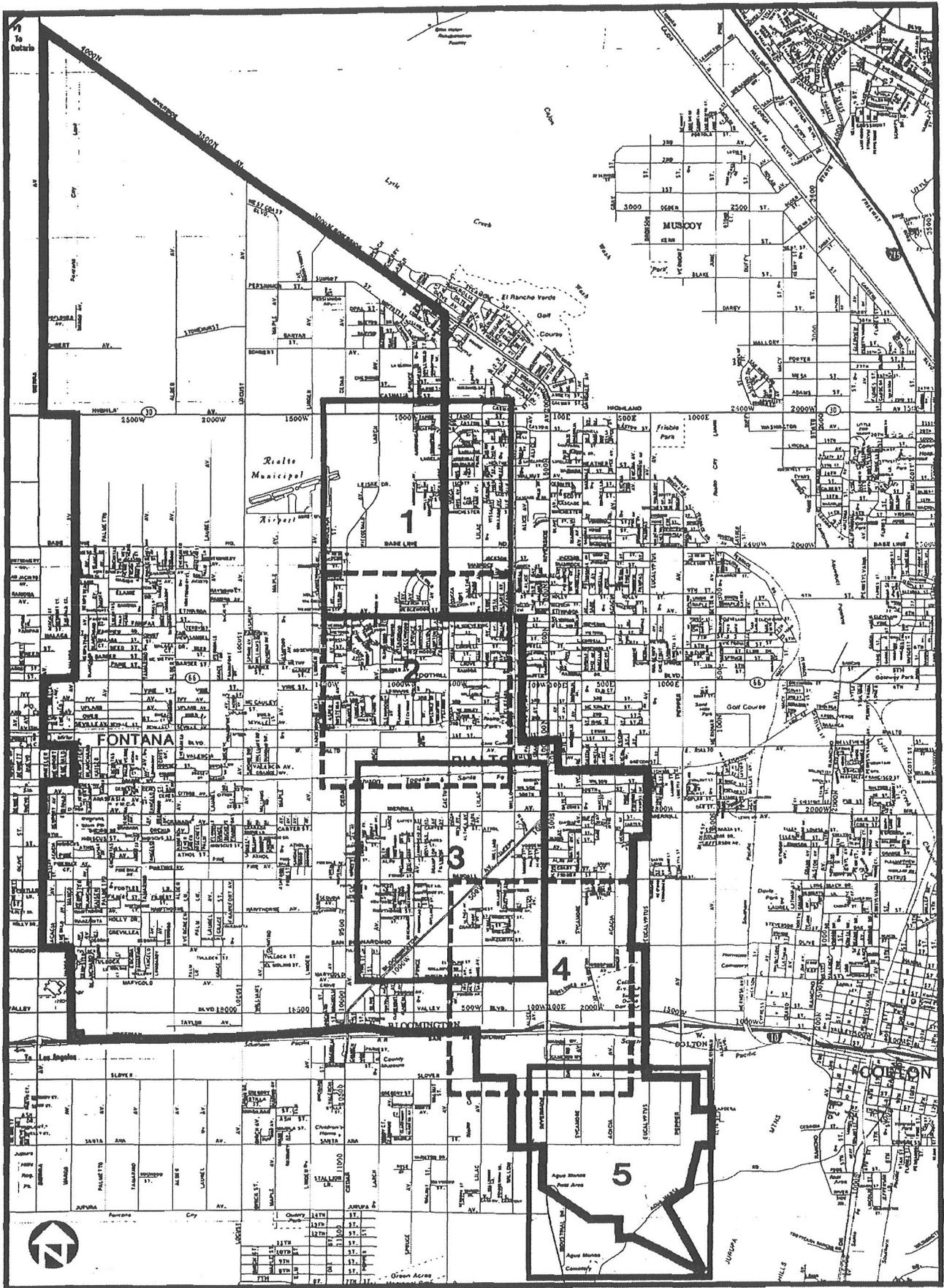
**San Bernardino County
FLOOD CONTROL DISTRICT**

COMPREHENSIVE STORM DRAIN PLAN
PROJECT NO. 3-3 A SERIES

DATE
12-86

1"=1000'

DRAWING NO.
4 of 5



INDEX TO A SERIES PLAN DRAWINGS



APPROXIMATE SCALE IN FEET
500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY,
CALIFORNIA AND
INCORPORATED AREAS

PANEL 8678 OF 9400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX

CITY OF COLTON	060273	F
SAN BERNARDINO COUNTY	060280	F
UNINCORPORATED AREAS	060270	F
SAN BERNARDINO CITY OF	060281	F

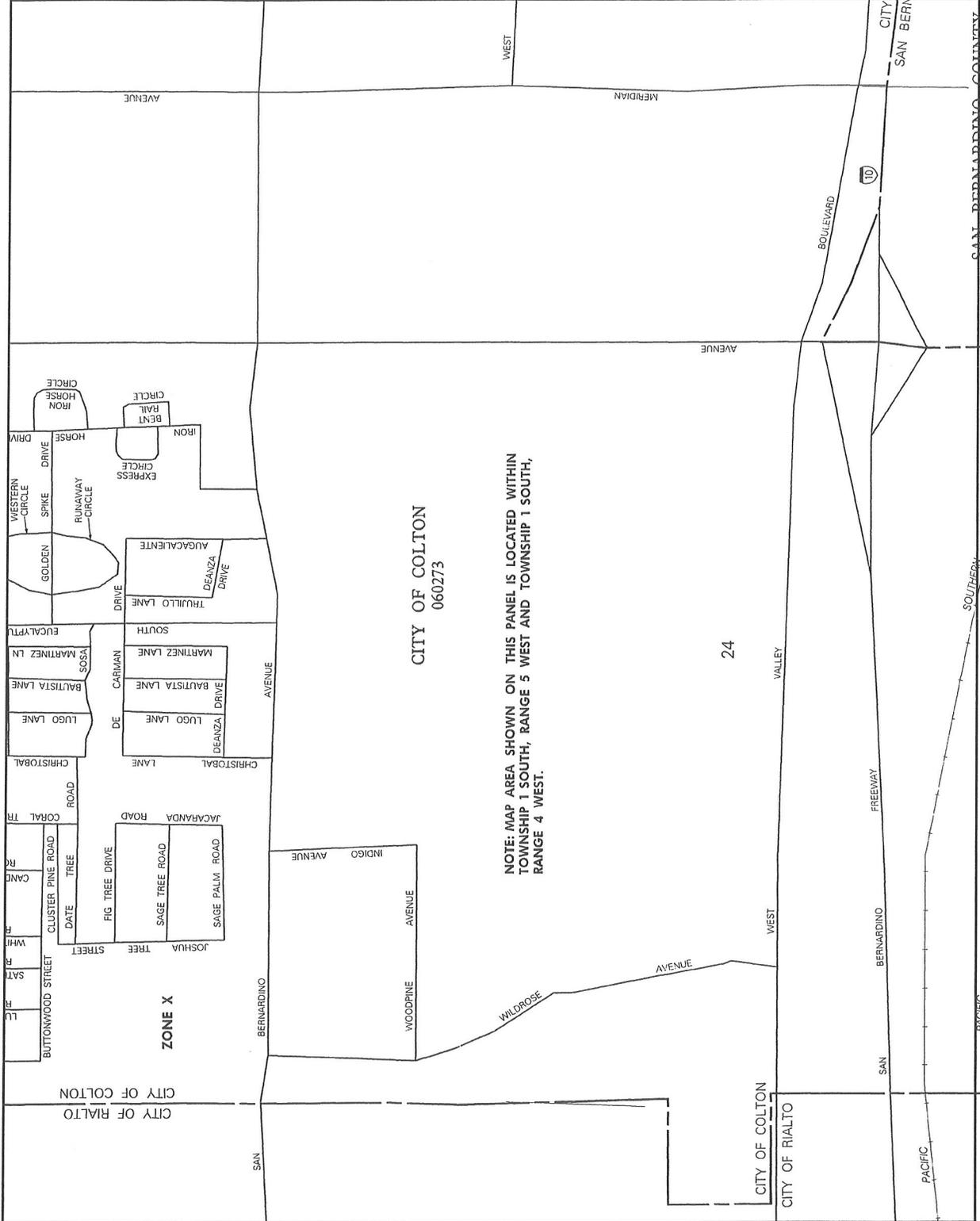
MAP NUMBER
06071C8678 F

EFFECTIVE DATE:
MARCH 18, 1996



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was prepared by the Federal Emergency Management Agency (FEMA) and is subject to change without notice. Any changes or amendments which may have been made subsequent to the date of this title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



CITY OF COLTON
060273

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN
TOWNSHIP 1 SOUTH, RANGE 5 WEST AND TOWNSHIP 1 SOUTH,
RANGE 4 WEST.

ZONE X

CITY OF RIALTO

CITY OF COLTON

CITY OF RIALTO

SAN BERNARDINO COUNTY

SOUTHERN

PACIFIC

APPENDIX B

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2003 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2003 License ID 1237

Analysis prepared by:

Hall & Foreman, Inc.
420 Exchange, Suite 100
Irvine, CA 92602

***** DESCRIPTION OF STUDY *****
* EXISTING CONDITIONS *
* 100 YEAR STORM EVENT *
* COLTON SUPER BLOCK DEC. 20, 2007 *

FILE NAME: EX_COLT.DAT
TIME/DATE OF STUDY: 17:12 12/20/2007

=====

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
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.260
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.2600
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:	CURB	GUTTER-GEOMETRIES:			MANNING
	WIDTH	CROSSFALL	IN- / OUT-/PARK-	HEIGHT	WIDTH	LIP	HIKE	FACTOR
	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	43.0	21.5	0.009/0.009/0.020	0.67	2.00	0.0313	0.167	0.0160
2	28.0	14.0	0.017/0.017/0.020	0.67	2.00	0.0313	0.167	0.0160
3	36.0	18.0	0.017/0.017/0.020	0.67	2.00	0.0313	0.167	0.0160
4	24.0	12.0	0.017/0.017/0.020	0.67	2.00	0.0313	0.167	0.0160

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.50 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 5.5 (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 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1200.00
ELEVATION DATA: UPSTREAM(FEET) = 1086.00 DOWNSTREAM(FEET) = 1074.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 13.129

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.136

SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	6.87	0.27	0.10	86	13.13

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA RUNOFF(CFS) = 19.22

TOTAL AREA(ACRES) = 6.87 PEAK FLOW RATE(CFS) = 19.22

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 1074.50 DOWNSTREAM ELEVATION(FEET) = 1071.60
STREET LENGTH(FEET) = 1198.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50

INSIDE STREET CROSSFALL(DECIMAL) = 0.009

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54

HALFSTREET FLOOD WIDTH(FEET) = 40.06

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.47

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79

STREET FLOW TRAVEL TIME(MIN.) = 13.60 T_c (MIN.) = 26.73

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.047

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	2.85	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA AREA(ACRES) = 2.85 SUBAREA RUNOFF(CFS) = 5.18

EFFECTIVE AREA(ACRES) = 9.72 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 9.72 PEAK FLOW RATE(CFS) = 19.22
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 38.04
FLOW VELOCITY(FEET/SEC.) = 1.43 DEPTH*VELOCITY(FT*FT/SEC.) = 0.75
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 2398.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 109.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1071.60 DOWNSTREAM ELEVATION(FEET) = 1070.50
STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50
INSIDE STREET CROSSFALL(DECIMAL) = 0.009
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.71
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.58
HALFSTREET FLOOD WIDTH(FEET) = 43.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.30
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.75
STREET FLOW TRAVEL TIME(MIN.) = 9.02 Tc(MIN.) = 35.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	6.28	0.27	0.50	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.50

SUBAREA AREA(ACRES) = 6.28 SUBAREA RUNOFF(CFS) = 8.95

EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.26

TOTAL AREA(ACRES) = 16.00 PEAK FLOW RATE(CFS) = 23.75

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 43.00
FLOW VELOCITY(FEET/SEC.) = 1.30 DEPTH*VELOCITY(FT*FT/SEC.) = 0.76
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 109.00 = 3100.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

=====

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 940.00
ELEVATION DATA: UPSTREAM(FEET) = 1115.00 DOWNSTREAM(FEET) = 1087.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.205
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	8.38	0.27	0.90	86	15.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
SUBAREA RUNOFF(CFS) = 19.81
TOTAL AREA(ACRES) = 8.38 PEAK FLOW RATE(CFS) = 19.81

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1087.00 DOWNSTREAM ELEVATION(FEET) = 1083.87
STREET LENGTH(FEET) = 575.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 32.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.50
STREET FLOW TRAVEL TIME(MIN.) = 3.82 Tc(MIN.) = 19.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.510

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "2 DWELLINGS/ACRE"	C	13.32	0.27	0.70	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.70$
 SUBAREA AREA (ACRES) = 13.32 SUBAREA RUNOFF (CFS) = 27.81
 EFFECTIVE AREA (ACRES) = 21.70 AREA-AVERAGED F_m (INCH/HR) = 0.21
 AREA-AVERAGED F_p (INCH/HR) = 0.27 AREA-AVERAGED $A_p = 0.78$
 TOTAL AREA (ACRES) = 21.70 PEAK FLOW RATE (CFS) = 44.90

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.65 HALFSTREET FLOOD WIDTH (FEET) = 37.25
 FLOW VELOCITY (FEET/SEC.) = 2.66 DEPTH*VELOCITY (FT*FT/SEC.) = 1.72
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND $L = 575.0$ FT WITH ELEVATION-DROP = 3.1 FT, IS 31.4 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 105.00
 LONGEST FLOWPATH FROM NODE 103.00 TO NODE 105.00 = 1515.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 107.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<
 >>>> (STREET TABLE SECTION # 2 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 1083.87 DOWNSTREAM ELEVATION (FEET) = 1079.50
 STREET LENGTH (FEET) = 696.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 28.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 14.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.50

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.69
 HALFSTREET FLOOD WIDTH (FEET) = 29.09
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.19
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.20
 STREET FLOW TRAVEL TIME (MIN.) = 3.63 T_c (MIN.) = 22.65
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.260

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
RESIDENTIAL ".4 DWELLING/ACRE"	C	8.37	0.27	0.90	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.90$					
SUBAREA AREA (ACRES) = 8.37 SUBAREA RUNOFF (CFS) = 15.18					
EFFECTIVE AREA (ACRES) = 30.07 AREA-AVERAGED F_m (INCH/HR) = 0.22					
AREA-AVERAGED F_p (INCH/HR) = 0.27 AREA-AVERAGED $A_p = 0.81$					
TOTAL AREA (ACRES) = 30.07 PEAK FLOW RATE (CFS) = 55.20					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.70 HALFSTREET FLOOD WIDTH (FEET) = 29.58
 FLOW VELOCITY (FEET/SEC.) = 3.24 DEPTH*VELOCITY (FT*FT/SEC.) = 2.27

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 107.00 = 2211.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 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.) = 22.65
RAINFALL INTENSITY(INCH/HR) = 2.26
AREA-AVERAGED F_m (INCH/HR) = 0.22
AREA-AVERAGED F_p (INCH/HR) = 0.27
AREA-AVERAGED A_p = 0.81
EFFECTIVE STREAM AREA(ACRES) = 30.07
TOTAL STREAM AREA(ACRES) = 30.07
PEAK FLOW RATE(CFS) AT CONFLUENCE = 55.20

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 996.00
ELEVATION DATA: UPSTREAM(FEET) = 1109.00 DOWNSTREAM(FEET) = 1079.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 15.578
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.830
SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	7.01	0.27	0.90	86	15.58

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.90
SUBAREA RUNOFF(CFS) = 16.31
TOTAL AREA(ACRES) = 7.01 PEAK FLOW RATE(CFS) = 16.31

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 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.) = 15.58
RAINFALL INTENSITY(INCH/HR) = 2.83
AREA-AVERAGED F_m (INCH/HR) = 0.24
AREA-AVERAGED F_p (INCH/HR) = 0.27
AREA-AVERAGED A_p = 0.90
EFFECTIVE STREAM AREA(ACRES) = 7.01
TOTAL STREAM AREA(ACRES) = 7.01
PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.31

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.20	22.65	2.260	0.27(0.22)	0.81	30.1	103.00
2	16.31	15.58	2.830	0.27(0.24)	0.90	7.0	106.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	64.87	15.58	2.830	0.27(0.23)	0.83	27.7	106.00
2	67.92	22.65	2.260	0.27(0.23)	0.83	37.1	103.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 67.92 Tc(MIN.) = 22.65
EFFECTIVE AREA(ACRES) = 37.08 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 37.08
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 107.00 = 2211.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====
UPSTREAM ELEVATION(FEET) = 1079.50 DOWNSTREAM ELEVATION(FEET) = 1077.00
STREET LENGTH(FEET) = 375.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 28.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 14.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 75.19

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.75

HALFSTREET FLOOD WIDTH(FEET) = 32.26

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.78

STREET FLOW TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 24.34

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.165

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL ".4 DWELLING/ACRE"	C	8.42	0.27	0.90	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90

SUBAREA AREA (ACRES) = 8.42 SUBAREA RUNOFF (CFS) = 14.55
 EFFECTIVE AREA (ACRES) = 45.50 AREA-AVERAGED Fm (INCH/HR) = 0.23
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.84
 TOTAL AREA (ACRES) = 45.50 PEAK FLOW RATE (CFS) = 79.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.76 HALFSTREET FLOOD WIDTH (FEET) = 32.81
 FLOW VELOCITY (FEET/SEC.) = 3.77 DEPTH*VELOCITY (FT*FT/SEC.) = 2.87
 LONGEST FLOWPATH FROM NODE 103.00 TO NODE 108.00 = 2586.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 109.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<
 >>>> (STREET TABLE SECTION # 2 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 1077.00 DOWNSTREAM ELEVATION (FEET) = 1070.50
 STREET LENGTH (FEET) = 1254.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 28.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 14.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.78

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.81
 HALFSTREET FLOOD WIDTH (FEET) = 35.01
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.53
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.85
 STREET FLOW TRAVEL TIME (MIN.) = 5.92 Tc (MIN.) = 30.27
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.900

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	6.53	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA AREA (ACRES) = 6.53 SUBAREA RUNOFF (CFS) = 11.00

EFFECTIVE AREA (ACRES) = 52.03 AREA-AVERAGED Fm (INCH/HR) = 0.20

AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.75

TOTAL AREA (ACRES) = 52.03 PEAK FLOW RATE (CFS) = 79.42

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.79 HALFSTREET FLOOD WIDTH (FEET) = 34.28
 FLOW VELOCITY (FEET/SEC.) = 3.45 DEPTH*VELOCITY (FT*FT/SEC.) = 2.73
 LONGEST FLOWPATH FROM NODE 103.00 TO NODE 109.00 = 3840.00 FEET.

 FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====
** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.92	23.20	2.228	0.27(0.20)	0.73	42.6	106.00
2	79.42	30.27	1.900	0.27(0.20)	0.75	52.0	103.00

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 109.00 = 3840.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.75	35.75	1.719	0.27(0.07)	0.26	16.0	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 109.00 = 3100.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	99.09	23.20	2.228	0.27(0.17)	0.64	53.0	106.00
2	101.73	30.27	1.900	0.27(0.18)	0.65	65.6	103.00
3	94.72	35.75	1.719	0.27(0.17)	0.63	68.0	100.00

TOTAL AREA (ACRES) = 68.03

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 101.73 Tc (MIN.) = 30.268
EFFECTIVE AREA (ACRES) = 65.58 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.65
TOTAL AREA (ACRES) = 68.03
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 109.00 = 3840.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 109.00 TO NODE 116.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION (FEET) = 1070.50 DOWNSTREAM ELEVATION (FEET) = 1064.00
STREET LENGTH (FEET) = 853.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 21.50
INSIDE STREET CROSSFALL (DECIMAL) = 0.009
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 103.28

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.69
HALFSTREET FLOOD WIDTH (FEET) = 44.10
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.75
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.58
STREET FLOW TRAVEL TIME (MIN.) = 3.79 Tc (MIN.) = 34.06
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.97	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA (ACRES) = 1.97 SUBAREA RUNOFF (CFS) = 3.09
EFFECTIVE AREA (ACRES) = 67.55 AREA-AVERAGED Fm (INCH/HR) = 0.17
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.63
TOTAL AREA (ACRES) = 70.00 PEAK FLOW RATE (CFS) = 101.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.69 HALFSTREET FLOOD WIDTH (FEET) = 43.98
FLOW VELOCITY (FEET/SEC.) = 3.72 DEPTH*VELOCITY (FT*FT/SEC.) = 2.56
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 116.00 = 4693.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1000.00
ELEVATION DATA: UPSTREAM (FEET) = 1105.00 DOWNSTREAM (FEET) = 1085.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.878
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.697

SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	13.10	0.27	0.90	86	16.88

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
SUBAREA RUNOFF (CFS) = 28.91
TOTAL AREA (ACRES) = 13.10 PEAK FLOW RATE (CFS) = 28.91

FLOW PROCESS FROM NODE 111.00 TO NODE 114.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

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=====
UPSTREAM NODE ELEVATION(FEET) = 1085.00
DOWNSTREAM NODE ELEVATION(FEET) = 1075.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1500.00
"V" GUTTER WIDTH(FEET) = 5.00 GUTTER HIKE(FEET) = 0.250
PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0250
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(FEET) = 5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.012
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/          SCS SOIL   AREA      Fp          Ap          SCS
    LAND USE                GROUP   (ACRES) (INCH/HR) (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C       16.29    0.27      0.40      86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.40
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.88
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.35
AVERAGE FLOW DEPTH(FEET) = 0.80 FLOOD WIDTH(FEET) = 59.45
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 10.62 Tc(MIN.) = 27.50
SUBAREA AREA(ACRES) = 16.29 SUBAREA RUNOFF(CFS) = 27.90
EFFECTIVE AREA(ACRES) = 29.39 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 29.39 PEAK FLOW RATE(CFS) = 48.74

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.84 FLOOD WIDTH(FEET) = 62.57
FLOW VELOCITY(FEET/SEC.) = 2.42 DEPTH*VELOCITY(FT*FT/SEC) = 2.02
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 2500.00 FEET.

*****
FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 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.) = 27.50
RAINFALL INTENSITY(INCH/HR) = 2.01
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.62
EFFECTIVE STREAM AREA(ACRES) = 29.39
TOTAL STREAM AREA(ACRES) = 29.39
PEAK FLOW RATE(CFS) AT CONFLUENCE = 48.74

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 995.00
ELEVATION DATA: UPSTREAM(FEET) = 1103.00 DOWNSTREAM(FEET) = 1090.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.341

```

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.566
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	6.69	0.27	0.90	86	18.34

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
 SUBAREA RUNOFF(CFS) = 13.97
 TOTAL AREA(ACRES) = 6.69 PEAK FLOW RATE(CFS) = 13.97

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

=====

UPSTREAM NODE ELEVATION(FEET) = 1090.00
 DOWNSTREAM NODE ELEVATION(FEET) = 1075.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1225.00
 "V" GUTTER WIDTH(FEET) = 5.00 GUTTER HIKE(FEET) = 0.250
 PAVEMENT LIP(FEET) = 0.010 MANNING'S N = .0250
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) = 5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.079
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL ".4 DWELLING/ACRE"	C	12.43	0.27	0.90	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.65
 AVERAGE FLOW DEPTH(FEET) = 0.62 FLOOD WIDTH(FEET) = 41.39
 "V" GUTTER FLOW TRAVEL TIME(MIN.) = 7.70 Tc(MIN.) = 26.04
 SUBAREA AREA(ACRES) = 12.43 SUBAREA RUNOFF(CFS) = 20.52
 EFFECTIVE AREA(ACRES) = 19.12 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.90
 TOTAL AREA(ACRES) = 19.12 PEAK FLOW RATE(CFS) = 31.57

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) = 0.67 FLOOD WIDTH(FEET) = 46.26
 FLOW VELOCITY(FEET/SEC.) = 2.81 DEPTH*VELOCITY(FT*FT/SEC) = 1.89
 LONGEST FLOWPATH FROM NODE 112.00 TO NODE 114.00 = 2220.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 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.) = 26.04
 RAINFALL INTENSITY(INCH/HR) = 2.08
 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.27

AREA-AVERAGED $A_p = 0.90$
 EFFECTIVE STREAM AREA (ACRES) = 19.12
 TOTAL STREAM AREA (ACRES) = 19.12
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 31.57

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.74	27.50	2.012	0.27(0.17)	0.62	29.4	110.00
2	31.57	26.04	2.079	0.27(0.24)	0.90	19.1	112.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.39	26.04	2.079	0.27(0.20)	0.74	46.9	112.00
2	79.15	27.50	2.012	0.27(0.20)	0.73	48.5	110.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 79.39 Tc (MIN.) = 26.04
 EFFECTIVE AREA (ACRES) = 46.95 AREA-AVERAGED Fm (INCH/HR) = 0.20
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.74
 TOTAL AREA (ACRES) = 48.51
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 2500.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 116.00 IS CODE = 91

 >>>> COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA <<<<<
 =====

UPSTREAM NODE ELEVATION (FEET) = 1075.00
 DOWNSTREAM NODE ELEVATION (FEET) = 1064.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 755.00
 "V" GUTTER WIDTH (FEET) = 5.00 GUTTER HIKE (FEET) = 0.130
 PAVEMENT LIP (FEET) = 0.010 MANNING'S N = .0150
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH (FEET) = 2.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.977
 SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	12.83	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 90.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.52
 AVERAGE FLOW DEPTH (FEET) = 0.66 FLOOD WIDTH (FEET) = 56.86
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 2.28 Tc (MIN.) = 28.32
 SUBAREA AREA (ACRES) = 12.83 SUBAREA RUNOFF (CFS) = 22.52
 EFFECTIVE AREA (ACRES) = 59.78 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.60
 TOTAL AREA (ACRES) = 61.34 PEAK FLOW RATE (CFS) = 97.60

END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH (FEET) = 0.68 FLOOD WIDTH (FEET) = 58.67

FLOW VELOCITY (FEET/SEC.) = 5.59 DEPTH*VELOCITY (FT*FT/SEC) = 3.78
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 3255.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 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.) =	28.32
RAINFALL INTENSITY (INCH/HR) =	1.98
AREA-AVERAGED Fm (INCH/HR) =	0.16
AREA-AVERAGED Fp (INCH/HR) =	0.27
AREA-AVERAGED Ap =	0.60
EFFECTIVE STREAM AREA (ACRES) =	59.78
TOTAL STREAM AREA (ACRES) =	61.34
PEAK FLOW RATE (CFS) AT CONFLUENCE =	97.60

FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) =	1931.00
ELEVATION DATA: UPSTREAM (FEET) =	1082.00
DOWNSTREAM (FEET) =	1064.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20						
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) =	15.969					
* 100 YEAR RAINFALL INTENSITY (INCH/HR) =	2.788					
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	C	24.39	0.27	0.10	86	15.97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) =	0.27					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.10					
SUBAREA RUNOFF (CFS) =	60.60					
TOTAL AREA (ACRES) =	24.39					
PEAK FLOW RATE (CFS) =	60.60					

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 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.) =	15.97
RAINFALL INTENSITY (INCH/HR) =	2.79
AREA-AVERAGED Fm (INCH/HR) =	0.03
AREA-AVERAGED Fp (INCH/HR) =	0.27
AREA-AVERAGED Ap =	0.10
EFFECTIVE STREAM AREA (ACRES) =	24.39
TOTAL STREAM AREA (ACRES) =	24.39
PEAK FLOW RATE (CFS) AT CONFLUENCE =	60.60

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	97.60	28.32	1.977	0.27 (0.16)	0.60	59.8	112.00
1	96.86	29.80	1.918	0.27 (0.16)	0.60	61.3	110.00
2	60.60	15.97	2.788	0.27 (0.03)	0.10	24.4	115.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.24	15.97	2.788	0.27 (0.11)	0.39	58.1	115.00
2	140.40	28.32	1.977	0.27 (0.12)	0.45	84.2	112.00
3	138.36	29.80	1.918	0.27 (0.12)	0.46	85.7	110.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 140.40 Tc (MIN.) = 28.32
EFFECTIVE AREA (ACRES) = 84.17 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 85.73
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 3255.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.24	15.97	2.788	0.27 (0.11)	0.39	58.1	115.00
2	140.40	28.32	1.977	0.27 (0.12)	0.45	84.2	112.00
3	138.36	29.80	1.918	0.27 (0.12)	0.46	85.7	110.00

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 116.00 = 3255.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	99.09	27.03	2.033	0.27 (0.17)	0.62	55.0	106.00
2	101.73	34.06	1.770	0.27 (0.17)	0.63	67.5	103.00
3	94.72	39.65	1.616	0.27 (0.17)	0.62	70.0	100.00

LONGEST FLOWPATH FROM NODE 103.00 TO NODE 116.00 = 4693.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	222.49	15.97	2.788	0.27 (0.13)	0.47	90.6	115.00
2	239.47	27.03	2.033	0.27 (0.14)	0.52	136.5	106.00
3	239.97	28.32	1.977	0.27 (0.14)	0.52	141.5	112.00
4	238.49	29.80	1.918	0.27 (0.14)	0.53	145.7	110.00
5	228.68	34.06	1.770	0.27 (0.15)	0.53	153.3	103.00
6	209.77	39.65	1.616	0.27 (0.14)	0.53	155.7	100.00

TOTAL AREA (ACRES) = 155.73

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 239.97 Tc (MIN.) = 28.317
EFFECTIVE AREA (ACRES) = 141.45 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 155.73
LONGEST FLOWPATH FROM NODE 103.00 TO NODE 116.00 = 4693.00 FEET.

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<
=====

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<<
=====

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 998.00
ELEVATION DATA: UPSTREAM (FEET) = 1098.00 DOWNSTREAM (FEET) = 1077.60

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.482
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.589
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 C 5.21 0.27 0.10 86 10.48
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA RUNOFF (CFS) = 16.70
TOTAL AREA (ACRES) = 5.21 PEAK FLOW RATE (CFS) = 16.70

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 3 USED)<<<<<<
=====

UPSTREAM ELEVATION (FEET) = 1077.60 DOWNSTREAM ELEVATION (FEET) = 1073.00
STREET LENGTH (FEET) = 906.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 36.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 18.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.66
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.73
HALFSTREET FLOOD WIDTH(FEET) = 36.60
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.07
STREET FLOW TRAVEL TIME(MIN.) = 5.33 Tc(MIN.) = 15.81
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.805
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL ".4 DWELLING/ACRE"	C	9.46	0.27	0.90	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
SUBAREA AREA(ACRES) = 9.46 SUBAREA RUNOFF(CFS) = 21.80
EFFECTIVE AREA(ACRES) = 14.67 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 14.67 PEAK FLOW RATE(CFS) = 34.82

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.78 HALFSTREET FLOOD WIDTH(FEET) = 41.48
FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH*VELOCITY(FT*FT/SEC.) = 2.28
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 1904.00 FEET.

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>(STREET TABLE SECTION # 3 USED)<<<<<<
=====

UPSTREAM ELEVATION(FEET) = 1073.00 DOWNSTREAM ELEVATION(FEET) = 1068.00
STREET LENGTH(FEET) = 1364.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 36.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 18.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.72
STREET FLOW SPLITS OVER STREET-CROWN
FULL DEPTH(FEET) = 0.78 FLOOD WIDTH(FEET) = 41.48
FULL HALF-STREET VELOCITY(FEET/SEC.) = 2.50
SPLIT DEPTH(FEET) = 0.74 SPLIT FLOOD WIDTH(FEET) = 37.12
SPLIT FLOW(CFS) = 23.95 SPLIT VELOCITY(FEET/SEC.) = 2.41
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.78
HALFSTREET FLOOD WIDTH(FEET) = 41.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.50
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.94

STREET FLOW TRAVEL TIME(MIN.) = 9.10 Tc(MIN.) = 24.91

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.135

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" C 19.88 0.27 0.50 86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.50

SUBAREA AREA(ACRES) = 19.88 SUBAREA RUNOFF(CFS) = 35.77

EFFECTIVE AREA(ACRES) = 34.55 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.55

TOTAL AREA(ACRES) = 34.55 PEAK FLOW RATE(CFS) = 61.76

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 HALFSTREET FLOOD WIDTH(FEET) = 42.12

FLOW VELOCITY(FEET/SEC.) = 2.56 DEPTH*VELOCITY(FT*FT/SEC.) = 2.02

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,

AND L = 1364.0 FT WITH ELEVATION-DROP = 5.0 FT, IS 39.4 CFS,

WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 203.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 3268.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 205.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 1068.00 DOWNSTREAM ELEVATION(FEET) = 1066.80

STREET LENGTH(FEET) = 369.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50

INSIDE STREET CROSSFALL(DECIMAL) = 0.009

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.56

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.68

HALFSTREET FLOOD WIDTH(FEET) = 43.43

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.37

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.60

STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 27.50

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.012

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL C 0.90 0.27 0.10 86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.61

EFFECTIVE AREA(ACRES) = 35.45 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.54
 TOTAL AREA(ACRES) = 35.45 PEAK FLOW RATE(CFS) = 61.76
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 43.31
 FLOW VELOCITY(FEET/SEC.) = 2.36 DEPTH*VELOCITY(FT*FT/SEC.) = 1.59
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 3637.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 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.) = 27.50
 RAINFALL INTENSITY(INCH/HR) = 2.01
 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.54
 EFFECTIVE STREAM AREA(ACRES) = 35.45
 TOTAL STREAM AREA(ACRES) = 35.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.76

 FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1275.00
 ELEVATION DATA: UPSTREAM(FEET) = 1084.00 DOWNSTREAM(FEET) = 1066.80

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.562
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.220
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	8.28	0.27	0.10	86	12.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF(CFS) = 23.79
 TOTAL AREA(ACRES) = 8.28 PEAK FLOW RATE(CFS) = 23.79

 FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 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.) = 12.56
 RAINFALL INTENSITY(INCH/HR) = 3.22

AREA-AVERAGED Fm (INCH/HR) = 0.03
 AREA-AVERAGED Fp (INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 8.28
 TOTAL STREAM AREA (ACRES) = 8.28
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 23.79

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.76	27.50	2.012	0.27 (0.15)	0.54	35.5	200.00
2	23.79	12.56	3.220	0.27 (0.03)	0.10	8.3	204.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	70.26	12.56	3.220	0.27 (0.11)	0.39	24.5	204.00
2	76.55	27.50	2.012	0.27 (0.12)	0.45	43.7	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 76.55 Tc (MIN.) = 27.50
 EFFECTIVE AREA (ACRES) = 43.73 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 43.73
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 3637.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1020.00
 ELEVATION DATA: UPSTREAM (FEET) = 1098.30 DOWNSTREAM (FEET) = 1077.60

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.963

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.689

SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	3.52	0.27	0.90	86	16.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90

SUBAREA RUNOFF (CFS) = 7.74

TOTAL AREA (ACRES) = 3.52 PEAK FLOW RATE (CFS) = 7.74

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1077.60 DOWNSTREAM ELEVATION(FEET) = 1068.00
STREET LENGTH(FEET) = 2313.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 36.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 18.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.79
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.57
HALFSTREET FLOOD WIDTH(FEET) = 24.15
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.20
STREET FLOW TRAVEL TIME(MIN.) = 18.41 Tc(MIN.) = 35.38
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	3.94	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA(ACRES) = 3.94 SUBAREA RUNOFF(CFS) = 6.04
EFFECTIVE AREA(ACRES) = 7.46 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 7.46 PEAK FLOW RATE(CFS) = 10.74

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 24.08
FLOW VELOCITY(FEET/SEC.) = 2.10 DEPTH*VELOCITY(FT*FT/SEC.) = 1.20
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 3333.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 304.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1068.00 DOWNSTREAM ELEVATION(FEET) = 1037.50
STREET LENGTH(FEET) = 1287.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50
INSIDE STREET CROSSFALL(DECIMAL) = 0.009
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.02
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.39
 HALFSTREET FLOOD WIDTH(FEET) = 22.93
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.30
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.28
 STREET FLOW TRAVEL TIME(MIN.) = 6.49 Tc(MIN.) = 41.87
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL ".4 DWELLING/ACRE"	C	10.57	0.27	0.90	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
 SUBAREA AREA(ACRES) = 10.57 SUBAREA RUNOFF(CFS) = 12.55
 EFFECTIVE AREA(ACRES) = 18.03 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.73
 TOTAL AREA(ACRES) = 18.03 PEAK FLOW RATE(CFS) = 22.17

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 25.62
 FLOW VELOCITY(FEET/SEC.) = 3.50 DEPTH*VELOCITY(FT*FT/SEC.) = 1.44
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 4620.00 FEET.

 FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 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.) = 41.87
 RAINFALL INTENSITY(INCH/HR) = 1.56
 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.73
 EFFECTIVE STREAM AREA(ACRES) = 18.03
 TOTAL STREAM AREA(ACRES) = 18.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.17

 FLOW PROCESS FROM NODE 300.00 TO NODE 303.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 1168.00
 ELEVATION DATA: UPSTREAM(FEET) = 1098.30 DOWNSTREAM(FEET) = 1086.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 19.663

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.461

SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	C	6.01	0.27	0.80	86	19.66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.80
SUBAREA RUNOFF (CFS) = 12.13
TOTAL AREA (ACRES) = 6.01 PEAK FLOW RATE (CFS) = 12.13

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 1086.00 DOWNSTREAM ELEVATION (FEET) = 1037.50
STREET LENGTH (FEET) = 2580.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 24.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 12.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.43
HALFSTREET FLOOD WIDTH (FEET) = 15.80
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.45
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.49
STREET FLOW TRAVEL TIME (MIN.) = 12.47 Tc (MIN.) = 32.14

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.833

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	4.70	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 7.64
EFFECTIVE AREA (ACRES) = 10.71 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.49
TOTAL AREA (ACRES) = 10.71 PEAK FLOW RATE (CFS) = 16.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 15.89
FLOW VELOCITY (FEET/SEC.) = 3.50 DEPTH*VELOCITY (FT*FT/SEC.) = 1.52
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 3748.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 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.) = 32.14
RAINFALL INTENSITY(INCH/HR) = 1.83
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.49
EFFECTIVE STREAM AREA(ACRES) = 10.71
TOTAL STREAM AREA(ACRES) = 10.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.37

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	22.17	41.87	1.564	0.27(0.20)	0.73	18.0	300.00
2	16.37	32.14	1.833	0.27(0.13)	0.49	10.7	300.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.74	32.14	1.833	0.27(0.17)	0.62	24.5	300.00
2	35.95	41.87	1.564	0.27(0.17)	0.64	28.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 36.74 Tc(MIN.) = 32.14
EFFECTIVE AREA(ACRES) = 24.55 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 28.74
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 4620.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 307.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1037.50 DOWNSTREAM ELEVATION(FEET) = 1035.00
STREET LENGTH(FEET) = 531.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50
INSIDE STREET CROSSFALL(DECIMAL) = 0.009
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.54
STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.57
 HALFSTREET FLOOD WIDTH (FEET) = 43.00
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.17
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.24
 STREET FLOW TRAVEL TIME (MIN.) = 4.08 Tc (MIN.) = 36.22
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.706

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.06	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA AREA (ACRES) = 1.06 SUBAREA RUNOFF (CFS) = 1.60
 EFFECTIVE AREA (ACRES) = 25.61 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.60
 TOTAL AREA (ACRES) = 29.80 PEAK FLOW RATE (CFS) = 36.74
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 43.00
 FLOW VELOCITY (FEET/SEC.) = 2.15 DEPTH*VELOCITY (FT*FT/SEC.) = 1.22
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 5151.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 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.) = 36.22
 RAINFALL INTENSITY (INCH/HR) = 1.71
 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.60
 EFFECTIVE STREAM AREA (ACRES) = 25.61
 TOTAL STREAM AREA (ACRES) = 29.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 36.74

 FLOW PROCESS FROM NODE 305.00 TO NODE 307.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 2160.00
 ELEVATION DATA: UPSTREAM (FEET) = 1076.00 DOWNSTREAM (FEET) = 1035.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 33.645
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.783
 SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL FAIR COVER "PASTURE, DRYLAND"	C	23.41	0.14	1.00	93	33.64

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.14
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.00
 SUBAREA RUNOFF(CFS) = 34.61
 TOTAL AREA(ACRES) = 23.41 PEAK FLOW RATE(CFS) = 34.61

FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 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.) = 33.64
 RAINFALL INTENSITY(INCH/HR) = 1.78
 AREA-AVERAGED F_m (INCH/HR) = 0.14
 AREA-AVERAGED F_p (INCH/HR) = 0.14
 AREA-AVERAGED A_p = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 23.41
 TOTAL STREAM AREA(ACRES) = 23.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.61

FLOW PROCESS FROM NODE 306.00 TO NODE 307.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 991.00
 ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.479
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.590
 SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	C	5.84	0.27	0.10	86	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.10
 SUBAREA RUNOFF(CFS) = 18.73
 TOTAL AREA(ACRES) = 5.84 PEAK FLOW RATE(CFS) = 18.73

FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 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.) = 10.48
 RAINFALL INTENSITY(INCH/HR) = 3.59
 AREA-AVERAGED F_m (INCH/HR) = 0.03
 AREA-AVERAGED F_p (INCH/HR) = 0.27
 AREA-AVERAGED A_p = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 5.84
 TOTAL STREAM AREA(ACRES) = 5.84

PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.73

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.74	36.22	1.706	0.27(0.16)	0.60	25.6	300.00
1	35.95	46.00	1.478	0.27(0.17)	0.62	29.8	300.00
2	34.61	33.64	1.783	0.14(0.14)	1.00	23.4	305.00
3	18.73	10.48	3.590	0.27(0.03)	0.10	5.8	306.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	64.98	10.48	3.590	0.19(0.12)	0.60	20.5	306.00
2	79.68	33.64	1.783	0.19(0.14)	0.72	53.0	305.00
3	78.55	36.22	1.706	0.19(0.14)	0.72	54.9	300.00
4	71.76	46.00	1.478	0.20(0.14)	0.72	59.0	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 79.68 Tc(MIN.) = 33.64
EFFECTIVE AREA(ACRES) = 53.04 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 59.05
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 5151.00 FEET.

FLOW PROCESS FROM NODE 307.00 TO NODE 310.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1035.00 DOWNSTREAM ELEVATION(FEET) = 1027.00
STREET LENGTH(FEET) = 620.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50
INSIDE STREET CROSSFALL(DECIMAL) = 0.009
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 81.28
STREET FLOWING FULL
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.61
HALFSTREET FLOOD WIDTH(FEET) = 43.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.99
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.42
STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 36.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.705
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 2.12 0.27 0.10 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA (ACRES) = 2.12 SUBAREA RUNOFF (CFS) = 3.20
EFFECTIVE AREA (ACRES) = 55.16 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.19 AREA-AVERAGED Ap = 0.70
TOTAL AREA (ACRES) = 61.17 PEAK FLOW RATE (CFS) = 79.68
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.60 HALFSTREET FLOOD WIDTH (FEET) = 43.00
FLOW VELOCITY (FEET/SEC.) = 3.97 DEPTH*VELOCITY (FT*FT/SEC.) = 2.39
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 310.00 = 5771.00 FEET.

FLOW PROCESS FROM NODE 310.00 TO NODE 310.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

FLOW PROCESS FROM NODE 305.00 TO NODE 309.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1895.00
ELEVATION DATA: UPSTREAM (FEET) = 1076.00 DOWNSTREAM (FEET) = 1055.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 24.527

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.155

SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	14.32	0.27	0.90	86	24.53
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90						
SUBAREA RUNOFF (CFS) = 24.62						
TOTAL AREA (ACRES) = 14.32 PEAK FLOW RATE (CFS) = 24.62						

FLOW PROCESS FROM NODE 309.00 TO NODE 309.00 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.) = 24.53
RAINFALL INTENSITY (INCH/HR) = 2.16
AREA-AVERAGED Fm (INCH/HR) = 0.24
AREA-AVERAGED Fp (INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.90
EFFECTIVE STREAM AREA (ACRES) = 14.32

TOTAL STREAM AREA(ACRES) = 14.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 24.62

 FLOW PROCESS FROM NODE 308.00 TO NODE 309.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1300.00
 ELEVATION DATA: UPSTREAM(FEET) = 1064.00 DOWNSTREAM(FEET) = 1055.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 19.607
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.465

SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	14.32	0.27	0.60	86	19.61

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.60
 SUBAREA RUNOFF(CFS) = 29.67
 TOTAL AREA(ACRES) = 14.32 PEAK FLOW RATE(CFS) = 29.67

 FLOW PROCESS FROM NODE 309.00 TO NODE 309.00 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.) = 19.61
 RAINFALL INTENSITY(INCH/HR) = 2.46
 AREA-AVERAGED F_m (INCH/HR) = 0.16
 AREA-AVERAGED F_p (INCH/HR) = 0.27
 AREA-AVERAGED A_p = 0.60
 EFFECTIVE STREAM AREA(ACRES) = 14.32
 TOTAL STREAM AREA(ACRES) = 14.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.67

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	$F_p(F_m)$ (INCH/HR)	A_p (ACRES)	A_e (ACRES)	HEADWATER NODE
1	24.62	24.53	2.155	0.27(0.24)	0.90	14.3	305.00
2	29.67	19.61	2.465	0.27(0.16)	0.60	14.3	308.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	$F_p(F_m)$ (INCH/HR)	A_p (ACRES)	A_e (ACRES)	HEADWATER NODE
1	52.54	19.61	2.465	0.27(0.20)	0.73	25.8	308.00
2	50.29	24.53	2.155	0.27(0.20)	0.75	28.6	305.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 52.54 Tc (MIN.) = 19.61
EFFECTIVE AREA (ACRES) = 25.77 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.73
TOTAL AREA (ACRES) = 28.64
LONGEST FLOWPATH FROM NODE 305.00 TO NODE 309.00 = 1895.00 FEET.

FLOW PROCESS FROM NODE 309.00 TO NODE 310.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION (FEET)	=	1055.00	DOWNSTREAM ELEVATION (FEET)	=	1027.00
STREET LENGTH (FEET)	=	813.00	CURB HEIGHT (INCHES)	=	8.0
STREET HALFWIDTH (FEET)	=	19.00			

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 9.50
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 55.87

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.55
HALFSTREET FLOOD WIDTH (FEET) = 19.00
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.36
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 3.48
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 21.74
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.317

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	3.23	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA (ACRES) = 3.23 SUBAREA RUNOFF (CFS) = 6.66
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.66
TOTAL AREA (ACRES) = 31.87 PEAK FLOW RATE (CFS) = 55.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 19.00
FLOW VELOCITY (FEET/SEC.) = 6.35 DEPTH*VELOCITY (FT*FT/SEC.) = 3.47
LONGEST FLOWPATH FROM NODE 305.00 TO NODE 310.00 = 2708.00 FEET.

FLOW PROCESS FROM NODE 310.00 TO NODE 310.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.77	21.74	2.317	0.27 (0.18)	0.66	29.0	308.00
2	53.41	26.70	2.048	0.27 (0.19)	0.68	31.9	305.00

LONGEST FLOWPATH FROM NODE 305.00 TO NODE 310.00 = 2708.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	64.98	13.26	3.117	0.20 (0.11)	0.55	22.7	306.00
2	79.68	36.23	1.705	0.19 (0.13)	0.70	55.2	305.00
3	78.55	38.82	1.636	0.19 (0.13)	0.70	57.0	300.00
4	71.76	48.70	1.428	0.20 (0.14)	0.70	61.2	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 310.00 = 5771.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.73	13.26	3.117	0.23 (0.14)	0.60	40.3	306.00
2	126.17	21.74	2.317	0.23 (0.15)	0.63	63.6	308.00
3	126.98	26.70	2.048	0.23 (0.15)	0.66	73.5	305.00
4	123.25	36.23	1.705	0.22 (0.15)	0.69	87.0	305.00
5	120.14	38.82	1.636	0.22 (0.15)	0.69	88.8	300.00
6	107.38	48.70	1.428	0.22 (0.16)	0.69	93.0	300.00

TOTAL AREA (ACRES) = 93.04

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 126.98 Tc (MIN.) = 26.703
 EFFECTIVE AREA (ACRES) = 73.55 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.63
 TOTAL AREA (ACRES) = 93.04
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 310.00 = 5771.00 FEET.

 FLOW PROCESS FROM NODE 310.00 TO NODE 310.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

 FLOW PROCESS FROM NODE 310.00 TO NODE 310.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

 FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 470.00
 ELEVATION DATA: UPSTREAM (FEET) = 1091.00 DOWNSTREAM (FEET) = 1078.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.695

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.361
 SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	C	4.91	0.27	0.90	86	11.69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90
 SUBAREA RUNOFF (CFS) = 13.77
 TOTAL AREA (ACRES) = 4.91 PEAK FLOW RATE (CFS) = 13.77

 FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 61

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> (STANDARD CURB SECTION USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 1078.00 DOWNSTREAM ELEVATION (FEET) = 1073.00
 STREET LENGTH (FEET) = 670.00 CURB HEIGHT (INCHES) = 6.0
 STREET HALFWIDTH (FEET) = 26.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 13.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.010
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.010

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.81

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.44

HALFSTREET FLOOD WIDTH (FEET) = 26.00

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.49

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.10

STREET FLOW TRAVEL TIME (MIN.) = 4.48 Tc (MIN.) = 16.17

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.767

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	7.31	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA AREA (ACRES) = 7.31 SUBAREA RUNOFF (CFS) = 18.02

EFFECTIVE AREA (ACRES) = 12.22 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.42

TOTAL AREA (ACRES) = 12.22 PEAK FLOW RATE (CFS) = 29.17

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 26.00

FLOW VELOCITY (FEET/SEC.) = 2.75 DEPTH*VELOCITY (FT*FT/SEC.) = 1.29

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 1140.00 FEET.

 FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 1065.00
FLOW LENGTH(FEET) = 426.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.70
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 29.17
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 17.09
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1566.00 FEET.

*****
FLOW PROCESS FROM NODE 403.00 TO NODE 103.00 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.) = 17.09
RAINFALL INTENSITY(INCH/HR) = 2.68
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.42
EFFECTIVE STREAM AREA(ACRES) = 12.22
TOTAL STREAM AREA(ACRES) = 12.22
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.17

*****
FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 426.00
ELEVATION DATA: UPSTREAM(FEET) = 1073.00 DOWNSTREAM(FEET) = 1070.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.228
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.874
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 C 5.25 0.27 0.10 86 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA RUNOFF(CFS) = 18.18
TOTAL AREA(ACRES) = 5.25 PEAK FLOW RATE(CFS) = 18.18

*****
FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 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.) = 9.23
RAINFALL INTENSITY(INCH/HR) = 3.87
AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 5.25
TOTAL STREAM AREA(ACRES) = 5.25
PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.18

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	29.17	17.09	2.676	0.27(0.11)	0.42	12.2	400.00
2	18.18	9.23	3.874	0.27(0.03)	0.10	5.2	402.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.29	9.23	3.874	0.27(0.08)	0.28	11.8	402.00
2	41.69	17.09	2.676	0.27(0.09)	0.32	17.5	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 41.69 Tc(MIN.) = 17.09
EFFECTIVE AREA(ACRES) = 17.47 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 17.47
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1566.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1055.50
FLOW LENGTH(FEET) = 827.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.95
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.69
PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 18.48
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 2393.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 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.) = 18.48
RAINFALL INTENSITY(INCH/HR) = 2.55
AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp (INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.32
 EFFECTIVE STREAM AREA (ACRES) = 17.47
 TOTAL STREAM AREA (ACRES) = 17.47
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 41.69

 FLOW PROCESS FROM NODE 403.00 TO NODE 405.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 827.00
 ELEVATION DATA: UPSTREAM (FEET) = 1070.00 DOWNSTREAM (FEET) = 1060.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.910
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.504
 SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	8.53	0.27	0.10	86	10.91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF (CFS) = 26.69
 TOTAL AREA (ACRES) = 8.53 PEAK FLOW RATE (CFS) = 26.69

 FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 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.) = 10.91
 RAINFALL INTENSITY (INCH/HR) = 3.50
 AREA-AVERAGED Fm (INCH/HR) = 0.03
 AREA-AVERAGED Fp (INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 8.53
 TOTAL STREAM AREA (ACRES) = 8.53
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.69

 FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 712.00
 ELEVATION DATA: UPSTREAM (FEET) = 1070.00 DOWNSTREAM (FEET) = 1060.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.973
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.698
 SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL C 4.00 0.27 0.10 86 9.97
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF (CFS) = 13.22
 TOTAL AREA (ACRES) = 4.00 PEAK FLOW RATE (CFS) = 13.22

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 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.) = 9.97
 RAINFALL INTENSITY (INCH/HR) = 3.70
 AREA-AVERAGED Fm (INCH/HR) = 0.03
 AREA-AVERAGED Fp (INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 4.00
 TOTAL STREAM AREA (ACRES) = 4.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 13.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.29	10.61	3.562	0.27 (0.08)	0.28	11.8	402.00
1	41.69	18.48	2.554	0.27 (0.09)	0.32	17.5	400.00
2	26.69	10.91	3.504	0.27 (0.03)	0.10	8.5	403.00
3	13.22	9.97	3.698	0.27 (0.03)	0.10	4.0	404.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.28	9.97	3.698	0.27 (0.05)	0.19	22.9	404.00
2	80.42	10.61	3.562	0.27 (0.05)	0.19	24.1	402.00
3	80.51	10.91	3.504	0.27 (0.05)	0.19	24.6	403.00
4	70.18	18.48	2.554	0.27 (0.06)	0.23	30.0	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 80.51 Tc (MIN.) = 10.91
 EFFECTIVE AREA (ACRES) = 24.59 AREA-AVERAGED Fm (INCH/HR) = 0.05
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.19
 TOTAL AREA (ACRES) = 30.00
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 2393.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 411.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 1055.50 DOWNSTREAM (FEET) = 1041.00

FLOW LENGTH(FEET) = 609.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.77
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 80.51
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 11.55
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 411.00 = 3002.00 FEET.

 FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 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.) = 11.55
 RAINFALL INTENSITY(INCH/HR) = 3.39
 AREA-AVERAGED Fm(INCH/HR) = 0.05
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.19
 EFFECTIVE STREAM AREA(ACRES) = 24.59
 TOTAL STREAM AREA(ACRES) = 30.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 80.51

 FLOW PROCESS FROM NODE 405.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 609.00
 ELEVATION DATA: UPSTREAM(FEET) = 1060.50 DOWNSTREAM(FEET) = 1046.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.344
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.116

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	4.01	0.27	0.10	86	8.34

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF(CFS) = 14.76
 TOTAL AREA(ACRES) = 4.01 PEAK FLOW RATE(CFS) = 14.76

 FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 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.) = 8.34
 RAINFALL INTENSITY(INCH/HR) = 4.12
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27

AREA-AVERAGED $A_p = 0.10$
 EFFECTIVE STREAM AREA (ACRES) = 4.01
 TOTAL STREAM AREA (ACRES) = 4.01
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 14.76

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.28	10.64	3.558	0.27 (0.05)	0.19	22.9	404.00
1	80.42	11.26	3.439	0.27 (0.05)	0.19	24.1	402.00
1	80.51	11.55	3.386	0.27 (0.05)	0.19	24.6	403.00
1	70.18	19.15	2.500	0.27 (0.06)	0.23	30.0	400.00
2	14.76	8.34	4.116	0.27 (0.03)	0.10	4.0	405.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	86.83	8.34	4.116	0.27 (0.05)	0.17	22.0	405.00
2	92.02	10.64	3.558	0.27 (0.05)	0.17	26.9	404.00
3	92.73	11.26	3.439	0.27 (0.05)	0.18	28.2	402.00
4	92.63	11.55	3.386	0.27 (0.05)	0.18	28.6	403.00
5	79.11	19.15	2.500	0.27 (0.06)	0.22	34.0	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 92.73 Tc (MIN.) = 11.26
 EFFECTIVE AREA (ACRES) = 28.15 AREA-AVERAGED Fm (INCH/HR) = 0.05
 AREA-AVERAGED Fp (INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 34.01
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 411.00 = 3002.00 FEET.

 FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

 FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 1078.00
 ELEVATION DATA: UPSTREAM (FEET) = 1089.00 DOWNSTREAM (FEET) = 1070.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 11.135

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.461

SUBAREA Tc AND LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	13.63	0.27	0.10	86	11.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) =			0.27			
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			0.10			

SUBAREA RUNOFF(CFS) = 42.13
TOTAL AREA(ACRES) = 13.63 PEAK FLOW RATE(CFS) = 42.13

FLOW PROCESS FROM NODE 407.00 TO NODE 409.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET)	=	1065.00	DOWNSTREAM(FEET)	=	1043.00
FLOW LENGTH(FEET)	=	652.00	MANNING'S N	=	0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS		17.6	INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.)	=	15.34			
ESTIMATED PIPE DIAMETER(INCH)	=	27.00	NUMBER OF PIPES	=	1
PIPE-FLOW(CFS)	=	42.13			
PIPE TRAVEL TIME(MIN.)	=	0.71	Tc(MIN.)	=	11.84
LONGEST FLOWPATH FROM NODE		406.00	TO NODE		409.00 = 1730.00 FEET.

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 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.)	=	11.84
RAINFALL INTENSITY(INCH/HR)	=	3.34
AREA-AVERAGED Fm(INCH/HR)	=	0.03
AREA-AVERAGED Fp(INCH/HR)	=	0.27
AREA-AVERAGED Ap	=	0.10
EFFECTIVE STREAM AREA(ACRES)	=	13.63
TOTAL STREAM AREA(ACRES)	=	13.63
PEAK FLOW RATE(CFS) AT CONFLUENCE	=	42.13

FLOW PROCESS FROM NODE 407.00 TO NODE 409.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET)	=	652.00			
ELEVATION DATA: UPSTREAM(FEET)	=	1054.00	DOWNSTREAM(FEET)	=	1048.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20							
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.)	=	10.370					
* 100 YEAR RAINFALL INTENSITY(INCH/HR)	=	3.612					
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	C	6.63	0.27	0.10	86	10.37	
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR)	=	0.27					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap	=	0.10					
SUBAREA RUNOFF(CFS)	=	21.39					
TOTAL AREA(ACRES)	=	6.63	PEAK FLOW RATE(CFS)	=	21.39		

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 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.) = 10.37
RAINFALL INTENSITY(INCH/HR) = 3.61
AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 6.63
TOTAL STREAM AREA(ACRES) = 6.63
PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	42.13	11.84	3.336	0.27(0.03)	0.10	13.6	406.00
2	21.39	10.37	3.612	0.27(0.03)	0.10	6.6	407.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	61.36	10.37	3.612	0.27(0.03)	0.10	18.6	407.00
2	61.87	11.84	3.336	0.27(0.03)	0.10	20.3	406.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 61.87 Tc(MIN.) = 11.84
EFFECTIVE AREA(ACRES) = 20.26 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 20.26
LONGEST FLOWPATH FROM NODE 406.00 TO NODE 409.00 = 1730.00 FEET.

FLOW PROCESS FROM NODE 409.00 TO NODE 411.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 1043.00 DOWNSTREAM(FEET) = 1041.00
FLOW LENGTH(FEET) = 341.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.72
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 61.87
PIPE TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 12.50
LONGEST FLOWPATH FROM NODE 406.00 TO NODE 411.00 = 2071.00 FEET.

FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 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.) = 12.50
 RAINFALL INTENSITY(INCH/HR) = 3.23
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 20.26
 TOTAL STREAM AREA(ACRES) = 20.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.87

 FLOW PROCESS FROM NODE 409.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 915.00
 ELEVATION DATA: UPSTREAM(FEET) = 1080.00 DOWNSTREAM(FEET) = 1046.00

$$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.983

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.937

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	2.05	0.27	0.10	86	8.98

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA RUNOFF(CFS) = 7.21

TOTAL AREA(ACRES) = 2.05 PEAK FLOW RATE(CFS) = 7.21

 FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 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.) = 8.98
 RAINFALL INTENSITY(INCH/HR) = 3.94
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 2.05
 TOTAL STREAM AREA(ACRES) = 2.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.21

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	61.36	11.04	3.479	0.27(0.03)	0.10	18.6	407.00
1	61.87	12.50	3.230	0.27(0.03)	0.10	20.3	406.00
2	7.21	8.98	3.937	0.27(0.03)	0.10	2.0	409.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	63.77	8.98	3.937	0.27(0.03)	0.10	17.2	409.00
2	67.73	11.04	3.479	0.27(0.03)	0.10	20.6	407.00
3	67.78	12.50	3.230	0.27(0.03)	0.10	22.3	406.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 67.78 Tc(MIN.) = 12.50
 EFFECTIVE AREA(ACRES) = 22.31 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 22.31
 LONGEST FLOWPATH FROM NODE 406.00 TO NODE 411.00 = 2071.00 FEET.

FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	63.77	8.98	3.937	0.27(0.03)	0.10	17.2	409.00
2	67.73	11.04	3.479	0.27(0.03)	0.10	20.6	407.00
3	67.78	12.50	3.230	0.27(0.03)	0.10	22.3	406.00

LONGEST FLOWPATH FROM NODE 406.00 TO NODE 411.00 = 2071.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	86.83	8.34	4.116	0.27(0.05)	0.17	22.0	405.00
2	92.02	10.64	3.558	0.27(0.05)	0.17	26.9	404.00
3	92.73	11.26	3.439	0.27(0.05)	0.18	28.2	402.00
4	92.63	11.55	3.386	0.27(0.05)	0.18	28.6	403.00
5	79.11	19.15	2.500	0.27(0.06)	0.22	34.0	400.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 411.00 = 3002.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	148.77	8.34	4.116	0.27(0.04)	0.14	37.9	405.00
2	152.05	8.98	3.937	0.27(0.04)	0.14	40.5	409.00
3	158.97	10.64	3.558	0.27(0.04)	0.14	46.9	404.00
4	160.21	11.04	3.479	0.27(0.04)	0.14	48.3	407.00
5	160.47	11.26	3.439	0.27(0.04)	0.14	49.0	402.00
6	160.38	11.55	3.386	0.27(0.04)	0.14	49.8	403.00
7	158.73	12.50	3.230	0.27(0.04)	0.15	51.6	406.00
8	131.44	19.15	2.500	0.27(0.05)	0.17	56.3	400.00

TOTAL AREA(ACRES) = 56.32

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 160.47 Tc(MIN.) = 11.258
 EFFECTIVE AREA(ACRES) = 49.02 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.14

TOTAL AREA(ACRES) = 56.32
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 411.00 = 3002.00 FEET.

FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN) = 11.26

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.439

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

" .4 DWELLING/ACRE" C 8.49 0.27 0.90 86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.90

SUBAREA AREA(ACRES) = 8.49 SUBAREA RUNOFF(CFS) = 24.40

EFFECTIVE AREA(ACRES) = 57.51 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.25

TOTAL AREA(ACRES) = 64.81 PEAK FLOW RATE(CFS) = 174.40

FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
=====

FLOW PROCESS FROM NODE 500.00 TO NODE 501.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 871.00

ELEVATION DATA: UPSTREAM(FEET) = 1063.70 DOWNSTREAM(FEET) = 1050.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.460

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.594

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

COMMERCIAL C 7.50 0.27 0.10 86 10.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA RUNOFF(CFS) = 24.07

TOTAL AREA(ACRES) = 7.50 PEAK FLOW RATE(CFS) = 24.07

FLOW PROCESS FROM NODE 501.00 TO NODE 501.00 IS CODE = 13

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-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
=====
*****
FLOW PROCESS FROM NODE      600.00 TO NODE      601.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =  689.00
ELEVATION DATA: UPSTREAM(FEET) =  1070.00  DOWNSTREAM(FEET) =  1051.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =  8.512
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.067
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            C      8.73     0.27       0.10      86   8.51
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA RUNOFF(CFS) =  31.74
TOTAL AREA(ACRES) =  8.73  PEAK FLOW RATE(CFS) =  31.74

*****
FLOW PROCESS FROM NODE      601.00 TO NODE      601.00 IS CODE =  13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
=====
*****
FLOW PROCESS FROM NODE      700.00 TO NODE      701.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =  1216.00
ELEVATION DATA: UPSTREAM(FEET) =  1071.00  DOWNSTREAM(FEET) =  1051.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =  11.848
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.335
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            C     12.40     0.27       0.10      86  11.85
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA RUNOFF(CFS) =  36.91
TOTAL AREA(ACRES) =  12.40  PEAK FLOW RATE(CFS) =  36.91

*****
FLOW PROCESS FROM NODE      701.00 TO NODE      701.00 IS CODE =  13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
=====

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.10$
 SUBAREA RUNOFF(CFS) = 36.91
 TOTAL AREA(ACRES) = 12.40 PEAK FLOW RATE(CFS) = 36.91

 FLOW PROCESS FROM NODE 701.00 TO NODE 701.00 IS CODE = 13

 >>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
 =====

 FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 568.00
 ELEVATION DATA: UPSTREAM(FEET) = 1069.00 DOWNSTREAM(FEET) = 1058.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 8.457
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.083

SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	C	5.81	0.27	0.10	86	8.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.10$
 SUBAREA RUNOFF(CFS) = 21.21
 TOTAL AREA(ACRES) = 5.81 PEAK FLOW RATE(CFS) = 21.21

 FLOW PROCESS FROM NODE 801.00 TO NODE 801.00 IS CODE = 13

 >>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
 =====

 FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 553.00
 ELEVATION DATA: UPSTREAM(FEET) = 1124.00 DOWNSTREAM(FEET) = 1093.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.748
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.536

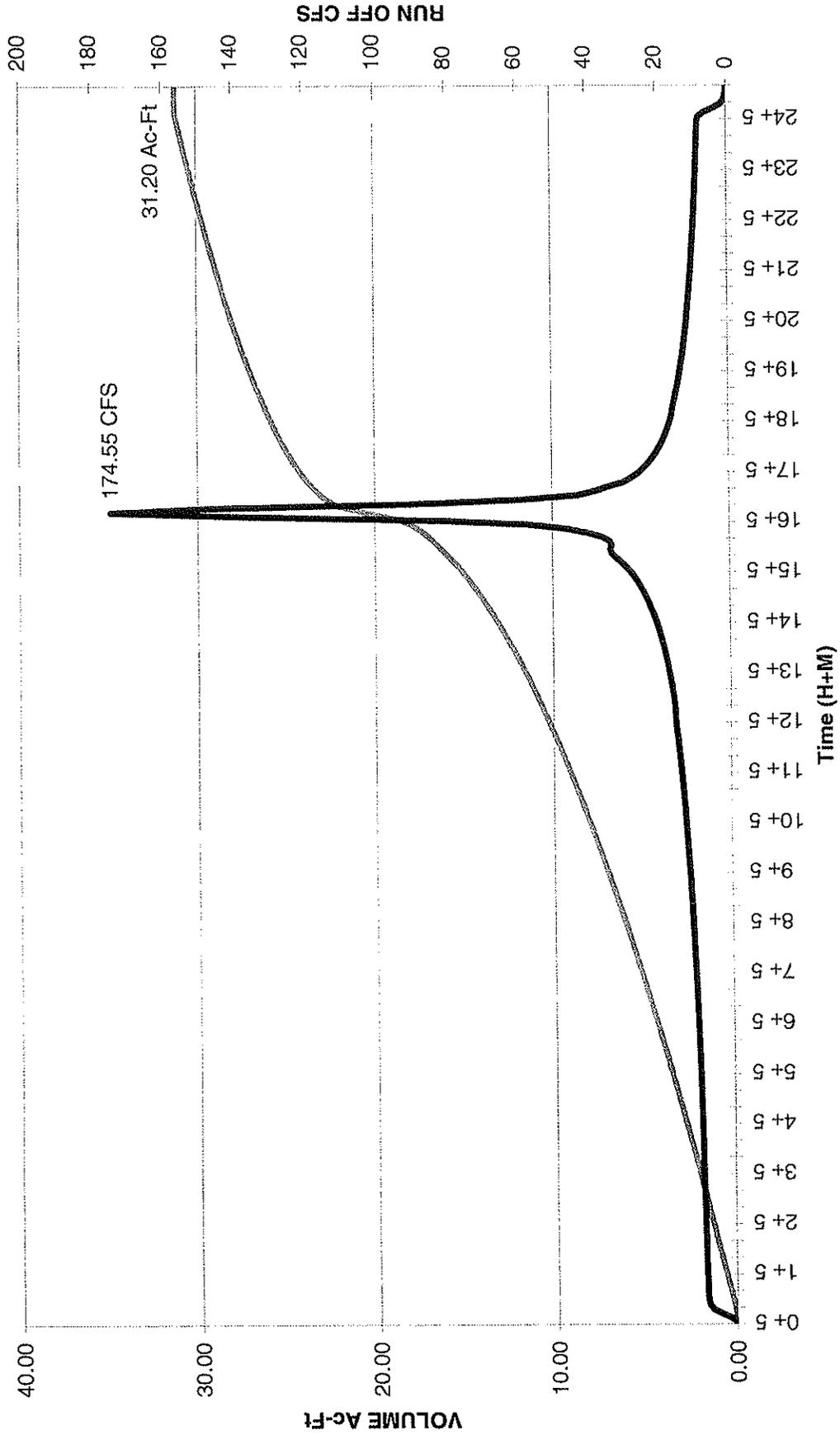
SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
PUBLIC PARK	C	7.00	0.27	0.85	86	10.75

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.85$
 SUBAREA RUNOFF(CFS) = 20.82
 TOTAL AREA(ACRES) = 7.00 PEAK FLOW RATE(CFS) = 20.82

COLTON SUPER BLOCK, EXISTING CONDITIONS
100 YEAR 24 HR STORM EVENT

Area D Hydrograph



VOLUME (Ac-Ft) — Q (cfs)

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 12/21/07

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

Program License Serial Number 4014

Existing Conditions
100 Year 24hr Storm Event
Area D - Hydrograph for Existing Hospital Detention Basin
Dec. 21, 2007

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
64.81	1	0.90

Rainfall data for year 2		
64.81	6	1.50

Rainfall data for year 2		
64.81	24	2.60

Rainfall data for year 100		
64.81	1	1.27

Rainfall data for year 100		
64.81	6	3.10

Rainfall data for year 100		
64.81	24	6.30

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

SCS curve No. (AMCII)	SCS curve NO. (AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	86.2	64.81	1.000	0.262	0.250	0.065

Area-averaged adjusted loss rate Fm (In/Hr) = 0.065

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
16.20	0.250	69.0	86.2	1.60	0.749
48.61	0.750	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.909

Area-averaged low loss fraction, Yb = 0.091

User entry of time of concentration = 0.249 (hours)

++++

Watershed area = 64.81 (Ac.)

Catchment Lag time = 0.199 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 41.8340

Hydrograph baseflow = 0.00 (CFS)

Average maximum watershed loss rate (Fm) = 0.065 (In/Hr)

Average low loss rate fraction (Yb) = 0.091 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.470 (In)

Computed peak 30-minute rainfall = 0.962 (In)

Specified peak 1-hour rainfall = 1.270 (In)

Computed peak 3-hour rainfall = 2.195 (In)

Specified peak 6-hour rainfall = 3.100 (In)

Specified peak 24-hour rainfall = 6.300 (In)

Rainfall depth area reduction factors:

Using a total area of 64.81 (Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.469 (In)

30-minute factor = 0.997 Adjusted rainfall = 0.960 (In)

1-hour factor = 0.997 Adjusted rainfall = 1.266 (In)

3-hour factor = 1.000 Adjusted rainfall = 2.194 (In)

6-hour factor = 1.000 Adjusted rainfall = 3.099 (In)

24-hour factor = 1.000 Adjusted rainfall = 6.299 (In)

Unit Hydrograph

++++

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

(K = 783.80 (CFS))

1	3.284	25.737
2	21.314	141.319
3	53.600	253.056
4	80.839	213.503
5	92.666	92.701
6	97.411	37.188
7	98.695	10.061
8	99.448	5.901
9	100.000	4.330

Total soil rain loss = 0.52(In)
Total effective rainfall = 5.78(In)
Peak flow rate in flood hydrograph = 174.55 (CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0018	0.26	Q				
0+10	0.0135	1.70	Q				
0+15	0.0430	4.28	Q				
0+20	0.0875	6.46	VQ				
0+25	0.1386	7.42	VQ				
0+30	0.1925	7.82	VQ				
0+35	0.2472	7.94	VQ				
0+40	0.3024	8.02	VQ				
0+45	0.3582	8.09	VQ				
0+50	0.4140	8.11	VQ				
0+55	0.4700	8.13	VQ				
1+ 0	0.5262	8.15	VQ				
1+ 5	0.5825	8.17	VQ				
1+10	0.6389	8.20	VQ				
1+15	0.6955	8.22	VQ				
1+20	0.7523	8.24	VQ				
1+25	0.8092	8.26	Q				
1+30	0.8662	8.29	Q				
1+35	0.9235	8.31	Q				
1+40	0.9809	8.33	Q				
1+45	1.0384	8.36	Q				
1+50	1.0961	8.38	Q				
1+55	1.1540	8.40	Q				
2+ 0	1.2120	8.43	Q				
2+ 5	1.2702	8.45	Q				
2+10	1.3286	8.48	Q				
2+15	1.3871	8.50	Q				
2+20	1.4458	8.52	Q				
2+25	1.5047	8.55	Q				
2+30	1.5638	8.57	QV				
2+35	1.6230	8.60	QV				
2+40	1.6824	8.63	QV				

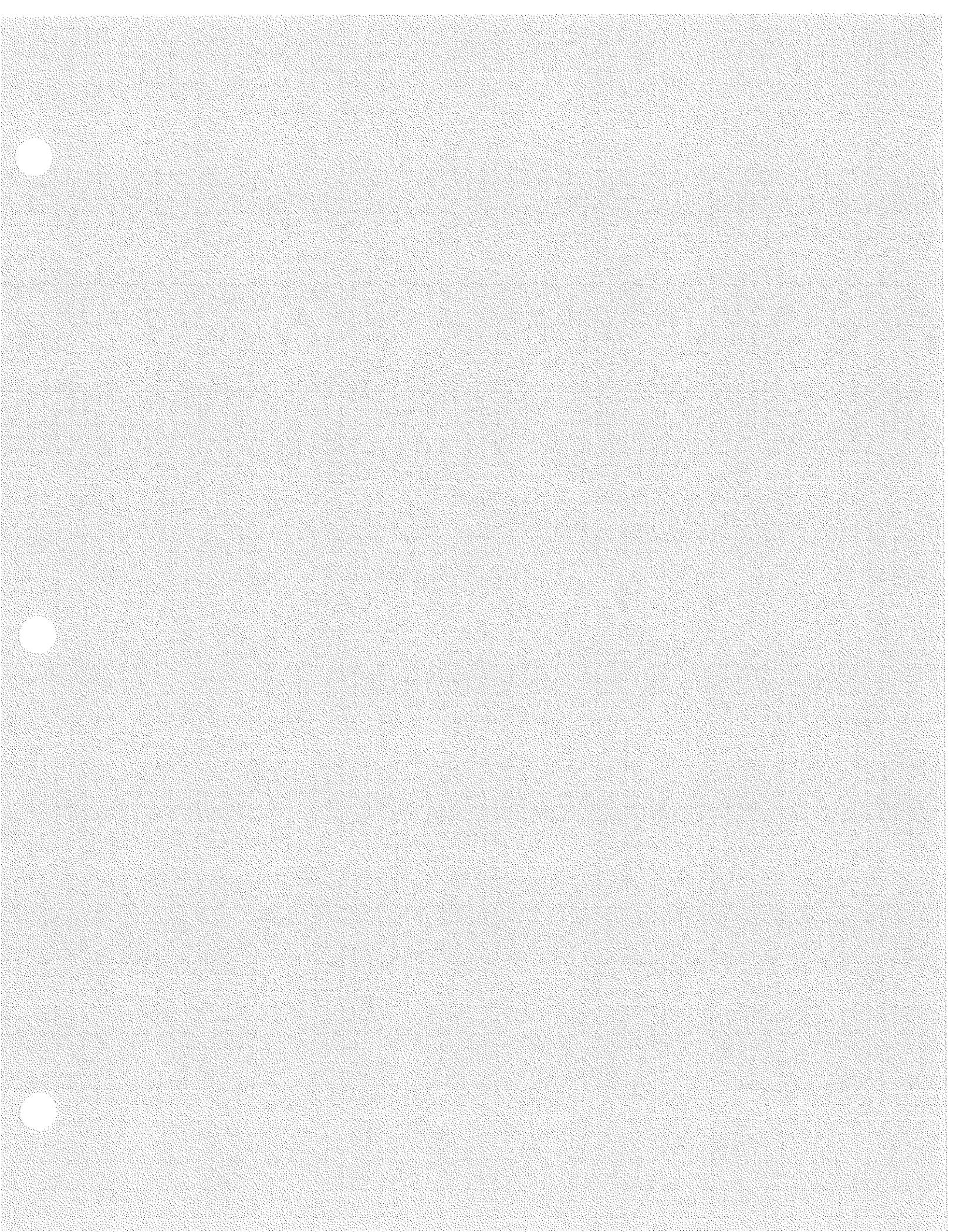
2+45	1.7420	8.65	QV
2+50	1.8018	8.68	QV
2+55	1.8617	8.70	QV
3+ 0	1.9219	8.73	QV
3+ 5	1.9822	8.76	QV
3+10	2.0427	8.79	QV
3+15	2.1034	8.81	QV
3+20	2.1642	8.84	QV
3+25	2.2253	8.87	QV
3+30	2.2866	8.90	QV
3+35	2.3481	8.92	Q V
3+40	2.4097	8.95	Q V
3+45	2.4716	8.98	Q V
3+50	2.5336	9.01	Q V
3+55	2.5959	9.04	Q V
4+ 0	2.6584	9.07	Q V
4+ 5	2.7211	9.10	Q V
4+10	2.7840	9.13	Q V
4+15	2.8471	9.16	Q V
4+20	2.9104	9.19	Q V
4+25	2.9739	9.23	Q V
4+30	3.0377	9.26	Q V
4+35	3.1017	9.29	Q V
4+40	3.1659	9.32	Q V
4+45	3.2303	9.35	Q V
4+50	3.2950	9.39	Q V
4+55	3.3598	9.42	Q V
5+ 0	3.4250	9.46	Q V
5+ 5	3.4903	9.49	Q V
5+10	3.5559	9.52	Q V
5+15	3.6218	9.56	Q V
5+20	3.6878	9.60	Q V
5+25	3.7542	9.63	Q V
5+30	3.8207	9.67	Q V
5+35	3.8876	9.70	Q V
5+40	3.9547	9.74	Q V
5+45	4.0220	9.78	Q V
5+50	4.0896	9.82	Q V
5+55	4.1575	9.86	Q V
6+ 0	4.2256	9.89	Q V
6+ 5	4.2941	9.93	Q V
6+10	4.3627	9.97	Q V
6+15	4.4317	10.01	Q V
6+20	4.5010	10.05	Q V
6+25	4.5705	10.10	Q V
6+30	4.6403	10.14	Q V
6+35	4.7104	10.18	Q V
6+40	4.7808	10.22	Q V
6+45	4.8516	10.27	Q V
6+50	4.9226	10.31	Q V
6+55	4.9939	10.36	Q V
7+ 0	5.0655	10.40	Q V
7+ 5	5.1375	10.45	Q V
7+10	5.2098	10.49	Q V
7+15	5.2823	10.54	Q V
7+20	5.3553	10.59	Q V
7+25	5.4285	10.64	Q V

7+30	5.5021	10.69	Q	V
7+35	5.5761	10.74	Q	V
7+40	5.6504	10.79	Q	V
7+45	5.7250	10.84	Q	V
7+50	5.8000	10.89	Q	V
7+55	5.8754	10.94	Q	V
8+ 0	5.9511	11.00	Q	V
8+ 5	6.0272	11.05	Q	V
8+10	6.1037	11.11	Q	V
8+15	6.1806	11.16	Q	V
8+20	6.2579	11.22	Q	V
8+25	6.3356	11.28	Q	V
8+30	6.4136	11.34	Q	V
8+35	6.4921	11.40	Q	V
8+40	6.5710	11.46	Q	V
8+45	6.6504	11.52	Q	V
8+50	6.7301	11.58	Q	V
8+55	6.8103	11.65	Q	V
9+ 0	6.8910	11.71	Q	V
9+ 5	6.9721	11.78	Q	V
9+10	7.0537	11.84	Q	V
9+15	7.1357	11.91	Q	V
9+20	7.2182	11.98	Q	V
9+25	7.3013	12.05	Q	V
9+30	7.3848	12.13	Q	V
9+35	7.4688	12.20	Q	V
9+40	7.5533	12.27	Q	V
9+45	7.6384	12.35	Q	V
9+50	7.7239	12.43	Q	V
9+55	7.8101	12.51	Q	V
10+ 0	7.8968	12.59	Q	V
10+ 5	7.9840	12.67	Q	V
10+10	8.0719	12.75	Q	V
10+15	8.1603	12.84	Q	V
10+20	8.2493	12.93	Q	V
10+25	8.3390	13.02	Q	V
10+30	8.4293	13.11	Q	V
10+35	8.5202	13.20	Q	V
10+40	8.6118	13.30	Q	V
10+45	8.7040	13.39	Q	V
10+50	8.7969	13.49	Q	V
10+55	8.8906	13.60	Q	V
11+ 0	8.9849	13.70	Q	V
11+ 5	9.0800	13.81	Q	V
11+10	9.1759	13.92	Q	V
11+15	9.2725	14.03	Q	V
11+20	9.3699	14.14	Q	V
11+25	9.4682	14.26	Q	V
11+30	9.5672	14.38	Q	V
11+35	9.6671	14.51	Q	V
11+40	9.7679	14.64	Q	V
11+45	9.8696	14.77	Q	V
11+50	9.9722	14.90	Q	V
11+55	10.0758	15.04	Q	V
12+ 0	10.1804	15.18	Q	V
12+ 5	10.2858	15.31	Q	V
12+10	10.3919	15.39	Q	V

12+15	10.4980	15.42	Q	V		
12+20	10.6045	15.47	Q	V		
12+25	10.7119	15.58	Q	V		
12+30	10.8202	15.74	Q	V		
12+35	10.9298	15.91	Q	V		
12+40	11.0406	16.09	Q	V		
12+45	11.1527	16.27	Q	V		
12+50	11.2661	16.47	Q	V		
12+55	11.3809	16.67	Q	V		
13+ 0	11.4972	16.89	Q	V		
13+ 5	11.6151	17.11	Q	V		
13+10	11.7344	17.34	Q	V		
13+15	11.8555	17.57	Q	V		
13+20	11.9782	17.82	Q	V		
13+25	12.1027	18.08	Q	V		
13+30	12.2291	18.35	Q	V		
13+35	12.3574	18.63	Q	V		
13+40	12.4878	18.93	Q	V		
13+45	12.6203	19.24	Q	V		
13+50	12.7551	19.57	Q	V		
13+55	12.8922	19.91	Q	V		
14+ 0	13.0319	20.28	Q	V		
14+ 5	13.1742	20.66	Q	V		
14+10	13.3194	21.09	Q	V		
14+15	13.4678	21.55	Q	V		
14+20	13.6195	22.03	Q	V		
14+25	13.7747	22.53	Q	V		
14+30	13.9335	23.06	Q	V		
14+35	14.0962	23.62	Q	V		
14+40	14.2631	24.23	Q	V		
14+45	14.4345	24.89	Q	V		
14+50	14.6108	25.60	Q	V		
14+55	14.7925	26.37	Q	V		
15+ 0	14.9800	27.23	Q	V		
15+ 5	15.1740	28.17	Q	V		
15+10	15.3753	29.22	Q	V		
15+15	15.5847	30.40	Q	V		
15+20	15.8032	31.74	Q	V		
15+25	16.0306	33.01	Q	V		
15+30	16.2608	33.43	Q	V		
15+35	16.4885	33.06	Q	V		
15+40	16.7194	33.53	Q	V		
15+45	16.9659	35.79	Q	V		
15+50	17.2397	39.75	Q	V		
15+55	17.5564	45.99	Q	V		
16+ 0	17.9476	56.79	Q	V		
16+ 5	18.5131	82.12	Q	V		
16+10	19.4499	136.02	Q	V		
16+15	20.6520	174.55	Q	V		
16+20	21.6676	147.46	Q	V		
16+25	22.2827	89.31	Q	V		
16+30	22.6827	58.08	Q	V		
16+35	22.9754	42.50	Q	V		
16+40	23.2334	37.47	Q	V		
16+45	23.4661	33.79	Q	V		
16+50	23.6706	29.69	Q	V		
16+55	23.8603	27.55	Q	V		

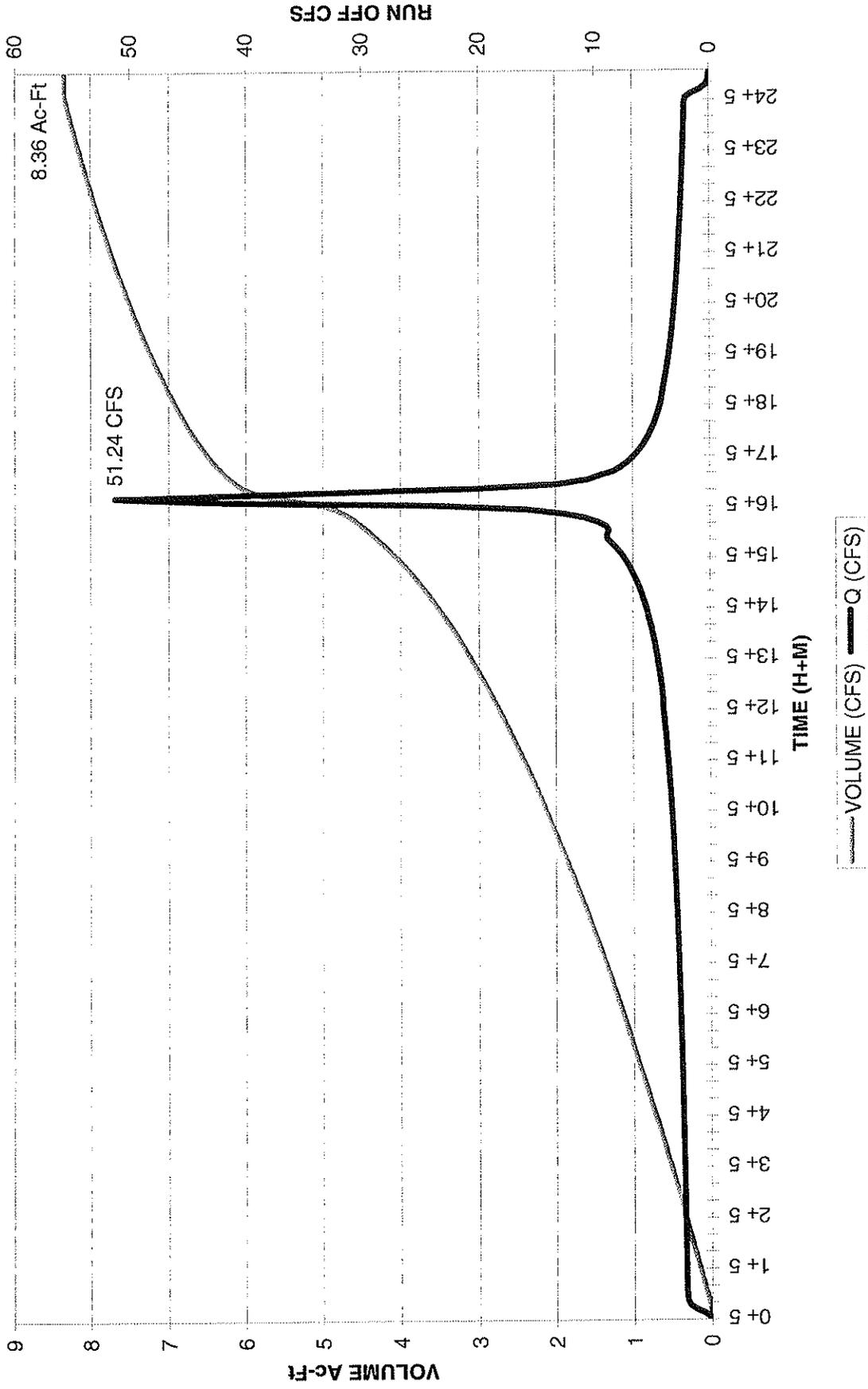
17+ 0	24.0384	25.85	Q	V
17+ 5	24.2067	24.45	Q	V
17+10	24.3666	23.21	Q	V
17+15	24.5191	22.14	Q	V
17+20	24.6651	21.20	Q	V
17+25	24.8054	20.38	Q	V
17+30	24.9407	19.65	Q	V
17+35	25.0716	19.00	Q	V
17+40	25.1984	18.41	Q	V
17+45	25.3215	17.87	Q	V
17+50	25.4412	17.38	Q	V
17+55	25.5578	16.93	Q	V
18+ 0	25.6715	16.51	Q	V
18+ 5	25.7826	16.13	Q	V
18+10	25.8917	15.84	Q	V
18+15	25.9994	15.63	Q	V
18+20	26.1056	15.43	Q	V
18+25	26.2101	15.18	Q	V
18+30	26.3129	14.91	Q	V
18+35	26.4138	14.65	Q	V
18+40	26.5129	14.40	Q	V
18+45	26.6105	14.16	Q	V
18+50	26.7064	13.93	Q	V
18+55	26.8009	13.72	Q	V
19+ 0	26.8939	13.51	Q	V
19+ 5	26.9856	13.31	Q	V
19+10	27.0760	13.12	Q	V
19+15	27.1651	12.94	Q	V
19+20	27.2530	12.77	Q	V
19+25	27.3398	12.60	Q	V
19+30	27.4255	12.44	Q	V
19+35	27.5100	12.28	Q	V
19+40	27.5936	12.13	Q	V
19+45	27.6762	11.99	Q	V
19+50	27.7578	11.85	Q	V
19+55	27.8386	11.72	Q	V
20+ 0	27.9184	11.59	Q	V
20+ 5	27.9973	11.47	Q	V
20+10	28.0755	11.34	Q	V
20+15	28.1528	11.23	Q	V
20+20	28.2293	11.11	Q	V
20+25	28.3051	11.00	Q	V
20+30	28.3802	10.90	Q	V
20+35	28.4545	10.79	Q	V
20+40	28.5281	10.69	Q	V
20+45	28.6011	10.59	Q	V
20+50	28.6734	10.50	Q	V
20+55	28.7451	10.41	Q	V
21+ 0	28.8161	10.32	Q	V
21+ 5	28.8866	10.23	Q	V
21+10	28.9564	10.14	Q	V
21+15	29.0257	10.06	Q	V
21+20	29.0945	9.98	Q	V
21+25	29.1626	9.90	Q	V
21+30	29.2303	9.82	Q	V
21+35	29.2974	9.75	Q	V
21+40	29.3640	9.67	Q	V

21+45	29.4301	9.60	Q	V
21+50	29.4957	9.53	Q	V
21+55	29.5609	9.46	Q	V
22+ 0	29.6256	9.39	Q	V
22+ 5	29.6898	9.33	Q	V
22+10	29.7536	9.26	Q	V
22+15	29.8169	9.20	Q	V
22+20	29.8798	9.14	Q	V
22+25	29.9423	9.07	Q	V
22+30	30.0044	9.02	Q	V
22+35	30.0661	8.96	Q	V
22+40	30.1274	8.90	Q	V
22+45	30.1883	8.84	Q	V
22+50	30.2488	8.79	Q	V
22+55	30.3090	8.73	Q	V
23+ 0	30.3687	8.68	Q	V
23+ 5	30.4282	8.63	Q	V
23+10	30.4873	8.58	Q	V
23+15	30.5460	8.53	Q	V
23+20	30.6044	8.48	Q	V
23+25	30.6624	8.43	Q	V
23+30	30.7201	8.38	Q	V
23+35	30.7775	8.33	Q	V
23+40	30.8346	8.29	Q	V
23+45	30.8914	8.24	Q	V
23+50	30.9479	8.20	Q	V
23+55	31.0040	8.16	Q	V
24+ 0	31.0599	8.11	Q	V
24+ 5	31.1137	7.81	Q	V
24+10	31.1573	6.33	Q	V
24+15	31.1830	3.73	Q	V
24+20	31.1936	1.54	Q	V
24+25	31.1976	0.59	Q	V
24+30	31.1990	0.21	Q	V
24+35	31.1998	0.10	Q	V
24+40	31.2001	0.04	Q	V



COLTON SUPER BLOCK EXISTING CONDITIONS
100 YEAR 24 HR STORM EVENT

HYD-1



Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 12/21/07

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

Program License Serial Number 4014

EXISTING CONDITIONS
100 YEAR 24 STORM EVENT
HYD-1
DEC 21 2007

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
17.97	1	0.90

Rainfall data for year 2		
17.97	6	1.50

Rainfall data for year 2		
17.97	24	2.60

Rainfall data for year 100		
17.97	1	1.27

Rainfall data for year 100		
17.97	6	3.10

Rainfall data for year 100		
17.97	24	6.30

1	4.127	8.969
2	26.887	49.463
3	64.399	81.522
4	87.458	50.113
5	96.010	18.585
6	98.485	5.380
7	99.340	1.857
8	100.000	1.435

Total soil rain loss = 0.72 (In)
Total effective rainfall = 5.58 (In)
Peak flow rate in flood hydrograph = 51.24 (CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

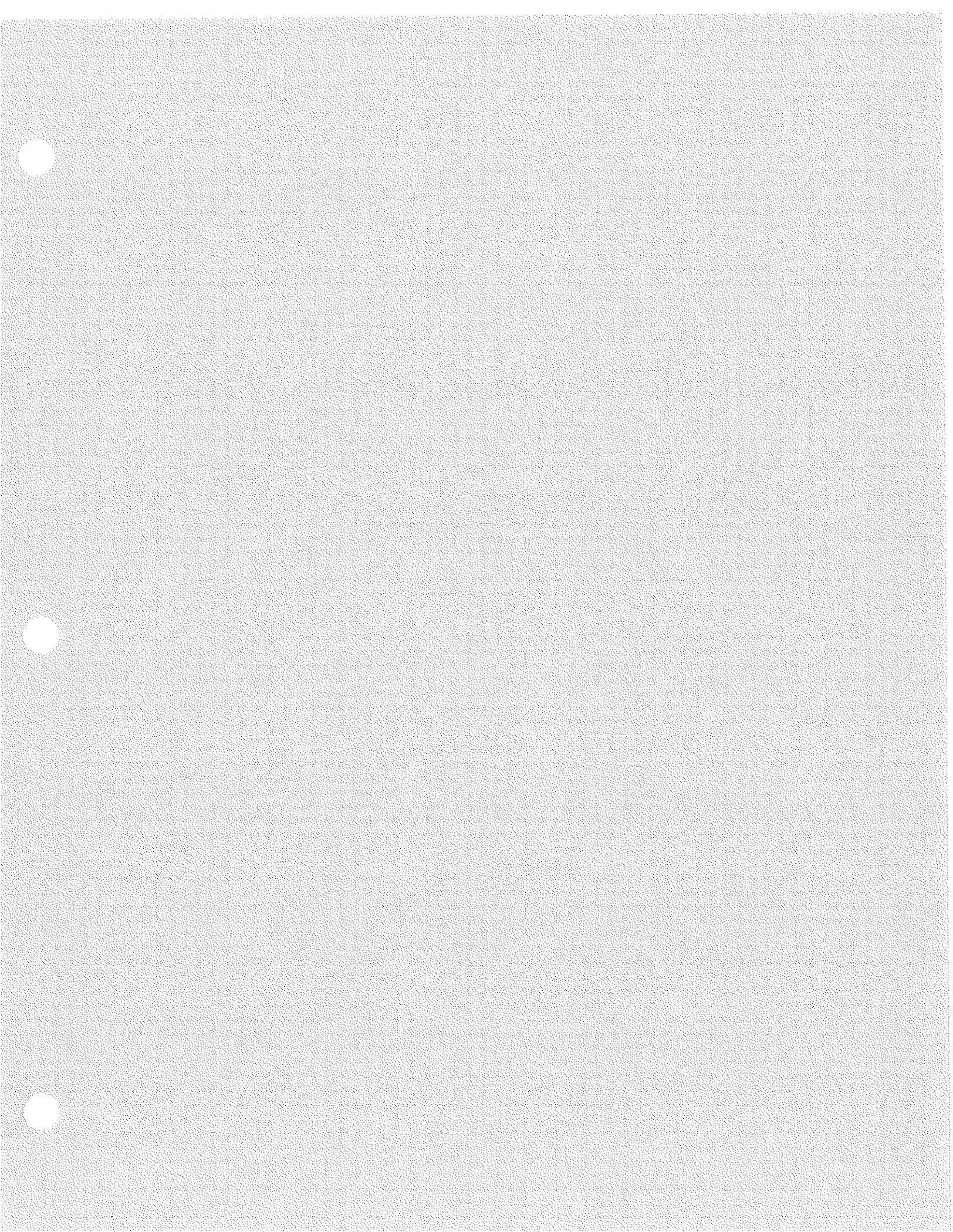
Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0006	0.09	Q				
0+10	0.0046	0.57	Q				
0+15	0.0140	1.38	Q				
0+20	0.0269	1.87	VQ				
0+25	0.0411	2.06	VQ				
0+30	0.0557	2.12	VQ				
0+35	0.0704	2.14	VQ				
0+40	0.0853	2.16	VQ				
0+45	0.1002	2.16	VQ				
0+50	0.1151	2.17	VQ				
0+55	0.1301	2.18	VQ				
1+ 0	0.1451	2.18	VQ				
1+ 5	0.1602	2.19	VQ				
1+10	0.1753	2.19	VQ				
1+15	0.1904	2.20	VQ				
1+20	0.2056	2.21	VQ				
1+25	0.2209	2.21	Q				
1+30	0.2361	2.22	Q				
1+35	0.2515	2.22	Q				
1+40	0.2668	2.23	Q				
1+45	0.2822	2.24	Q				
1+50	0.2977	2.24	Q				
1+55	0.3132	2.25	Q				
2+ 0	0.3287	2.26	Q				
2+ 5	0.3443	2.26	Q				
2+10	0.3599	2.27	Q				
2+15	0.3756	2.27	Q				
2+20	0.3913	2.28	Q				
2+25	0.4070	2.29	Q				
2+30	0.4228	2.30	QV				
2+35	0.4387	2.30	QV				
2+40	0.4546	2.31	QV				
2+45	0.4705	2.32	QV				

2+50	0.4865	2.32	QV			
2+55	0.5026	2.33	QV			
3+ 0	0.5187	2.34	QV			
3+ 5	0.5348	2.34	QV			
3+10	0.5510	2.35	QV			
3+15	0.5673	2.36	QV			
3+20	0.5836	2.37	QV			
3+25	0.5999	2.37	QV			
3+30	0.6163	2.38	QV			
3+35	0.6328	2.39	Q V			
3+40	0.6493	2.40	Q V			
3+45	0.6658	2.40	Q V			
3+50	0.6824	2.41	Q V			
3+55	0.6991	2.42	Q V			
4+ 0	0.7158	2.43	Q V			
4+ 5	0.7326	2.44	Q V			
4+10	0.7494	2.44	Q V			
4+15	0.7663	2.45	Q V			
4+20	0.7833	2.46	Q V			
4+25	0.8003	2.47	Q V			
4+30	0.8174	2.48	Q V			
4+35	0.8345	2.49	Q V			
4+40	0.8517	2.50	Q V			
4+45	0.8689	2.50	Q V			
4+50	0.8862	2.51	Q V			
4+55	0.9036	2.52	Q V			
5+ 0	0.9210	2.53	Q V			
5+ 5	0.9385	2.54	Q V			
5+10	0.9561	2.55	Q V			
5+15	0.9737	2.56	Q V			
5+20	0.9914	2.57	Q V			
5+25	1.0092	2.58	Q V			
5+30	1.0270	2.59	Q V			
5+35	1.0449	2.60	Q V			
5+40	1.0628	2.61	Q V			
5+45	1.0809	2.62	Q V			
5+50	1.0990	2.63	Q V			
5+55	1.1171	2.64	Q V			
6+ 0	1.1354	2.65	Q V			
6+ 5	1.1537	2.66	Q V			
6+10	1.1721	2.67	Q V			
6+15	1.1906	2.68	Q V			
6+20	1.2091	2.69	Q V			
6+25	1.2277	2.70	Q V			
6+30	1.2464	2.71	Q V			
6+35	1.2652	2.73	Q V			
6+40	1.2840	2.74	Q V			
6+45	1.3030	2.75	Q V			
6+50	1.3220	2.76	Q V			
6+55	1.3411	2.77	Q V			
7+ 0	1.3603	2.79	Q V			
7+ 5	1.3795	2.80	Q V			
7+10	1.3989	2.81	Q V			
7+15	1.4183	2.82	Q V			
7+20	1.4379	2.84	Q V			
7+25	1.4575	2.85	Q V			
7+30	1.4772	2.86	Q V			

7+35	1.4970	2.88	Q	V
7+40	1.5169	2.89	Q	V
7+45	1.5369	2.90	Q	V
7+50	1.5570	2.92	Q	V
7+55	1.5771	2.93	Q	V
8+ 0	1.5974	2.95	Q	V
8+ 5	1.6178	2.96	Q	V
8+10	1.6383	2.97	Q	V
8+15	1.6589	2.99	Q	V
8+20	1.6796	3.01	Q	V
8+25	1.7004	3.02	Q	V
8+30	1.7213	3.04	Q	V
8+35	1.7423	3.05	Q	V
8+40	1.7635	3.07	Q	V
8+45	1.7847	3.09	Q	V
8+50	1.8061	3.10	Q	V
8+55	1.8276	3.12	Q	V
9+ 0	1.8492	3.14	Q	V
9+ 5	1.8709	3.15	Q	V
9+10	1.8927	3.17	Q	V
9+15	1.9147	3.19	Q	V
9+20	1.9368	3.21	Q	V
9+25	1.9591	3.23	Q	V
9+30	1.9814	3.25	Q	V
9+35	2.0039	3.27	Q	V
9+40	2.0266	3.29	Q	V
9+45	2.0494	3.31	Q	V
9+50	2.0723	3.33	Q	V
9+55	2.0954	3.35	Q	V
10+ 0	2.1186	3.37	Q	V
10+ 5	2.1420	3.39	Q	V
10+10	2.1655	3.42	Q	V
10+15	2.1892	3.44	Q	V
10+20	2.2131	3.46	Q	V
10+25	2.2371	3.49	Q	V
10+30	2.2613	3.51	Q	V
10+35	2.2857	3.54	Q	V
10+40	2.3102	3.56	Q	V
10+45	2.3349	3.59	Q	V
10+50	2.3598	3.62	Q	V
10+55	2.3849	3.64	Q	V
11+ 0	2.4102	3.67	Q	V
11+ 5	2.4357	3.70	Q	V
11+10	2.4614	3.73	Q	V
11+15	2.4873	3.76	Q	V
11+20	2.5134	3.79	Q	V
11+25	2.5398	3.82	Q	V
11+30	2.5663	3.86	Q	V
11+35	2.5931	3.89	Q	V
11+40	2.6201	3.92	Q	V
11+45	2.6474	3.96	Q	V
11+50	2.6749	4.00	Q	V
11+55	2.7027	4.03	Q	V
12+ 0	2.7307	4.07	Q	V
12+ 5	2.7590	4.11	Q	V
12+10	2.7874	4.12	Q	V
12+15	2.8158	4.12	Q	V

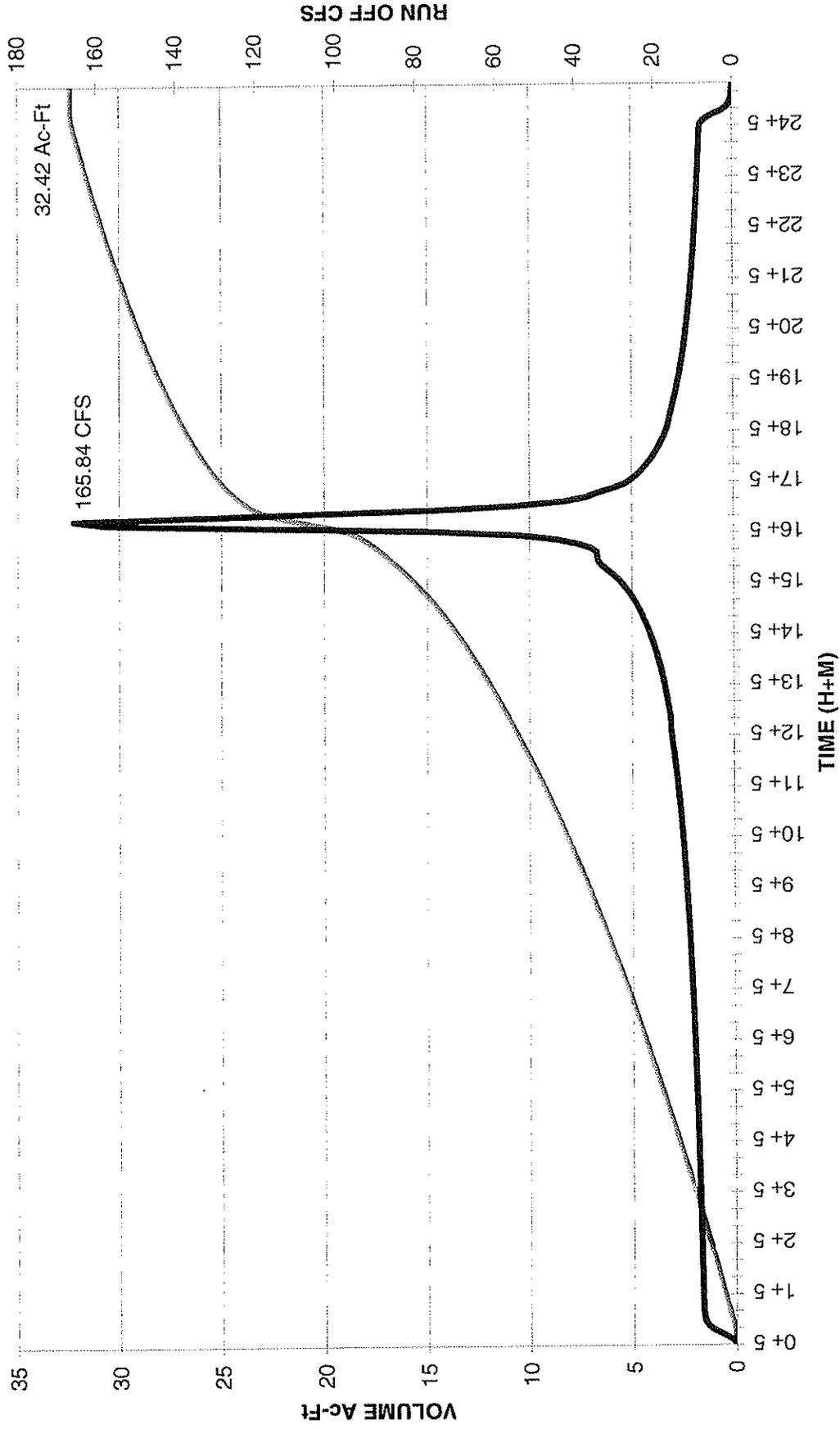
12+20	2.8443	4.14	Q	V		
12+25	2.8731	4.18	Q	V		
12+30	2.9021	4.22	Q	V		
12+35	2.9315	4.27	Q	V		
12+40	2.9612	4.31	Q	V		
12+45	2.9913	4.37	Q	V		
12+50	3.0217	4.42	Q	V		
12+55	3.0526	4.47	Q	V		
13+ 0	3.0838	4.53	Q	V		
13+ 5	3.1154	4.59	Q	V		
13+10	3.1474	4.65	Q	V		
13+15	3.1799	4.72	Q	V		
13+20	3.2129	4.78	Q	V		
13+25	3.2463	4.86	Q	V		
13+30	3.2802	4.93	Q	V		
13+35	3.3147	5.01	Q	V		
13+40	3.3497	5.08	Q	V		
13+45	3.3853	5.17	Q	V		
13+50	3.4216	5.26	Q	V		
13+55	3.4584	5.35	Q	V		
14+ 0	3.4959	5.45	Q	V		
14+ 5	3.5342	5.56	Q	V		
14+10	3.5732	5.67	Q	V		
14+15	3.6131	5.79	Q	V		
14+20	3.6538	5.91	Q	V		
14+25	3.6955	6.05	Q	V		
14+30	3.7381	6.19	Q	V		
14+35	3.7818	6.34	Q	V		
14+40	3.8266	6.51	Q	V		
14+45	3.8727	6.69	Q	V		
14+50	3.9201	6.88	Q	V		
14+55	3.9690	7.10	Q	V		
15+ 0	4.0195	7.33	Q	V		
15+ 5	4.0718	7.59	Q	V		
15+10	4.1260	7.88	Q	V		
15+15	4.1826	8.21	Q	V		
15+20	4.2416	8.57	Q	V		
15+25	4.3031	8.92	Q	V		
15+30	4.3648	8.96	Q	V		
15+35	4.4254	8.80	Q	V		
15+40	4.4876	9.04	Q	V		
15+45	4.5550	9.77	Q	V		
15+50	4.6302	10.92	Q	V		
15+55	4.7176	12.69	Q	V		
16+ 0	4.8269	15.87	Q	V		
16+ 5	4.9920	23.98	Q	V		
16+10	5.2781	41.53	Q	V		
16+15	5.6309	51.24	Q	V		
16+20	5.8777	35.83	Q	V		
16+25	6.0183	20.41	Q	V		
16+30	6.1086	13.11	Q	V		
16+35	6.1819	10.65	Q	V		
16+40	6.2482	9.62	Q	V		
16+45	6.3057	8.35	Q	V		
16+50	6.3588	7.71	Q	V		
16+55	6.4083	7.19	Q	V		
17+ 0	6.4549	6.77	Q	V		

21+50	7.9052	2.54	Q	V
21+55	7.9225	2.52	Q	V
22+ 0	7.9398	2.51	Q	V
22+ 5	7.9569	2.49	Q	V
22+10	7.9740	2.47	Q	V
22+15	7.9909	2.45	Q	V
22+20	8.0077	2.44	Q	V
22+25	8.0243	2.42	Q	V
22+30	8.0409	2.41	Q	V
22+35	8.0574	2.39	Q	V
22+40	8.0737	2.38	Q	V
22+45	8.0900	2.36	Q	V
22+50	8.1062	2.35	Q	V
22+55	8.1222	2.33	Q	V
23+ 0	8.1382	2.32	Q	V
23+ 5	8.1540	2.30	Q	V
23+10	8.1698	2.29	Q	V
23+15	8.1855	2.28	Q	V
23+20	8.2011	2.26	Q	V
23+25	8.2166	2.25	Q	V
23+30	8.2320	2.24	Q	V
23+35	8.2473	2.23	Q	V
23+40	8.2625	2.21	Q	V
23+45	8.2777	2.20	Q	V
23+50	8.2928	2.19	Q	V
23+55	8.3078	2.18	Q	V
24+ 0	8.3227	2.17	Q	V
24+ 5	8.3369	2.07	Q	V
24+10	8.3477	1.57	Q	V
24+15	8.3530	0.76	Q	V
24+20	8.3549	0.27	Q	V
24+25	8.3554	0.09	Q	V
24+30	8.3557	0.03	Q	V
24+35	8.3558	0.01	Q	V



COLTON SUPER BLOC... EXISTING CONDITIONS
100 YEAR 24 HR STORM EVENT

HYD-2



Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 12/21/07

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

Program License Serial Number 4014

EXISTING CONDITIONS
100 YEAR 24 HR STORM EVENT
HYD-2
DEC 21 2007

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
70.53	1	0.90

Rainfall data for year 2		
70.53	6	1.50

Rainfall data for year 2		
70.53	24	2.60

Rainfall data for year 100		
70.53	1	1.27

Rainfall data for year 100		
70.53	6	3.10

Rainfall data for year 100		
70.53	24	6.30

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

SCS curve No. (AMCII)	SCS curve NO. (AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
77.0	92.2	70.53	1.000	0.151	0.900	0.136

Area-averaged adjusted loss rate Fm (In/Hr) = 0.136

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
63.48	0.900	77.0	92.2	0.85	0.855
7.05	0.100	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.866

Area-averaged low loss fraction, Yb = 0.134

User entry of time of concentration = 0.300 (hours)

Watershed area = 70.53 (Ac.)

Catchment Lag time = 0.240 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 34.7222

Hydrograph baseflow = 0.00 (CFS)

Average maximum watershed loss rate (Fm) = 0.136 (In/Hr)

Average low loss rate fraction (Yb) = 0.134 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.470 (In)

Computed peak 30-minute rainfall = 0.962 (In)

Specified peak 1-hour rainfall = 1.270 (In)

Computed peak 3-hour rainfall = 2.195 (In)

Specified peak 6-hour rainfall = 3.100 (In)

Specified peak 24-hour rainfall = 6.300 (In)

Rainfall depth area reduction factors:

Using a total area of 70.53 (Ac.) (Ref: fig. E-4)

5-minute factor = 0.997	Adjusted rainfall = 0.468 (In)
30-minute factor = 0.997	Adjusted rainfall = 0.959 (In)
1-hour factor = 0.997	Adjusted rainfall = 1.266 (In)
3-hour factor = 1.000	Adjusted rainfall = 2.194 (In)
6-hour factor = 1.000	Adjusted rainfall = 3.099 (In)
24-hour factor = 1.000	Adjusted rainfall = 6.299 (In)

Unit Hydrograph

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

(K = 852.97 (CFS))

1	2.419	20.632
2	14.869	106.196
3	38.398	200.696
4	67.322	246.712
5	84.742	148.590
6	93.197	72.121
7	97.181	33.982
8	98.488	11.142
9	99.113	5.331
10	99.728	5.254
11	100.000	2.316

Total soil rain loss = 0.78 (In)
Total effective rainfall = 5.52 (In)
Peak flow rate in flood hydrograph = 165.84 (CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0014	0.20	Q				
0+10	0.0099	1.23	Q				
0+15	0.0317	3.18	Q				
0+20	0.0702	5.58	VQ				
0+25	0.1186	7.03	VQ				
0+30	0.1720	7.75	VQ				
0+35	0.2278	8.10	VQ				
0+40	0.2844	8.23	VQ				
0+45	0.3416	8.30	VQ				
0+50	0.3993	8.37	VQ				
0+55	0.4573	8.42	VQ				
1+ 0	0.5154	8.44	VQ				
1+ 5	0.5737	8.46	VQ				
1+10	0.6322	8.49	VQ				
1+15	0.6908	8.51	VQ				
1+20	0.7495	8.53	VQ				
1+25	0.8085	8.56	VQ				
1+30	0.8675	8.58	Q				
1+35	0.9268	8.60	Q				
1+40	0.9862	8.63	Q				
1+45	1.0458	8.65	Q				
1+50	1.1055	8.68	Q				
1+55	1.1655	8.70	Q				
2+ 0	1.2255	8.72	Q				
2+ 5	1.2858	8.75	Q				
2+10	1.3462	8.77	Q				
2+15	1.4068	8.80	Q				
2+20	1.4676	8.83	Q				
2+25	1.5286	8.85	Q				
2+30	1.5897	8.88	Q				

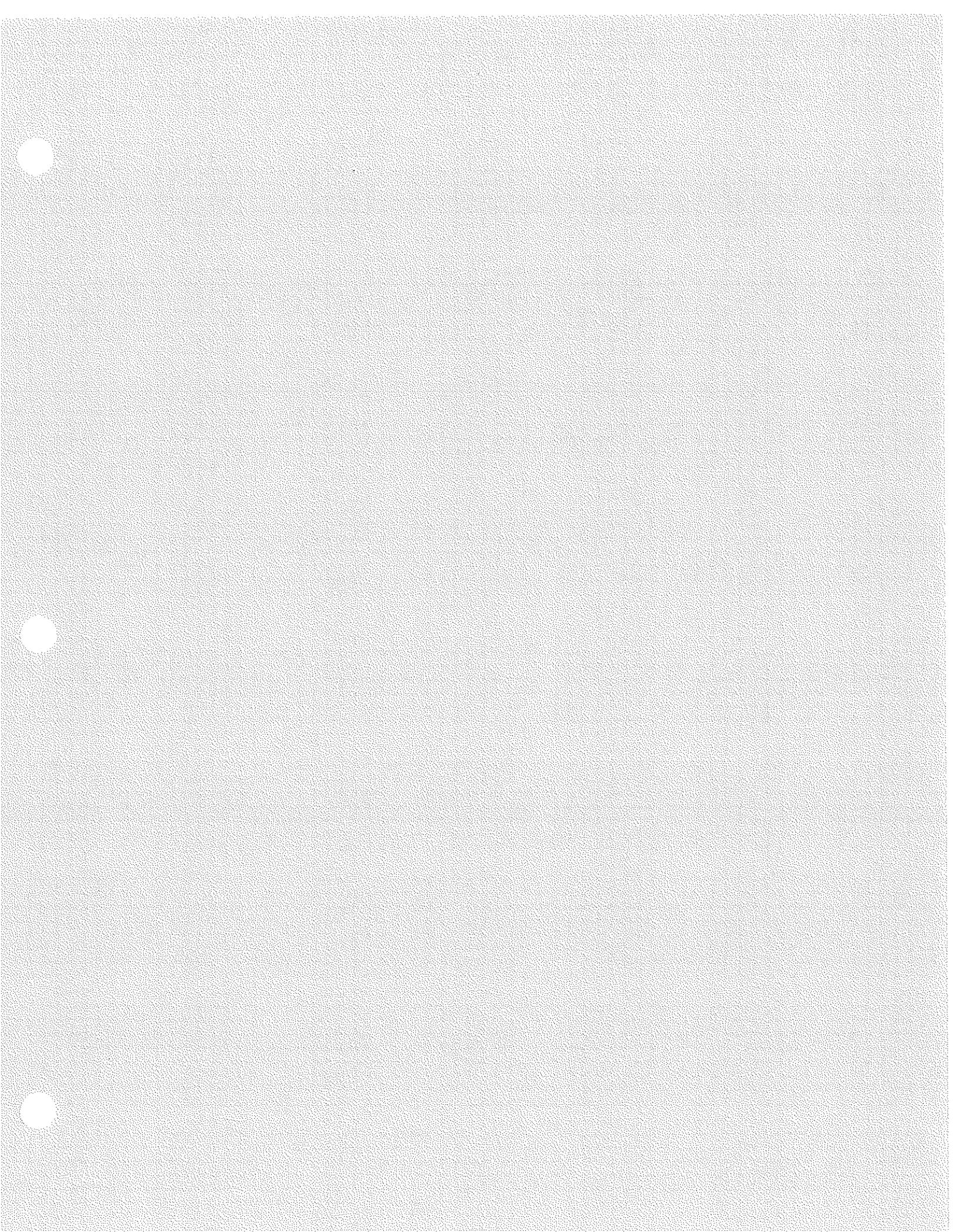
2+35	1.6510	8.90	QV
2+40	1.7125	8.93	QV
2+45	1.7742	8.96	QV
2+50	1.8361	8.98	QV
2+55	1.8981	9.01	QV
3+ 0	1.9604	9.04	QV
3+ 5	2.0228	9.07	QV
3+10	2.0855	9.09	QV
3+15	2.1483	9.12	QV
3+20	2.2113	9.15	QV
3+25	2.2745	9.18	QV
3+30	2.3380	9.21	QV
3+35	2.4016	9.24	QV
3+40	2.4654	9.27	Q V
3+45	2.5294	9.30	Q V
3+50	2.5937	9.33	Q V
3+55	2.6581	9.36	Q V
4+ 0	2.7228	9.39	Q V
4+ 5	2.7877	9.42	Q V
4+10	2.8528	9.45	Q V
4+15	2.9181	9.48	Q V
4+20	2.9836	9.52	Q V
4+25	3.0494	9.55	Q V
4+30	3.1154	9.58	Q V
4+35	3.1816	9.61	Q V
4+40	3.2481	9.65	Q V
4+45	3.3147	9.68	Q V
4+50	3.3816	9.72	Q V
4+55	3.4488	9.75	Q V
5+ 0	3.5162	9.79	Q V
5+ 5	3.5838	9.82	Q V
5+10	3.6517	9.86	Q V
5+15	3.7199	9.89	Q V
5+20	3.7882	9.93	Q V
5+25	3.8569	9.97	Q V
5+30	3.9258	10.00	Q V
5+35	3.9949	10.04	Q V
5+40	4.0644	10.08	Q V
5+45	4.1340	10.12	Q V
5+50	4.2040	10.16	Q V
5+55	4.2742	10.20	Q V
6+ 0	4.3448	10.24	Q V
6+ 5	4.4155	10.28	Q V
6+10	4.4866	10.32	Q V
6+15	4.5580	10.36	Q V
6+20	4.6296	10.40	Q V
6+25	4.7016	10.45	Q V
6+30	4.7738	10.49	Q V
6+35	4.8463	10.53	Q V
6+40	4.9192	10.58	Q V
6+45	4.9923	10.62	Q V
6+50	5.0658	10.67	Q V
6+55	5.1396	10.71	Q V
7+ 0	5.2137	10.76	Q V
7+ 5	5.2881	10.81	Q V
7+10	5.3629	10.86	Q V
7+15	5.4380	10.90	Q V

7+20	5.5134	10.95	Q	V
7+25	5.5892	11.00	Q	V
7+30	5.6653	11.05	Q	V
7+35	5.7418	11.11	Q	V
7+40	5.8187	11.16	Q	V
7+45	5.8959	11.21	Q	V
7+50	5.9735	11.26	Q	V
7+55	6.0514	11.32	Q	V
8+ 0	6.1297	11.37	Q	V
8+ 5	6.2084	11.43	Q	V
8+10	6.2876	11.49	Q	V
8+15	6.3671	11.54	Q	V
8+20	6.4470	11.60	Q	V
8+25	6.5273	11.66	Q	V
8+30	6.6080	11.72	Q	V
8+35	6.6892	11.78	Q	V
8+40	6.7708	11.85	Q	V
8+45	6.8528	11.91	Q	V
8+50	6.9353	11.98	Q	V
8+55	7.0182	12.04	Q	V
9+ 0	7.1016	12.11	Q	V
9+ 5	7.1855	12.18	Q	V
9+10	7.2698	12.24	Q	V
9+15	7.3546	12.31	Q	V
9+20	7.4399	12.39	Q	V
9+25	7.5257	12.46	Q	V
9+30	7.6120	12.53	Q	V
9+35	7.6989	12.61	Q	V
9+40	7.7862	12.69	Q	V
9+45	7.8741	12.76	Q	V
9+50	7.9626	12.84	Q	V
9+55	8.0516	12.92	Q	V
10+ 0	8.1412	13.01	Q	V
10+ 5	8.2314	13.09	Q	V
10+10	8.3221	13.18	Q	V
10+15	8.4135	13.27	Q	V
10+20	8.5055	13.36	Q	V
10+25	8.5981	13.45	Q	V
10+30	8.6914	13.54	Q	V
10+35	8.7853	13.64	Q	V
10+40	8.8799	13.74	Q	V
10+45	8.9752	13.84	Q	V
10+50	9.0712	13.94	Q	V
10+55	9.1679	14.04	Q	V
11+ 0	9.2654	14.15	Q	V
11+ 5	9.3636	14.26	Q	V
11+10	9.4625	14.37	Q	V
11+15	9.5623	14.49	Q	V
11+20	9.6629	14.61	Q	V
11+25	9.7643	14.72	Q	V
11+30	9.8666	14.85	Q	V
11+35	9.9697	14.98	Q	V
11+40	10.0738	15.11	Q	V
11+45	10.1787	15.24	Q	V
11+50	10.2846	15.38	Q	V
11+55	10.3915	15.52	Q	V
12+ 0	10.4994	15.67	Q	V

12+ 5	10.6082	15.80	Q	V		
12+10	10.7178	15.91	Q	V		
12+15	10.8278	15.97	Q	V		
12+20	10.9380	16.01	Q	V		
12+25	11.0489	16.10	Q	V		
12+30	11.1608	16.24	Q	V		
12+35	11.2738	16.40	Q	V		
12+40	11.3880	16.59	Q	V		
12+45	11.5035	16.78	Q	V		
12+50	11.6205	16.98	Q	V		
12+55	11.7388	17.18	Q	V		
13+ 0	11.8586	17.40	Q	V		
13+ 5	11.9799	17.62	Q	V		
13+10	12.1029	17.85	Q	V		
13+15	12.2275	18.09	Q	V		
13+20	12.3539	18.35	Q	V		
13+25	12.4820	18.61	Q	V		
13+30	12.6121	18.89	Q	V		
13+35	12.7441	19.17	Q	V		
13+40	12.8783	19.47	Q	V		
13+45	13.0145	19.78	Q	V		
13+50	13.1531	20.12	Q	V		
13+55	13.2940	20.46	Q	V		
14+ 0	13.4375	20.83	Q	V		
14+ 5	13.5836	21.22	Q	V		
14+10	13.7327	21.65	Q	V		
14+15	13.8849	22.10	Q	V		
14+20	14.0406	22.60	Q	V		
14+25	14.1997	23.10	Q	V		
14+30	14.3625	23.64	Q	V		
14+35	14.5292	24.21	Q	V		
14+40	14.7002	24.82	Q	V		
14+45	14.8756	25.47	Q	V		
14+50	15.0559	26.19	Q	V		
14+55	15.2415	26.95	Q	V		
15+ 0	15.4330	27.81	Q	V		
15+ 5	15.6309	28.73	Q	V		
15+10	15.8359	29.77	Q	V		
15+15	16.0489	30.92	Q	V		
15+20	16.2709	32.24	Q	V		
15+25	16.5017	33.52	Q	V		
15+30	16.7378	34.28	Q	V		
15+35	16.9748	34.42	Q	V		
15+40	17.2130	34.58	Q	V		
15+45	17.4619	36.14	Q	V		
15+50	17.7332	39.39	Q	V		
15+55	18.0397	44.50	Q	V		
16+ 0	18.4088	53.60	Q	V		
16+ 5	18.9228	74.62	Q	V		
16+10	19.7397	118.62	Q	V		
16+15	20.8243	157.48	Q	V		
16+20	21.9664	165.84	Q	V		
16+25	22.7769	117.69	Q	V		
16+30	23.3146	78.08	Q	V		
16+35	23.6997	55.90	Q	V		
16+40	23.9953	42.93	Q	V		
16+45	24.2526	37.35	Q	V		

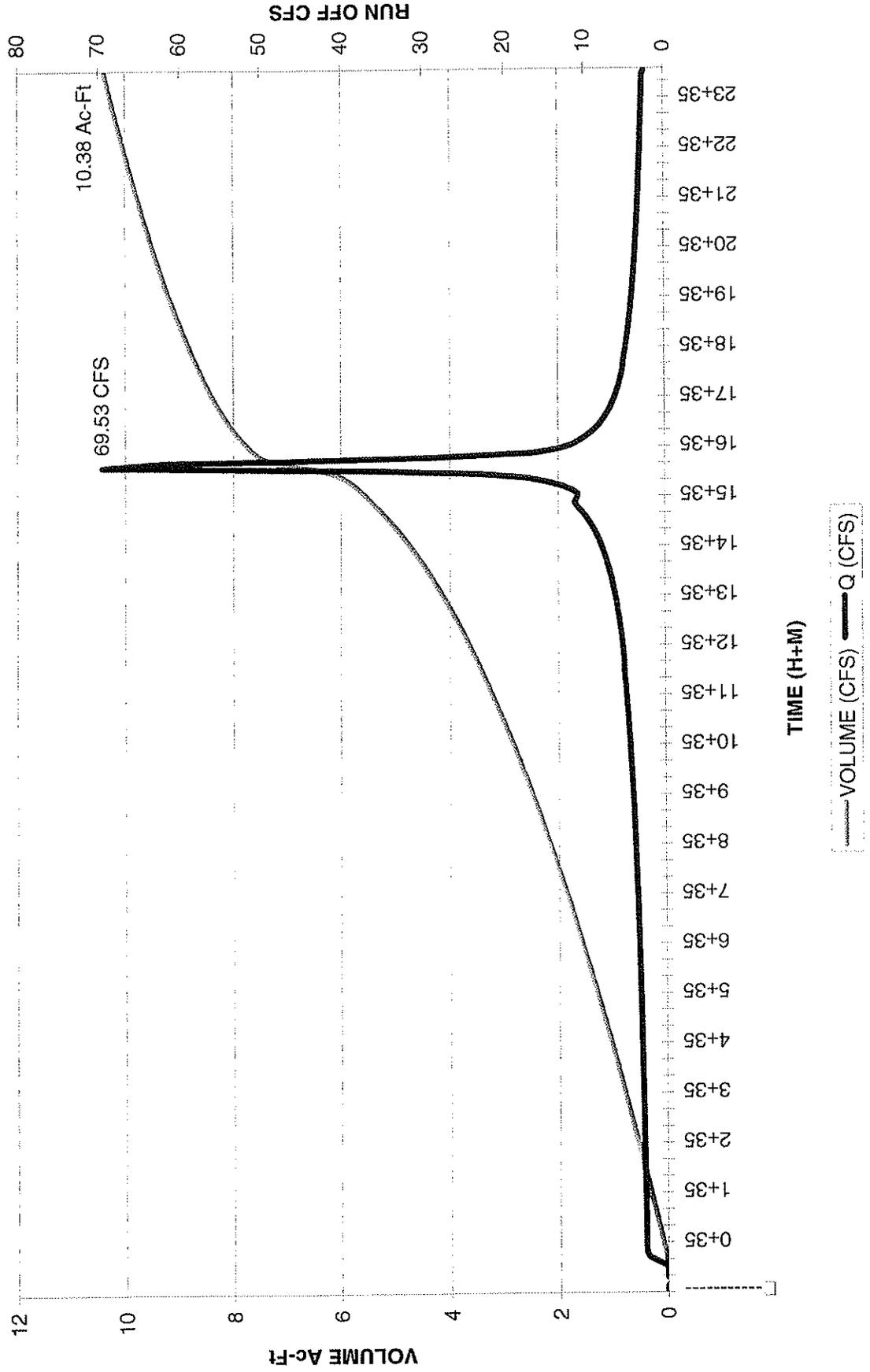
16+50	24.4891	34.34	Q	V
16+55	24.7010	30.78	Q	V
17+ 0	24.8929	27.86	Q	V
17+ 5	25.0731	26.17	Q	V
17+10	25.2439	24.79	Q	V
17+15	25.4063	23.59	Q	V
17+20	25.5615	22.53	Q	V
17+25	25.7103	21.60	Q	V
17+30	25.8535	20.79	Q	V
17+35	25.9917	20.07	Q	V
17+40	26.1255	19.42	Q	V
17+45	26.2552	18.84	Q	V
17+50	26.3812	18.30	Q	V
17+55	26.5039	17.81	Q	V
18+ 0	26.6234	17.35	Q	V
18+ 5	26.7400	16.94	Q	V
18+10	26.8544	16.60	Q	V
18+15	26.9669	16.34	Q	V
18+20	27.0779	16.12	Q	V
18+25	27.1872	15.87	Q	V
18+30	27.2946	15.60	Q	V
18+35	27.4002	15.33	Q	V
18+40	27.5039	15.07	Q	V
18+45	27.6060	14.81	Q	V
18+50	27.7063	14.57	Q	V
18+55	27.8051	14.34	Q	V
19+ 0	27.9023	14.12	Q	V
19+ 5	27.9981	13.91	Q	V
19+10	28.0926	13.71	Q	V
19+15	28.1856	13.52	Q	V
19+20	28.2775	13.33	Q	V
19+25	28.3680	13.15	Q	V
19+30	28.4575	12.98	Q	V
19+35	28.5458	12.82	Q	V
19+40	28.6330	12.66	Q	V
19+45	28.7191	12.51	Q	V
19+50	28.8043	12.37	Q	V
19+55	28.8885	12.22	Q	V
20+ 0	28.9717	12.09	Q	V
20+ 5	29.0541	11.96	Q	V
20+10	29.1355	11.83	Q	V
20+15	29.2162	11.70	Q	V
20+20	29.2959	11.59	Q	V
20+25	29.3749	11.47	Q	V
20+30	29.4531	11.36	Q	V
20+35	29.5306	11.25	Q	V
20+40	29.6073	11.14	Q	V
20+45	29.6834	11.04	Q	V
20+50	29.7587	10.94	Q	V
20+55	29.8334	10.84	Q	V
21+ 0	29.9074	10.75	Q	V
21+ 5	29.9807	10.65	Q	V
21+10	30.0535	10.56	Q	V
21+15	30.1256	10.48	Q	V
21+20	30.1972	10.39	Q	V
21+25	30.2682	10.31	Q	V
21+30	30.3386	10.23	Q	V

21+35	30.4085	10.15	Q	V
21+40	30.4778	10.07	Q	V
21+45	30.5466	9.99	Q	V
21+50	30.6149	9.92	Q	V
21+55	30.6827	9.85	Q	V
22+ 0	30.7500	9.77	Q	V
22+ 5	30.8169	9.71	Q	V
22+10	30.8833	9.64	Q	V
22+15	30.9492	9.57	Q	V
22+20	31.0146	9.51	Q	V
22+25	31.0797	9.44	Q	V
22+30	31.1443	9.38	Q	V
22+35	31.2084	9.32	Q	V
22+40	31.2722	9.26	Q	V
22+45	31.3356	9.20	Q	V
22+50	31.3985	9.14	Q	V
22+55	31.4611	9.08	Q	V
23+ 0	31.5233	9.03	Q	V
23+ 5	31.5851	8.97	Q	V
23+10	31.6465	8.92	Q	V
23+15	31.7076	8.87	Q	V
23+20	31.7683	8.82	Q	V
23+25	31.8287	8.77	Q	V
23+30	31.8887	8.72	Q	V
23+35	31.9484	8.67	Q	V
23+40	32.0078	8.62	Q	V
23+45	32.0668	8.57	Q	V
23+50	32.1255	8.53	Q	V
23+55	32.1839	8.48	Q	V
24+ 0	32.2420	8.43	Q	V
24+ 5	32.2984	8.19	Q	V
24+10	32.3474	7.12	Q	V
24+15	32.3828	5.14	Q	V
24+20	32.4016	2.72	Q	V
24+25	32.4104	1.27	Q	V
24+30	32.4143	0.57	Q	V
24+35	32.4159	0.24	Q	V
24+40	32.4167	0.13	Q	V
24+45	32.4173	0.07	Q	V
24+50	32.4174	0.02	Q	V



COLTON SUPER BLOCK EXISTING CONDITIONS
100 YEAR 24 HR STORM EVENT

HYD-3



Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

Study date 12/21/07

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

Program License Serial Number 4014

EXISTING CONDITIONS
100 YEAR 24HR STORM EVENT
HYD-3
DEC. 20, 2007

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
22.36	1	0.90

Rainfall data for year 2		
22.36	6	1.50

Rainfall data for year 2		
22.36	24	2.60

Rainfall data for year 100		
22.36	1	1.27

Rainfall data for year 100		
22.36	6	3.10

Rainfall data for year 100		
22.36	24	6.30

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

SCS curve No. (AMCII)	SCS curve NO. (AMC 3)	Area (Ac.)	Area Fraction	Fp (Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
77.0	92.2	22.36	1.000	0.151	0.800	0.121

Area-averaged adjusted loss rate Fm (In/Hr) = 0.121

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
17.89	0.800	77.0	92.2	0.85	0.855
4.47	0.200	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.877

Area-averaged low loss fraction, Yb = 0.123

User entry of time of concentration = 0.160 (hours)

Watershed area = 22.36 (Ac.)

Catchment Lag time = 0.128 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 65.1042

Hydrograph baseflow = 0.00 (CFS)

Average maximum watershed loss rate (Fm) = 0.121 (In/Hr)

Average low loss rate fraction (Yb) = 0.123 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.470 (In)

Computed peak 30-minute rainfall = 0.962 (In)

Specified peak 1-hour rainfall = 1.270 (In)

Computed peak 3-hour rainfall = 2.195 (In)

Specified peak 6-hour rainfall = 3.100 (In)

Specified peak 24-hour rainfall = 6.300 (In)

Rainfall depth area reduction factors:

Using a total area of 22.36 (Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.470 (In)
30-minute factor = 0.999	Adjusted rainfall = 0.961 (In)
1-hour factor = 0.999	Adjusted rainfall = 1.269 (In)
3-hour factor = 1.000	Adjusted rainfall = 2.195 (In)
6-hour factor = 1.000	Adjusted rainfall = 3.100 (In)
24-hour factor = 1.000	Adjusted rainfall = 6.300 (In)

Unit Hydrograph

Interval Number	'S' Graph Mean values	Unit Hydrograph (CFS)
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(K = 270.42 (CFS))

1	7.634	20.643
2	47.879	108.831
3	85.995	103.070
4	97.049	29.892
5	99.073	5.475
6	100.000	2.506

Total soil rain loss = 0.72 (In)
Total effective rainfall = 5.58 (In)
Peak flow rate in flood hydrograph = 69.53 (CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

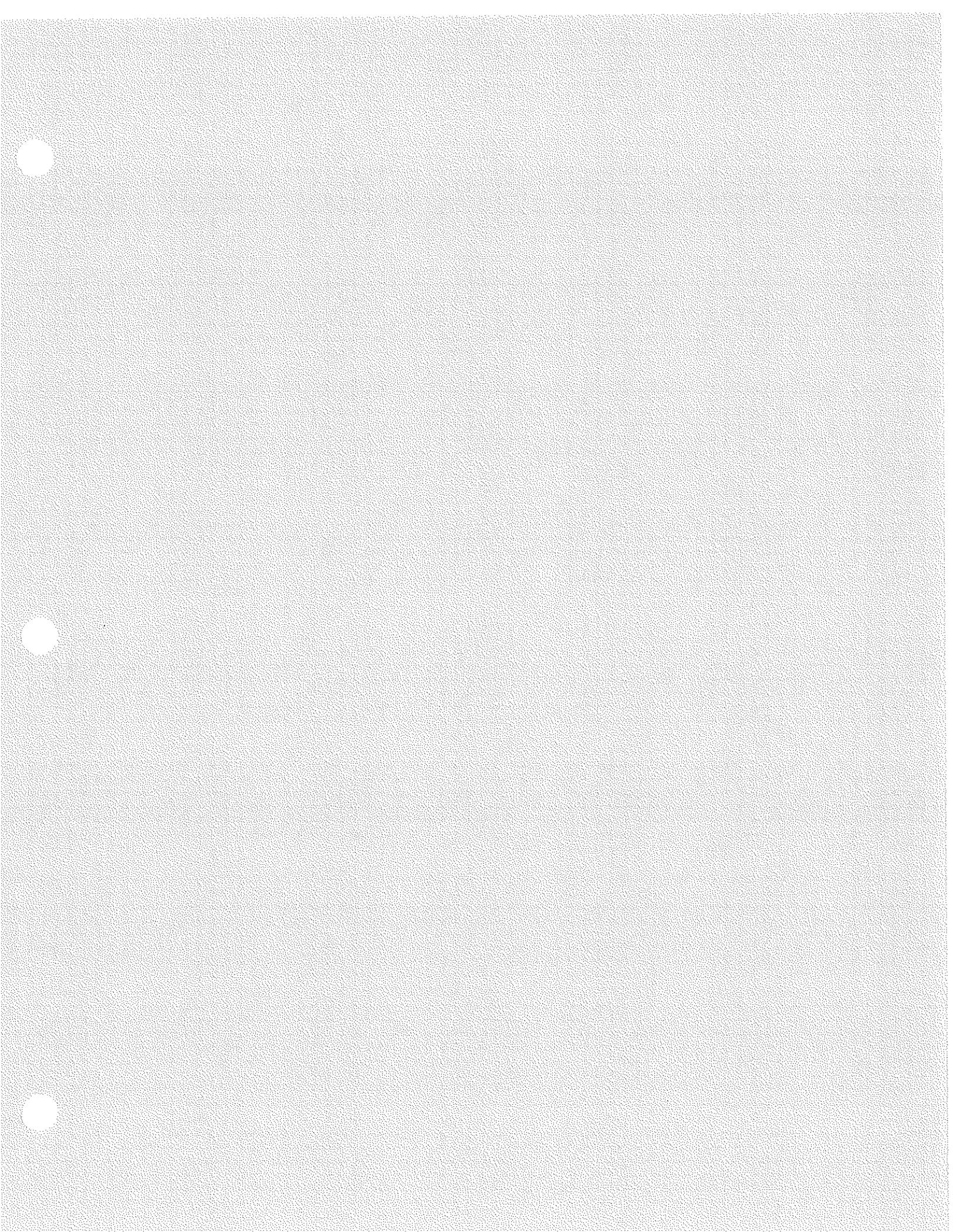
Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0014	0.20	Q				
0+10	0.0102	1.27	Q				
0+15	0.0259	2.29	VQ				
0+20	0.0437	2.58	VQ				
0+25	0.0619	2.65	VQ				
0+30	0.0804	2.68	VQ				
0+35	0.0988	2.68	VQ				
0+40	0.1174	2.69	VQ				
0+45	0.1359	2.70	VQ				
0+50	0.1546	2.70	VQ				
0+55	0.1733	2.71	VQ				
1+ 0	0.1920	2.72	VQ				
1+ 5	0.2108	2.73	VQ				
1+10	0.2296	2.73	VQ				
1+15	0.2485	2.74	VQ				
1+20	0.2674	2.75	Q				
1+25	0.2864	2.76	Q				
1+30	0.3054	2.76	Q				
1+35	0.3245	2.77	Q				
1+40	0.3437	2.78	Q				
1+45	0.3629	2.79	Q				
1+50	0.3821	2.80	Q				
1+55	0.4014	2.80	Q				
2+ 0	0.4208	2.81	Q				
2+ 5	0.4402	2.82	Q				
2+10	0.4597	2.83	Q				
2+15	0.4792	2.84	Q				
2+20	0.4988	2.84	Q				
2+25	0.5184	2.85	Q				
2+30	0.5381	2.86	QV				
2+35	0.5579	2.87	QV				
2+40	0.5777	2.88	QV				
2+45	0.5976	2.89	QV				
2+50	0.6175	2.90	QV				
2+55	0.6375	2.90	QV				

3+ 0	0.6576	2.91	QV
3+ 5	0.6777	2.92	QV
3+10	0.6979	2.93	QV
3+15	0.7182	2.94	QV
3+20	0.7385	2.95	QV
3+25	0.7589	2.96	QV
3+30	0.7793	2.97	QV
3+35	0.7998	2.98	Q V
3+40	0.8204	2.99	Q V
3+45	0.8410	3.00	Q V
3+50	0.8618	3.01	Q V
3+55	0.8825	3.02	Q V
4+ 0	0.9034	3.03	Q V
4+ 5	0.9243	3.04	Q V
4+10	0.9453	3.05	Q V
4+15	0.9664	3.06	Q V
4+20	0.9875	3.07	Q V
4+25	1.0087	3.08	Q V
4+30	1.0300	3.09	Q V
4+35	1.0513	3.10	Q V
4+40	1.0728	3.11	Q V
4+45	1.0943	3.12	Q V
4+50	1.1159	3.13	Q V
4+55	1.1375	3.15	Q V
5+ 0	1.1593	3.16	Q V
5+ 5	1.1811	3.17	Q V
5+10	1.2030	3.18	Q V
5+15	1.2250	3.19	Q V
5+20	1.2470	3.20	Q V
5+25	1.2692	3.22	Q V
5+30	1.2914	3.23	Q V
5+35	1.3137	3.24	Q V
5+40	1.3361	3.25	Q V
5+45	1.3586	3.27	Q V
5+50	1.3812	3.28	Q V
5+55	1.4039	3.29	Q V
6+ 0	1.4266	3.30	Q V
6+ 5	1.4495	3.32	Q V
6+10	1.4724	3.33	Q V
6+15	1.4954	3.34	Q V
6+20	1.5186	3.36	Q V
6+25	1.5418	3.37	Q V
6+30	1.5651	3.39	Q V
6+35	1.5885	3.40	Q V
6+40	1.6120	3.42	Q V
6+45	1.6357	3.43	Q V
6+50	1.6594	3.44	Q V
6+55	1.6832	3.46	Q V
7+ 0	1.7071	3.47	Q V
7+ 5	1.7312	3.49	Q V
7+10	1.7553	3.51	Q V
7+15	1.7796	3.52	Q V
7+20	1.8039	3.54	Q V
7+25	1.8284	3.55	Q V
7+30	1.8530	3.57	Q V
7+35	1.8777	3.59	Q V
7+40	1.9026	3.60	Q V

7+45	1.9275	3.62	Q	V
7+50	1.9526	3.64	Q	V
7+55	1.9778	3.66	Q	V
8+ 0	2.0031	3.68	Q	V
8+ 5	2.0285	3.69	Q	V
8+10	2.0541	3.71	Q	V
8+15	2.0798	3.73	Q	V
8+20	2.1056	3.75	Q	V
8+25	2.1316	3.77	Q	V
8+30	2.1577	3.79	Q	V
8+35	2.1839	3.81	Q	V
8+40	2.2103	3.83	Q	V
8+45	2.2368	3.85	Q	V
8+50	2.2635	3.87	Q	V
8+55	2.2903	3.89	Q	V
9+ 0	2.3173	3.92	Q	V
9+ 5	2.3444	3.94	Q	V
9+10	2.3717	3.96	Q	V
9+15	2.3992	3.98	Q	V
9+20	2.4268	4.01	Q	V
9+25	2.4545	4.03	Q	V
9+30	2.4825	4.06	Q	V
9+35	2.5106	4.08	Q	V
9+40	2.5389	4.11	Q	V
9+45	2.5673	4.13	Q	V
9+50	2.5960	4.16	Q	V
9+55	2.6248	4.19	Q	V
10+ 0	2.6538	4.21	Q	V
10+ 5	2.6830	4.24	Q	V
10+10	2.7124	4.27	Q	V
10+15	2.7420	4.30	Q	V
10+20	2.7719	4.33	Q	V
10+25	2.8019	4.36	Q	V
10+30	2.8321	4.39	Q	V
10+35	2.8626	4.42	Q	V
10+40	2.8932	4.45	Q	V
10+45	2.9241	4.49	Q	V
10+50	2.9553	4.52	Q	V
10+55	2.9866	4.56	Q	V
11+ 0	3.0183	4.59	Q	V
11+ 5	3.0501	4.63	Q	V
11+10	3.0823	4.66	Q	V
11+15	3.1146	4.70	Q	V
11+20	3.1473	4.74	Q	V
11+25	3.1802	4.78	Q	V
11+30	3.2134	4.82	Q	V
11+35	3.2470	4.87	Q	V
11+40	3.2808	4.91	Q	V
11+45	3.3149	4.95	Q	V
11+50	3.3493	5.00	Q	V
11+55	3.3841	5.05	Q	V
12+ 0	3.4192	5.10	Q	V
12+ 5	3.4545	5.13	Q	V
12+10	3.4899	5.13	Q	V
12+15	3.5252	5.13	Q	V
12+20	3.5608	5.17	Q	V
12+25	3.5968	5.23	Q	V

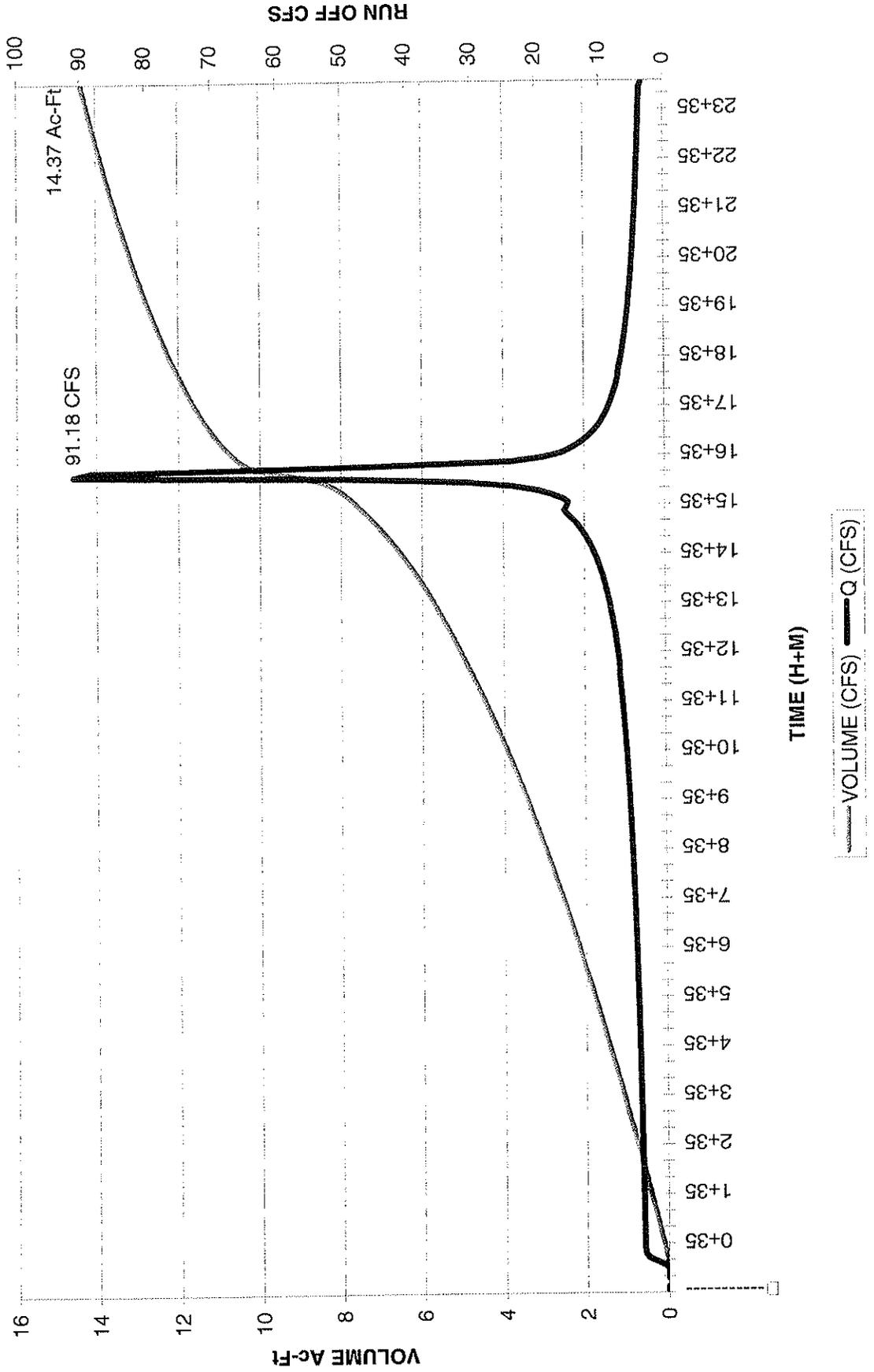
12+30	3.6332	5.28	Q	V			
12+35	3.6700	5.34	Q	V			
12+40	3.7073	5.41	Q	V			
12+45	3.7450	5.47	Q	V			
12+50	3.7831	5.54	Q	V			
12+55	3.8217	5.61	Q	V			
13+ 0	3.8609	5.68	Q	V			
13+ 5	3.9005	5.76	Q	V			
13+10	3.9408	5.84	Q	V			
13+15	3.9815	5.92	Q	V			
13+20	4.0229	6.01	Q	V			
13+25	4.0648	6.09	Q	V			
13+30	4.1075	6.19	Q	V			
13+35	4.1508	6.29	Q	V			
13+40	4.1948	6.39	Q	V			
13+45	4.2395	6.50	Q	V			
13+50	4.2851	6.61	Q	V			
13+55	4.3314	6.73	Q	V			
14+ 0	4.3786	6.86	Q	V			
14+ 5	4.4268	6.99	Q	V			
14+10	4.4760	7.14	Q	V			
14+15	4.5262	7.29	Q	V			
14+20	4.5776	7.46	Q	V			
14+25	4.6301	7.63	Q	V			
14+30	4.6840	7.82	Q	V			
14+35	4.7392	8.01	Q	V			
14+40	4.7959	8.23	Q	V			
14+45	4.8541	8.46	Q	V			
14+50	4.9142	8.72	Q	V			
14+55	4.9762	9.00	Q	V			
15+ 0	5.0403	9.31	Q	V			
15+ 5	5.1068	9.65	Q	V			
15+10	5.1759	10.04	Q	V			
15+15	5.2480	10.46	Q	V			
15+20	5.3235	10.97	Q	V			
15+25	5.4016	11.34	Q	V			
15+30	5.4776	11.03	Q	V			
15+35	5.5524	10.87	Q	V			
15+40	5.6323	11.60	Q	V			
15+45	5.7205	12.80	Q	V			
15+50	5.8209	14.58	Q	V			
15+55	5.9397	17.25	Q	V			
16+ 0	6.0961	22.71	Q	V			
16+ 5	6.3535	37.37	Q	V			
16+10	6.8323	69.53	Q	V			
16+15	7.2588	61.93	Q	V			
16+20	7.4625	29.58	Q	V			
16+25	7.5750	16.32	Q	V			
16+30	7.6669	13.35	Q	V			
16+35	7.7470	11.63	Q	V			
16+40	7.8206	10.68	Q	V			
16+45	7.8883	9.83	Q	V			
16+50	7.9513	9.16	Q	V			
16+55	8.0105	8.59	Q	V			
17+ 0	8.0664	8.12	Q	V			
17+ 5	8.1195	7.72	Q	V			
17+10	8.1702	7.36	Q	V			

22+ 0	9.8924	3.11	Q	V
22+ 5	9.9137	3.08	Q	V
22+10	9.9348	3.06	Q	V
22+15	9.9557	3.04	Q	V
22+20	9.9765	3.02	Q	V
22+25	9.9972	3.00	Q	V
22+30	10.0177	2.98	Q	V
22+35	10.0381	2.96	Q	V
22+40	10.0584	2.94	Q	V
22+45	10.0786	2.93	Q	V
22+50	10.0986	2.91	Q	V
22+55	10.1185	2.89	Q	V
23+ 0	10.1383	2.87	Q	V
23+ 5	10.1579	2.86	Q	V
23+10	10.1775	2.84	Q	V
23+15	10.1969	2.82	Q	V
23+20	10.2163	2.81	Q	V
23+25	10.2355	2.79	Q	V
23+30	10.2546	2.77	Q	V
23+35	10.2736	2.76	Q	V
23+40	10.2925	2.74	Q	V
23+45	10.3113	2.73	Q	V
23+50	10.3300	2.71	Q	V
23+55	10.3486	2.70	Q	V
24+ 0	10.3671	2.69	Q	V
24+ 5	10.3841	2.47	Q	V
24+10	10.3937	1.39	Q	V
24+15	10.3962	0.37	Q	V
24+20	10.3968	0.08	Q	V
24+25	10.3970	0.02	Q	V



COLTON SUPER BLOCK EXISTING CONDITIONS
100 YEAR 24 HR STORM EVENT

HYD-4



U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/21/07

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

Program License Serial Number 4014

EXISTING CONDITIONS
100 YEAR 24HR STORM EVENT
HYD-4
DEC 21 2007

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
30.94	1	0.90

Rainfall data for year 2		
30.94	6	1.50

Rainfall data for year 2		
30.94	24	2.60

Rainfall data for year 100		
30.94	1	1.27

Rainfall data for year 100		
30.94	6	3.10

Rainfall data for year 100		
30.94	24	6.30

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

SCS curve No. (AMCII)	SCS curve NO. (AMC 3)	Area (Ac.)	Area Fraction	Fp (Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
77.0	92.2	30.94	1.000	0.151	0.800	0.121

Area-averaged adjusted loss rate Fm (In/Hr) = 0.121

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
24.75	0.800	77.0	92.2	0.85	0.855
6.19	0.200	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.877

Area-averaged low loss fraction, Yb = 0.123

User entry of time of concentration = 0.170 (hours)

Watershed area = 30.94 (Ac.)

Catchment Lag time = 0.136 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 61.2745

Hydrograph baseflow = 0.00 (CFS)

Average maximum watershed loss rate (Fm) = 0.121 (In/Hr)

Average low loss rate fraction (Yb) = 0.123 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.470 (In)

Computed peak 30-minute rainfall = 0.962 (In)

Specified peak 1-hour rainfall = 1.270 (In)

Computed peak 3-hour rainfall = 2.195 (In)

Specified peak 6-hour rainfall = 3.100 (In)

Specified peak 24-hour rainfall = 6.300 (In)

Rainfall depth area reduction factors:

Using a total area of 30.94 (Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.469 (In)
30-minute factor = 0.999	Adjusted rainfall = 0.961 (In)
1-hour factor = 0.999	Adjusted rainfall = 1.268 (In)
3-hour factor = 1.000	Adjusted rainfall = 2.195 (In)
6-hour factor = 1.000	Adjusted rainfall = 3.100 (In)
24-hour factor = 1.000	Adjusted rainfall = 6.300 (In)

Unit Hydrograph

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

(K = 374.18 (CFS))

1	6.789	25.404
2	43.210	136.281
3	82.892	148.482
4	95.987	48.998
5	98.763	10.388
6	100.000	4.628

Total soil rain loss = 0.72(In)
Total effective rainfall = 5.58(In)
Peak flow rate in flood hydrograph = 91.18(CFS)

+++++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	25.0	50.0	75.0	100.0
0+ 5	0.0017	0.25	Q				
0+10	0.0127	1.59	Q				
0+15	0.0336	3.05	VQ				
0+20	0.0580	3.54	VQ				
0+25	0.0831	3.65	VQ				
0+30	0.1086	3.70	VQ				
0+35	0.1342	3.71	VQ				
0+40	0.1598	3.72	VQ				
0+45	0.1855	3.73	VQ				
0+50	0.2113	3.74	VQ				
0+55	0.2372	3.75	VQ				
1+ 0	0.2631	3.76	VQ				
1+ 5	0.2890	3.77	VQ				
1+10	0.3151	3.78	VQ				
1+15	0.3412	3.79	VQ				
1+20	0.3674	3.80	Q				
1+25	0.3937	3.81	Q				
1+30	0.4200	3.82	Q				
1+35	0.4464	3.83	Q				
1+40	0.4729	3.85	Q				
1+45	0.4994	3.86	Q				
1+50	0.5261	3.87	Q				
1+55	0.5528	3.88	Q				
2+ 0	0.5796	3.89	Q				
2+ 5	0.6064	3.90	Q				
2+10	0.6334	3.91	Q				
2+15	0.6604	3.92	Q				
2+20	0.6875	3.93	Q				
2+25	0.7146	3.95	Q				
2+30	0.7419	3.96	QV				
2+35	0.7692	3.97	QV				
2+40	0.7967	3.98	QV				
2+45	0.8242	3.99	QV				
2+50	0.8517	4.01	QV				
2+55	0.8794	4.02	QV				

3+ 0	0.9072	4.03	QV
3+ 5	0.9350	4.04	QV
3+10	0.9629	4.06	QV
3+15	0.9909	4.07	QV
3+20	1.0191	4.08	QV
3+25	1.0472	4.09	QV
3+30	1.0755	4.11	QV
3+35	1.1039	4.12	Q V
3+40	1.1324	4.13	Q V
3+45	1.1609	4.15	Q V
3+50	1.1896	4.16	Q V
3+55	1.2183	4.17	Q V
4+ 0	1.2472	4.19	Q V
4+ 5	1.2761	4.20	Q V
4+10	1.3051	4.22	Q V
4+15	1.3343	4.23	Q V
4+20	1.3635	4.24	Q V
4+25	1.3928	4.26	Q V
4+30	1.4223	4.27	Q V
4+35	1.4518	4.29	Q V
4+40	1.4815	4.30	Q V
4+45	1.5112	4.32	Q V
4+50	1.5411	4.34	Q V
4+55	1.5710	4.35	Q V
5+ 0	1.6011	4.37	Q V
5+ 5	1.6313	4.38	Q V
5+10	1.6616	4.40	Q V
5+15	1.6920	4.41	Q V
5+20	1.7225	4.43	Q V
5+25	1.7531	4.45	Q V
5+30	1.7839	4.46	Q V
5+35	1.8148	4.48	Q V
5+40	1.8457	4.50	Q V
5+45	1.8768	4.52	Q V
5+50	1.9081	4.53	Q V
5+55	1.9394	4.55	Q V
6+ 0	1.9709	4.57	Q V
6+ 5	2.0025	4.59	Q V
6+10	2.0342	4.61	Q V
6+15	2.0661	4.63	Q V
6+20	2.0981	4.64	Q V
6+25	2.1302	4.66	Q V
6+30	2.1625	4.68	Q V
6+35	2.1948	4.70	Q V
6+40	2.2274	4.72	Q V
6+45	2.2600	4.74	Q V
6+50	2.2929	4.76	Q V
6+55	2.3258	4.78	Q V
7+ 0	2.3589	4.81	Q V
7+ 5	2.3922	4.83	Q V
7+10	2.4256	4.85	Q V
7+15	2.4591	4.87	Q V
7+20	2.4928	4.89	Q V
7+25	2.5267	4.92	Q V
7+30	2.5607	4.94	Q V
7+35	2.5949	4.96	Q V
7+40	2.6292	4.99	Q V

7+45	2.6637	5.01	Q	V
7+50	2.6984	5.03	Q	V
7+55	2.7332	5.06	Q	V
8+ 0	2.7682	5.08	Q	V
8+ 5	2.8034	5.11	Q	V
8+10	2.8388	5.13	Q	V
8+15	2.8743	5.16	Q	V
8+20	2.9100	5.19	Q	V
8+25	2.9459	5.21	Q	V
8+30	2.9820	5.24	Q	V
8+35	3.0183	5.27	Q	V
8+40	3.0548	5.30	Q	V
8+45	3.0915	5.33	Q	V
8+50	3.1284	5.36	Q	V
8+55	3.1655	5.39	Q	V
9+ 0	3.2028	5.42	Q	V
9+ 5	3.2403	5.45	Q	V
9+10	3.2781	5.48	Q	V
9+15	3.3160	5.51	Q	V
9+20	3.3542	5.54	Q	V
9+25	3.3926	5.58	Q	V
9+30	3.4312	5.61	Q	V
9+35	3.4701	5.64	Q	V
9+40	3.5092	5.68	Q	V
9+45	3.5486	5.71	Q	V
9+50	3.5882	5.75	Q	V
9+55	3.6280	5.79	Q	V
10+ 0	3.6682	5.83	Q	V
10+ 5	3.7086	5.86	Q	V
10+10	3.7492	5.90	Q	V
10+15	3.7902	5.94	Q	V
10+20	3.8314	5.99	Q	V
10+25	3.8729	6.03	Q	V
10+30	3.9147	6.07	Q	V
10+35	3.9568	6.11	Q	V
10+40	3.9992	6.16	Q	V
10+45	4.0419	6.20	Q	V
10+50	4.0850	6.25	Q	V
10+55	4.1284	6.30	Q	V
11+ 0	4.1721	6.35	Q	V
11+ 5	4.2161	6.40	Q	V
11+10	4.2606	6.45	Q	V
11+15	4.3053	6.50	Q	V
11+20	4.3505	6.56	Q	V
11+25	4.3960	6.61	Q	V
11+30	4.4419	6.67	Q	V
11+35	4.4883	6.73	Q	V
11+40	4.5350	6.79	Q	V
11+45	4.5822	6.85	Q	V
11+50	4.6298	6.91	Q	V
11+55	4.6778	6.98	Q	V
12+ 0	4.7263	7.04	Q	V
12+ 5	4.7752	7.10	Q	V
12+10	4.8241	7.10	Q	V
12+15	4.8730	7.10	Q	V
12+20	4.9223	7.15	Q	V
12+25	4.9721	7.22	Q	V

12+30	5.0224	7.30	Q	V		
12+35	5.0732	7.39	Q	V		
12+40	5.1247	7.47	Q	V		
12+45	5.1768	7.56	Q	V		
12+50	5.2295	7.66	Q	V		
12+55	5.2829	7.75	Q	V		
13+ 0	5.3370	7.85	Q	V		
13+ 5	5.3918	7.96	Q	V		
13+10	5.4474	8.07	Q	V		
13+15	5.5037	8.18	Q	V		
13+20	5.5609	8.30	Q	V		
13+25	5.6189	8.42	Q	V		
13+30	5.6778	8.55	Q	V		
13+35	5.7376	8.68	Q	V		
13+40	5.7984	8.83	Q	V		
13+45	5.8602	8.98	Q	V		
13+50	5.9231	9.13	Q	V		
13+55	5.9871	9.30	Q	V		
14+ 0	6.0523	9.47	Q	V		
14+ 5	6.1189	9.66	Q	V		
14+10	6.1868	9.86	Q	V		
14+15	6.2562	10.08	Q	V		
14+20	6.3271	10.30	Q	V		
14+25	6.3997	10.54	Q	V		
14+30	6.4741	10.80	Q	V		
14+35	6.5503	11.07	Q	V		
14+40	6.6286	11.37	Q	V		
14+45	6.7091	11.69	Q	V		
14+50	6.7920	12.04	Q	V		
14+55	6.8775	12.42	Q	V		
15+ 0	6.9660	12.84	Q	V		
15+ 5	7.0576	13.31	Q	V		
15+10	7.1529	13.84	Q	V		
15+15	7.2523	14.43	Q	V		
15+20	7.3564	15.11	Q	V		
15+25	7.4642	15.65	Q	V		
15+30	7.5697	15.32	Q	V		
15+35	7.6732	15.03	Q	V		
15+40	7.7830	15.94	Q	V		
15+45	7.9038	17.54	Q	V		
15+50	8.0408	19.90	Q	V		
15+55	8.2027	23.49	Q	V		
16+ 0	8.4134	30.59	Q	V		
16+ 5	8.7546	49.54	Q	V		
16+10	9.3825	91.18	Q	V		
16+15	9.9918	88.48	Q	V		
16+20	10.2982	44.49	Q	V		
16+25	10.4649	24.19	Q	V		
16+30	10.5965	19.11	Q	V		
16+35	10.7083	16.23	Q	V		
16+40	10.8109	14.90	Q	V		
16+45	10.9054	13.72	Q	V		
16+50	10.9933	12.77	Q	V		
16+55	11.0757	11.97	Q	V		
17+ 0	11.1536	11.30	Q	V		
17+ 5	11.2275	10.74	Q	V		
17+10	11.2980	10.24	Q	V		

17+15	11.3656	9.81	Q	V
17+20	11.4305	9.43	Q	V
17+25	11.4931	9.09	Q	V
17+30	11.5537	8.79	Q	V
17+35	11.6123	8.52	Q	V
17+40	11.6693	8.27	Q	V
17+45	11.7246	8.04	Q	V
17+50	11.7785	7.83	Q	V
17+55	11.8310	7.63	Q	V
18+ 0	11.8824	7.45	Q	V
18+ 5	11.9326	7.29	Q	V
18+10	11.9822	7.20	Q	V
18+15	12.0313	7.13	Q	V
18+20	12.0796	7.02	Q	V
18+25	12.1271	6.89	Q	V
18+30	12.1737	6.77	Q	V
18+35	12.2195	6.65	Q	V
18+40	12.2646	6.54	Q	V
18+45	12.3089	6.43	Q	V
18+50	12.3525	6.33	Q	V
18+55	12.3954	6.24	Q	V
19+ 0	12.4378	6.14	Q	V
19+ 5	12.4795	6.06	Q	V
19+10	12.5206	5.97	Q	V
19+15	12.5612	5.89	Q	V
19+20	12.6012	5.81	Q	V
19+25	12.6408	5.74	Q	V
19+30	12.6798	5.67	Q	V
19+35	12.7184	5.60	Q	V
19+40	12.7565	5.53	Q	V
19+45	12.7941	5.47	Q	V
19+50	12.8314	5.41	Q	V
19+55	12.8682	5.35	Q	V
20+ 0	12.9046	5.29	Q	V
20+ 5	12.9407	5.23	Q	V
20+10	12.9764	5.18	Q	V
20+15	13.0117	5.13	Q	V
20+20	13.0466	5.08	Q	V
20+25	13.0812	5.03	Q	V
20+30	13.1155	4.98	Q	V
20+35	13.1495	4.93	Q	V
20+40	13.1831	4.89	Q	V
20+45	13.2165	4.84	Q	V
20+50	13.2495	4.80	Q	V
20+55	13.2823	4.76	Q	V
21+ 0	13.3148	4.72	Q	V
21+ 5	13.3470	4.68	Q	V
21+10	13.3790	4.64	Q	V
21+15	13.4107	4.60	Q	V
21+20	13.4421	4.56	Q	V
21+25	13.4733	4.53	Q	V
21+30	13.5042	4.49	Q	V
21+35	13.5349	4.46	Q	V
21+40	13.5654	4.43	Q	V
21+45	13.5957	4.39	Q	V
21+50	13.6257	4.36	Q	V
21+55	13.6555	4.33	Q	V

22+ 0	13.6851	4.30	Q	V
22+ 5	13.7146	4.27	Q	V
22+10	13.7438	4.24	Q	V
22+15	13.7728	4.21	Q	V
22+20	13.8016	4.18	Q	V
22+25	13.8302	4.16	Q	V
22+30	13.8586	4.13	Q	V
22+35	13.8869	4.10	Q	V
22+40	13.9150	4.08	Q	V
22+45	13.9429	4.05	Q	V
22+50	13.9706	4.03	Q	V
22+55	13.9981	4.00	Q	V
23+ 0	14.0255	3.98	Q	V
23+ 5	14.0528	3.95	Q	V
23+10	14.0798	3.93	Q	V
23+15	14.1068	3.91	Q	V
23+20	14.1335	3.89	Q	V
23+25	14.1601	3.86	Q	V
23+30	14.1866	3.84	Q	V
23+35	14.2129	3.82	Q	V
23+40	14.2391	3.80	Q	V
23+45	14.2651	3.78	Q	V
23+50	14.2910	3.76	Q	V
23+55	14.3167	3.74	Q	V
24+ 0	14.3423	3.72	Q	V
24+ 5	14.3661	3.45	Q	V
24+10	14.3805	2.10	Q	V
24+15	14.3849	0.63	Q	V
24+20	14.3859	0.15	Q	V
24+25	14.3862	0.05	Q	V

APPENDIX C

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2003 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2003 License ID 1237

Analysis prepared by:

Hall & Foreman, Inc.
9130 Anaheim Place, Suite 120
Rancho Cucamonga, CA 91730

***** DESCRIPTION OF STUDY *****

- * Proposed Condition *
- * RATIONAL FOR HYD-2 AND AREA A,B,C,H & J *
- * 100 Year Storm Event: Colton Super Block (August 2013) *

FILE NAME: P_COLT.DAT
TIME/DATE OF STUDY: 11:04 08/28/2013

=====

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
10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 0.950
100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) = 1.260
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.2600
SLOPE OF INTENSITY DURATION CURVE = 0.6000

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	43.0	21.5	0.009/0.009/0.020	0.67	2.00	0.0313	0.167	0.0160
2	28.0	14.0	0.017/0.017/0.020	0.67	2.00	0.0313	0.167	0.0160
3	36.0	18.0	0.014/0.014/0.020	0.67	2.00	0.0313	0.167	0.0160
4	24.0	12.0	0.014/0.014/0.020	0.67	2.00	0.0313	0.167	0.0160

- GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.67 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 4.0 (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

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+-----+
| Area A                                     |
| Rational Method                           |
| 19.79 Ac                                  |
+-----+

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P_COLT.RES

 FLOW PROCESS FROM NODE 10.00 TO NODE 11.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1000.00
 ELEVATION DATA: UPSTREAM(FEET) = 1105.00 DOWNSTREAM(FEET) = 1085.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 24.468
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.158
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	C	13.10	0.16	1.00	92	24.47

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.16
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.00
 SUBAREA RUNOFF(CFS) = 23.56
 TOTAL AREA(ACRES) = 13.10 PEAK FLOW RATE(CFS) = 23.56

 FLOW PROCESS FROM NODE 11.00 TO NODE 13.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1080.00 DOWNSTREAM(FEET) = 1077.40
 FLOW LENGTH(FEET) = 520.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.44
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 23.56
 PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 25.81
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 13.00 = 1520.00 FEET.

 FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 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.) = 25.81
 RAINFALL INTENSITY(INCH/HR) = 2.09
 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.16
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 13.10
 TOTAL STREAM AREA(ACRES) = 13.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.56

 FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 995.00
 ELEVATION DATA: UPSTREAM(FEET) = 1103.00 DOWNSTREAM(FEET) = 1090.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

P_COLT.RES

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 26.589
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.053
 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 FAIR COVER
 "WOODLAND,GRASS" C 6.69 0.16 1.00 92 26.59
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.16
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.00
 SUBAREA RUNOFF(CFS) = 11.40
 TOTAL AREA(ACRES) = 6.69 PEAK FLOW RATE(CFS) = 11.40

 FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 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.) = 26.59
 RAINFALL INTENSITY(INCH/HR) = 2.05
 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.16
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 6.69
 TOTAL STREAM AREA(ACRES) = 6.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.40

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.56	25.81	2.090	0.16(0.16)	1.00	13.1	10.00
2	11.40	26.59	2.053	0.16(0.16)	1.00	6.7	12.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	34.84	25.81	2.090	0.16(0.16)	1.00	19.6	10.00
2	34.51	26.59	2.053	0.16(0.16)	1.00	19.8	12.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 34.84 Tc(MIN.) = 25.81
 EFFECTIVE AREA(ACRES) = 19.59 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.16 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 19.79
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 13.00 = 1520.00 FEET.

 FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 13

>>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<<

-----+-----
 | Area B
 | Rational Method
 | 16.47 Ac
 +-----+-----

P_COLT.RES

 FLOW PROCESS FROM NODE 20.00 TO NODE 21.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1486.00
 ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1075.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.884
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.521
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	C	16.47	0.27	0.40	86	18.88

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.40
 SUBAREA RUNOFF(CFS) = 35.76
 TOTAL AREA(ACRES) = 16.47 PEAK FLOW RATE(CFS) = 35.76

 FLOW PROCESS FROM NODE 21.00 TO NODE 21.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

+-----+
 | Area J
 | Rational Method
 | 19.0 Ac
 +-----+

 FLOW PROCESS FROM NODE 30.00 TO NODE 31.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1931.00
 ELEVATION DATA: UPSTREAM(FEET) = 1082.00 DOWNSTREAM(FEET) = 1064.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.969
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.788
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	19.00	0.27	0.10	86	15.97

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF(CFS) = 47.21
 TOTAL AREA(ACRES) = 19.00 PEAK FLOW RATE(CFS) = 47.21

 FLOW PROCESS FROM NODE 31.00 TO NODE 31.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

+-----+
 | Area C
 +-----+

| Rational Method
| 31.44 Ac
+-----+

FLOW PROCESS FROM NODE 200.00 TO NODE 202.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1895.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 1055.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 20.750
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.383
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "3-4 DWELLINGS/ACRE"	C	14.32	0.27	0.60	86	20.75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.60
SUBAREA RUNOFF(CFS) = 28.60
TOTAL AREA(ACRES) = 14.32 PEAK FLOW RATE(CFS) = 28.60

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 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.) = 20.75
RAINFALL INTENSITY(INCH/HR) = 2.38
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.60
EFFECTIVE STREAM AREA(ACRES) = 14.32
TOTAL STREAM AREA(ACRES) = 14.32
PEAK FLOW RATE(CFS) AT CONFLUENCE = 28.60

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1300.00
ELEVATION DATA: UPSTREAM(FEET) = 1064.00 DOWNSTREAM(FEET) = 1055.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.467
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	2.92	0.27	0.10	86	14.47

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA RUNOFF(CFS) = 7.70
TOTAL AREA(ACRES) = 2.92 PEAK FLOW RATE(CFS) = 7.70

P_COLT.RES

 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 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.) = 14.47
 RAINFALL INTENSITY(INCH/HR) = 2.96
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 2.92
 TOTAL STREAM AREA(ACRES) = 2.92
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.70

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.60	20.75	2.383	0.27(0.16)	0.60	14.3	200.00
2	7.70	14.47	2.958	0.27(0.03)	0.10	2.9	201.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.82	14.47	2.958	0.27(0.13)	0.49	12.9	201.00
2	34.79	20.75	2.383	0.27(0.14)	0.52	17.2	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 34.79 Tc(MIN.) = 20.75
 EFFECTIVE AREA(ACRES) = 17.24 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 17.24
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 1895.00 FEET.

 FLOW PROCESS FROM NODE 202.00 TO NODE 205.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 1055.00 DOWNSTREAM ELEVATION(FEET) = 1027.00
 STREET LENGTH(FEET) = 813.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 24.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 12.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.014
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.014

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
 Manning's FRICTION FACTOR for Back-of-walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.98
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.48
 HALFSTREET FLOOD WIDTH(FEET) = 22.36
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.13

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PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.48
STREET FLOW TRAVEL TIME(MIN.) = 2.64 Tc(MIN.) = 23.39
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.217

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	3.23	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA(ACRES) = 3.23 SUBAREA RUNOFF(CFS) = 6.37
EFFECTIVE AREA(ACRES) = 20.47 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 20.47 PEAK FLOW RATE(CFS) = 38.60

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 22.55
FLOW VELOCITY(FEET/SEC.) = 5.13 DEPTH*VELOCITY(FT*FT/SEC.) = 2.49
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 2708.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 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.) = 23.39
RAINFALL INTENSITY(INCH/HR) = 2.22
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.45
EFFECTIVE STREAM AREA(ACRES) = 20.47
TOTAL STREAM AREA(ACRES) = 20.47
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.60

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 991.00
ELEVATION DATA: UPSTREAM(FEET) = 1055.00 DOWNSTREAM(FEET) = 1034.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.377
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.611
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	5.84	0.27	0.10	86	10.38

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA RUNOFF(CFS) = 18.84
TOTAL AREA(ACRES) = 5.84 PEAK FLOW RATE(CFS) = 18.84

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 10.38
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.611

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SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	3.31	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA(ACRES) = 3.31 SUBAREA RUNOFF(CFS) = 10.68
EFFECTIVE AREA(ACRES) = 9.15 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 9.15 PEAK FLOW RATE(CFS) = 29.51

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 1034.00 DOWNSTREAM ELEVATION(FEET) = 1027.00
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 43.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 21.50
INSIDE STREET CROSSFALL(DECIMAL) = 0.009
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.009

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0160
Manning's FRICTION FACTOR for Back-of-walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.98
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.47
HALFSTREET FLOOD WIDTH(FEET) = 31.83
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.56
STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 12.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.232

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.71	0.27	0.10	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA AREA(ACRES) = 1.71 SUBAREA RUNOFF(CFS) = 4.93
EFFECTIVE AREA(ACRES) = 10.86 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 10.86 PEAK FLOW RATE(CFS) = 31.33

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 31.66
FLOW VELOCITY(FEET/SEC.) = 3.32 DEPTH*VELOCITY(FT*FT/SEC.) = 1.54
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 1414.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 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.) = 12.48

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RAINFALL INTENSITY(INCH/HR) = 3.23
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 10.86
 TOTAL STREAM AREA(ACRES) = 10.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.33

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.19	17.14	2.672	0.27(0.11)	0.41	16.1	201.00
1	38.60	23.39	2.217	0.27(0.12)	0.45	20.5	200.00
2	31.33	12.48	3.232	0.27(0.03)	0.10	10.9	203.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	64.33	12.48	3.232	0.27(0.07)	0.26	22.6	203.00
2	63.04	17.14	2.672	0.27(0.08)	0.28	27.0	201.00
3	60.00	23.39	2.217	0.27(0.09)	0.33	31.3	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 64.33 Tc(MIN.) = 12.48
 EFFECTIVE AREA(ACRES) = 22.61 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.26
 TOTAL AREA(ACRES) = 31.33
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 2708.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 13

>>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<<

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+-----+
| Hyd-2                                     |
| Rational Method                           |
| 167.28 Ac                                 |
+-----+
  
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FLOW PROCESS FROM NODE 10.00 TO NODE 11.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 935.00
 ELEVATION DATA: UPSTREAM(FEET) = 1115.00 DOWNSTREAM(FEET) = 1099.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.340
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.974
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" C 12.23 0.27 0.60 86 14.34
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.60

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SUBAREA RUNOFF(CFS) = 30.94
TOTAL AREA(ACRES) = 12.23 PEAK FLOW RATE(CFS) = 30.94

FLOW PROCESS FROM NODE 11.00 TO NODE 14.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1094.00 DOWNSTREAM(FEET) = 1075.30
FLOW LENGTH(FEET) = 435.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.17
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.94
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 14.82
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 14.00 = 1370.00 FEET.

FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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) = 2.92
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.60
EFFECTIVE STREAM AREA(ACRES) = 12.23
TOTAL STREAM AREA(ACRES) = 12.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 30.94

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 935.00
ELEVATION DATA: UPSTREAM(FEET) = 1099.63 DOWNSTREAM(FEET) = 1081.30

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.361
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.748
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
PUBLIC PARK	C	8.19	0.27	0.85	86	16.36

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.85
SUBAREA RUNOFF(CFS) = 18.55
TOTAL AREA(ACRES) = 8.19 PEAK FLOW RATE(CFS) = 18.55

FLOW PROCESS FROM NODE 13.00 TO NODE 14.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1076.30 DOWNSTREAM(FEET) = 1075.30
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013

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DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.19
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 18.55
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 16.44
 LONGEST FLOWPATH FROM NODE 12.00 TO NODE 14.00 = 985.00 FEET.

 FLOW PROCESS FROM NODE 14.00 TO NODE 14.00 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.) = 16.44
 RAINFALL INTENSITY(INCH/HR) = 2.74
 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.85
 EFFECTIVE STREAM AREA(ACRES) = 8.19
 TOTAL STREAM AREA(ACRES) = 8.19
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.55

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	30.94	14.82	2.916	0.27(0.16)	0.60	12.2	10.00
2	18.55	16.44	2.740	0.27(0.23)	0.85	8.2	12.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.83	14.82	2.916	0.27(0.19)	0.69	19.6	10.00
2	47.50	16.44	2.740	0.27(0.19)	0.70	20.4	12.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 48.83 Tc(MIN.) = 14.82
 EFFECTIVE AREA(ACRES) = 19.61 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.69
 TOTAL AREA(ACRES) = 20.42
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 14.00 = 1370.00 FEET.

 FLOW PROCESS FROM NODE 14.00 TO NODE 20.00 IS CODE = 31

 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 1075.30 DOWNSTREAM(FEET) = 1071.25
 FLOW LENGTH(FEET) = 570.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.76
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 48.83
 PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 15.90
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 20.00 = 1940.00 FEET.

 FLOW PROCESS FROM NODE 20.00 TO NODE 20.00 IS CODE = 10

=====
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
 =====

 FLOW PROCESS FROM NODE 15.00 TO NODE 16.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1505.00
 ELEVATION DATA: UPSTREAM(FEET) = 1092.20 DOWNSTREAM(FEET) = 1080.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 20.144

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.425

SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	8.82	0.27	0.60	86	20.14
PUBLIC PARK	C	18.07	0.27	0.85	86	23.62

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.77

SUBAREA RUNOFF(CFS) = 53.64

TOTAL AREA(ACRES) = 26.89 PEAK FLOW RATE(CFS) = 53.64

 FLOW PROCESS FROM NODE 16.00 TO NODE 19.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 1075.00 DOWNSTREAM(FEET) = 1073.25

FLOW LENGTH(FEET) = 850.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 33.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.67

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 53.64

PIPE TRAVEL TIME(MIN.) = 2.50 T_c (MIN.) = 22.64

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 19.00 = 2355.00 FEET.

 FLOW PROCESS FROM NODE 19.00 TO NODE 19.00 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.) = 22.64

RAINFALL INTENSITY(INCH/HR) = 2.26

AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.27

AREA-AVERAGED Ap = 0.77

EFFECTIVE STREAM AREA(ACRES) = 26.89

TOTAL STREAM AREA(ACRES) = 26.89

PEAK FLOW RATE(CFS) AT CONFLUENCE = 53.64

 FLOW PROCESS FROM NODE 17.00 TO NODE 18.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

P_COLT.RES

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 913.00
 ELEVATION DATA: UPSTREAM(FEET) = 1088.50 DOWNSTREAM(FEET) = 1078.25

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 12.153
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.284
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	C	10.48	0.27	0.20	86	12.15

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.20
 SUBAREA RUNOFF(CFS) = 30.47
 TOTAL AREA(ACRES) = 10.48 PEAK FLOW RATE(CFS) = 30.47

FLOW PROCESS FROM NODE 18.00 TO NODE 19.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1073.25 DOWNSTREAM(FEET) = 1072.25
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.31
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 30.47
 PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 12.23
 LONGEST FLOWPATH FROM NODE 17.00 TO NODE 19.00 = 963.00 FEET.

FLOW PROCESS FROM NODE 19.00 TO NODE 19.00 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.) = 12.23
 RAINFALL INTENSITY(INCH/HR) = 3.27
 AREA-AVERAGED Fm(INCH/HR) = 0.05
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.20
 EFFECTIVE STREAM AREA(ACRES) = 10.48
 TOTAL STREAM AREA(ACRES) = 10.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 30.47

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	53.64	22.64	2.261	0.27(0.21)	0.77	26.9	15.00
2	30.47	12.23	3.272	0.27(0.05)	0.20	10.5	17.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	73.71	12.23	3.272	0.27(0.14)	0.53	25.0	17.00
2	74.53	22.64	2.261	0.27(0.17)	0.61	37.4	15.00

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COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 74.53 Tc(MIN.) = 22.64
 EFFECTIVE AREA(ACRES) = 37.37 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.61
 TOTAL AREA(ACRES) = 37.37
 LONGEST FLOWPATH FROM NODE 15.00 TO NODE 19.00 = 2355.00 FEET.

 FLOW PROCESS FROM NODE 19.00 TO NODE 20.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1072.25 DOWNSTREAM(FEET) = 1071.25
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.48
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 74.53
 PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 22.70
 LONGEST FLOWPATH FROM NODE 15.00 TO NODE 20.00 = 2405.00 FEET.

 FLOW PROCESS FROM NODE 20.00 TO NODE 20.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

 FLOW PROCESS FROM NODE 20.00 TO NODE 20.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.71	12.28	3.263	0.27(0.14)	0.53	25.0	17.00
2	74.53	22.70	2.258	0.27(0.17)	0.61	37.4	15.00

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 20.00 = 2405.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.83	15.90	2.795	0.27(0.19)	0.69	19.6	10.00
2	47.50	17.53	2.636	0.27(0.19)	0.70	20.4	12.00

LONGEST FLOWPATH FROM NODE 10.00 TO NODE 20.00 = 1940.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	118.20	12.28	3.263	0.27(0.16)	0.59	40.1	17.00
2	122.82	15.90	2.795	0.27(0.17)	0.61	48.9	10.00
3	121.63	17.53	2.636	0.27(0.17)	0.62	51.7	12.00
4	114.68	22.70	2.258	0.27(0.17)	0.64	57.8	15.00

TOTAL AREA(ACRES) = 57.79

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 122.82 Tc(MIN.) = 15.903
 EFFECTIVE AREA(ACRES) = 48.91 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.62
 TOTAL AREA(ACRES) = 57.79

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LONGEST FLOWPATH FROM NODE    15.00 TO NODE    20.00 = 2405.00 FEET.
*****
FLOW PROCESS FROM NODE    20.00 TO NODE    20.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<<
=====
*****
FLOW PROCESS FROM NODE    20.00 TO NODE    23.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1071.25  DOWNSTREAM(FEET) = 1070.25
FLOW LENGTH(FEET) = 150.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.74
ESTIMATED PIPE DIAMETER(INCH) = 51.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 122.82
PIPE TRAVEL TIME(MIN.) = 0.23  Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE    15.00 TO NODE    23.00 = 2555.00 FEET.
*****
FLOW PROCESS FROM NODE    23.00 TO NODE    23.00 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.) = 16.14
RAINFALL INTENSITY(INCH/HR) = 2.77
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.61
EFFECTIVE STREAM AREA(ACRES) = 48.91
TOTAL STREAM AREA(ACRES) = 57.79
PEAK FLOW RATE(CFS) AT CONFLUENCE = 122.82
*****
FLOW PROCESS FROM NODE    21.00 TO NODE    22.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1337.00
ELEVATION DATA: UPSTREAM(FEET) = 1091.50  DOWNSTREAM(FEET) = 1077.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.355
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.972
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.)
PUBLIC PARK              C      13.06   0.27      0.85      86  21.40
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C       6.04   0.27      0.20      86  14.35
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.64
SUBAREA RUNOFF(CFS) = 48.08
TOTAL AREA(ACRES) = 19.10  PEAK FLOW RATE(CFS) = 48.08
*****

```

FLOW PROCESS FROM NODE 22.00 TO NODE 23.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1071.25 DOWNSTREAM(FEET) = 1070.25
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 48.08
 PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 14.42
 LONGEST FLOWPATH FROM NODE 21.00 TO NODE 23.00 = 1387.00 FEET.

FLOW PROCESS FROM NODE 23.00 TO NODE 23.00 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.) = 14.42
 RAINFALL INTENSITY(INCH/HR) = 2.96
 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.64
 EFFECTIVE STREAM AREA(ACRES) = 19.10
 TOTAL STREAM AREA(ACRES) = 19.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 48.08

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	118.20	12.52	3.227	0.27(0.16)	0.59	40.1	17.00
1	122.82	16.14	2.771	0.27(0.17)	0.61	48.9	10.00
1	121.63	17.76	2.615	0.27(0.17)	0.62	51.7	12.00
1	114.68	22.94	2.244	0.27(0.17)	0.64	57.8	15.00
2	48.08	14.42	2.964	0.27(0.18)	0.64	19.1	21.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	163.87	12.52	3.227	0.27(0.17)	0.61	56.7	17.00
2	168.71	14.42	2.964	0.27(0.17)	0.62	63.9	21.00
3	167.57	16.14	2.771	0.27(0.17)	0.62	68.0	10.00
4	163.69	17.76	2.615	0.27(0.17)	0.63	70.8	12.00
5	150.34	22.94	2.244	0.27(0.17)	0.64	76.9	15.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 168.71 Tc(MIN.) = 14.42
 EFFECTIVE AREA(ACRES) = 63.85 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.62
 TOTAL AREA(ACRES) = 76.89
 LONGEST FLOWPATH FROM NODE 15.00 TO NODE 23.00 = 2555.00 FEET.

FLOW PROCESS FROM NODE 23.00 TO NODE 28.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1070.25 DOWNSTREAM(FEET) = 1065.17
 FLOW LENGTH(FEET) = 1068.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.16
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 168.71
 PIPE TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 16.17
 LONGEST FLOWPATH FROM NODE 15.00 TO NODE 28.00 = 3623.00 FEET.

 FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 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.) = 16.17
 RAINFALL INTENSITY(INCH/HR) = 2.77
 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.62
 EFFECTIVE STREAM AREA(ACRES) = 63.85
 TOTAL STREAM AREA(ACRES) = 76.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 168.71

 FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1175.00
 ELEVATION DATA: UPSTREAM(FEET) = 1075.50 DOWNSTREAM(FEET) = 1071.17

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.762
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.810

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	10.99	0.27	0.10	86	15.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10

SUBAREA RUNOFF(CFS) = 27.52

TOTAL AREA(ACRES) = 10.99 PEAK FLOW RATE(CFS) = 27.52

 FLOW PROCESS FROM NODE 25.00 TO NODE 28.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1066.17 DOWNSTREAM(FEET) = 1065.17
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.21
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 27.52
 PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 15.84
 LONGEST FLOWPATH FROM NODE 24.00 TO NODE 28.00 = 1225.00 FEET.

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 FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 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.) = 15.84
 RAINFALL INTENSITY(INCH/HR) = 2.80
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 10.99
 TOTAL STREAM AREA(ACRES) = 10.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.52

 FLOW PROCESS FROM NODE 26.00 TO NODE 27.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1421.00
 ELEVATION DATA: UPSTREAM(FEET) = 1082.77 DOWNSTREAM(FEET) = 1071.17

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.506
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.954
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	28.76	0.27	0.10	86	14.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF(CFS) = 75.74
 TOTAL AREA(ACRES) = 28.76 PEAK FLOW RATE(CFS) = 75.74

 FLOW PROCESS FROM NODE 27.00 TO NODE 28.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1066.17 DOWNSTREAM(FEET) = 1065.17
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.52
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 75.74
 PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 14.56
 LONGEST FLOWPATH FROM NODE 26.00 TO NODE 28.00 = 1471.00 FEET.

 FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 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.) = 14.56
 RAINFALL INTENSITY(INCH/HR) = 2.95
 AREA-AVERAGED Fm(INCH/HR) = 0.03

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AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 28.76
TOTAL STREAM AREA(ACRES) = 28.76
PEAK FLOW RATE(CFS) AT CONFLUENCE = 75.74

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	163.87	14.27	2.982	0.27(0.17)	0.61	56.7	17.00
1	168.71	16.17	2.767	0.27(0.17)	0.62	63.9	21.00
1	167.57	17.89	2.604	0.27(0.17)	0.62	68.0	10.00
1	163.69	19.52	2.472	0.27(0.17)	0.63	70.8	12.00
1	150.34	24.75	2.144	0.27(0.17)	0.64	76.9	15.00
2	27.52	15.84	2.802	0.27(0.03)	0.10	11.0	24.00
3	75.74	14.56	2.947	0.27(0.03)	0.10	28.8	26.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	265.44	14.27	2.982	0.27(0.11)	0.40	94.8	17.00
2	266.97	14.56	2.947	0.27(0.11)	0.40	96.7	26.00
3	267.37	15.84	2.802	0.27(0.11)	0.41	102.3	24.00
4	266.97	16.17	2.767	0.27(0.11)	0.42	103.6	21.00
5	260.00	17.89	2.604	0.27(0.12)	0.43	107.8	10.00
6	251.36	19.52	2.472	0.27(0.12)	0.44	110.5	12.00
7	226.24	24.75	2.144	0.27(0.12)	0.46	116.6	15.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 267.37 Tc(MIN.) = 15.84
EFFECTIVE AREA(ACRES) = 102.34 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 116.64
LONGEST FLOWPATH FROM NODE 15.00 TO NODE 28.00 = 3623.00 FEET.

FLOW PROCESS FROM NODE 28.00 TO NODE 29.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1065.17 DOWNSTREAM(FEET) = 1064.17

FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 60.0 INCH PIPE IS 49.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.53

ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 267.37

PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 15.93

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 29.00 = 3713.00 FEET.

FLOW PROCESS FROM NODE 29.00 TO NODE 29.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

FLOW PROCESS FROM NODE 30.00 TO NODE 31.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

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>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 843.00
ELEVATION DATA: UPSTREAM(FEET) = 1100.00 DOWNSTREAM(FEET) = 1094.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.397

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.744

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "3-4 DWELLINGS/ACRE"	C	12.48	0.27	0.60	86	16.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.60

SUBAREA RUNOFF(CFS) = 28.99

TOTAL AREA(ACRES) = 12.48 PEAK FLOW RATE(CFS) = 28.99

FLOW PROCESS FROM NODE 31.00 TO NODE 34.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1089.00 DOWNSTREAM(FEET) = 1065.48

FLOW LENGTH(FEET) = 3005.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.04

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 28.99

PIPE TRAVEL TIME(MIN.) = 6.23 Tc(MIN.) = 22.63

LONGEST FLOWPATH FROM NODE 30.00 TO NODE 34.00 = 3848.00 FEET.

FLOW PROCESS FROM NODE 34.00 TO NODE 34.00 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.) = 22.63

RAINFALL INTENSITY(INCH/HR) = 2.26

AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.27

AREA-AVERAGED Ap = 0.60

EFFECTIVE STREAM AREA(ACRES) = 12.48

TOTAL STREAM AREA(ACRES) = 12.48

PEAK FLOW RATE(CFS) AT CONFLUENCE = 28.99

FLOW PROCESS FROM NODE 32.00 TO NODE 33.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 1647.00

ELEVATION DATA: UPSTREAM(FEET) = 1084.80 DOWNSTREAM(FEET) = 1069.48

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.991

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.896

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	C	38.15	0.27	0.10	86	14.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
 SUBAREA RUNOFF(CFS) = 98.49
 TOTAL AREA(ACRES) = 38.15 PEAK FLOW RATE(CFS) = 98.49

 FLOW PROCESS FROM NODE 33.00 TO NODE 34.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1066.48 DOWNSTREAM(FEET) = 1065.48
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.44
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 98.49
 PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 15.05
 LONGEST FLOWPATH FROM NODE 32.00 TO NODE 34.00 = 1697.00 FEET.

 FLOW PROCESS FROM NODE 34.00 TO NODE 34.00 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.) = 15.05
 RAINFALL INTENSITY(INCH/HR) = 2.89
 AREA-AVERAGED Fm(INCH/HR) = 0.03
 AREA-AVERAGED Fp(INCH/HR) = 0.27
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 38.15
 TOTAL STREAM AREA(ACRES) = 38.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 98.49

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.99	22.63	2.262	0.27(0.16)	0.60	12.5	30.00
2	98.49	15.05	2.889	0.27(0.03)	0.10	38.2	32.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.53	15.05	2.889	0.27(0.05)	0.19	46.4	32.00
2	105.89	22.63	2.262	0.27(0.06)	0.22	50.6	30.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 123.53 Tc(MIN.) = 15.05
 EFFECTIVE AREA(ACRES) = 46.45 AREA-AVERAGED Fm(INCH/HR) = 0.05
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.19
 TOTAL AREA(ACRES) = 50.63
 LONGEST FLOWPATH FROM NODE 30.00 TO NODE 34.00 = 3848.00 FEET.

 FLOW PROCESS FROM NODE 34.00 TO NODE 29.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1065.48 DOWNSTREAM(FEET) = 1064.17
 FLOW LENGTH(FEET) = 845.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.18
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 123.53
 PIPE TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 17.33
 LONGEST FLOWPATH FROM NODE 30.00 TO NODE 29.00 = 4693.00 FEET.

 FLOW PROCESS FROM NODE 29.00 TO NODE 29.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.53	17.33	2.655	0.27(0.05)	0.19	46.4	32.00
2	105.89	24.98	2.131	0.27(0.06)	0.22	50.6	30.00

LONGEST FLOWPATH FROM NODE 30.00 TO NODE 29.00 = 4693.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	265.44	14.37	2.970	0.27(0.11)	0.40	94.8	17.00
2	266.97	14.66	2.935	0.27(0.11)	0.40	96.7	26.00
3	267.37	15.93	2.792	0.27(0.11)	0.41	102.3	24.00
4	266.97	16.27	2.757	0.27(0.11)	0.42	103.6	21.00
5	260.00	17.99	2.596	0.27(0.12)	0.43	107.8	10.00
6	251.36	19.62	2.464	0.27(0.12)	0.44	110.5	12.00
7	226.24	24.85	2.138	0.27(0.12)	0.46	116.6	15.00

LONGEST FLOWPATH FROM NODE 15.00 TO NODE 29.00 = 3713.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	380.31	14.37	2.970	0.27(0.09)	0.34	133.4	17.00
2	382.74	14.66	2.935	0.27(0.09)	0.34	136.0	26.00
3	386.94	15.93	2.792	0.27(0.09)	0.35	145.1	24.00
4	387.52	16.27	2.757	0.27(0.10)	0.35	147.2	21.00
5	386.21	17.33	2.655	0.27(0.10)	0.35	152.6	32.00
6	382.01	17.99	2.596	0.27(0.10)	0.36	154.6	10.00
7	369.61	19.62	2.464	0.27(0.10)	0.37	158.2	12.00
8	332.44	24.85	2.138	0.27(0.11)	0.39	167.2	15.00
9	331.34	24.98	2.131	0.27(0.11)	0.39	167.3	30.00

TOTAL AREA(ACRES) = 167.27

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 387.52 Tc(MIN.) = 16.269
 EFFECTIVE AREA(ACRES) = 147.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 167.27
 LONGEST FLOWPATH FROM NODE 30.00 TO NODE 29.00 = 4693.00 FEET.

 FLOW PROCESS FROM NODE 29.00 TO NODE 57.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<

P_COLT.RES

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1064.17 DOWNSTREAM(FEET) = 1055.00
FLOW LENGTH(FEET) = 695.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.48
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 387.52
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 16.90
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 57.00 = 5388.00 FEET.

FLOW PROCESS FROM NODE 57.00 TO NODE 57.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

+-----+
| Area H-1 |
| Rational Method |
| 7.68 Ac |
+-----+

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 800.00
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 1066.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.606
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.941
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 C 7.68 0.27 0.10 86 14.61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
SUBAREA RUNOFF(CFS) = 20.14
TOTAL AREA(ACRES) = 7.68 PEAK FLOW RATE(CFS) = 20.14

+-----+
| Areas E,F,G & D of existing to remain the same for proposed |
| Hyd-4 is the same for existing as proposed |
+-----+

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 7.68 TC(MIN.) = 14.61
EFFECTIVE AREA(ACRES) = 7.68 AREA-AVERAGED Fm(INCH/HR)= 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.10
PEAK FLOW RATE(CFS) = 20.14

END OF RATIONAL METHOD ANALYSIS

♀

APPENDIX D



VICINITY MAP

CONSTRUCTION NOTES AND QUANTITY OPINION

1. INSTALL 54" RCP, D=1350 70 LF.
2. INSTALL 36" CSP, GAUGE 10 75 LF.
3. INSTALL 42" RCP, D=1020 94 LF.
4. INSTALL 6" DIA. OUTLET STRUCTURE PER DETAILS NO. 3 AND NO. 4 ON SHEET 2 1 EACH
5. CONSTRUCT WING TYPE HEADWALL PER SBCRD. STD. DRWG. NO. 209 1 EACH
6. CONSTRUCT 12" THICK RIP RAP BLANKET W/9"-18" ROCK 287 SF.
7. CONSTRUCT GRADED EARTH CHANNEL 275 LF.
8. PROVIDE 6" MINIMUM THICK GUNITE SLOPE/CHANNEL PROTECTION, WITH 6"x6" 10/10 WWF REINFORCING 5670 SF.
9. CONSTRUCT REINFORCED CONCRETE APRON/TOEWALL WITH NO.4 REINFORCING BARS AT 12" MAXIMUM SPACING O.C. EACH WAY. PROVIDE 2" MINIMUM COVER OVER REBAR. REBAR SHALL OVERLAP WWF 1' MINIMUM WHERE APPLICABLE 13.8 CY
10. CONSTRUCT PLUG PER DETAIL NO. 5 ON SHEET 2 1 EACH
11. GRADE DETENTION BASIN AND EMBANKMENTS TO CONTOURS SHOWN 35,000 CY CUT - SEE BELOW
35,000 CY FILL - SEE BELOW
12. INSTALL STREET BARRICADE PER CITY OF COLTON STD. DRWG. NO. 114 68 LF.
13. PROTECT EXISTING INSTALLATION IN PLACE
14. CONSTRUCT REINFORCED CONCRETE CUT-OFF COLLARS PER DETAIL 1A & 6 ON SHEET 2 5 EA.
15. INSTALL OUTLET PROTECTION BARRIER NO.1 PER S.B.C.F.C.D. STD. DRG. 2 EA.
16. INSTALL OUTLET PROTECTION BARRIER NO. 2 PER S.B.C.F.C.D. STD. DRG. NOS. S.P. 101-1 THRU S.P. 101-3 1 EA.
17. INSTALL ONLY "REMOVABLE PORTION" OF INCLINED TRASH RACK PER I.A.C.F.C.D. STD. DRG. NOS. 2-DTR1.1 AND 2-DTR1.2, CASE A. LR=10'. MODIFY THE TOP BAR CONNECTION PER DETAIL NO. 7 ON SHEET 2 1 EA.

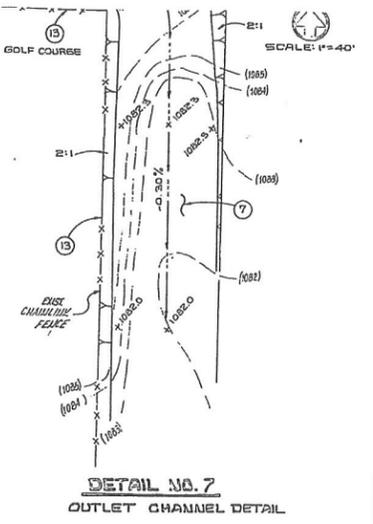
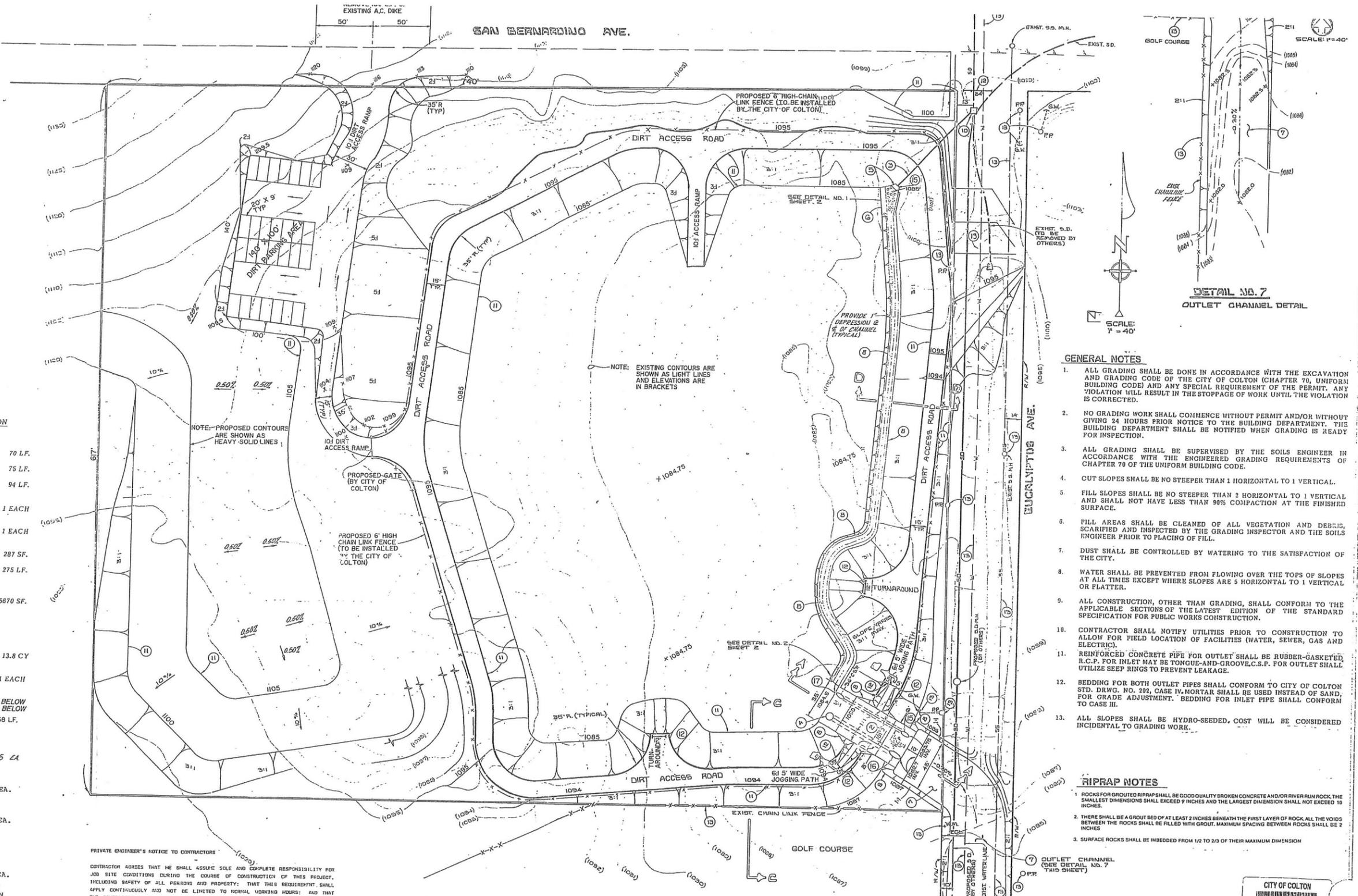
NOTE: THESE VALUES FOR CUT AND FILL ARE "RAW" QUANTITIES AND DO NOT INCLUDE OVEREXCAVATION, SHRINKAGE, OR SUBSIDENCE. SHOULD EXCAVATION FROM THE SITE YIELD LESS THAN THAT REQUIRED TO CONSTRUCT THE EMBANKMENTS, THE CONTRACTOR SHALL NOT IMPORT MATERIAL. RATHER, THE EMBANKMENT ON THE WEST HALF OF THE SITE MAY BE REDUCED IN INCREMENTS OF 6", BEGINNING AT ELEVATION 1,105, UNTIL THE EARTHWORK BALANCES. IN NO CASE SHALL EMBANKMENT REDUCTION BE ALLOWED BELOW ELEVATION 1,095.

PRIVATE ENGINEER'S NOTICE TO CONTRACTORS

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER. THE EXISTENCE AND APPROXIMATE LOCATIONS OF UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS WERE DETERMINED BY A SECTION OF AVAILABLE PUBLIC RECORDS. THE CONTRACTOR SHALL POTENTIALLY REFERENCED UTILITY LINES PRIOR TO CONSTRUCTION TO VERIFY EXACT LOCATION OF SAID UTILITIES. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UNDERGROUND UTILITIES OR STRUCTURES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ALL OTHER UTILITIES OR STRUCTURES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

BENCH MARK

CITY OF COLTON S.H. NO. 405-A: STD. BRASS DISC SET IN CONCRETE SIDEWALK AT MID-CURB AT SOUTHWEST CORNER OF MERIDIAN AVENUE AND OLIVE STREET. SET APPROXIMATELY 30 FEET SOUTH AND 30 FEET EAST OF CENTERLINE INTERSECTION. INITIALS "S.M." MARKED ON SIDEWALK 6.5 FEET NORTHWEST OF DISC. ELEVATION 1084.897



GENERAL NOTES

1. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH THE EXCAVATION AND GRADING CODE OF THE CITY OF COLTON (CHAPTER 70, UNIFORM BUILDING CODE) AND ANY SPECIAL REQUIREMENT OF THE PERMIT. ANY VIOLATION WILL RESULT IN THE STOPPAGE OF WORK UNTIL THE VIOLATION IS CORRECTED.
2. NO GRADING WORK SHALL COMMENCE WITHOUT PERMIT AND/OR WITHOUT GIVING 24 HOURS PRIOR NOTICE TO THE BUILDING DEPARTMENT. THE BUILDING DEPARTMENT SHALL BE NOTIFIED WHEN GRADING IS READY FOR INSPECTION.
3. ALL GRADING SHALL BE SUPERVISED BY THE SOILS ENGINEER IN ACCORDANCE WITH THE ENGINEERED GRADING REQUIREMENTS OF CHAPTER 70 OF THE UNIFORM BUILDING CODE.
4. CUT SLOPES SHALL BE NO STEEPER THAN 1 HORIZONTAL TO 1 VERTICAL.
5. FILL SLOPES SHALL BE NO STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL AND SHALL NOT HAVE LESS THAN 90% COMPACTION AT THE FINISHED SURFACE.
6. FILL AREAS SHALL BE CLEANED OF ALL VEGETATION AND DEBRIS, SCARIFIED AND INSPECTED BY THE GRADING INSPECTOR AND THE SOILS ENGINEER PRIOR TO PLACING OF FILL.
7. DUST SHALL BE CONTROLLED BY WATERING TO THE SATISFACTION OF THE CITY.
8. WATER SHALL BE PREVENTED FROM FLOWING OVER THE TOPS OF SLOPES AT ALL TIMES EXCEPT WHERE SLOPES ARE 5 HORIZONTAL TO 1 VERTICAL OR FLATTER.
9. ALL CONSTRUCTION, OTHER THAN GRADING, SHALL CONFORM TO THE APPLICABLE SECTIONS OF THE LATEST EDITION OF THE STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION.
10. CONTRACTOR SHALL NOTIFY UTILITIES PRIOR TO CONSTRUCTION TO ALLOW FOR FIELD LOCATION OF FACILITIES (WATER, SEWER, GAS AND ELECTRIC).
11. REINFORCED CONCRETE PIPE FOR OUTLET SHALL BE RUBBER-GASKETED, R.C.P. FOR INLET MAY BE TONGUE-AND-GROOVE, C.S.P. FOR OUTLET SHALL UTILIZE SEEP RINGS TO PREVENT LEAKAGE.
12. BEDDING FOR BOTH OUTLET PIPES SHALL CONFORM TO CITY OF COLTON STD. DRWG. NO. 202, CASE IV. MORTAR SHALL BE USED INSTEAD OF SAND, FOR GRADE ADJUSTMENT. BEDDING FOR INLET PIPE SHALL CONFORM TO CASE III.
13. ALL SLOPES SHALL BE HYDRO-SEEDED. COST WILL BE CONSIDERED INCIDENTAL TO GRADING WORK.

RIPRAP NOTES

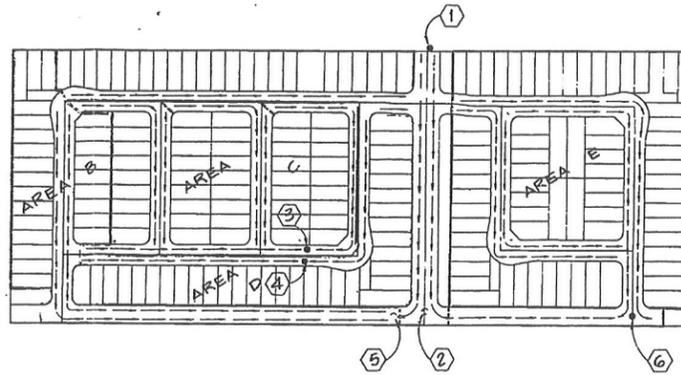
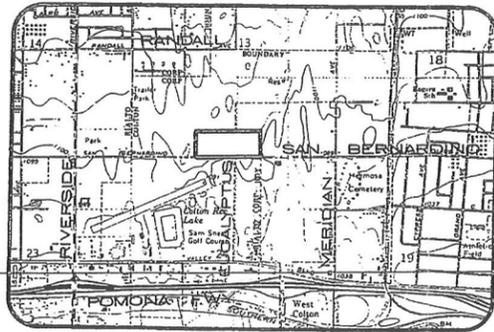
1. ROCKS FOR GROUTED RIPRAP SHALL BE GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSIONS SHALL EXCEED 9 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 18 INCHES.
2. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
3. SURFACE ROCKS SHALL BE IMBEDDED FROM 1/2 TO 2/3 OF THEIR MAXIMUM DIMENSION.

<p>PLANS PREPARED BY CIVIL ENGINEERING LAND SURVEYING LAND PLANNING 540 K W 97TH ST. • UPLAND CA 91785 • (914) 840-0212</p>		<p>CITY OF COLTON PUBLIC WORKS DEPT. DETENTION BASIN EUCALYPTUS AVE AT SAN BERNARDINO AVE. PLAN NO. 3134</p>		<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>APPR.</th> </tr> <tr> <td>1</td> <td>13440</td> <td></td> </tr> </table>	NO.	DATE	APPR.	1	13440	
NO.	DATE	APPR.								
1	13440									
<p>C. PHILLIPS LARGE BY AUTHORITY EXPIRES 2/31/20</p>		<p>DATE: 11/20/00 SHEET 1 OF 2</p>								

EYTRA (A-B)

CITY OF COLTON
 COUNTY OF SAN BERNARDINO
 TRACT-12886 THRU 12892

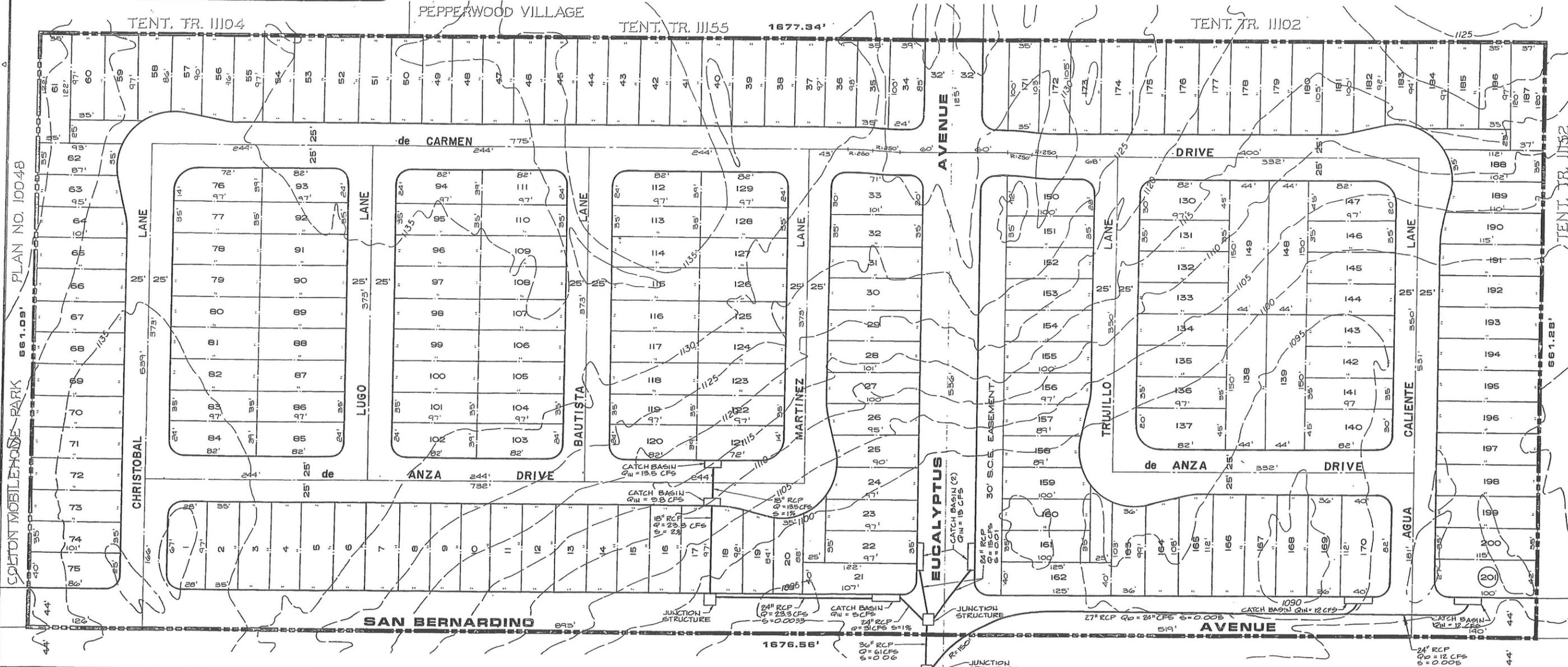
DRAINAGE PLAN



PT#	AREA	Q ₁₀	Q ₁₀₀
1	15.8 AC	26 CFS	40 CFS
2	19 AC	30 CFS	45 CFS
3	5.3 AC	9.1 CFS	13.5 CFS
4	3.2 AC	6.6 CFS	9.8 CFS
5	3 AC	5 CFS	7.4 CFS
6	9 AC	15.7 CFS	23.4 CFS



DRAINAGE BOUNDARY MAP
 SCALE 1"=200'



COLTON MOBILE HOME PARK PLAN NO. 10048

NESTE, BRUDIN & STONE Incorporated
 Engineers • Planners
 San Bernardino • Hemet • San Diego P.O.B. 851 HEMET CA 92343 TEL:(714)658-7116

RECORD DRAWING
 JULY 1985
 INFORMATION FURNISHED BY
 LAING HOMES
 PLAN NO. 3114 SH. 1 OF 4

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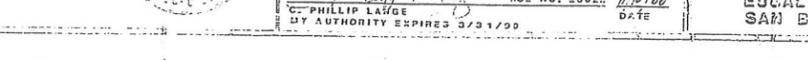
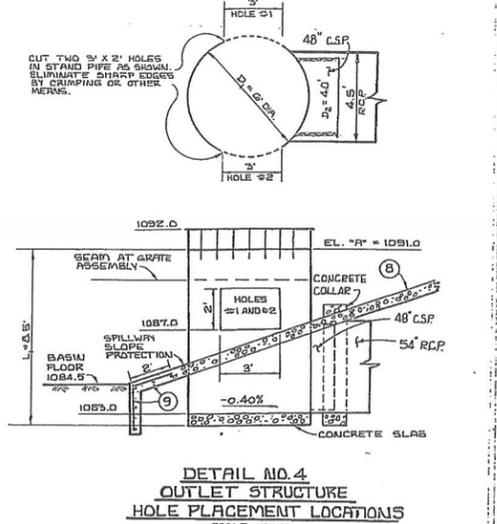
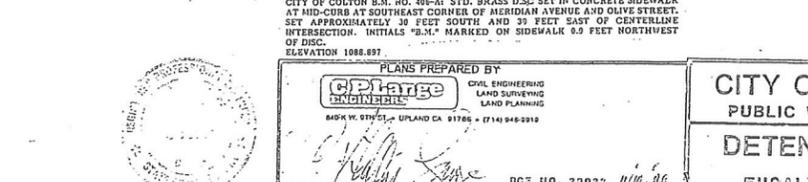
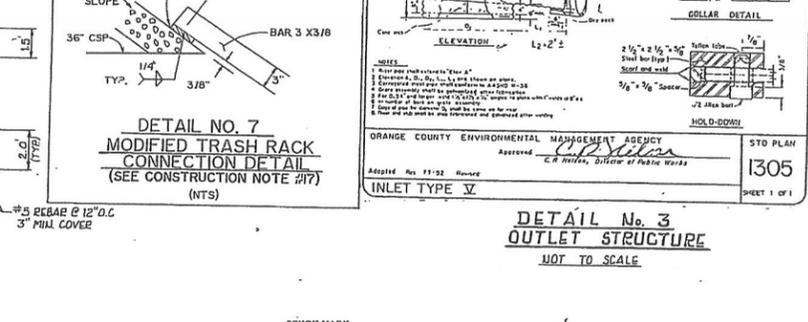
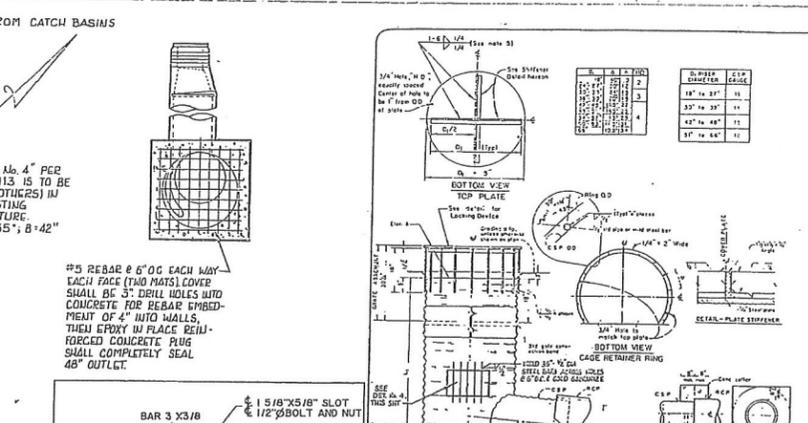
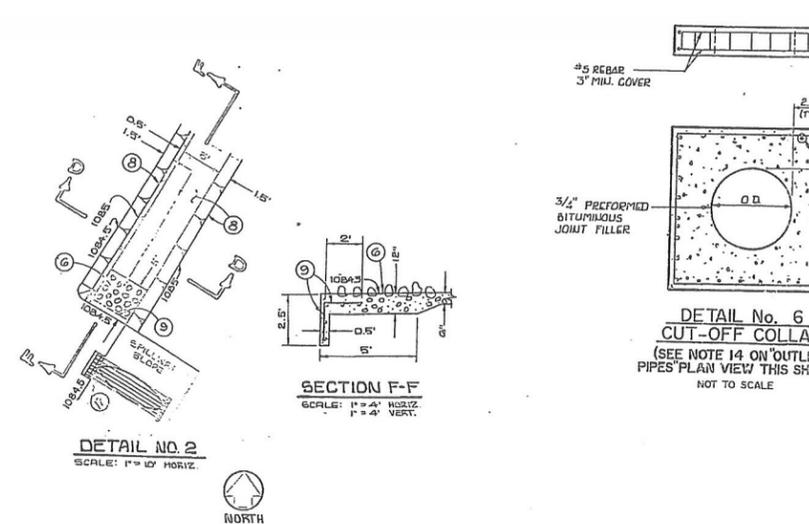
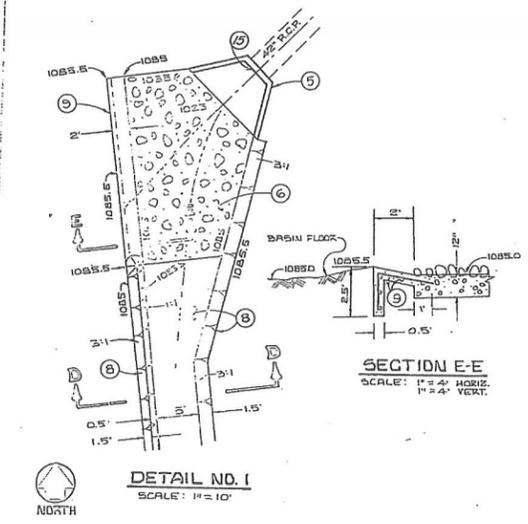
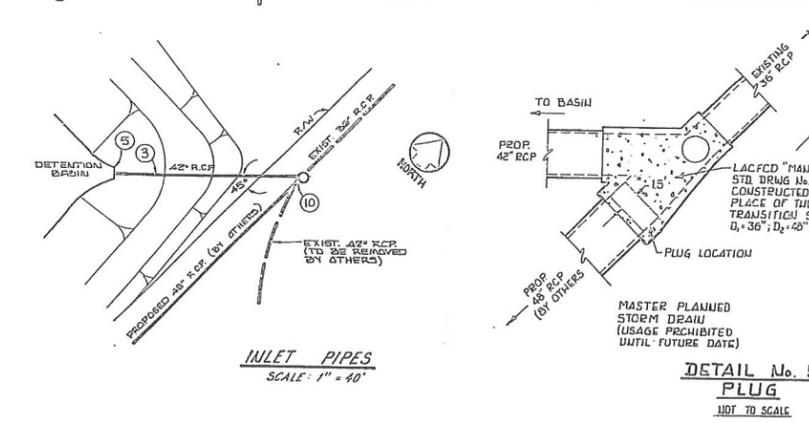
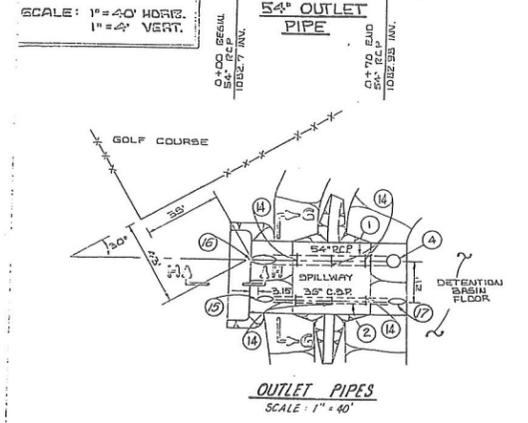
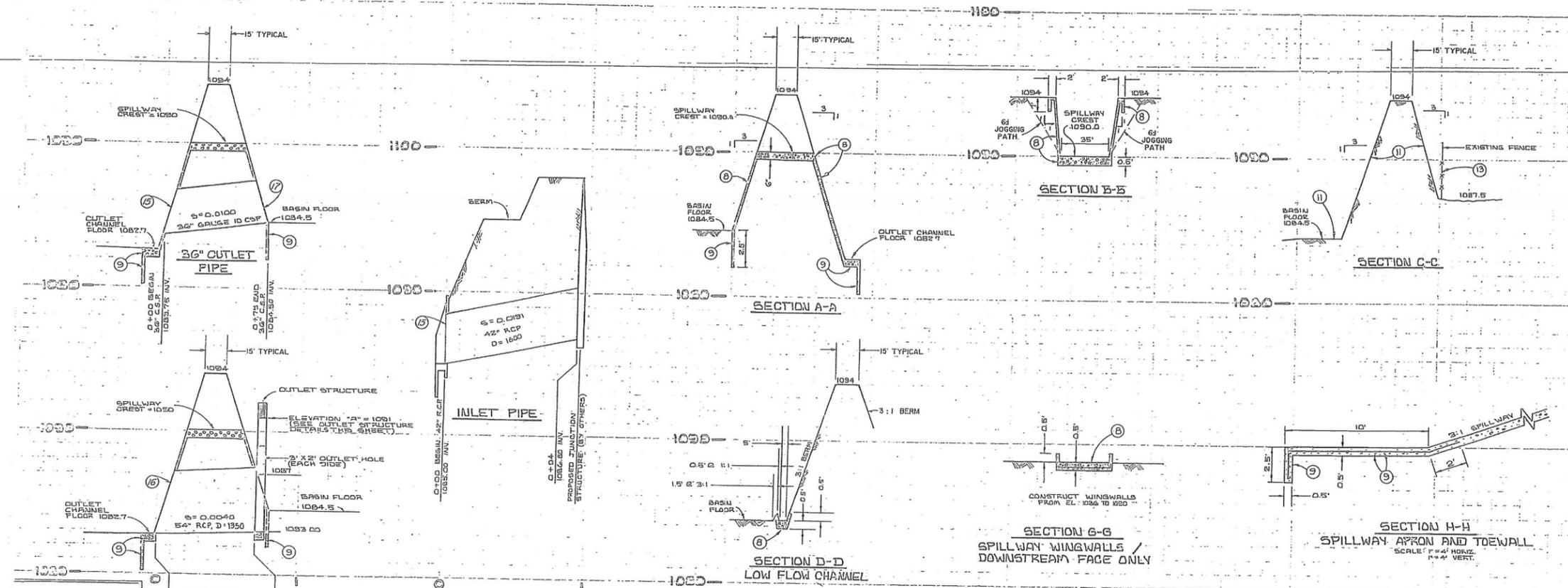
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CONSTRUCTION NOTES

1. INSTALL 54" RCP, D= 1350
2. INSTALL 36" CSP, GAUGE 10
3. INSTALL 42" RCP, D= 1600
4. INSTALL 6" DIA. OUTLET STRUCTURE PER DETAILS NO. 3 AND NO. 4 ON SHEET 2
5. CONSTRUCT WING TYPE HEADWALL PER SBCRD. STD. DRWG. NO. 209
6. CONSTRUCT 12" THICK RIP RAP BLANKET W/9"-18" ROCK
7. CONSTRUCT GRADED EARTH CHANNEL
8. PROVIDE 6" MINIMUM THICK GUNITE SLOPE/ CHANNEL PROTECTION, WITH 6"x6" 10/10 WWF REINFORCING
9. CONSTRUCT REINFORCED CONCRETE APRON/ TOEWALL WITH NO.4 REINFORCING BARS AT 12" MAXIMUM SPACING O.C. EACH WAY. PROVIDE 2" MINIMUM COVER OVER REBAR. REBAR SHALL OVERLAP WWF 1' MINIMUM WHERE APPLICABLE
10. CONSTRUCT PLUG PER DETAIL NO. 5 ON SHEET 2
11. GRADE DETENTION BASIN AND EMBANKMENTS TO CONTOURS SHOWN
12. INSTALL STREET BARRICADE PER CITY OF COLTON STD. DRWG. NO. 114
13. PROTECT EXISTING INSTALLATION IN PLACE
14. CONSTRUCT REINFORCED CONCRETE CUT-OFF COLLARS PER DETAIL NO. 6 ON SHEET 2
15. INSTALL OUTLET PROTECTION BARRIER NO.1 PER S.B.C.F.C.D. STD. DRG. NOS. S.P. 101-1 THRU S.P. 101-3
16. INSTALL OUTLET PROTECTION BARRIER NO. 2 PER S.B.C.F.C.D. STD. DRG. NOS. S.P. 101-1 THRU S.P. 101-3
17. INSTALL ONLY "REMOVABLE PORTION" OF INCLINED TRASH RACK PER L.A.C.F.C.D. STD. DRG. NOS. 2-DTR1.1 AND 2-DTR1.2, CASE A. LR=10'. MODIFY THE TOP BAR CONNECTION PER DETAIL NO. 7 ON SHEET 2

PRIVATE ENGINEER'S NOTICE TO CONTRACTORS

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER. THE EXISTING AND ADJACENT LOCATIONS OF UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS WERE DETERMINED BY A SEARCH OF AVAILABLE PUBLIC RECORDS. THE CONTRACTOR SHALL FURTHER RESEARCH AND VERIFY THE LOCATION OF SAID UTILITIES. THERE ARE NO EXISTING UNDERGROUND UTILITIES OR STRUCTURES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE THE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

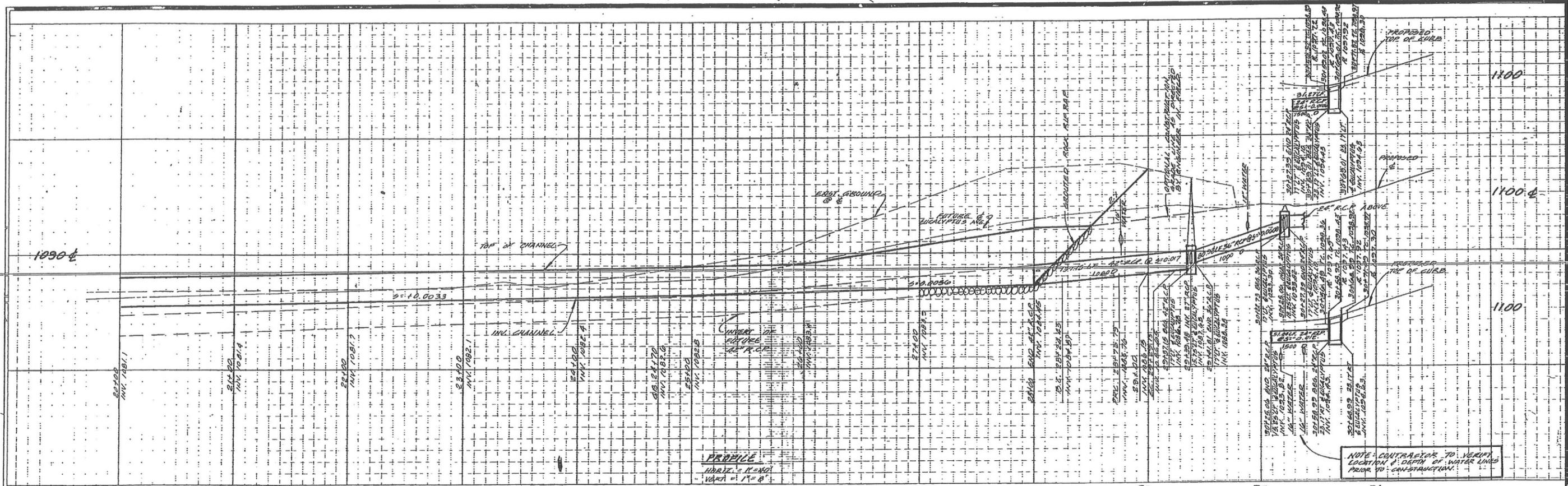


PLANS PREPARED BY
CPH ENGINEERS
 CIVIL ENGINEERING
 LAND SURVEYING
 LAND PLANNING
 5000 W. 5TH ST., UPLAND CA 91786 • (914) 940-2212
 R.C.E. NO. 20022
 DATE 11/10/06

CITY OF COLTON
 PUBLIC WORKS DEPT.
DETENTION BASIN
 EUCALYPTUS AVE AT
 SAN BERNARDINO AVE.

REVISIONS	DATE	APP
CITY ENGINEER		SCALE:
NAME C. GLENN WILSON		HORIZ: 1"=40'
R.C.E. 13440		VERT: 1"=4'
APPROVED		DATE: 11/03
PLAN NO. 3134		SHEET 2 OF 2

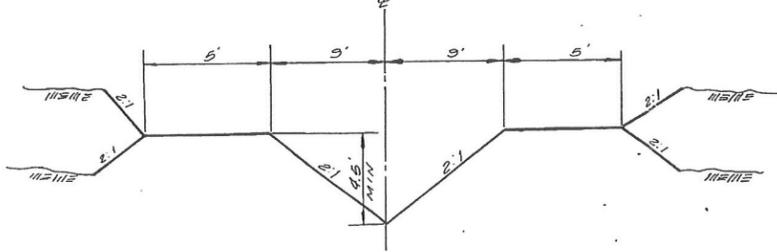
ETL A (150)



PROFILE
HORIZ. = 1"=40'
VERT. = 1"=8'

NOTE: CONTRACTOR TO VERIFY LOCATION & DEPTH OF WATER LINES PRIOR TO CONSTRUCTION.

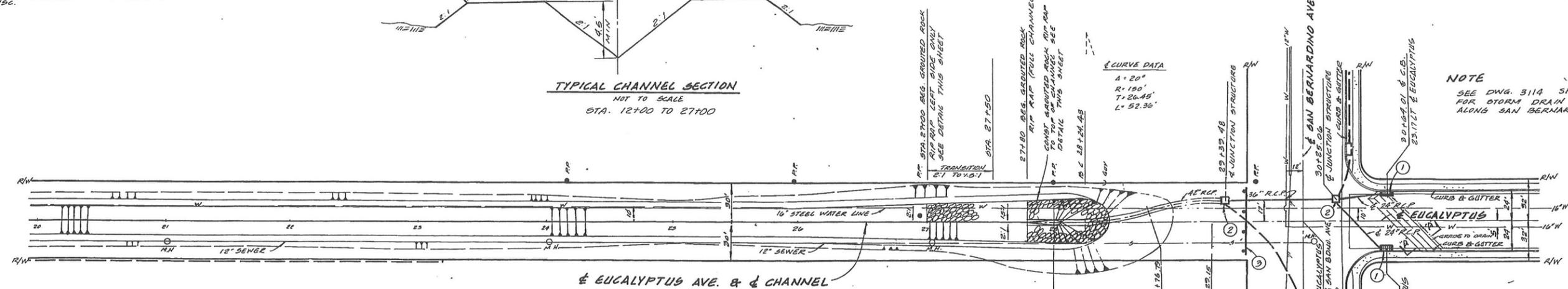
BENCH MARK
DESIGNATION 501 ELEV. 1074.44
CITY OF COLTON STANDARD 8 INCH BRASS DING SET IN THE CONC. SIDEWALK ON THE SOUTHWEST CORNER OF VALLEY BLVD WEST OF EUCALYPTUS AVE 1.0' NO. OF A CHAIN LINK FENCE CORNER AT THE NORTHEAST CORNER OF THE MACE IN CALDWELL AUCTION PROPERTY INITIALED "B.M." PAINTED ON SIDEWALK, 1.0' NO. OF DISC.



TYPICAL CHANNEL SECTION
NOT TO SCALE
STA. 12+00 TO 27+00

- CONSTRUCTION NOTES**
1. CONST. DROP INLET CATCH BASIN PER CITY OF COLTON STD. # 207 (3 GRATES) W=10' GRATES TO BE CONST. NORMAL TO ROAD &.
 2. CONST. JUNCTION STRUCTURE PER LOS ANGELES CO. F.G.D. MANUAL # 512 # 2-D113.
 3. CONST. STREET END BARRICADE PER CITY OF COLTON STD. # 114.

NOTE
SEE DWG. 3114 SH. 4 OF 4 FOR STORM DRAIN IMPROVEMENTS ALONG SAN BERNARDINO AVE.



CURVE DATA
Δ = 20°
R = 150'
T = 26.45'
L = 52.36'

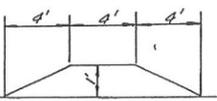
CURVE DATA
Δ = 20°
R = 150'
T = 26.45'
L = 52.36'

NOTE
ADJUST SEWER MANHOLES TO FINISHED GRADE AS NECESSARY.

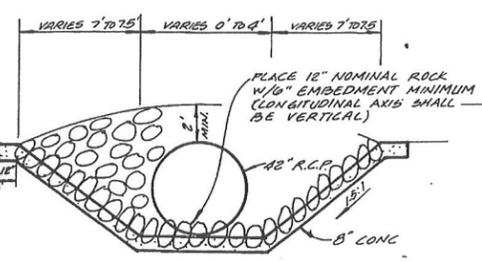


PLAN
SCALE 1"=40'

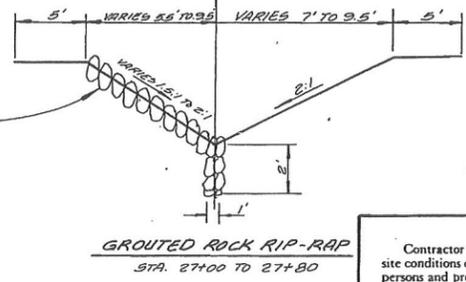
RECORD DRAWING
JULY 1988
INFORMATION FURNISHED BY
LAINI HOMES



SECTION A-A
NO SCALE



GRouted ROCK RIP-RAP
NO SCALE
STA. 27+00 TO 28+00



GRouted ROCK RIP-RAP
NO SCALE
STA. 27+00 TO 27+80

Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this Project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this Project, excepting for liability arising from the sole negligence of the Owner or the Engineer.

NESTE, BRUDIN & STONE Incorporated
Engineers • Planners

APPROVED: *[Signature]* R.C.E. DATE 12-2-88
DESIGNED: R.E.S. DRAWN: C.T. CHECKED: R.E.S. JOB NO. 284012-002

CITY OF COLTON PUBLIC WORKS

STORM DRAIN IMPROVEMENT PLAN
(INTERIM CHANNEL)
TRACT NO. S 12886 - 12892
EUCALYPTUS AVENUE

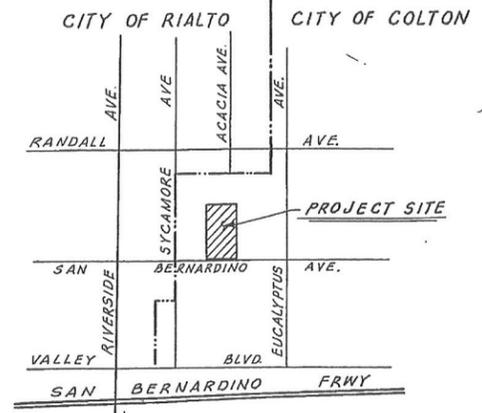
REVISED CHANNEL (R.E.S.)		DATE	
REVISIONS	DRAWN	DATE	APPR.
SCALE: HORIZ. 1"=40'	CHECKED: [Signature]	DATE: 2-7-85	DATE: 2-7-85
APPROVED: [Signature]	CITY ENGINEER, R.E.S. 12-2-88	DATE: 2-7-85	
PLAN NO. 3114		SHEET 1 OF 2	

CITY OF COLTON
SD1191

CONSTRUCTION NOTES & QUANTITIES ESTIMATE

STREETS		TR 13471	TR 13424
		QUANTITY	QUANTITY
1	CONST. "A.C. OVER" "A. B. PER SOILS REPORT BY [CITY]"	79,160 S.F.	78,900 S.F.
2	CONST. "A.C. OVER" "A. B. (SAN BERNARDINO AVE)"	— S.F.	14,750 S.F.
3	CONST. 8" CURB & 18" GUTTER PER CITY STD. DWG. NO. 100A	5,140 L.F.	5,090 L.F.
4	CONST. 6" CURB & 18" GUTTER " " " " " 107 & DETAIL HEREON.	— L.F.	200 L.F.
5	CONST. 4" P.C.C. SIDEWALK " " " " " 107	12,690 S.F.	10,170 S.F.
6	CONST. P.C.C. CROSS GUTTER " " " " " 112	1,440 S.F.	1,050 S.F.
7	CONST. STREET BARRICADE " " " " " 114	36 L.F.	— L.F.
8	FEATHER OVER EXIST. P.M.T. FOR A SMOOTH JOIN OR AS DIRECTED BY THE ENGINEER	— S.F.	— S.F.
9	CONST. PARKWAY CULVERT NO. 1, TYPE II INLET PER CITY OF SAN BERNARDINO STD. NO. 400, 5'-3"	— EA.	— EA.
10	CONST. INTERSECTION RAMPWAYS PER CITY STD. DWG. NO. 120 (AT ALL INTERSECTIONS)	8 EA.	8 EA.
11	INSTALL STREET NAME SIGNS.	— EA.	— EA.
12	CONST. RESIDENTIAL DRIVEWAY PER CITY STD. DWG. NO. 110A	10,010 S.F.	9,570 S.F.
13	INSTALL STOP SIGN.	— EA.	1 EA.
14	REMOVE BARRICADE IF EXIST.	— L.F.	— L.F.
15	CONST. COMMON DRIVEWAY PER DETAIL HEREON (2,000 S.F.	7,980 S.F.
16	CONST. 6" CURB "ONLY" FOR COMMON DRIVEWAY PER DETAIL HEREON	200 L.F.	620 L.F.
17	ADJUST MANHOLE TO GRADE AFTER PAVING	12 EA.	— EA.
18	MAN CUT & REMOVE EXISTING A.C. DIKE	—	622 L.F.

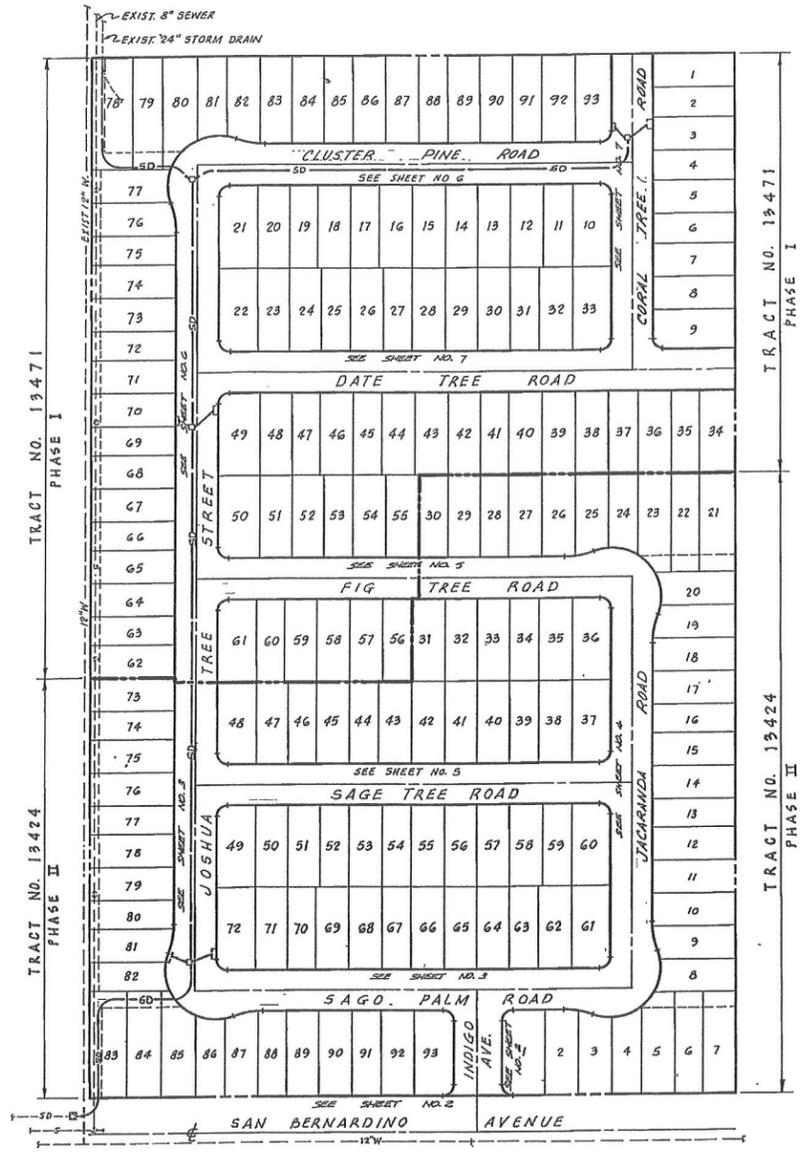
* FINAL STREET SECTION TO BE DETERMINE AFTER SUBGRADE IS MADE, R-VALUES DETERMINED AND STRUCTURAL SECTION FROM SOILS ENGINEER IS APPROVED BY CITY.



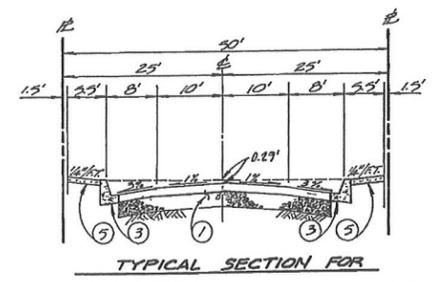
VICINITY MAP
NO SCALE

GENERAL NOTES

1. TREES SHALL BE RELOCATED BY CONTRACTOR
2. UTILITIES IN THE WAY OF CONSTRUCTION SHALL BE RELOCATED BY OTHERS.
3. CONTRACTOR SHALL BACKFILL PARKWAY.
4. REMOVAL AND SUBSEQUENT RELOCATION OR REPLACEMENT OF STREET NAME SIGNS, TRAFFIC CONTROL DEVICES, ETC., SHALL BE AS DIRECTED BY THE CITY ENGINEER.
5. ALL DRIVEWAYS TO BE LOCATED IN FIELD BY CITY ENGINEER.
6. ALL CONSTRUCTION SHALL CONFORM TO THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (CURRENT EDITION)" AND THE STANDARD DRAWINGS OF THE CITY OF COLTON PUBLIC WORKS DEPARTMENT.
7. CONTRACTOR SHALL WATER TEST ALL FLOWLINES HAVING GRADES LESS THAN 0.40% TO ASSURE PROPER DRAINAGE.
8. MINIMUM DISTANCE TO BE MAINTAINED BETWEEN SEWER AND WATER LINES AS PER CURRENT CALIFORNIA STATE HEALTH DEPARTMENT REGULATIONS.
9. CONTRACTOR SHALL OBTAIN AN EXCAVATION PERMIT FOR EXCAVATION OVER 5 FEET IN DEPTH FROM THE STATE DEPARTMENT OF INDUSTRIAL SAFETY AND COMPLY WITH THE REQUIREMENTS THEREOF.
10. CONTRACTOR SHALL NOTIFY UTILITIES PRIOR TO CONSTRUCTION, TO ALLOW FOR FIELD LOCATION OF FACILITIES (WATER, SEWER, GAS AND ELECTRIC).
11. CONSTRUCTION TIMES WILL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" (CURRENT EDITION)

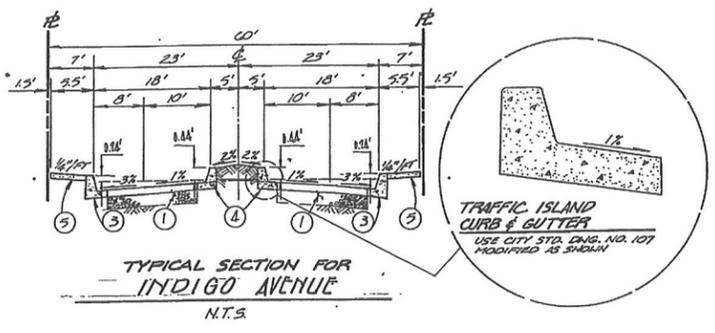


KEY MAP
SCALE: 1" = 100'

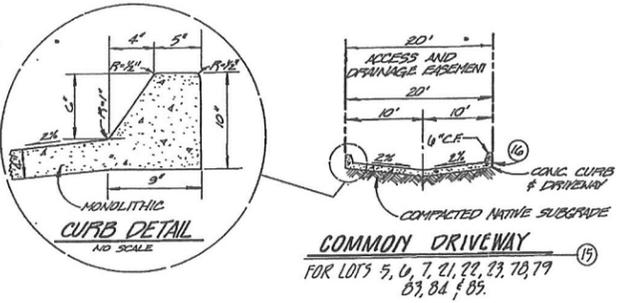


TYPICAL SECTION FOR SAGO PALM ROAD

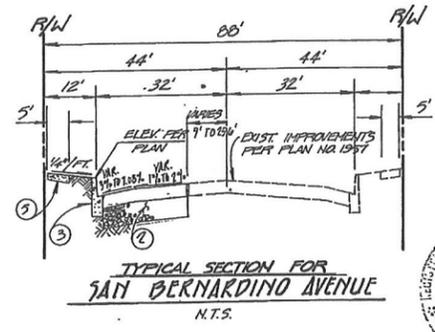
- SAGO PALM ROAD
- SAGE TREE ROAD
- FIG TREE ROAD
- DATE TREE ROAD
- CLUSTER PINE ROAD
- JACARANDA ROAD
- CORAL TREE ROAD
- JOSHUA TREE STREET



TYPICAL SECTION FOR INDIGO AVENUE
N.T.S.



COMMON DRIVEWAY CURB DETAIL
FOR LOTS 5, 6, 7, 21, 22, 23, 70, 79, 83, 84 & 85.



TYPICAL SECTION FOR SAN BERNARDINO AVENUE
N.T.S.



<p>PRIVATE ENGINEER'S NOTICE TO CONTRACTOR</p> <p>The existence and location of any underground utilities or structures shown on these plans are obtained by a search of available records. To the best of our knowledge there are no existing utilities except those shown on this plan. The Contractor is required to take all precautionary measures to protect the utilities shown, and any other lines or structures not shown on these plans, and is responsible for the protection of, and any damage to these lines or structures.</p>	<p>Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this Project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this Project, excepting for liability arising from the sole negligence of the Owner or the Engineer.</p>	<p>NOTICE</p> <p>CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.</p>	<p>BENCH MARK :</p> <p>B.M. 501 - CITY OF COLTON FD. BRASS DISK S. OF THE N.E. INTERSECTION OF VALLEY BLVD & EUCALYPTUS AVE. ELEVATION: 1074.443</p>	<p>OWNER/DEVELOPER :</p> <p>PRESLEY OF SOUTHERN CALIF. 17991 MITCHEL SOUTH, IRVINE, CALIF. 92714-6095 PHONE: (714) 660-0660</p>	<p>Prepared in the office of</p> <p>Church Engineering, Inc. Consulting Civil Engineers Land Planners Land Surveyors</p> <p>3201 Alton, Irvine, Irvine California 92714 Telephone (714) 860-8600</p>	<p style="text-align: center;">CITY OF COLTON ENGINEERING DIVISION</p> <p style="text-align: center;">STREET IMPROVEMENT PLAN</p> <p style="text-align: center;">FOR TRACTS 13424 & 13471</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>REVISIONS</td> <td>DATE</td> <td>APPR.</td> </tr> <tr> <td>SCALE</td> <td>HORIZ.</td> <td>DRAWN</td> </tr> <tr> <td></td> <td>VERT.</td> <td>CHECKED</td> </tr> <tr> <td colspan="2">APPROVED</td> <td>DATE</td> </tr> <tr> <td colspan="2">CITY ENGINEER, R.C.E. 13440</td> <td>11-18-87</td> </tr> <tr> <td colspan="2">PLAN NO. 1011-1</td> <td>SHEET 1 OF 7</td> </tr> </table>	REVISIONS	DATE	APPR.	SCALE	HORIZ.	DRAWN		VERT.	CHECKED	APPROVED		DATE	CITY ENGINEER, R.C.E. 13440		11-18-87	PLAN NO. 1011-1		SHEET 1 OF 7
REVISIONS	DATE	APPR.																						
SCALE	HORIZ.	DRAWN																						
	VERT.	CHECKED																						
APPROVED		DATE																						
CITY ENGINEER, R.C.E. 13440		11-18-87																						
PLAN NO. 1011-1		SHEET 1 OF 7																						

APPENDIX E

APPENDIX F

COLTON'S HUB CITY CENTER

Land Use Plan

Alternative A

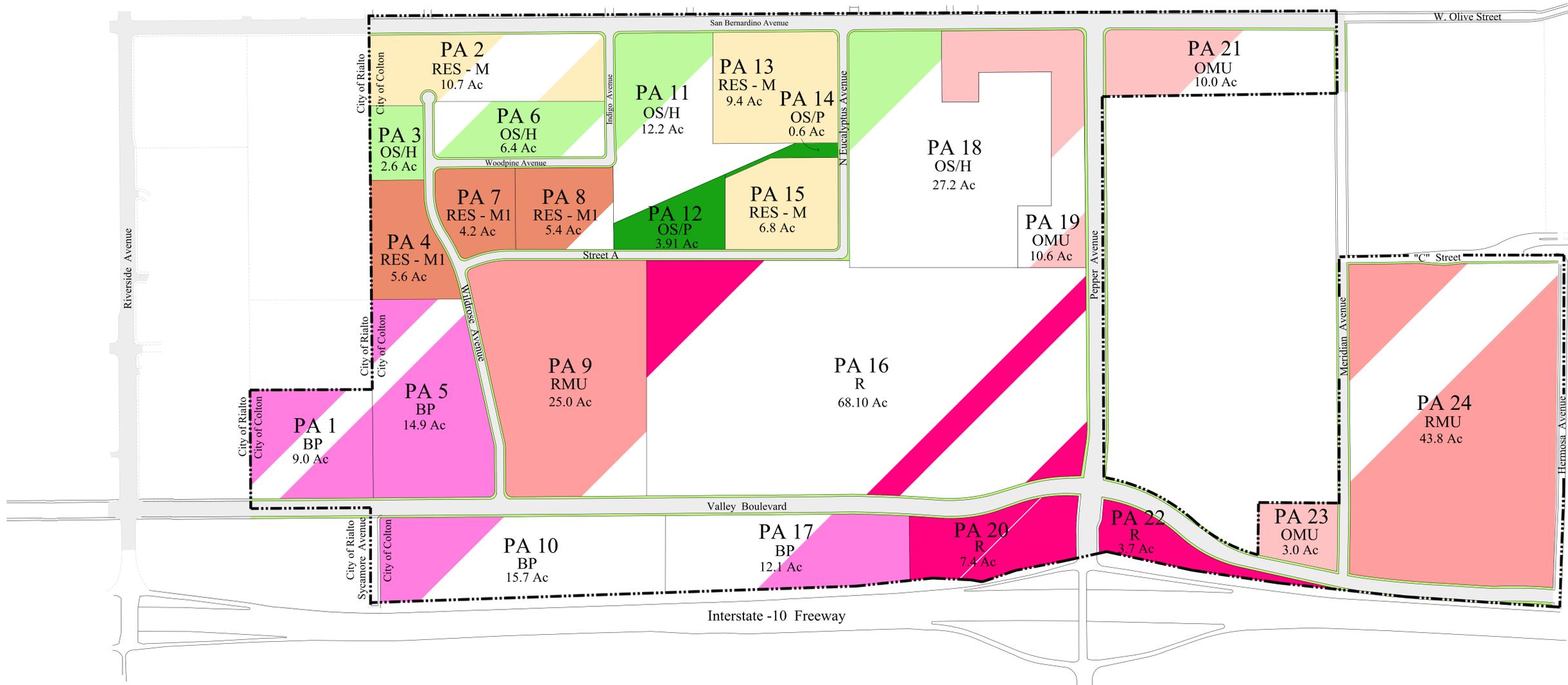
Prepared by:

JHA Consulting, Inc.

Community Planning and Design
Project Management

17782 17th Street, Suite 200
Tustin, CA 92602

Date: April 18, 2013



LEGEND:

 RES-M (Medium)	 R Retail	 OS/P Open Space / Park
 RES-M1 (Medium - 1)	 OMU Office Mixed Use	 OS/H Natural Habitat
 RMU Retail Mixed Use	 BP Business Park	

