

THE RANCH PLAN PLANNED COMMUNITY
PLANNING AREAS 3 AND 4 RUNOFF MANAGEMENT PLAN

Michael Baker
INTERNATIONAL

TECHNICAL APPENDIX B.1

**Rational Method High Confidence
(25- and 100-year)**

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****

* RMV PA-3 SUBAREA A ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC AUGUST 2018 ROKAMOTO *

FILE NAME: PA3A25HC.DAT
TIME/DATE OF STUDY: 10:40 08/14/2018

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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	STREET-HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.372
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	C	1.10	0.25	1.000	77	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.09
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 3.09

OA-1

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.160

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	0.90	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	2.60	0.25	1.000	77
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.70	0.25	0.900	69

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.60
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.62
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 1.14
Tc(MIN.) = 10.55
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.02
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 13.90

OA-2

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 6.30
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

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

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UPSTREAM ELEVATION(FEET) = 605.00 DOWNSTREAM ELEVATION(FEET) = 584.00
STREET LENGTH(FEET) = 264.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.66
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.48
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.33
STREET FLOW TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 11.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 69
COMMERCIAL C 1.00 0.25 0.100 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.52
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 18.90

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 11.68
FLOW VELOCITY(FEET/SEC.) = 6.69 DEPTH*VELOCITY(FT*FT/SEC.) = 2.48
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 584.00 DOWNSTREAM ELEVATION(FEET) = 564.00
STREET LENGTH(FEET) = 494.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.17
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46

HALFSTREET FLOOD WIDTH(FEET) = 16.76
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.66
STREET FLOW TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 12.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.10 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
COMMERCIAL C 6.60 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.80 0.25 0.900 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 24.53
EFFECTIVE AREA(ACRES) = 17.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 17.2 PEAK FLOW RATE(CFS) = 42.10

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 18.95
FLOW VELOCITY(FEET/SEC.) = 6.19 DEPTH*VELOCITY(FT*FT/SEC.) = 3.10
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 564.00 DOWNSTREAM(FEET) = 520.00
FLOW LENGTH(FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.35
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.10
PIPE TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 14.35
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.35
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.656
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL C 3.90 0.25 0.100 69
PUBLIC PARK C 0.20 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.90 0.25 0.900 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.255

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A-1

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SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 13.06
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE (CFS) = 52.13

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.35					
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.656					
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
COMMERCIAL	C	5.00	0.25	0.100	69
PUBLIC PARK	C	2.10	0.25	0.850	69
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	0.80	0.25	0.900	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400					
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 21.13					
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm (INCH/HR) = 0.11					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE (CFS) = 73.26					

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FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.35					
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.656					
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.80	0.20	0.100	75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100					
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.27					
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm (INCH/HR) = 0.11					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.42					
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE (CFS) = 77.53					

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A-4

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.59

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 77.53
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 15.27
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.27					
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.564					
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.80	0.30	0.100	56
COMMERCIAL	C	7.60	0.25	0.100	69
PUBLIC PARK	C	0.40	0.25	0.850	69
COMMERCIAL	D	10.50	0.20	0.100	75
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	0.30	0.20	0.900	75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125					
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 49.29					
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm (INCH/HR) = 0.08					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE (CFS) = 124.03					

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A-5

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.27					
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.564					
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	6.80	0.30	0.100	56
COMMERCIAL	C	12.10	0.25	0.100	69
PUBLIC PARK	C	1.00	0.25	0.850	69
COMMERCIAL	D	4.50	0.20	0.100	75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131					
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 55.58					
EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm (INCH/HR) = 0.06					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.25					
TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE (CFS) = 179.61					

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FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 18.27
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 179.61
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.01
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.01
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.497
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.40 0.30 0.100 56
COMMERCIAL C 6.70 0.25 0.100 69
PUBLIC PARK C 0.10 0.25 0.850 69
COMMERCIAL D 2.50 0.20 0.100 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 28.23
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 203.00

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.01
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.497
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 7.20 0.30 0.100 56
PUBLIC PARK B 0.70 0.30 0.850 56
COMMERCIAL C 7.60 0.25 0.100 69
PUBLIC PARK C 0.30 0.25 0.850 69
COMMERCIAL D 4.70 0.20 0.100 75
PUBLIC PARK D 0.40 0.20 0.850 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 46.23
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 249.23

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.51
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 249.23
PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 17.36
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.36
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.50 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.60 0.30 0.900 56
COMMERCIAL C 2.80 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.80 0.25 0.900 69
COMMERCIAL D 0.60 0.20 0.100 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 17.34
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 255.14

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.36
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.40 0.30 0.200 56
APARTMENTS C 5.50 0.25 0.200 69
APARTMENTS D 3.20 0.20 0.200 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.15
EFFECTIVE AREA(ACRES) = 130.80 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 130.8 PEAK FLOW RATE(CFS) = 274.29

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 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.) = 17.36
RAINFALL INTENSITY(INCH/HR) = 2.38
AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.22
EFFECTIVE STREAM AREA(ACRES) = 130.80
TOTAL STREAM AREA(ACRES) = 130.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 274.29

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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 645.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.417
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.610
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
".4 DWELLING/ACRE" C 0.40 0.25 0.900 69 8.68
COMMERCIAL D 0.30 0.20 0.100 75 5.42
PUBLIC PARK D 1.30 0.20 0.850 75 8.61
RESIDENTIAL
".4 DWELLING/ACRE" D 1.00 0.20 0.900 75 8.68
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.798
SUBAREA RUNOFF(CFS) = 12.00
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 12.00

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 595.00
STREET LENGTH(FEET) = 517.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.99
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 12.54

COMMERCIAL D 1.00 0.20 0.100 75
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.335
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 27.39
EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 49.51

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 22.07
FLOW VELOCITY(FEET/SEC.) = 5.45 DEPTH*VELOCITY(FT*FT/SEC.) = 3.03
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 22.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.22
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.51
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 8.96
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.468
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 1.60 0.25 0.100 69
PUBLIC PARK C 0.20 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 8.75
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 55.57

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.468

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 9.00 0.25 0.100 69
PUBLIC PARK C 1.90 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 2.70 0.25 0.900 69
COMMERCIAL D 4.10 0.20 0.100 75
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.313
SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 54.95
EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 110.51

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.468
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 4.50 0.25 0.100 69
PUBLIC PARK C 1.20 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 3.80 0.25 0.900 69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.515
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 28.55
EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 139.06

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.468
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" C 5.30 0.25 1.000 77
NATURAL FAIR COVER
"WOODLAND,GRASS" C 0.30 0.25 1.000 77
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 16.22
EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 155.28

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FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.38
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 155.28
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 9.83
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 = 2955.00 FEET.
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*****
FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 9.83
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.290
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        3.40    0.30    0.100    56
COMMERCIAL          C        11.00    0.25    0.100    69
PUBLIC PARK         C        1.80    0.25    0.850    69
RESIDENTIAL
".4 DWELLING/ACRE"  C        1.50    0.25    0.900    69
COMMERCIAL          D        3.20    0.20    0.100    75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.222
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 60.84
EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 207.88
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FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 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) = 535.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.17
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 207.88
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 10.57
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 = 4065.00 FEET.
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*****
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN.) = 10.57
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.158
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        3.10    0.30    0.100    56
PUBLIC PARK         B        1.40    0.30    0.850    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.10    0.30    0.900    56
COMMERCIAL          C        5.10    0.25    0.100    69
PUBLIC PARK         C        1.90    0.25    0.850    69
RESIDENTIAL
".4 DWELLING/ACRE"  C        3.60    0.25    0.900    69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.485
SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 44.17
EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 243.49
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*****
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.57
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.158
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          D        2.70    0.20    0.100    75
PUBLIC PARK         D        0.10    0.20    0.850    75
RESIDENTIAL
".4 DWELLING/ACRE"  D        0.50    0.20    0.900    75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.244
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.24
EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 252.72
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*****
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
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```
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.57
RAINFALL INTENSITY(INCH/HR) = 3.16
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.40
EFFECTIVE STREAM AREA(ACRES) = 91.80
TOTAL STREAM AREA(ACRES) = 91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 252.72
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** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	274.29	17.36	2.385	0.25(0.05)	0.22	130.8	100.00
2	252.72	10.57	3.158	0.25(0.10)	0.40	91.8	110.00

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	475.12	10.57	3.158	0.25(0.08)	0.32	171.4	110.00
2	463.10	17.36	2.385	0.25(0.07)	0.29	222.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 475.12 Tc(MIN.) = 10.57
EFFECTIVE AREA(ACRES) = 171.42 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.45
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 475.12
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 11.54
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.54
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.005
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	C	3.60	0.25	0.100	69

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 12.60

EFFECTIVE AREA(ACRES) = 176.12 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 475.12

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 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.) = 11.54
RAINFALL INTENSITY(INCH/HR) = 3.01
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 176.12
TOTAL STREAM AREA(ACRES) = 227.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 475.12

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.027

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.50	0.25	0.100	69	6.88
PUBLIC PARK	C	0.20	0.25	0.850	69	10.93
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	C	2.70	0.25	0.200	69	7.33
RESIDENTIAL						
".4 DWELLING/ACRE"	C	1.40	0.25	0.900	69	11.02
PUBLIC PARK	D	0.10	0.20	0.850	75	10.93
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	D	1.30	0.20	0.200	75	7.33

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.381

SUBAREA RUNOFF(CFS) = 21.95

TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 21.95

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 6.88

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.20	0.20	0.900	75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 22.64

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 626.00
FLOW LENGTH(FEET) = 425.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.34
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.64
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 7.56
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.56

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.816

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	5.40	0.25	0.200	69
RESIDENTIAL					
".4 DWELLING/ACRE"	C	2.40	0.25	0.900	69
COMMERCIAL	C	0.70	0.25	0.100	69
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.60	0.20	0.900	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423

SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 30.41

EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 15.5 PEAK FLOW RATE(CFS) = 51.84

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 626.00 DOWNSTREAM(FEET) = 606.00
FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.58
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.84
PIPE TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 8.93

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.93

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.474

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	C	7.60	0.25	0.200	69
COMMERCIAL	C	1.40	0.25	0.100	69
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	2.30	0.25	0.200	69
RESIDENTIAL					
".4 DWELLING/ACRE"	C	6.50	0.25	0.900	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	8.40	0.25	0.600	69
APARTMENTS	D	0.50	0.20	0.200	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491

SUBAREA AREA(ACRES) = 26.70 SUBAREA RUNOFF(CFS) = 80.53

EFFECTIVE AREA(ACRES) = 42.20 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46

TOTAL AREA(ACRES) = 42.2 PEAK FLOW RATE(CFS) = 127.60

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.93

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.474

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.30	0.20	0.100	75
PUBLIC PARK	D	1.10	0.20	0.850	75
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	2.00	0.20	0.200	75
RESIDENTIAL					
".4 DWELLING/ACRE"	D	3.80	0.20	0.900	75
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	3.80	0.20	0.600	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642

SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 33.12

EFFECTIVE AREA(ACRES) = 53.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 53.2 PEAK FLOW RATE(CFS) = 160.72

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 606.00 DOWNSTREAM(FEET) = 604.00
FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.61
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 160.72
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 9.22
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 2006.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 9.22
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.411
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.10 0.25 0.200 69
COMMERCIAL C 1.60 0.25 0.100 69
PUBLIC PARK C 0.20 0.25 0.850 69
APARTMENTS D 0.30 0.20 0.200 75
COMMERCIAL D 2.10 0.20 0.100 75
PUBLIC PARK D 0.60 0.20 0.850 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 14.82
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 172.53

A-23

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 9.22
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.411
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.20 0.20 0.200 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 173.14

A-23

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 604.00 DOWNSTREAM(FEET) = 546.00
FLOW LENGTH(FEET) = 1271.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.78
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 173.14
PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 10.11
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 125.00 = 3277.00 FEET.

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 10.11
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.238
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.50 0.25 0.200 69
COMMERCIAL C 1.20 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.20 0.25 0.900 69
APARTMENTS D 0.10 0.20 0.200 75
COMMERCIAL D 1.60 0.20 0.100 75
RESIDENTIAL
".4 DWELLING/ACRE" D 3.00 0.20 0.900 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 21.33
EFFECTIVE AREA(ACRES) = 65.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 65.9 PEAK FLOW RATE(CFS) = 185.37

A-25

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 10.11
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.238
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 1.90 0.25 0.200 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.60 0.25 0.900 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.30 0.25 0.600 69
APARTMENTS D 5.00 0.20 0.200 75
PUBLIC PARK D 2.30 0.20 0.850 75
RESIDENTIAL
".4 DWELLING/ACRE" D 3.50 0.20 0.900 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 38.28
EFFECTIVE AREA(ACRES) = 79.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.49

A-25.1

TOTAL AREA(ACRES) = 79.5 PEAK FLOW RATE(CFS) = 223.66

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 10.11
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.238

A-25.1

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	10.20	0.20	0.600	75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 28.62

EFFECTIVE AREA(ACRES) = 89.70 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 89.7 PEAK FLOW RATE(CFS) = 252.28

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00

FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 23.87

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 252.28

PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.51

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 10.51

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.169

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SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS	C	5.90	0.25	0.200	69
COMMERCIAL	C	0.10	0.25	0.100	69

RESIDENTIAL

"4 DWELLING/ACRE"	C	0.60	0.25	0.900	69
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APARTMENTS	D	6.00	0.20	0.200	75
COMMERCIAL	D	1.10	0.20	0.100	75

RESIDENTIAL

"4 DWELLING/ACRE"	D	4.70	0.20	0.900	75
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.395

SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 51.08

EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 297.79

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.16

ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 297.79

PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 11.03

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.03

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.082

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	B	1.50	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56

APARTMENTS	C	1.10	0.25	0.200	69
COMMERCIAL	C	12.70	0.25	0.100	69

PUBLIC PARK	C	0.80	0.25	0.850	69
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RESIDENTIAL

"4 DWELLING/ACRE"	C	4.10	0.25	0.900	69
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.303

SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 55.18

EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 344.53

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.03

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.082

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	D	1.20	0.20	0.100	75
PUBLIC PARK	D	1.50	0.20	0.850	75

RESIDENTIAL

"4 DWELLING/ACRE"	D	0.10	0.20	0.900	75
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.530

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SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 7.50
EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 352.03

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.03
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.00 0.30 0.100 56
COMMERCIAL C 1.30 0.25 0.100 69
COMMERCIAL D 12.60 0.20 0.100 75
PUBLIC PARK D 1.10 0.20 0.850 75
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 75
RESIDENTIAL
".4 DWELLING/ACRE" D 2.10 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.238
SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 49.68
EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE(CFS) = 401.71

A-28

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.29
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 401.71
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 11.43
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.43
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.021
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 2.20 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.40 0.25 0.900 69

A-29

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 6.94
EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE(CFS) = 401.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 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.) = 11.43
RAINFALL INTENSITY(INCH/HR) = 3.02
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.43
EFFECTIVE STREAM AREA(ACRES) = 152.10
TOTAL STREAM AREA(ACRES) = 152.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 401.71

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	475.12	11.54	3.005	0.25(0.08)	0.31	176.1	110.00
1	463.10	18.33	2.312	0.25(0.07)	0.29	227.3	100.00
2	401.71	11.43	3.021	0.22(0.10)	0.43	152.1	120.00

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	874.96	11.43	3.021	0.23(0.09)	0.37	326.6	120.00
2	874.62	11.54	3.005	0.24(0.09)	0.36	328.2	110.00
3	767.47	18.33	2.312	0.24(0.08)	0.34	379.4	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 874.96 Tc(MIN.) = 11.43
EFFECTIVE AREA(ACRES) = 326.56 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 379.4
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 96.0 INCH PIPE IS 72.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.44
ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 874.96
PIPE TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 12.59
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.60 0.30 0.900 56
COMMERCIAL C 1.80 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.40 0.25 0.900 69
COMMERCIAL D 0.80 0.20 0.100 75
RESIDENTIAL
".4 DWELLING/ACRE" D 1.60 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.524
SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 16.74
EFFECTIVE AREA(ACRES) = 333.36 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 874.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

A-30

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.50 0.30 0.100 56
PUBLIC PARK B 0.30 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 1.50 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.344
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 11.66
EFFECTIVE AREA(ACRES) = 338.06 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37

A-31

TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 874.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56
COMMERCIAL C 4.70 0.25 0.100 69
PUBLIC PARK C 1.30 0.25 0.850 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.90 0.25 0.200 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 3.80 0.25 0.600 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.386
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 34.02
EFFECTIVE AREA(ACRES) = 351.76 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 877.82

A-31

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 4.40 0.25 0.500 69
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.70 0.25 0.400 69
COMMERCIAL D 5.00 0.20 0.100 75
PUBLIC PARK D 0.10 0.20 0.850 75
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 10.30 0.20 0.200 75
RESIDENTIAL
".4 DWELLING/ACRE" D 0.10 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 51.98
EFFECTIVE AREA(ACRES) = 372.36 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 425.2 PEAK FLOW RATE(CFS) = 929.80

A-31

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.59

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860

SUBAREA LOSS RATE DATA(AMC II):

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

"3-4 DWELLINGS/ACRE"	D	1.30	0.20	0.600	75
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RESIDENTIAL

"5-7 DWELLINGS/ACRE"	D	3.90	0.20	0.500	75
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RESIDENTIAL

"8-10 DWELLINGS/ACRE"	D	2.30	0.20	0.400	75
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.487

SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 18.65

EFFECTIVE AREA(ACRES) = 379.86 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36

TOTAL AREA(ACRES) = 432.7 PEAK FLOW RATE(CFS) = 948.45

A-31

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00

FLOW LENGTH(FEET) = 1786.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 28.49

ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 948.45

PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 13.64

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.64

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.734

SUBAREA LOSS RATE DATA(AMC II):

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

B	1.30	0.30	0.100	56
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RESIDENTIAL

"4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
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RESIDENTIAL

"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
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COMMERCIAL	C	1.30	0.25	0.100	69
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PUBLIC PARK	C	0.10	0.25	0.850	69
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RESIDENTIAL

"4 DWELLING/ACRE"	C	3.00	0.25	0.900	69
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.598

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SUBAREA AREA(ACRES) = 7.00 SUBAREA RUNOFF(CFS) = 16.22

EFFECTIVE AREA(ACRES) = 386.86 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 439.7 PEAK FLOW RATE(CFS) = 948.45

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.64

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.734

SUBAREA LOSS RATE DATA(AMC II):

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

"3-4 DWELLINGS/ACRE"	C	2.50	0.25	0.600	69
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COMMERCIAL

D	0.80	0.20	0.100	75
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RESIDENTIAL

"4 DWELLING/ACRE"	D	1.30	0.20	0.900	75
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RESIDENTIAL

"3-4 DWELLINGS/ACRE"	D	3.30	0.20	0.600	75
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.599

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 18.52

EFFECTIVE AREA(ACRES) = 394.76 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 447.6 PEAK FLOW RATE(CFS) = 948.45

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 675.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.312

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392

SUBAREA Tc AND LOSS RATE DATA(AMC II):

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

"OPEN BRUSH"	C	1.50	0.25	1.000	77	9.31
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NATURAL FAIR COVER

"WOODLAND,GRASS"	C	0.40	0.25	1.000	77	9.31
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

OA-4

SUBAREA RUNOFF(CFS) = 5.37
TOTAL AREA(ACRES) = 1.90 PEAK FLOW RATE(CFS) = 5.37

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 635.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 421.00 CHANNEL SLOPE = 0.0950
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.186

SUBAREA LOSS RATE DATA(AMC II):

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

"OPEN BRUSH" C 4.90 0.25 1.000 77

NATURAL FAIR COVER

"WOODLAND,GRASS" C 2.40 0.25 1.000 77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.44

AVERAGE FLOW DEPTH(FEET) = 0.88 TRAVEL TIME(MIN.) = 1.09

Tc(MIN.) = 10.40

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 19.29

EFFECTIVE AREA(ACRES) = 9.20 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.2 PEAK FLOW RATE(CFS) = 24.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 7.25

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 631.00

FLOW LENGTH(FEET) = 501.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.50

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 24.31

PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 11.52

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.52

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.008

0A-6

SUBAREA LOSS RATE DATA(AMC II):

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

"OPEN BRUSH" C 5.10 0.25 1.000 77

NATURAL FAIR COVER

"WOODLAND,GRASS" C 4.00 0.25 1.000 77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 22.59

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 45.43

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 631.00 DOWNSTREAM(FEET) = 630.00

FLOW LENGTH(FEET) = 711.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.59

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 45.43

PIPE TRAVEL TIME(MIN.) = 2.58 Tc(MIN.) = 14.10

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.10

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.683

SUBAREA LOSS RATE DATA(AMC II):

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

"CHAPARRAL,BROADLEAF" C 0.30 0.25 1.000 75

NATURAL FAIR COVER

"CHAPARRAL,NARROWLEAF" C 5.70 0.25 1.000 81

NATURAL FAIR COVER

"OPEN BRUSH" C 3.40 0.25 1.000 77

NATURAL FAIR COVER

"WOODLAND,GRASS" C 0.10 0.25 1.000 77

NATURAL FAIR COVER

"CHAPARRAL,NARROWLEAF" D 2.10 0.20 1.000 86

NATURAL FAIR COVER

"OPEN BRUSH" D 1.60 0.20 1.000 83

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 13.20 SUBAREA RUNOFF(CFS) = 29.07

EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 69.14

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*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =    14.10
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    2.683
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"      D        0.20    0.20    1.000    82
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
SUBAREA AREA(ACRES) =    0.20    SUBAREA RUNOFF(CFS) =    0.45
EFFECTIVE AREA(ACRES) =    31.70    AREA-AVERAGED Fm(INCH/HR) =    0.24
AREA-AVERAGED Fp(INCH/HR) =    0.24    AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    31.7    PEAK FLOW RATE(CFS) =    69.59

*****
FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    630.00 DOWNSTREAM(FEET) =    628.00
FLOW LENGTH(FEET) =    910.00 MANNING'S N =    0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    6.01
ESTIMATED PIPE DIAMETER(INCH) =    51.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    69.59
PIPE TRAVEL TIME(MIN.) =    2.52    Tc(MIN.) =    16.62
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

*****
FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =    16.62
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    2.444
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C        1.60    0.25    1.000    75
NATURAL FAIR COVER
"OPEN BRUSH"          C        1.60    0.25    1.000    77
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D        1.80    0.20    1.000    81
NATURAL FAIR COVER
"OPEN BRUSH"          D        1.50    0.20    1.000    83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
SUBAREA AREA(ACRES) =    6.50    SUBAREA RUNOFF(CFS) =    12.98
EFFECTIVE AREA(ACRES) =    38.20    AREA-AVERAGED Fm(INCH/HR) =    0.24
AREA-AVERAGED Fp(INCH/HR) =    0.24    AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    38.2    PEAK FLOW RATE(CFS) =    75.76

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*****
FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    629.00 DOWNSTREAM(FEET) =    610.00
FLOW LENGTH(FEET) =    796.00 MANNING'S N =    0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    14.87
ESTIMATED PIPE DIAMETER(INCH) =    33.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    75.76
PIPE TRAVEL TIME(MIN.) =    0.89    Tc(MIN.) =    17.51
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.

*****
FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =    17.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    2.373
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C        1.90    0.25    1.000    75
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" C        0.40    0.25    1.000    81
NATURAL FAIR COVER
"OPEN BRUSH"          C        1.30    0.25    1.000    77
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D        4.50    0.20    1.000    81
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" D        1.30    0.20    1.000    86
NATURAL FAIR COVER
"OPEN BRUSH"          D        3.70    0.20    1.000    83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
SUBAREA AREA(ACRES) =    13.10    SUBAREA RUNOFF(CFS) =    25.46
EFFECTIVE AREA(ACRES) =    51.30    AREA-AVERAGED Fm(INCH/HR) =    0.23
AREA-AVERAGED Fp(INCH/HR) =    0.23    AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    51.3    PEAK FLOW RATE(CFS) =    98.77

*****
FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    610.00 DOWNSTREAM(FEET) =    410.00
FLOW LENGTH(FEET) =    6198.00 MANNING'S N =    0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    18.11
ESTIMATED PIPE DIAMETER(INCH) =    36.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    98.77
PIPE TRAVEL TIME(MIN.) =    5.70    Tc(MIN.) =    23.22

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LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

*****
FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)      NODE
1          98.77  23.22   2.023  0.23( 0.23) 1.00      51.3    150.00
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)      NODE
1          948.45  13.64   2.734  0.24( 0.09) 0.37     394.8    120.00
2          947.84  13.74   2.722  0.24( 0.09) 0.37     396.4    110.00
3          837.78  20.61   2.164  0.24( 0.08) 0.36     447.6    100.00
LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)      NODE
1          1029.51  13.64   2.734  0.24( 0.10) 0.42     424.9    120.00
2          1029.14  13.74   2.722  0.24( 0.10) 0.42     426.8    110.00
3          932.37  20.61   2.164  0.24( 0.10) 0.41     493.1    100.00
4          879.77  23.22   2.023  0.24( 0.10) 0.42     498.9    150.00
TOTAL AREA (ACRES) =          498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    1029.51  Tc(MIN.) =    13.635
EFFECTIVE AREA(ACRES) =    424.90  AREA-AVERAGED Fm(INCH/HR) =    0.10
AREA-AVERAGED Fp(INCH/HR) =    0.24  AREA-AVERAGED Ap =    0.42
TOTAL AREA(ACRES) =    498.9
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

*****
FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) =    13.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    2.734
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)  (INCH/HR)  (DECIMAL)  CN
AGRICULTURAL POOR COVER
"FALLOW"      B          1.60      0.30      1.000      86
NATURAL FAIR COVER
"OPEN BRUSH"   B          1.30      0.30      1.000      66
RESIDENTIAL
".4 DWELLING/ACRE" B          2.60      0.30      0.900      56
NATURAL FAIR COVER
"WOODLAND,GRASS" B          1.90      0.30      1.000      65
AGRICULTURAL POOR COVER
"FALLOW"      C          0.70      0.25      1.000      91

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NATURAL FAIR COVER
"OPEN BRUSH"      C          0.80      0.25      1.000      77
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.29
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    0.971
SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =    19.63
EFFECTIVE AREA(ACRES) =    433.80  AREA-AVERAGED Fm(INCH/HR) =    0.10
AREA-AVERAGED Fp(INCH/HR) =    0.24  AREA-AVERAGED Ap =    0.43
TOTAL AREA(ACRES) =    507.8      PEAK FLOW RATE(CFS) =    1029.51
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) =    13.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    2.734
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)  (INCH/HR)  (DECIMAL)  CN
PUBLIC PARK      C          0.10      0.25      0.850      69
RESIDENTIAL
".4 DWELLING/ACRE" C          1.50      0.25      0.900      69
NATURAL FAIR COVER
"WOODLAND,GRASS"   C          0.40      0.25      1.000      77
NATURAL FAIR COVER
"OPEN BRUSH"      D          0.10      0.20      1.000      83
RESIDENTIAL
".4 DWELLING/ACRE" D          0.30      0.20      0.900      75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    0.919
SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    5.43
EFFECTIVE AREA(ACRES) =    436.20  AREA-AVERAGED Fm(INCH/HR) =    0.10
AREA-AVERAGED Fp(INCH/HR) =    0.24  AREA-AVERAGED Ap =    0.43
TOTAL AREA(ACRES) =    510.2      PEAK FLOW RATE(CFS) =    1032.92

=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) =    510.2  TC(MIN.) =    13.64
EFFECTIVE AREA(ACRES) =    436.20  AREA-AVERAGED Fm(INCH/HR)=    0.10
AREA-AVERAGED Fp(INCH/HR) =    0.24  AREA-AVERAGED Ap =    0.432
PEAK FLOW RATE(CFS) =    1032.92

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)      Ap      Ae      HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)      (ACRES)      NODE
1          1032.92  13.64   2.734  0.24( 0.10) 0.43     436.2    120.00
2          1032.59  13.74   2.722  0.24( 0.10) 0.43     438.1    110.00
3          936.15  20.61   2.164  0.24( 0.10) 0.43     504.4    100.00
4          881.43  23.22   2.023  0.24( 0.10) 0.43     510.2    150.00

=====
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

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92707

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

* RMV PA-3 SUBAREA A ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC AUGUST 2018 ROKAMOTO *

FILE NAME: PA3A00HC.DAT
TIME/DATE OF STUDY: 08:22 08/14/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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	STREET-HEIGHT (FT)	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313 0.167 0.0150	
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312 0.167 0.0150	
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312 0.125 0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.306
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						
"OPEN BRUSH"	C	1.10	0.25	1.000	92	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 4.02
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 4.02

OA-1

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.047

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	0.90	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	2.60	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.70	0.25	0.900	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.20
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.98
AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 10.49
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 14.37
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 18.13

OA-2

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.95 FLOW VELOCITY(FEET/SEC.) = 6.71
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 605.00 DOWNSTREAM ELEVATION(FEET) = 584.00
STREET LENGTH(FEET) = 264.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.70
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 12.46
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.87
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.64
STREET FLOW TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 11.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.912

SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 86
COMMERCIAL C 1.00 0.25 0.100 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 7.15
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 24.63

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.16
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH*VELOCITY(FT*FT/SEC.) = 2.81
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 584.00 DOWNSTREAM ELEVATION(FEET) = 564.00
STREET LENGTH(FEET) = 494.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.49
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50

HALFSTREET FLOOD WIDTH(FEET) = 18.63
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.15
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.04
STREET FLOW TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 12.47
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.666

SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.10 0.30 0.100 76
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 76
COMMERCIAL C 6.60 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.80 0.25 0.900 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 31.71
EFFECTIVE AREA(ACRES) = 17.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 17.2 PEAK FLOW RATE(CFS) = 54.70

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.98
FLOW VELOCITY(FEET/SEC.) = 6.63 DEPTH*VELOCITY(FT*FT/SEC.) = 3.56
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 564.00 DOWNSTREAM(FEET) = 520.00
FLOW LENGTH(FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.34
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 54.70
PIPE TRAVEL TIME(MIN.) = 1.58 Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.423
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 76
COMMERCIAL C 3.90 0.25 0.100 86
PUBLIC PARK C 0.20 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.90 0.25 0.900 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.255

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A-1

A-3

SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 16.93
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE (CFS) = 67.88

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.05					
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.423					
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	76
PUBLIC PARK	B	0.30	0.30	0.850	76
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	76
COMMERCIAL	C	5.00	0.25	0.100	86
PUBLIC PARK	C	2.10	0.25	0.850	86
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	0.80	0.25	0.900	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400					
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 27.48					
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm (INCH/HR) = 0.11					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE (CFS) = 95.36					

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.05					
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.423					
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.80	0.20	0.100	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100					
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.51					
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm (INCH/HR) = 0.11					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.42					
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE (CFS) = 100.88					

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.51

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 100.88
PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 14.91
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.91					
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.308					
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.80	0.30	0.100	76
COMMERCIAL	C	7.60	0.25	0.100	86
PUBLIC PARK	C	0.40	0.25	0.850	86
COMMERCIAL	D	10.50	0.20	0.100	91
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	0.30	0.20	0.900	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125					
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 63.75					
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm (INCH/HR) = 0.08					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE (CFS) = 161.12					

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.91					
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.308					
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	6.80	0.30	0.100	76
COMMERCIAL	C	12.10	0.25	0.100	86
PUBLIC PARK	C	1.00	0.25	0.850	86
COMMERCIAL	D	4.50	0.20	0.100	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131					
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 71.91					
EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm (INCH/HR) = 0.06					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.25					
TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE (CFS) = 233.03					

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.21
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 233.03
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 15.61
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.222

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	76
COMMERCIAL	C	6.70	0.25	0.100	86
PUBLIC PARK	C	0.10	0.25	0.850	86
COMMERCIAL	D	2.50	0.20	0.100	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 36.52
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 263.38

A-8

FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.222

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	76
PUBLIC PARK	B	0.70	0.30	0.850	76
COMMERCIAL	C	7.60	0.25	0.100	86
PUBLIC PARK	C	0.30	0.25	0.850	86
COMMERCIAL	D	4.70	0.20	0.100	91
PUBLIC PARK	D	0.40	0.20	0.850	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 59.88
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 323.26

A-7

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 60.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.19
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 323.26
PIPE TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 16.89
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.89
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.080

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	76
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.60	0.30	0.900	76
COMMERCIAL	C	2.80	0.25	0.100	86
RESIDENTIAL					
"4 DWELLING/ACRE"	C	0.80	0.25	0.900	86
COMMERCIAL	D	0.60	0.20	0.100	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 22.53
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 331.32

A-18

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.89
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.080

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	76
APARTMENTS	C	5.50	0.25	0.200	86
APARTMENTS	D	3.20	0.20	0.200	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 24.84
EFFECTIVE AREA(ACRES) = 130.80 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 130.8 PEAK FLOW RATE(CFS) = 356.16

A-9

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 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.) = 16.89
RAINFALL INTENSITY(INCH/HR) = 3.08
AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.22
EFFECTIVE STREAM AREA(ACRES) = 130.80
TOTAL STREAM AREA(ACRES) = 130.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 356.16

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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 645.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.417
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.910
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
".4 DWELLING/ACRE" C 0.40 0.25 0.900 86 8.68
COMMERCIAL D 0.30 0.20 0.100 91 5.42
PUBLIC PARK D 1.30 0.20 0.850 91 8.61
RESIDENTIAL
".4 DWELLING/ACRE" D 1.00 0.20 0.900 91 8.68
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.798
SUBAREA RUNOFF(CFS) = 15.51
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 15.51

A-10

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 595.00
STREET LENGTH(FEET) = 517.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.54
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 14.02

COMMERCIAL D 1.00 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.335
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 35.59
EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 64.36

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.49
FLOW VELOCITY(FEET/SEC.) = 5.80 DEPTH*VELOCITY(FT*FT/SEC.) = 3.48
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.25
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.36
PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 8.75
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.491
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 1.60 0.25 0.100 86
PUBLIC PARK C 0.20 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 11.42
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 72.42

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.491

SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 9.00 0.25 0.100 86
PUBLIC PARK C 1.90 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 2.70 0.25 0.900 86
COMMERCIAL D 4.10 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.313
SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 71.52
EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 143.94

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.491
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 4.50 0.25 0.100 86
PUBLIC PARK C 1.20 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 3.80 0.25 0.900 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.515
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 37.30
EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 181.24

FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.491
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" C 5.30 0.25 1.000 92
NATURAL FAIR COVER
"WOODLAND,GRASS" C 0.30 0.25 1.000 92
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 21.38
EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 202.62

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*****
FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   565.00  DOWNSTREAM(FEET) =   535.00
FLOW LENGTH(FEET) =  1017.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   20.97
ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       202.62
PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =    9.55
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =   2955.00 FEET.

*****
FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =    9.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   4.269
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL          B         3.40    0.30    0.100    76
COMMERCIAL          C         11.00    0.25    0.100    86
PUBLIC PARK         C         1.80    0.25    0.850    86
RESIDENTIAL
".4 DWELLING/ACRE"  C         1.50    0.25    0.900    86
COMMERCIAL          D         3.20    0.20    0.100    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =  0.222
SUBAREA AREA(ACRES) =  20.90    SUBAREA RUNOFF(CFS) =   79.26
EFFECTIVE AREA(ACRES) =   72.30    AREA-AVERAGED Fm(INCH/HR) =   0.10
AREA-AVERAGED Fp(INCH/HR) =  0.24    AREA-AVERAGED Ap =  0.39
TOTAL AREA(ACRES) =   72.3    PEAK FLOW RATE(CFS) =  271.61

*****
FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
FLOW LENGTH(FEET) =  1110.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   27.30
ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       271.61
PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.23
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =   4065.00 FEET.

*****
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) =   10.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   4.105
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL          B         3.10    0.30    0.100    76
PUBLIC PARK         B         1.40    0.30    0.850    76
RESIDENTIAL
".4 DWELLING/ACRE"  B         1.10    0.30    0.900    76
COMMERCIAL          C         5.10    0.25    0.100    86
PUBLIC PARK         C         1.90    0.25    0.850    86
RESIDENTIAL
".4 DWELLING/ACRE"  C         3.60    0.25    0.900    86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =  0.485
SUBAREA AREA(ACRES) =   16.20    SUBAREA RUNOFF(CFS) =   57.97
EFFECTIVE AREA(ACRES) =   88.50    AREA-AVERAGED Fm(INCH/HR) =   0.10
AREA-AVERAGED Fp(INCH/HR) =  0.25    AREA-AVERAGED Ap =  0.41
TOTAL AREA(ACRES) =   88.5    PEAK FLOW RATE(CFS) =  318.89

*****
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   10.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   4.105
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL          D         2.70    0.20    0.100    91
PUBLIC PARK         D         0.10    0.20    0.850    91
RESIDENTIAL
".4 DWELLING/ACRE"  D         0.50    0.20    0.900    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =  0.244
SUBAREA AREA(ACRES) =    3.30    SUBAREA RUNOFF(CFS) =   12.05
EFFECTIVE AREA(ACRES) =   91.80    AREA-AVERAGED Fm(INCH/HR) =   0.10
AREA-AVERAGED Fp(INCH/HR) =  0.25    AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =   91.8    PEAK FLOW RATE(CFS) =  330.93

*****
FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   10.23
RAINFALL INTENSITY(INCH/HR) =   4.10
AREA-AVERAGED Fm(INCH/HR) =   0.10
AREA-AVERAGED Fp(INCH/HR) =   0.25
AREA-AVERAGED Ap =   0.40
EFFECTIVE STREAM AREA(ACRES) =    91.80
TOTAL STREAM AREA(ACRES) =    91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =   330.93

```

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** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	356.16	16.89	3.080	0.25(0.05)	0.22	130.8	100.00
2	330.93	10.23	4.105	0.25(0.10)	0.40	91.8	110.00

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	619.77	10.23	4.105	0.25(0.08)	0.32	171.0	110.00
2	602.43	16.89	3.080	0.25(0.07)	0.29	222.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 619.77 Tc(MIN.) = 10.23
EFFECTIVE AREA(ACRES) = 171.04 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 90.0 INCH PIPE IS 71.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.56
ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 619.77
PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.14
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.910
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	76
COMMERCIAL	C	3.60	0.25	0.100	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 16.43
EFFECTIVE AREA(ACRES) = 175.74 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 619.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 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.) = 11.14
RAINFALL INTENSITY(INCH/HR) = 3.91
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.74
TOTAL STREAM AREA(ACRES) = 227.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 619.77

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.153
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	0.50	0.25	0.100	86	6.88
PUBLIC PARK	C	0.20	0.25	0.850	86	10.93
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	C	2.70	0.25	0.200	86	7.33
RESIDENTIAL						
".4 DWELLING/ACRE"	C	1.40	0.25	0.900	86	11.02
PUBLIC PARK	D	0.10	0.20	0.850	91	10.93
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	D	1.30	0.20	0.200	91	7.33

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA RUNOFF(CFS) = 28.24
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 28.24

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 6.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.153
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"	D	0.20	0.20	0.900	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.90
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 29.13

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 626.00
FLOW LENGTH(FEET) = 425.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.69
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 29.13
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 7.54
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.54

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.889

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	5.40	0.25	0.200	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	2.40	0.25	0.900	86
COMMERCIAL	C	0.70	0.25	0.100	86
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.60	0.20	0.900	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423					
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 39.20					
EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.10					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.41					
TOTAL AREA(ACRES) = 15.5 PEAK FLOW RATE(CFS) = 66.81					

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 626.00 DOWNSTREAM(FEET) = 606.00
FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.40
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.81
PIPE TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 8.82

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.82

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.468

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	C	7.60	0.25	0.200	86
COMMERCIAL	C	1.40	0.25	0.100	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	2.30	0.25	0.200	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	6.50	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	8.40	0.25	0.600	86
APARTMENTS	D	0.50	0.20	0.200	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491					
SUBAREA AREA(ACRES) = 26.70 SUBAREA RUNOFF(CFS) = 104.43					
EFFECTIVE AREA(ACRES) = 42.20 AREA-AVERAGED Fm(INCH/HR) = 0.11					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46					
TOTAL AREA(ACRES) = 42.2 PEAK FLOW RATE(CFS) = 165.37					

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.82

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.468

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.30	0.20	0.100	91
PUBLIC PARK	D	1.10	0.20	0.850	91
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	2.00	0.20	0.200	91
RESIDENTIAL					
".4 DWELLING/ACRE"	D	3.80	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	3.80	0.20	0.600	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642					
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 42.97					
EFFECTIVE AREA(ACRES) = 53.20 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.50					
TOTAL AREA(ACRES) = 53.2 PEAK FLOW RATE(CFS) = 208.34					

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 606.00 DOWNSTREAM(FEET) = 604.00
FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.49
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 208.34
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 9.10
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 2006.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 9.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.391
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.10 0.25 0.200 86
COMMERCIAL C 1.60 0.25 0.100 86
PUBLIC PARK C 0.20 0.25 0.850 86
APARTMENTS D 0.30 0.20 0.200 91
COMMERCIAL D 2.10 0.20 0.100 91
PUBLIC PARK D 0.60 0.20 0.850 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 19.14
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 223.77

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FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 9.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.391
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.20 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 224.55

A-23

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 604.00 DOWNSTREAM(FEET) = 546.00
FLOW LENGTH(FEET) = 1271.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.16
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 224.55
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 9.94
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 125.00 = 3277.00 FEET.

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 9.94
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.174
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.50 0.25 0.200 86
COMMERCIAL C 1.20 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.20 0.25 0.900 86
APARTMENTS D 0.10 0.20 0.200 91
COMMERCIAL D 1.60 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 3.00 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 27.74
EFFECTIVE AREA(ACRES) = 65.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 65.9 PEAK FLOW RATE(CFS) = 240.90

A-25

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 9.94
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.174
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 1.90 0.25 0.200 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.60 0.25 0.900 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.30 0.25 0.600 86
APARTMENTS D 5.00 0.20 0.200 91
PUBLIC PARK D 2.30 0.20 0.850 91
RESIDENTIAL
".4 DWELLING/ACRE" D 3.50 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 49.74
EFFECTIVE AREA(ACRES) = 79.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.49

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TOTAL AREA(ACRES) = 79.5 PEAK FLOW RATE(CFS) = 290.63

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====MAINLINE Tc(MIN.) = 9.94

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.174

A-25.1

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

"3-4 DWELLINGS/ACRE" D 10.20 0.20 0.600 91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 37.21

EFFECTIVE AREA(ACRES) = 89.70 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 89.7 PEAK FLOW RATE(CFS) = 327.85

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<-----

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<-----

=====ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00

FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 25.69

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 327.85

PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 10.30

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

=====MAINLINE Tc(MIN.) = 10.30

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.088

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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
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APARTMENTS

C 5.90 0.25 0.200 86

COMMERCIAL

C 0.10 0.25 0.100 86

RESIDENTIAL

"4 DWELLING/ACRE" C 0.60 0.25 0.900 86

APARTMENTS D 6.00 0.20 0.200 91

COMMERCIAL D 1.10 0.20 0.100 91

RESIDENTIAL

"4 DWELLING/ACRE" D 4.70 0.20 0.900 91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.395

SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 66.32

EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 387.28

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

----->>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<-----

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<-----

=====ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.44

ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 387.28

PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.80

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

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

=====MAINLINE Tc(MIN.) = 10.80

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.980

A-27

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 B 1.50 0.30 0.100 76

PUBLIC PARK B 0.20 0.30 0.850 76

APARTMENTS C 1.10 0.25 0.200 86

COMMERCIAL C 12.70 0.25 0.100 86

PUBLIC PARK C 0.80 0.25 0.850 86

RESIDENTIAL

"4 DWELLING/ACRE" C 4.10 0.25 0.900 86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.303

SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 71.67

EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 448.40

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

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

=====MAINLINE Tc(MIN.) = 10.80

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.980

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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 D 1.20 0.20 0.100 91

PUBLIC PARK D 1.50 0.20 0.850 91

RESIDENTIAL

"4 DWELLING/ACRE" D 0.10 0.20 0.900 91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.530

SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 9.76
EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE (CFS) = 458.16

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.80
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.980
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.00 0.30 0.100 76
COMMERCIAL C 1.30 0.25 0.100 86
COMMERCIAL D 12.60 0.20 0.100 91
PUBLIC PARK D 1.10 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 91
RESIDENTIAL
".4 DWELLING/ACRE" D 2.10 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.238
SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 64.40
EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE (CFS) = 522.55

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FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.49
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 522.55
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 11.17
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.904
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 2.20 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.40 0.25 0.900 86

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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 9.01
EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE (CFS) = 522.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 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.) = 11.17
RAINFALL INTENSITY(INCH/HR) = 3.90
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.43
EFFECTIVE STREAM AREA(ACRES) = 152.10
TOTAL STREAM AREA(ACRES) = 152.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 522.55

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	619.77	11.14	3.910	0.25(0.08)	0.31	175.7	110.00
1	602.43	17.80	2.989	0.25(0.07)	0.29	227.3	100.00
2	522.55	11.17	3.904	0.22(0.10)	0.43	152.1	120.00

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	1141.73	11.14	3.910	0.24(0.09)	0.36	327.4	110.00
2	1142.24	11.17	3.904	0.24(0.09)	0.36	328.1	120.00
3	999.45	17.80	2.989	0.24(0.08)	0.34	379.4	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1142.24 Tc(MIN.) = 11.17
EFFECTIVE AREA(ACRES) = 328.07 AREA-AVERAGED Fm (INCH/HR) = 0.09
AREA-AVERAGED Fp (INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 379.4
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 78.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 23.05
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1142.24
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.703
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 76
RESIDENTIAL
".4 DWELLING/ACRE" B 0.60 0.30 0.900 76
COMMERCIAL C 1.80 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.40 0.25 0.900 86
COMMERCIAL D 0.80 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 1.60 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.524
SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 21.90
EFFECTIVE AREA(ACRES) = 334.87 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 1142.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.703
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.50 0.30 0.100 76
PUBLIC PARK B 0.30 0.30 0.850 76
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 76
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 76
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 1.50 0.30 0.600 76
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 76
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.344
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 15.23
EFFECTIVE AREA(ACRES) = 339.57 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37

A-31

TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 1142.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.703
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" B 2.90 0.30 0.400 76
COMMERCIAL C 4.70 0.25 0.100 86
PUBLIC PARK C 1.30 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.90 0.25 0.200 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 3.80 0.25 0.600 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.386
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 44.42
EFFECTIVE AREA(ACRES) = 353.27 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 1149.59

A-31

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.703
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 4.40 0.25 0.500 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.70 0.25 0.400 86
COMMERCIAL D 5.00 0.20 0.100 91
PUBLIC PARK D 0.10 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 10.30 0.20 0.200 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.10 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 67.60
EFFECTIVE AREA(ACRES) = 373.87 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 425.2 PEAK FLOW RATE(CFS) = 1217.19

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FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.703
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 1.30 0.20 0.600 91
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 3.90 0.20 0.500 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 2.30 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.487
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 24.34
EFFECTIVE AREA(ACRES) = 381.37 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 432.7 PEAK FLOW RATE(CFS) = 1241.53

A-31

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
FLOW LENGTH(FEET) = 1786.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 93.0 INCH PIPE IS 74.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.49
ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1241.53
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 13.22
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.22
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.544
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.30 0.30 0.100 76
RESIDENTIAL
".4 DWELLING/ACRE" B 1.20 0.30 0.900 76
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 76
COMMERCIAL C 1.30 0.25 0.100 86
PUBLIC PARK C 0.10 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 3.00 0.25 0.900 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.598

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SUBAREA AREA(ACRES) = 7.00 SUBAREA RUNOFF(CFS) = 21.33
EFFECTIVE AREA(ACRES) = 388.37 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 439.7 PEAK FLOW RATE(CFS) = 1241.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.22
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.544
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 2.50 0.25 0.600 86
COMMERCIAL D 0.80 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 1.30 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 3.30 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.599
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 24.28
EFFECTIVE AREA(ACRES) = 396.27 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 447.6 PEAK FLOW RATE(CFS) = 1241.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

A-32

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 675.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.312
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.332
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
"OPEN BRUSH" C 1.50 0.25 1.000 92 9.31
NATURAL FAIR COVER
"WOODLAND,GRASS" C 0.40 0.25 1.000 92 9.31
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

0A-4

SUBAREA RUNOFF(CFS) = 6.98
TOTAL AREA(ACRES) = 1.90 PEAK FLOW RATE(CFS) = 6.98

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 635.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 421.00 CHANNEL SLOPE = 0.0950
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.082

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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NATURAL FAIR COVER

"OPEN BRUSH" C 4.90 0.25 1.000 92

NATURAL FAIR COVER

"WOODLAND,GRASS" C 2.40 0.25 1.000 92

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.88

AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 1.02

Tc(MIN.) = 10.33

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 25.18

EFFECTIVE AREA(ACRES) = 9.20 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.2 PEAK FLOW RATE(CFS) = 31.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.17 FLOW VELOCITY(FEET/SEC.) = 7.72

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

0A-5

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 631.00

FLOW LENGTH(FEET) = 501.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.03

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 31.73

PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 11.37

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.37

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.864

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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NATURAL FAIR COVER

"OPEN BRUSH" C 5.10 0.25 1.000 92

NATURAL FAIR COVER

"WOODLAND,GRASS" C 4.00 0.25 1.000 92

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 29.60

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 59.52

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 631.00 DOWNSTREAM(FEET) = 630.00

FLOW LENGTH(FEET) = 711.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.83

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 59.52

PIPE TRAVEL TIME(MIN.) = 2.45 Tc(MIN.) = 13.83

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.83

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.454

SUBAREA LOSS RATE DATA(AMC III):

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

NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" C 0.30 0.25 1.000 91

NATURAL FAIR COVER

"CHAPARRAL,NARROWLEAF" C 5.70 0.25 1.000 95

NATURAL FAIR COVER

"OPEN BRUSH" C 3.40 0.25 1.000 92

NATURAL FAIR COVER

"WOODLAND,GRASS" C 0.10 0.25 1.000 92

NATURAL FAIR COVER

"CHAPARRAL,NARROWLEAF" D 2.10 0.20 1.000 97

NATURAL FAIR COVER

"OPEN BRUSH" D 1.60 0.20 1.000 96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 13.20 SUBAREA RUNOFF(CFS) = 38.24

EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 91.01

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*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.454
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"      D      0.20    0.20    1.000    95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20    SUBAREA RUNOFF(CFS) = 0.59
EFFECTIVE AREA(ACRES) = 31.70    AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 31.7    PEAK FLOW RATE(CFS) = 91.60

*****
FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 628.00
FLOW LENGTH(FEET) = 910.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.46
ESTIMATED PIPE DIAMETER(INCH) = 57.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.60
PIPE TRAVEL TIME(MIN.) = 2.35    Tc(MIN.) = 16.18
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 = 2873.00 FEET.

*****
FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.18
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.157
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C      1.60    0.25    1.000    91
NATURAL FAIR COVER
"OPEN BRUSH"          C      1.60    0.25    1.000    92
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D      1.80    0.20    1.000    95
NATURAL FAIR COVER
"OPEN BRUSH"          D      1.50    0.20    1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.50    SUBAREA RUNOFF(CFS) = 17.16
EFFECTIVE AREA(ACRES) = 38.20    AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 38.2    PEAK FLOW RATE(CFS) = 100.28

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*****
FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 796.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.31
ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 100.28
PIPE TRAVEL TIME(MIN.) = 0.81    Tc(MIN.) = 16.99
LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 = 3669.00 FEET.

*****
FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.99
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.070
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C      1.90    0.25    1.000    91
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" C      0.40    0.25    1.000    95
NATURAL FAIR COVER
"OPEN BRUSH"          C      1.30    0.25    1.000    92
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D      4.50    0.20    1.000    95
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" D      1.30    0.20    1.000    97
NATURAL FAIR COVER
"OPEN BRUSH"          D      3.70    0.20    1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 13.10    SUBAREA RUNOFF(CFS) = 33.67
EFFECTIVE AREA(ACRES) = 51.30    AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.3    PEAK FLOW RATE(CFS) = 130.95

*****
FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 410.00
FLOW LENGTH(FEET) = 6198.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.27
ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 130.95
PIPE TRAVEL TIME(MIN.) = 5.36    Tc(MIN.) = 22.35

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LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 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	130.95	22.35	2.623	0.23(0.23)	1.00	51.3	150.00

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 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	1241.22	13.19	3.548	0.24(0.09)	0.37	395.6	110.00
2	1241.53	13.22	3.544	0.24(0.09)	0.37	396.3	120.00
3	1095.09	19.92	2.803	0.24(0.08)	0.36	447.6	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1348.44	13.19	3.548	0.24(0.10)	0.42	425.9	110.00
2	1348.84	13.22	3.544	0.24(0.10)	0.42	426.6	120.00
3	1220.52	19.92	2.803	0.24(0.10)	0.42	493.3	100.00
4	1153.86	22.35	2.623	0.24(0.10)	0.42	498.9	150.00

TOTAL AREA(ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1348.84 Tc(MIN.) = 13.224
EFFECTIVE AREA(ACRES) = 426.63 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 498.9
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.22

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.544

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
AGRICULTURAL POOR COVER "FALLOW"	B	1.60	0.30	1.000	97
NATURAL FAIR COVER "OPEN BRUSH"	B	1.30	0.30	1.000	84
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.60	0.30	0.900	76
NATURAL FAIR COVER "WOODLAND,GRASS"	B	1.90	0.30	1.000	83
AGRICULTURAL POOR COVER "FALLOW"	C	0.70	0.25	1.000	98

NATURAL FAIR COVER

"OPEN BRUSH" C 0.80 0.25 1.000 92
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.971
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 26.12
EFFECTIVE AREA(ACRES) = 435.53 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 507.8 PEAK FLOW RATE(CFS) = 1349.04

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.22

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.544

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL ".4 DWELLING/ACRE"	C	1.50	0.25	0.900	86
NATURAL FAIR COVER "WOODLAND,GRASS"	C	0.40	0.25	1.000	92
NATURAL FAIR COVER "OPEN BRUSH"	D	0.10	0.20	1.000	96
RESIDENTIAL ".4 DWELLING/ACRE"	D	0.30	0.20	0.900	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.18
EFFECTIVE AREA(ACRES) = 437.93 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 510.2 PEAK FLOW RATE(CFS) = 1356.21

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 510.2 TC(MIN.) = 13.22
EFFECTIVE AREA(ACRES) = 437.93 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.432
PEAK FLOW RATE(CFS) = 1356.21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1355.82	13.19	3.548	0.24(0.10)	0.43	437.2	110.00
2	1356.21	13.22	3.544	0.24(0.10)	0.43	437.9	120.00
3	1226.53	19.92	2.803	0.24(0.10)	0.43	504.6	100.00
4	1157.19	22.35	2.623	0.24(0.10)	0.43	510.2	150.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA B ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC May 2018 ROKAMOTO *

FILE NAME: PA3B25HC.DAT
TIME/DATE OF STUDY: 12:10 05/23/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 412.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.935
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.377

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.30	0.30	0.100	56	5.94
RESIDENTIAL						
"4 DWELLING/ACRE"	B	0.10	0.30	0.900	56	9.51
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56	8.04
COMMERCIAL	C	0.30	0.25	0.100	69	5.94
RESIDENTIAL						
"4 DWELLING/ACRE"	C	0.70	0.25	0.900	69	9.51
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	1.50	0.25	0.600	69	8.04

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.580
SUBAREA RUNOFF(CFS) = 11.42
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 11.42

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

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 520.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 13.63
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.66
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.89
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 7.79
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.752

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.40	0.30	0.600	56
COMMERCIAL	C	0.50	0.25	0.100	69

RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.50 0.25 0.200 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.50 0.25 0.900 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.525
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 11.71
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 21.44

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.96
FLOW VELOCITY(FEET/SEC.) = 4.89 DEPTH*VELOCITY(FT*FT/SEC.) = 2.10
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 825.00 FEET.

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) =	7.79				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.752				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	3.40	0.25	0.600	69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600					
SUBAREA AREA(ACRES) =	3.40	SUBAREA RUNOFF(CFS) =	11.02		
EFFECTIVE AREA(ACRES) =	10.00	AREA-AVERAGED Fm(INCH/HR) =	0.14		
AREA-AVERAGED Fp(INCH/HR) =	0.26	AREA-AVERAGED Ap =	0.57		
TOTAL AREA(ACRES) =	10.0	PEAK FLOW RATE(CFS) =	32.47		

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

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

=====

UPSTREAM ELEVATION(FEET) = 385.00 DOWNSTREAM ELEVATION(FEET) = 375.00
STREET LENGTH(FEET) = 430.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.40
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.56
HALFSTREET FLOOD WIDTH(FEET) = 21.99

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

MAINLINE Tc(MIN.) = 9.19
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.418
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 1.80 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.25
EFFECTIVE AREA(ACRES) = 30.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 30.2 PEAK FLOW RATE(CFS) = 89.29

B-4

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 360.00
FLOW LENGTH(FEET) = 1242.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.24
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.29
PIPE TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 10.88
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2497.00 FEET.

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

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

MAINLINE Tc(MIN.) = 10.88
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 1.60 0.30 0.900 56
COMMERCIAL C 0.10 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.20 0.25 0.900 69
COMMERCIAL D 0.20 0.20 0.100 75
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.609
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 8.72
EFFECTIVE AREA(ACRES) = 33.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 33.5 PEAK FLOW RATE(CFS) = 89.54

B-5

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 937.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.61
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.54
PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 12.22
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 3434.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.22
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 1.00 0.30 0.900 56
COMMERCIAL C 0.50 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.660
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.36
EFFECTIVE AREA(ACRES) = 36.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 36.5 PEAK FLOW RATE(CFS) = 90.92

B-5.1

FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 345.00
FLOW LENGTH(FEET) = 587.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.78
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.92
PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 13.13
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 206.00 = 4021.00 FEET.

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.13

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.793
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.30 0.30 0.100 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
COMMERCIAL C 0.40 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 69
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.30 0.25 0.400 69
COMMERCIAL D 0.20 0.20 0.100 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 3.68
EFFECTIVE AREA(ACRES) = 38.00 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 38.0 PEAK FLOW RATE(CFS) = 90.92
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.13
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.793
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.10 0.20 0.400 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.24
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 91.05

B-6

FLOW PROCESS FROM NODE 206.00 TO NODE 221.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1217.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.38
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.05
PIPE TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 14.77
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 221.00 = 5238.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.613
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 7.70 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.30 0.30 0.200 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
COMMERCIAL D 3.80 0.20 0.100 75
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.40 0.20 0.200 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.135
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 29.67
EFFECTIVE AREA(ACRES) = 50.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 50.9 PEAK FLOW RATE(CFS) = 114.56

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FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.613
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 0.20 0.20 0.900 75
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 0.10 0.20 0.500 75
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.20 0.20 0.400 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.620
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.12
EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 115.68

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FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.613
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.20 0.30 0.100 56

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COMMERCIAL          C          1.30      0.25      0.100      69
RESIDENTIAL
".4 DWELLING/ACRE"  C          0.10      0.25      0.900      69
COMMERCIAL          D          0.50      0.20      0.100      75
RESIDENTIAL
".4 DWELLING/ACRE"  D          0.10      0.20      0.900      75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.120
SUBAREA AREA(ACRES) = 8.20      SUBAREA RUNOFF(CFS) = 19.04
EFFECTIVE AREA(ACRES) = 59.60      AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.26      AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 59.6      PEAK FLOW RATE(CFS) = 134.73

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FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.77
RAINFALL INTENSITY(INCH/HR) = 2.61
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.26
AREA-AVERAGED Ap = 0.39
EFFECTIVE STREAM AREA(ACRES) = 59.60
TOTAL STREAM AREA(ACRES) = 59.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 134.73

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FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

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

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=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 467.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.740
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.307
SUBAREA Tc AND LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
PUBLIC PARK	C	0.80	0.25	0.850	69	12.58
RESIDENTIAL						
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	69	12.68
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	1.50	0.25	0.500	69	10.13
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	C	0.20	0.25	0.400	69	9.74
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.615						
SUBAREA RUNOFF(CFS) = 7.38						
TOTAL AREA(ACRES) = 2.60						
PEAK FLOW RATE(CFS) = 7.38						

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FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

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

```

```

=====
UPSTREAM ELEVATION(FEET) = 467.00 DOWNSTREAM ELEVATION(FEET) = 466.00
STREET LENGTH(FEET) = 193.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

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

```

```

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.10
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 18.40
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
STREET FLOW TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 11.21
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.055
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56
PUBLIC PARK	C	0.50	0.25	0.850	69
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	2.20	0.25	0.500	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.00	0.25	0.400	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.501					
SUBAREA AREA(ACRES) = 5.10					
SUBAREA RUNOFF(CFS) = 13.45					
EFFECTIVE AREA(ACRES) = 7.70					
AREA-AVERAGED Fm(INCH/HR) = 0.14					
AREA-AVERAGED Fp(INCH/HR) = 0.25					
AREA-AVERAGED Ap = 0.54					
TOTAL AREA(ACRES) = 7.7					
PEAK FLOW RATE(CFS) = 20.23					

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 21.29
FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH*VELOCITY(FT*FT/SEC.) = 1.29
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 523.00 FEET.

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FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 11.21
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.055

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.70 0.20 0.400 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.87
EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 22.11

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FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 466.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 324.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.06
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.51
HALFSTREET FLOOD WIDTH(FEET) = 19.57
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.30
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.20
STREET FLOW TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 12.46
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.876

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.90 0.25 0.100 69
PUBLIC PARK C 0.40 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.20 0.25 0.900 69
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 4.00 0.25 0.500 69
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 1.70 0.25 0.400 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.457
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 17.90
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 38.66

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 21.37
FLOW VELOCITY(FEET/SEC.) = 4.53 DEPTH*VELOCITY(FT*FT/SEC.) = 2.46
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 847.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 405.00
FLOW LENGTH(FEET) = 508.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.75
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.66
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 12.84
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1355.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.84
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.829
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.10 0.30 0.400 56
COMMERCIAL C 1.60 0.25 0.100 69
PUBLIC PARK C 0.60 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 2.40 0.25 0.900 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.524
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 19.12
EFFECTIVE AREA(ACRES) = 23.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 23.5 PEAK FLOW RATE(CFS) = 57.12

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.84
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.829
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 0.10 0.25 0.500 69

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RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 4.80 0.25 0.400 69
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 75
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.80 0.20 0.400 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.427
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 14.73
EFFECTIVE AREA(ACRES) = 29.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 71.84

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 400.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.77
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.84
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 13.37
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 1731.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	0.60	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.40	0.30	0.500	56
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	69

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.349
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 19.87
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 90.01

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	4.10	0.25	0.500	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	0.10	0.20	0.500	75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 9.98
EFFECTIVE AREA(ACRES) = 42.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 42.0 PEAK FLOW RATE(CFS) = 99.99

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.80	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.50	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.50	0.30	0.600	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.30	0.30	0.400	56
PUBLIC PARK	C	1.20	0.25	0.850	69

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.503
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 20.51
EFFECTIVE AREA(ACRES) = 50.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 50.7 PEAK FLOW RATE(CFS) = 120.50

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	3.00	0.25	0.200	69
RESIDENTIAL					

"4 DWELLING/ACRE"	C	0.90	0.25	0.900	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.50	0.25	0.600	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.40	0.25	0.500	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	4.80	0.25	0.400	69
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	1.80	0.20	0.200	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.25				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.368				
SUBAREA AREA(ACRES) =	11.40	SUBAREA RUNOFF(CFS) =	27.44		
EFFECTIVE AREA(ACRES) =	62.10	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.26	AREA-AVERAGED Ap =	0.45		
TOTAL AREA(ACRES) =	62.1	PEAK FLOW RATE(CFS) =	147.94		

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"4 DWELLING/ACRE" D 0.10 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 62.20 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 62.2 PEAK FLOW RATE(CFS) = 148.17

FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 1800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.78
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 148.17
PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 14.97
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 3531.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.594
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	0.50	0.30	0.850	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	1.40	0.30	0.900	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	56
PUBLIC PARK	C	0.50	0.25	0.850	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	0.70	0.25	0.400	69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.29				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.508				
SUBAREA AREA(ACRES) =	9.30	SUBAREA RUNOFF(CFS) =	20.47		
EFFECTIVE AREA(ACRES) =	71.50	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.27	AREA-AVERAGED Ap =	0.46		
TOTAL AREA(ACRES) =	71.5	PEAK FLOW RATE(CFS) =	159.06		

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.594
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK D 0.40 0.20 0.850 75
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 2.30 0.20 0.400 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.467
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.08
EFFECTIVE AREA(ACRES) = 74.20 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 74.2 PEAK FLOW RATE(CFS) = 165.13

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.594
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 1.30 0.30 0.850 56
RESIDENTIAL
"4 DWELLING/ACRE" B 2.40 0.30 0.900 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.80 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 4.70 0.30 0.400 56
RESIDENTIAL
"4 DWELLING/ACRE" C 2.00 0.25 0.900 69
RESIDENTIAL

"5-7 DWELLINGS/ACRE" C 0.90 0.25 0.500 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.644
SUBAREA AREA(ACRES) = 12.10 SUBAREA RUNOFF(CFS) = 26.24
EFFECTIVE AREA(ACRES) = 86.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 86.3 PEAK FLOW RATE(CFS) = 191.37

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.594
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.10	0.25	0.400	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	1.40	0.20	0.500	75
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	1.00	0.20	0.400	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.431					
SUBAREA AREA(ACRES) = 4.50					
SUBAREA RUNOFF(CFS) = 10.12					
EFFECTIVE AREA(ACRES) = 90.80					
AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.27					
AREA-AVERAGED Ap = 0.48					
TOTAL AREA(ACRES) = 90.8					
PEAK FLOW RATE(CFS) = 201.49					

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FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 886.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.58
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 201.49
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 15.98
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 4417.00 FEET.

FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.499
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	A	0.30	0.40	0.850	32
RESIDENTIAL					

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"11+ DWELLINGS/ACRE" A 0.40 0.40 0.200 32
RESIDENTIAL

"11+ DWELLINGS/ACRE" B 1.80 0.30 0.200 56
COMMERCIAL C 0.40 0.25 0.100 69
PUBLIC PARK C 2.20 0.25 0.850 69
RESIDENTIAL

"11+ DWELLINGS/ACRE" C 1.00 0.25 0.200 69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.460
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 13.03
EFFECTIVE AREA(ACRES) = 96.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 96.9 PEAK FLOW RATE(CFS) = 206.80

FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.499
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	5.20	0.20	0.100	75
PUBLIC PARK	D	0.60	0.20	0.850	75
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	8.60	0.20	0.200	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.191					
SUBAREA AREA(ACRES) = 14.40					
SUBAREA RUNOFF(CFS) = 31.89					
EFFECTIVE AREA(ACRES) = 111.30					
AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.26					
AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 111.3					
PEAK FLOW RATE(CFS) = 238.70					

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FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.499
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.70	0.30	0.200	56
COMMERCIAL	D	4.30	0.20	0.100	75
PUBLIC PARK	D	3.00	0.20	0.850	75
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	10.30	0.20	0.200	75
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	3.70	0.20	0.400	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.298					
SUBAREA AREA(ACRES) = 23.00					
SUBAREA RUNOFF(CFS) = 50.47					
EFFECTIVE AREA(ACRES) = 134.30					
AREA-AVERAGED Fm(INCH/HR) = 0.11					
AREA-AVERAGED Fp(INCH/HR) = 0.26					
AREA-AVERAGED Ap = 0.42					

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TOTAL AREA(ACRES) = 134.3 PEAK FLOW RATE(CFS) = 289.17

FLOW PROCESS FROM NODE 217.00 TO NODE 221.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 330.00

FLOW LENGTH(FEET) = 1266.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.91

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 289.17

PIPE TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 17.50

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 221.00 = 5683.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 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.) = 17.50

RAINFALL INTENSITY(INCH/HR) = 2.37

AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.26

AREA-AVERAGED Ap = 0.42

EFFECTIVE STREAM AREA(ACRES) = 134.30

TOTAL STREAM AREA(ACRES) = 134.30

PEAK FLOW RATE(CFS) AT CONFLUENCE = 289.17

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	134.73	14.77	2.613	0.26(0.10)	0.39	59.6	200.00
2	289.17	17.50	2.374	0.26(0.11)	0.42	134.3	210.00

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	404.56	14.77	2.613	0.26(0.10)	0.41	173.0	200.00
2	411.08	17.50	2.374	0.26(0.11)	0.41	193.9	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 411.08 Tc(MIN.) = 17.50

EFFECTIVE AREA(ACRES) = 193.90 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 193.9

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 221.00 = 5683.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 49.40

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 411.08

PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 17.59

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 222.00 = 5961.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.59

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.367

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.80	0.40	0.100	32
RESIDENTIAL					
"4 DWELLING/ACRE"	A	0.30	0.40	0.900	32
COMMERCIAL	B	1.90	0.30	0.100	56
AGRICULTURAL FAIR COVER					
"ORCHARDS"	B	1.30	0.30	1.000	65
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.517					
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 19.87					
EFFECTIVE AREA(ACRES) = 203.90 AREA-AVERAGED Fm(INCH/HR) = 0.11					
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.41					
TOTAL AREA(ACRES) = 203.9 PEAK FLOW RATE(CFS) = 414.58					

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.59

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.367

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.10	0.30	1.000	65
COMMERCIAL	C	4.70	0.25	0.100	69
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.30	0.25	1.000	77
RESIDENTIAL					
"4 DWELLING/ACRE"	C	4.00	0.25	0.900	69
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" C 0.60 0.25 0.500 69
 NATURAL FAIR COVER
 "WOODLAND,GRASS" C 0.40 0.25 1.000 77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 20.35
 EFFECTIVE AREA(ACRES) = 214.00 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 214.0 PEAK FLOW RATE(CFS) = 434.92

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.59
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.367 **B-19**
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL FAIR COVER
 "ORCHARDS" D 0.60 0.20 1.000 82
 RESIDENTIAL
 ".4 DWELLING/ACRE" D 0.10 0.20 0.900 75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.37
 EFFECTIVE AREA(ACRES) = 214.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 214.7 PEAK FLOW RATE(CFS) = 436.29

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 214.7 TC(MIN.) = 17.59
 EFFECTIVE AREA(ACRES) = 214.70 AREA-AVERAGED Fm(INCH/HR)= 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.421
 PEAK FLOW RATE(CFS) = 436.29

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	434.96	14.87	2.603	0.26(0.11)	0.42	193.8	200.00
2	436.29	17.59	2.367	0.26(0.11)	0.42	214.7	210.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA B ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC May 2018 ROKAMOTO *

FILE NAME: PA3B00HC.DAT
TIME/DATE OF STUDY: 09:46 05/14/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 412.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.935
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.608
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	B	0.30	0.30	0.100	76	5.94
RESIDENTIAL						
"1.4 DWELLING/ACRE"	B	0.10	0.30	0.900	76	9.51
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	76	8.04
COMMERCIAL	C	0.30	0.25	0.100	86	5.94
RESIDENTIAL						
"1.4 DWELLING/ACRE"	C	0.70	0.25	0.900	86	9.51
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	1.50	0.25	0.600	86	8.04

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.580
SUBAREA RUNOFF(CFS) = 14.74
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 14.74

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

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 520.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.36
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.14
STREET FLOW TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 7.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.831

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	76
RESIDENTIAL					
"1.4 DWELLING/ACRE"	B	0.10	0.30	0.900	76
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.40	0.30	0.600	76
COMMERCIAL	C	0.50	0.25	0.100	86

RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.50 0.25 0.200 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.50 0.25 0.900 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.525
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 15.21
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 27.85

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68
FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH*VELOCITY(FT*FT/SEC.) = 2.39
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 825.00 FEET.

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

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

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	3.40	0.25	0.600	86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600					
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 14.32					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.14					
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.57					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 42.18					

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

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

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

=====

UPSTREAM ELEVATION(FEET) = 385.00 DOWNSTREAM ELEVATION(FEET) = 375.00
STREET LENGTH(FEET) = 430.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 24.34

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

MAINLINE Tc(MIN.) = 9.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.417
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 1.80 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.86
EFFECTIVE AREA(ACRES) = 30.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 30.2 PEAK FLOW RATE(CFS) = 116.44

B-4

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 360.00
FLOW LENGTH(FEET) = 1242.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.96
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 116.44
PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 10.60
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2497.00 FEET.

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

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

MAINLINE Tc(MIN.) = 10.60
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.022
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.30 0.100 76
RESIDENTIAL
".4 DWELLING/ACRE" B 1.60 0.30 0.900 76
COMMERCIAL C 0.10 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.20 0.25 0.900 86
COMMERCIAL D 0.20 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.609
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 11.44
EFFECTIVE AREA(ACRES) = 33.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 33.5 PEAK FLOW RATE(CFS) = 117.15

B-5

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 360.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 937.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.23
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 117.15
PIPE TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 11.88
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 3434.00 FEET.

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.769
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 76
RESIDENTIAL
".4 DWELLING/ACRE" B 1.00 0.30 0.900 76
COMMERCIAL C 0.50 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.660
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 9.69
EFFECTIVE AREA(ACRES) = 36.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 36.5 PEAK FLOW RATE(CFS) = 119.19

B-5.1

FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 345.00
FLOW LENGTH(FEET) = 587.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.39
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 119.19
PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 12.74
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 206.00 = 4021.00 FEET.

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.74

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.621
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.30 0.30 0.100 76
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 76
COMMERCIAL C 0.40 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.30 0.25 0.400 86
COMMERCIAL D 0.20 0.20 0.100 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 4.80
EFFECTIVE AREA(ACRES) = 38.00 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 38.0 PEAK FLOW RATE(CFS) = 119.19
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

B-6

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.621
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" D 0.10 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 119.45

B-6

FLOW PROCESS FROM NODE 206.00 TO NODE 221.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1217.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.11
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 119.45
PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 14.28
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 221.00 = 5238.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.391
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 7.70 0.30 0.100 76
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.30 0.30 0.200 76
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 76
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 76
COMMERCIAL D 3.80 0.20 0.100 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.40 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.135
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 38.63
EFFECTIVE AREA(ACRES) = 50.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 50.9 PEAK FLOW RATE(CFS) = 150.19

B-7

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.391
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 0.20 0.20 0.900 91
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 0.10 0.20 0.500 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.20 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.620
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.47
EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 151.66

B-7

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.391
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.20 0.30 0.100 76

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COMMERCIAL C 1.30 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 86
COMMERCIAL D 0.50 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.10 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.120
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 24.78
EFFECTIVE AREA(ACRES) = 59.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 59.6 PEAK FLOW RATE(CFS) = 176.44

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 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.) = 14.28
RAINFALL INTENSITY(INCH/HR) = 3.39
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.26
AREA-AVERAGED Ap = 0.39
EFFECTIVE STREAM AREA(ACRES) = 59.60
TOTAL STREAM AREA(ACRES) = 59.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 176.44

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 467.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.740
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.222

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	0.80	0.25	0.850	86	12.58
RESIDENTIAL						
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86	12.68
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	C	1.50	0.25	0.500	86	10.13
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	C	0.20	0.25	0.400	86	9.74
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.615						
SUBAREA RUNOFF(CFS) = 9.52						
TOTAL AREA(ACRES) = 2.60						
PEAK FLOW RATE(CFS) = 9.52						

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 467.00 DOWNSTREAM ELEVATION(FEET) = 466.00
STREET LENGTH(FEET) = 193.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.22
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.43
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.23
STREET FLOW TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 11.12
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.913

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	76
PUBLIC PARK	C	0.50	0.25	0.850	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	2.20	0.25	0.500	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.00	0.25	0.400	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.501					
SUBAREA AREA(ACRES) = 5.10					
SUBAREA RUNOFF(CFS) = 17.38					
EFFECTIVE AREA(ACRES) = 7.70					
AREA-AVERAGED Fm(INCH/HR) = 0.14					
AREA-AVERAGED Fp(INCH/HR) = 0.25					
AREA-AVERAGED Ap = 0.54					
TOTAL AREA(ACRES) = 7.7					
PEAK FLOW RATE(CFS) = 26.18					

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.55
FLOW VELOCITY(FEET/SEC.) = 2.54 DEPTH*VELOCITY(FT*FT/SEC.) = 1.48
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 523.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.12
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.913

B-10

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	0.70	0.20	0.400	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400					
SUBAREA AREA(ACRES) =	0.70	SUBAREA RUNOFF(CFS) =	2.41		
EFFECTIVE AREA(ACRES) =	8.40	AREA-AVERAGED Fm(INCH/HR) =	0.13		
AREA-AVERAGED Fp(INCH/HR) =	0.25	AREA-AVERAGED Ap =	0.53		
TOTAL AREA(ACRES) =	8.4	PEAK FLOW RATE(CFS) =	28.60		

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

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

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

UPSTREAM ELEVATION(FEET) = 466.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 324.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.19
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 21.68
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.58
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.52
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 12.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.693

B-11

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.90	0.25	0.100	86
PUBLIC PARK	C	0.40	0.25	0.850	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	4.00	0.25	0.500	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	1.70	0.25	0.400	86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.457					
SUBAREA AREA(ACRES) =	7.20	SUBAREA RUNOFF(CFS) =	23.19		
EFFECTIVE AREA(ACRES) =	15.60	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.25	AREA-AVERAGED Ap =	0.50		
TOTAL AREA(ACRES) =	15.6	PEAK FLOW RATE(CFS) =	50.13		

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 23.71
FLOW VELOCITY(FEET/SEC.) = 4.81 DEPTH*VELOCITY(FT*FT/SEC.) = 2.82
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 847.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 405.00
FLOW LENGTH(FEET) = 508.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.39
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 50.13
PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 12.65
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1355.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.635

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	76
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	76
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	76
COMMERCIAL	C	1.60	0.25	0.100	86
PUBLIC PARK	C	0.60	0.25	0.850	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	2.40	0.25	0.900	86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.524					
SUBAREA AREA(ACRES) =	7.90	SUBAREA RUNOFF(CFS) =	24.85		
EFFECTIVE AREA(ACRES) =	23.50	AREA-AVERAGED Fm(INCH/HR) =	0.13		
AREA-AVERAGED Fp(INCH/HR) =	0.25	AREA-AVERAGED Ap =	0.50		
TOTAL AREA(ACRES) =	23.5	PEAK FLOW RATE(CFS) =	74.16		

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.635

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.10	0.25	0.500	86

B-12

B-12

RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 4.80 0.25 0.400 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.80 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.427
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 19.08
EFFECTIVE AREA(ACRES) = 29.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 93.24

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 400.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.83
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 93.24
PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 13.14
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 1731.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	76
PUBLIC PARK	B	0.60	0.30	0.850	76
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	76
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	76
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.40	0.30	0.500	76
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.349
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 25.79
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 116.96

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	4.10	0.25	0.500	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	0.10	0.20	0.500	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 12.97
EFFECTIVE AREA(ACRES) = 42.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 42.0 PEAK FLOW RATE(CFS) = 129.93

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.80	0.30	0.850	76
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.50	0.30	0.200	76
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.40	0.30	0.900	76
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.50	0.30	0.600	76
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.30	0.30	0.400	76
PUBLIC PARK	C	1.20	0.25	0.850	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.503
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 26.71
EFFECTIVE AREA(ACRES) = 50.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 50.7 PEAK FLOW RATE(CFS) = 156.65

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 13.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	3.00	0.25	0.200	86
RESIDENTIAL					

"4 DWELLING/ACRE"	C	0.90	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.50	0.25	0.600	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.40	0.25	0.500	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	4.80	0.25	0.400	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	1.80	0.20	0.200	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =			0.25		
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =			0.368		
SUBAREA AREA(ACRES) =	11.40		SUBAREA RUNOFF(CFS) =	35.57	
EFFECTIVE AREA(ACRES) =	62.10		AREA-AVERAGED Fm(INCH/HR) =	0.12	
AREA-AVERAGED Fp(INCH/HR) =	0.26		AREA-AVERAGED Ap =	0.45	
TOTAL AREA(ACRES) =	62.1		PEAK FLOW RATE(CFS) =	192.21	

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"4 DWELLING/ACRE"	D	0.10	0.20	0.900	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =			0.20		
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =			0.900		
SUBAREA AREA(ACRES) =	0.10		SUBAREA RUNOFF(CFS) =	0.30	
EFFECTIVE AREA(ACRES) =	62.20		AREA-AVERAGED Fm(INCH/HR) =	0.12	
AREA-AVERAGED Fp(INCH/HR) =	0.26		AREA-AVERAGED Ap =	0.45	
TOTAL AREA(ACRES) =	62.2		PEAK FLOW RATE(CFS) =	192.52	

FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 1800.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.28
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 192.52
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 14.62
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 3531.00 FEET.

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.346
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	0.50	0.30	0.100	76
PUBLIC PARK	B	0.50	0.30	0.850	76
RESIDENTIAL					
"4 DWELLING/ACRE"	B	1.40	0.30	0.900	76
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	76
PUBLIC PARK	C	0.50	0.25	0.850	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	0.70	0.25	0.400	86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =			0.29		
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =			0.508		
SUBAREA AREA(ACRES) =	9.30		SUBAREA RUNOFF(CFS) =	26.76	
EFFECTIVE AREA(ACRES) =	71.50		AREA-AVERAGED Fm(INCH/HR) =	0.12	
AREA-AVERAGED Fp(INCH/HR) =	0.27		AREA-AVERAGED Ap =	0.46	
TOTAL AREA(ACRES) =	71.5		PEAK FLOW RATE(CFS) =	207.47	

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.346
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
PUBLIC PARK	D	0.40	0.20	0.850	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	2.30	0.20	0.400	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =			0.20		
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =			0.467		
SUBAREA AREA(ACRES) =	2.70		SUBAREA RUNOFF(CFS) =	7.90	
EFFECTIVE AREA(ACRES) =	74.20		AREA-AVERAGED Fm(INCH/HR) =	0.12	
AREA-AVERAGED Fp(INCH/HR) =	0.26		AREA-AVERAGED Ap =	0.46	
TOTAL AREA(ACRES) =	74.2		PEAK FLOW RATE(CFS) =	215.37	

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.346
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
PUBLIC PARK	B	1.30	0.30	0.850	76
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.40	0.30	0.900	76
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	76
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.70	0.30	0.400	76
RESIDENTIAL					
"4 DWELLING/ACRE"	C	2.00	0.25	0.900	86
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" C 0.90 0.25 0.500 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.644
SUBAREA AREA(ACRES) = 12.10 SUBAREA RUNOFF(CFS) = 34.43
EFFECTIVE AREA(ACRES) = 86.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 86.3 PEAK FLOW RATE(CFS) = 249.81

FLOW PROCESS FROM NODE 216.00 TO NODE 216.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.346
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 2.10 0.25 0.400 86
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 1.40 0.20 0.500 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 1.00 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.431
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 13.16
EFFECTIVE AREA(ACRES) = 90.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 90.8 PEAK FLOW RATE(CFS) = 262.97

FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 886.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.58
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 262.97
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 15.57
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 4417.00 FEET.

FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.228
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK A 0.30 0.40 0.850 52
RESIDENTIAL

"11+ DWELLINGS/ACRE" A 0.40 0.40 0.200 52
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.80 0.30 0.200 76
COMMERCIAL C 0.40 0.25 0.100 86
PUBLIC PARK C 2.20 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 1.00 0.25 0.200 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.460
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 17.03
EFFECTIVE AREA(ACRES) = 96.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 96.9 PEAK FLOW RATE(CFS) = 270.33

FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.228
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL D 5.20 0.20 0.100 91
PUBLIC PARK D 0.60 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 8.60 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.191
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 41.33
EFFECTIVE AREA(ACRES) = 111.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 111.3 PEAK FLOW RATE(CFS) = 311.67

FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.228
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.70 0.30 0.200 76
COMMERCIAL D 4.30 0.20 0.100 91
PUBLIC PARK D 3.00 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 10.30 0.20 0.200 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 3.70 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.298
SUBAREA AREA(ACRES) = 23.00 SUBAREA RUNOFF(CFS) = 65.55
EFFECTIVE AREA(ACRES) = 134.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 134.3 PEAK FLOW RATE(CFS) = 377.21

FLOW PROCESS FROM NODE 217.00 TO NODE 221.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 330.00

FLOW LENGTH(FEET) = 1266.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 58.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.77

ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 377.21

PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 17.00

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 221.00 = 5683.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 221.00 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.) = 17.00

RAINFALL INTENSITY(INCH/HR) = 3.07

AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.26

AREA-AVERAGED Ap = 0.42

EFFECTIVE STREAM AREA(ACRES) = 134.30

TOTAL STREAM AREA(ACRES) = 134.30

PEAK FLOW RATE(CFS) AT CONFLUENCE = 377.21

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	176.44	14.28	3.391	0.26(0.10)	0.39	59.6	200.00
2	377.21	17.00	3.069	0.26(0.11)	0.42	134.3	210.00

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	527.87	14.28	3.391	0.26(0.10)	0.41	172.5	200.00
2	536.42	17.00	3.069	0.26(0.11)	0.41	193.9	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 536.42 Tc(MIN.) = 17.00

EFFECTIVE AREA(ACRES) = 193.90 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 193.9

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 221.00 = 5683.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 52.23

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 536.42

PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 17.08

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 222.00 = 5961.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.08

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.060

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.80	0.40	0.100	52
RESIDENTIAL					
"4 DWELLING/ACRE"	A	0.30	0.40	0.900	52
COMMERCIAL	B	1.90	0.30	0.100	76
AGRICULTURAL FAIR COVER					
"ORCHARDS"	B	1.30	0.30	1.000	83
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.20	0.30	0.900	76
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	76
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.31					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517					
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 26.10					
EFFECTIVE AREA(ACRES) = 203.90 AREA-AVERAGED Fm(INCH/HR) = 0.11					
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.41					
TOTAL AREA(ACRES) = 203.9 PEAK FLOW RATE(CFS) = 541.78					

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.08

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.060

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.10	0.30	1.000	83
COMMERCIAL	C	4.70	0.25	0.100	86
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.30	0.25	1.000	92
RESIDENTIAL					
"4 DWELLING/ACRE"	C	4.00	0.25	0.900	86
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" C 0.60 0.25 0.500 86
 NATURAL FAIR COVER
 "WOODLAND,GRASS" C 0.40 0.25 1.000 92
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 26.65
 EFFECTIVE AREA(ACRES) = 214.00 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 214.0 PEAK FLOW RATE(CFS) = 568.43

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.08
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.060
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 AGRICULTURAL FAIR COVER
 "ORCHARDS" D 0.60 0.20 1.000 95
 RESIDENTIAL
 ".4 DWELLING/ACRE" D 0.10 0.20 0.900 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.80
 EFFECTIVE AREA(ACRES) = 214.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 214.7 PEAK FLOW RATE(CFS) = 570.23

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 214.7 TC(MIN.) = 17.08
 EFFECTIVE AREA(ACRES) = 214.70 AREA-AVERAGED Fm(INCH/HR)= 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.421
 PEAK FLOW RATE(CFS) = 570.23

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	568.68	14.37	3.379	0.26(0.11)	0.42	193.3	200.00
2	570.23	17.08	3.060	0.26(0.11)	0.42	214.7	210.00

END OF RATIONAL METHOD ANALYSIS

B-19

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

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

* RMV PA-3 SUBAREA C ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC DECEMBER 2018 CCHIUI *

FILE NAME: PA3C25HC.DAT
TIME/DATE OF STUDY: 09:39 12/13/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 320.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.766

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.065

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	0.20	0.25	0.100	86	6.77
PUBLIC PARK	C	0.90	0.25	0.850	86	10.75
COMMERCIAL	D	0.30	0.20	0.100	91	6.77
PUBLIC PARK	D	1.90	0.20	0.850	91	10.75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.736
SUBAREA RUNOFF(CFS) = 11.60
TOTAL AREA(ACRES) = 3.30 PEAK FLOW RATE(CFS) = 11.60

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

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

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

=====

UPSTREAM ELEVATION(FEET) = 634.00 DOWNSTREAM ELEVATION(FEET) = 630.00
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.01
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.55
HALFSTREET FLOOD WIDTH(FEET) = 21.60
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.98
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.64
STREET FLOW TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 9.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.339

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.50	0.25	0.100	86
PUBLIC PARK	C	2.10	0.25	0.850	86
SCHOOL	C	4.60	0.25	0.600	86
COMMERCIAL	D	0.30	0.20	0.100	91
PUBLIC PARK	D	1.40	0.20	0.850	91
SCHOOL	D	1.10	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.647
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 28.68
EFFECTIVE AREA(ACRES) = 13.30 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.67
TOTAL AREA(ACRES) = 13.3 PEAK FLOW RATE(CFS) = 38.12

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(Feet) = 0.61 HALFSTREET FLOOD WIDTH(Feet) = 25.12
FLOW VELOCITY(Feet/Sec.) = 3.27 DEPTH*VELOCITY(Ft*Ft/Sec.) = 2.00
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 823.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 302.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.339
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 1.00 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 9.30 0.25 0.200 86
PUBLIC PARK D 0.40 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 1.30 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276
SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 35.34
EFFECTIVE AREA(ACRES) = 25.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 25.3 PEAK FLOW RATE(CFS) = 73.47

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 630.00 DOWNSTREAM(Feet) = 625.00
FLOW LENGTH(Feet) = 651.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 9.81
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 73.47
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 10.68
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1474.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.139
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.40 0.25 0.100 86
PUBLIC PARK C 0.40 0.25 0.850 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 1.80 0.25 0.400 86

C-2

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SCHOOL C 1.30 0.25 0.600 86
COMMERCIAL D 0.60 0.20 0.100 91
PUBLIC PARK D 0.60 0.20 0.850 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.480
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 13.88
EFFECTIVE AREA(ACRES) = 30.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 82.78

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.139
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" D 3.50 0.20 0.400 91
SCHOOL D 5.20 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 23.76
EFFECTIVE AREA(ACRES) = 39.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 39.1 PEAK FLOW RATE(CFS) = 106.55

C-5

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.139
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 2.80 0.25 0.100 86
PUBLIC PARK C 0.40 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 7.40 0.25 0.200 86
PUBLIC PARK D 0.30 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.50 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.215
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 31.67
EFFECTIVE AREA(ACRES) = 50.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 50.5 PEAK FLOW RATE(CFS) = 138.21

C-4

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 10.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.139
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            C      4.70    0.25    0.100    86
PUBLIC PARK           C      2.30    0.25    0.850    86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C      4.90    0.25    0.200    86
COMMERCIAL            D      1.70    0.20    0.100    91
PUBLIC PARK           D      1.80    0.20    0.850    91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D      6.20    0.20    0.200    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.294
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 59.72
EFFECTIVE AREA(ACRES) = 72.10 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 72.1 PEAK FLOW RATE(CFS) = 197.93

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*****
FLOW PROCESS FROM NODE 303.00 TO NODE 305.00 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) = 625.00 DOWNSTREAM(FEET) = 615.00
FLOW LENGTH(FEET) = 1029.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.62
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 197.93
PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 11.94
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 2503.00 FEET.

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.94
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.947
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            C      2.10    0.25    0.100    86
PUBLIC PARK           C      1.80    0.25    0.850    86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C      1.00    0.25    0.200    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C      5.00    0.25    0.400    86
COMMERCIAL            D      2.80    0.20    0.100    91
PUBLIC PARK           D      0.90    0.20    0.850    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 34.99
EFFECTIVE AREA(ACRES) = 85.70 AREA-AVERAGED Fm(INCH/HR) = 0.09

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AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 85.7 PEAK FLOW RATE(CFS) = 220.48

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.94
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.947
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D      1.80    0.20    0.200    91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D      1.20    0.20    0.400    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.280
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.81
EFFECTIVE AREA(ACRES) = 88.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 88.7 PEAK FLOW RATE(CFS) = 228.28

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C-7

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.94
RAINFALL INTENSITY(INCH/HR) = 2.95
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23
AREA-AVERAGED Ap = 0.38
EFFECTIVE STREAM AREA(ACRES) = 88.70
TOTAL STREAM AREA(ACRES) = 88.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 228.28

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*****
FLOW PROCESS FROM NODE 306.00 TO NODE 307.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 646.00 DOWNSTREAM(FEET) = 645.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.296
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.562
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      0.40    0.25    0.850    86    15.30
RESIDENTIAL
".4 DWELLING/ACRE"   C      0.10    0.25    0.900    86    15.42

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PUBLIC PARK D 1.50 0.20 0.850 91 15.30
RESIDENTIAL
".4 DWELLING/ACRE" D 0.20 0.20 0.900 91 15.42
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.857
SUBAREA RUNOFF(CFS) = 4.71
TOTAL AREA(ACRES) = 2.20 PEAK FLOW RATE(CFS) = 4.71

FLOW PROCESS FROM NODE 307.00 TO NODE 307.10 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 645.00 DOWNSTREAM ELEVATION(FEET) = 641.00
STREET LENGTH(FEET) = 375.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.89
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 13.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.58
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.02
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 17.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.40	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	2.00	0.25	0.600	86
PUBLIC PARK	D	0.30	0.20	0.850	91
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.10	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	1.40	0.20	0.600	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.649
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 8.35
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 12.66

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.20
FLOW VELOCITY(FEET/SEC.) = 2.81 DEPTH*VELOCITY(FT*FT/SEC.) = 1.22
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 307.10 = 692.00 FEET.

FLOW PROCESS FROM NODE 307.10 TO NODE 308.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 635.00
STREET LENGTH(FEET) = 506.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 18.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.29
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.60
STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 20.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.184

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.00	0.25	0.100	86
PUBLIC PARK	C	0.30	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.80	0.25	0.600	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	2.30	0.20	0.600	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.554
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 15.71
EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 27.37

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.35
FLOW VELOCITY(FEET/SEC.) = 3.52 DEPTH*VELOCITY(FT*FT/SEC.) = 1.85
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 308.00 = 1198.00 FEET.

FLOW PROCESS FROM NODE 308.00 TO NODE 305.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 615.00
FLOW LENGTH(FEET) = 1516.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 9.45
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.37
PIPE TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 22.95
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 305.00 = 2714.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.95
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036 **C-10**
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 1.20 0.25 0.100 86
PUBLIC PARK C 0.10 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 2.20 0.25 0.200 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.80 0.25 0.600 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.50 0.25 0.400 86
SCHOOL C 0.20 0.25 0.600 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.289
SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 8.84
EFFECTIVE AREA(ACRES) = 19.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 19.9 PEAK FLOW RATE(CFS) = 34.22

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.95
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036 **C-10**
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL D 1.20 0.20 0.100 91
PUBLIC PARK D 0.20 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 2.30 0.20 0.200 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 4.00 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 6.60 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.415
SUBAREA AREA(ACRES) = 14.60 SUBAREA RUNOFF(CFS) = 25.66
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 59.89

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.95
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036 **C-10**
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
SCHOOL D 0.20 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.34
EFFECTIVE AREA(ACRES) = 34.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 34.7 PEAK FLOW RATE(CFS) = 60.23

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 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.) = 22.95
RAINFALL INTENSITY(INCH/HR) = 2.04
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.49
EFFECTIVE STREAM AREA(ACRES) = 34.70
TOTAL STREAM AREA(ACRES) = 34.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 60.23

** CONFLUENCE DATA **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	228.28	11.94	2.947	0.23(0.09)	0.38	88.7	300.00
2	60.23	22.95	2.036	0.22(0.11)	0.49	34.7	306.00

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

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	274.43	11.94	2.947	0.23(0.09)	0.40	106.8	300.00
2	215.81	22.95	2.036	0.23(0.09)	0.41	123.4	306.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 274.43 Tc(MIN.) = 11.94
EFFECTIVE AREA(ACRES) = 106.76 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 123.4
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 305.00 = 2714.00 FEET.

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*****
FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
FLOW LENGTH(FEET) =  2954.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  26.36
ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =          274.43
PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   13.81
LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =   5668.00 FEET.

*****
FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   13.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.714
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          C         4.80    0.25    0.100    86
RESIDENTIAL
".4 DWELLING/ACRE"  C         0.40    0.25    0.900    86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C         0.20    0.25    0.600    86
COMMERCIAL          D         2.30    0.20    0.100    91
RESIDENTIAL
".4 DWELLING/ACRE"  D         0.10    0.20    0.900    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
SUBAREA AREA(ACRES) =   7.80    SUBAREA RUNOFF(CFS) =   18.78
EFFECTIVE AREA(ACRES) =  114.56  AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =   131.2    PEAK FLOW RATE(CFS) =   274.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   13.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.714
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          D         0.10    0.20    0.100    91
PUBLIC PARK         C         0.20    0.25    0.850    86
PUBLIC PARK         D         2.30    0.20    0.850    91
RESIDENTIAL
"11+ DWELLINGS/ACRE" C         6.40    0.25    0.200    86
RESIDENTIAL

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"11+ DWELLINGS/ACRE"    D         2.60    0.20    0.200    91
RESIDENTIAL
".4 DWELLING/ACRE"      C         0.70    0.25    0.900    86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
SUBAREA AREA(ACRES) =   12.30    SUBAREA RUNOFF(CFS) =   29.13
EFFECTIVE AREA(ACRES) =   126.86  AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =   143.5    PEAK FLOW RATE(CFS) =   299.99

*****
FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   13.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.714
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"    D         2.20    0.20    0.900    91
RESIDENTIAL
"3-4 DWELLINGS/ACRE"  C         0.10    0.25    0.600    86
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  C         0.80    0.25    0.500    86
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  D        10.20    0.20    0.500    91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C         2.50    0.25    0.400    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D         3.70    0.20    0.400    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
SUBAREA AREA(ACRES) =   19.50    SUBAREA RUNOFF(CFS) =   45.76
EFFECTIVE AREA(ACRES) =   146.36  AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =   163.0    PEAK FLOW RATE(CFS) =   345.75

*****
FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
FLOW LENGTH(FEET) =  1056.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  51.0 INCH PIPE IS  41.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  28.01
ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =        345.75
PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   14.44
LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =   6724.00 FEET.

*****
FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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C-12

C-11

C-12

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=====
MAINLINE Tc(MIN.) = 14.44
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.647
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE              GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            C        1.60    0.25    0.100  86
COMMERCIAL            D        3.60    0.20    0.100  91
PUBLIC PARK           D        0.10    0.20    0.850  91
RESIDENTIAL
"11+ DWELLINGS/ACRE" C        3.90    0.25    0.200  86
RESIDENTIAL
"11+ DWELLINGS/ACRE" D        5.10    0.20    0.200  91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C        0.80    0.25    0.600  86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.191
SUBAREA AREA(ACRES) = 15.10 SUBAREA RUNOFF(CFS) = 35.39
EFFECTIVE AREA(ACRES) = 161.46 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 178.1 PEAK FLOW RATE(CFS) = 372.25

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C-13

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*****
FLOW PROCESS FROM NODE 311.00 TO NODE 311.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 14.44
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.647
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE              GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D        6.70    0.20    0.600  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 15.24
EFFECTIVE AREA(ACRES) = 168.16 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 184.8 PEAK FLOW RATE(CFS) = 387.48

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C-13

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*****
FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 31

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

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=====
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1373.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.97
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 387.48
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 15.26
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 312.00 = 8097.00 FEET.

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*****
FLOW PROCESS FROM NODE 312.00 TO NODE 312.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 15.26
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE              GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            A        1.50    0.40    0.100  52
COMMERCIAL            B        4.50    0.30    0.100  76
APARTMENTS            C        3.40    0.25    0.200  86
COMMERCIAL            D        0.30    0.20    0.100  91
PUBLIC PARK           C        0.10    0.25    0.850  86
RESIDENTIAL
".4 DWELLING/ACRE"   A        0.20    0.40    0.900  52
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.157
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 22.67
EFFECTIVE AREA(ACRES) = 178.16 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 194.8 PEAK FLOW RATE(CFS) = 397.85

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C-42

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*****
FLOW PROCESS FROM NODE 312.00 TO NODE 312.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 15.26
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE              GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   C        0.10    0.25    0.900  86
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        0.40    0.30    0.500  76
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C        0.10    0.25    0.500  86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.567
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.30
EFFECTIVE AREA(ACRES) = 178.76 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 195.4 PEAK FLOW RATE(CFS) = 399.15

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C-42

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*****
FLOW PROCESS FROM NODE 312.00 TO NODE 339.00 IS CODE = 31

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

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=====
ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 1370.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.55
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 399.15
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 16.00

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```

LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

*****
FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====

*****
FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE = 13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<
=====

*****
FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =    317.00
ELEVATION DATA: UPSTREAM(FEET) =    860.00 DOWNSTREAM(FEET) =    775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    3.417
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
"CHAPARRAL,NARROWLEAF"  C          0.20      0.25      1.000    95    9.20
NATURAL FAIR COVER
"OPEN BRUSH"           C          1.20      0.25      1.000    92    9.20
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
SUBAREA RUNOFF(CFS) =    3.99
TOTAL AREA(ACRES) =    1.40 PEAK FLOW RATE(CFS) =    3.99

*****
FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    775.00 DOWNSTREAM(FEET) =    700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    545.00 CHANNEL SLOPE =    0.1376
CHANNEL BASE(FEET) =    0.00 "Z" FACTOR =    3.000
MANNING'S FACTOR =    0.040 MAXIMUM DEPTH(FEET) =    20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    3.136
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"  C          1.70      0.25      1.000    95
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"  D          0.60      0.20      1.000    97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000

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OC-1

OC-2

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TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    6.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    6.05
AVERAGE FLOW DEPTH(FEET) =    0.62 TRAVEL TIME(MIN.) =    1.50
Tc(MIN.) =    10.70
SUBAREA AREA(ACRES) =    2.30 SUBAREA RUNOFF(CFS) =    6.00
EFFECTIVE AREA(ACRES) =    3.70 AREA-AVERAGED Fm(INCH/HR) =    0.24
AREA-AVERAGED Fp(INCH/HR) =    0.24 AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    3.7 PEAK FLOW RATE(CFS) =    9.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =    0.70 FLOW VELOCITY(FEET/SEC.) =    6.61
LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =    862.00 FEET.

*****
FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    700.00 DOWNSTREAM(FEET) =    635.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    1093.00 CHANNEL SLOPE =    0.0595
CHANNEL BASE(FEET) =    0.00 "Z" FACTOR =    3.000
MANNING'S FACTOR =    0.040 MAXIMUM DEPTH(FEET) =    20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =    2.758
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  C          1.40      0.25      1.000    91
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"  C          8.40      0.25      1.000    95
NATURAL FAIR COVER
"OPEN BRUSH"           C          2.70      0.25      1.000    92
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  D          0.40      0.20      1.000    95
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"  D          9.20      0.20      1.000    97
NATURAL FAIR COVER
"OPEN BRUSH"           D          0.60      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    35.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    6.68
AVERAGE FLOW DEPTH(FEET) =    1.33 TRAVEL TIME(MIN.) =    2.73
Tc(MIN.) =    13.42
SUBAREA AREA(ACRES) =    22.70 SUBAREA RUNOFF(CFS) =    51.70
EFFECTIVE AREA(ACRES) =    26.40 AREA-AVERAGED Fm(INCH/HR) =    0.23
AREA-AVERAGED Fp(INCH/HR) =    0.23 AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    26.4 PEAK FLOW RATE(CFS) =    60.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =    1.62 FLOW VELOCITY(FEET/SEC.) =    7.61
LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

*****
FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

OC-3

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.537

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.60	0.25	1.000	91
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	C	5.50	0.25	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	C	1.80	0.25	1.000	92
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.60	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	1.00	0.20	1.000	95
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	D	6.80	0.20	1.000	97

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 78.07

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.06

AVERAGE FLOW DEPTH(FEET) = 1.92 TRAVEL TIME(MIN.) = 2.13

Tc(MIN.) = 15.56

SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 35.96

EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 90.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.03 FLOW VELOCITY(FEET/SEC.) = 7.33

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

OC-4

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.56

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.537

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	2.50	0.20	1.000	96
NATURAL FAIR COVER					
"WOODLAND,GRASS"	D	0.10	0.20	1.000	95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 5.47

EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 96.26

OC-4

FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 664.00 CHANNEL SLOPE = 0.0377

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.411

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	6.30	0.25	1.000	91
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	C	5.90	0.25	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	C	6.80	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.90	0.25	0.900	86
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.50	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.20	0.20	1.000	95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 116.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.57

AVERAGE FLOW DEPTH(FEET) = 2.26 TRAVEL TIME(MIN.) = 1.46

Tc(MIN.) = 17.02

SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 40.10

EFFECTIVE AREA(ACRES) = 66.90 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 66.9 PEAK FLOW RATE(CFS) = 131.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.37 FLOW VELOCITY(FEET/SEC.) = 7.79

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3523.00 FEET.

FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.02

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.411

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	D	12.60	0.20	1.000	97
NATURAL FAIR COVER					
"OPEN BRUSH"	D	3.10	0.20	1.000	96
RESIDENTIAL					
".4 DWELLING/ACRE"	D	2.40	0.20	0.900	91
NATURAL FAIR COVER					

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"WOODLAND,GRASS" D 0.10 0.20 1.000 95
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.987
SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 36.27
EFFECTIVE AREA(ACRES) = 85.10 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 85.1 PEAK FLOW RATE(CFS) = 167.39

FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 573.00 DOWNSTREAM(FEET) = 389.00
FLOW LENGTH(FEET) = 5717.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.28
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 167.39
PIPE TRAVEL TIME(MIN.) = 4.70 Tc(MIN.) = 21.72
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9240.00 FEET.

FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 389.00 DOWNSTREAM(FEET) = 345.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1996.00 CHANNEL SLOPE = 0.0220
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.877

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	D	2.90	0.20	1.000	96
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	4.40	0.25	1.000	91
COMMERCIAL	C	0.50	0.25	0.100	86
NATURAL FAIR COVER					
"GRASS"	C	6.60	0.25	1.000	93
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.60	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	6.10	0.25	0.900	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.956
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 185.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.95
AVERAGE FLOW DEPTH(FEET) = 2.98 TRAVEL TIME(MIN.) = 4.79
Tc(MIN.) = 26.50
SUBAREA AREA(ACRES) = 24.10 SUBAREA RUNOFF(CFS) = 35.65
EFFECTIVE AREA(ACRES) = 109.20 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 109.2 PEAK FLOW RATE(CFS) = 167.39

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 6.77
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11236.00 FEET.

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 26.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.877
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	A	1.10	0.40	1.000	60
COMMERCIAL	A	1.10	0.40	0.100	52
NATURAL FAIR COVER					
"GRASS"	A	2.00	0.40	1.000	70
NATURAL FAIR COVER					
"OPEN BRUSH"	A	0.40	0.40	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	A	2.20	0.40	0.900	52
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	84

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.39
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 9.90
EFFECTIVE AREA(ACRES) = 116.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 116.3 PEAK FLOW RATE(CFS) = 171.99

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 26.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.877
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"	B	0.70	0.30	0.900	76
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.20	0.30	1.000	83
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.10	0.25	0.500	86
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	3.00	0.25	1.000	92
NATURAL FAIR COVER					
"OPEN BRUSH"	D	1.40	0.20	1.000	96

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.975
SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 8.11

EFFECTIVE AREA(ACRES) = 121.80 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 121.8 PEAK FLOW RATE(CFS) = 180.10

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 26.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.877
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 1.40 0.20 0.900 91
NATURAL FAIR COVER
"WOODLAND,GRASS" D 0.10 0.20 1.000 95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.907
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.29
EFFECTIVE AREA(ACRES) = 123.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 123.3 PEAK FLOW RATE(CFS) = 182.39

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FLOW PROCESS FROM NODE 371.00 TO NODE 372.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 488.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.61
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 182.39
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 26.77
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 372.00 = 11724.00 FEET.

FLOW PROCESS FROM NODE 372.00 TO NODE 373.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 300.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 924.00 CHANNEL SLOPE = 0.0011
GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 1.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
*ESTIMATED CHANNEL HEIGHT(FEET) = 3.36
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.662
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 32.30 0.40 0.100 52
COMMERCIAL B 2.70 0.30 0.100 76
COMMERCIAL C 0.60 0.25 0.100 86

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COMMERCIAL D 1.80 0.20 0.100 91
PUBLIC PARK A 7.20 0.40 0.850 52
PUBLIC PARK B 9.80 0.30 0.850 76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.35

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.334

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 220.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.53

AVERAGE FLOW DEPTH(FEET) = 2.35 TRAVEL TIME(MIN.) = 6.08

Tc(MIN.) = 32.85

SUBAREA AREA(ACRES) = 54.40 SUBAREA RUNOFF(CFS) = 75.64

EFFECTIVE AREA(ACRES) = 177.70 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.78

TOTAL AREA(ACRES) = 177.7 PEAK FLOW RATE(CFS) = 234.21

GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 1.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

*ESTIMATED CHANNEL HEIGHT(FEET) = 3.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.43 FLOW VELOCITY(FEET/SEC.) = 2.58

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 373.00 = 12648.00 FEET.

FLOW PROCESS FROM NODE 373.00 TO NODE 373.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 32.85

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.662

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 2.60 0.25 0.850 86
PUBLIC PARK D 2.10 0.20 0.850 91
RESIDENTIAL
".4 DWELLING/ACRE" A 3.50 0.40 0.900 52
RESIDENTIAL
".4 DWELLING/ACRE" B 4.80 0.30 0.900 76
RESIDENTIAL
".4 DWELLING/ACRE" C 3.60 0.25 0.900 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.80 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886
SUBAREA AREA(ACRES) = 17.40 SUBAREA RUNOFF(CFS) = 22.05
EFFECTIVE AREA(ACRES) = 195.10 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 195.1 PEAK FLOW RATE(CFS) = 256.26

FLOW PROCESS FROM NODE 373.00 TO NODE 374.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 298.00
FLOW LENGTH(FEET) = 1188.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 66.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.52

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ESTIMATED PIPE DIAMETER(INCH) = 87.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 256.26
PIPE TRAVEL TIME(MIN.) = 2.63    Tc(MIN.) = 35.48
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 374.00 = 13836.00 FEET.

*****
FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====

*****
FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 IS CODE = 13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<
=====

*****
FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 621.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.511
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168
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.)
APARTMENTS    C    1.50    0.25    0.200    86    10.51
APARTMENTS    D    2.00    0.20    0.200    91    10.51
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 9.84
TOTAL AREA(ACRES) = 3.50    PEAK FLOW RATE(CFS) = 9.84

*****
FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 621.00 DOWNSTREAM ELEVATION(FEET) = 612.00
STREET LENGTH(FEET) = 569.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.48
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.59
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.49
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.54
STREET FLOW TRAVEL TIME(MIN.) = 2.72    Tc(MIN.) = 13.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.781
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN
APARTMENTS    C    2.20    0.25    0.200    86
APARTMENTS    C    3.20    0.25    0.200    86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.40    SUBAREA RUNOFF(CFS) = 13.27
EFFECTIVE AREA(ACRES) = 8.90    AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 8.9    PEAK FLOW RATE(CFS) = 21.89

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.48    HALFSTREET FLOOD WIDTH(FEET) = 17.54
FLOW VELOCITY(FEET/SEC.) = 3.72    DEPTH*VELOCITY(FT*FT/SEC.) = 1.77
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 899.00 FEET.

*****
FLOW PROCESS FROM NODE 322.00 TO NODE 324.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 612.00 DOWNSTREAM ELEVATION(FEET) = 590.00
STREET LENGTH(FEET) = 891.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.68
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.51
HALFSTREET FLOOD WIDTH(FEET) = 19.34
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.49
STREET FLOW TRAVEL TIME(MIN.) = 3.03    Tc(MIN.) = 16.26
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
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    3.00    0.25    0.400    86
RESIDENTIAL

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"8-10 DWELLINGS/ACRE"	D	5.70	0.20	0.400	91
CONDOMINIUMS	D	1.20	0.20	0.350	91
PUBLIC PARK	C	0.30	0.25	0.850	86
PUBLIC PARK	D	0.90	0.20	0.850	91
COMMERCIAL	C	0.80	0.25	0.100	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.420
 SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 25.54
 EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.33
 TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 44.98

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 21.45
 FLOW VELOCITY(FEET/SEC.) = 5.23 DEPTH*VELOCITY(FT*FT/SEC.) = 2.85
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 1790.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.26
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.70	0.20	0.100	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.76
 EFFECTIVE AREA(ACRES) = 22.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 22.5 PEAK FLOW RATE(CFS) = 48.74

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FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 575.00
 FLOW LENGTH(FEET) = 529.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.18
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 48.74
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 16.88
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 2319.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.88
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.423
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.50	0.25	0.100	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.30	0.25	0.600	86
COMMERCIAL	D	0.30	0.20	0.100	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	2.10	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544
 SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 14.88
 EFFECTIVE AREA(ACRES) = 29.70 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 29.7 PEAK FLOW RATE(CFS) = 62.56

FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.88
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.423
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.80	0.25	0.600	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	10.20	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.606
 SUBAREA AREA(ACRES) = 15.30 SUBAREA RUNOFF(CFS) = 31.56
 EFFECTIVE AREA(ACRES) = 45.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 45.0 PEAK FLOW RATE(CFS) = 94.12

FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 515.00
 FLOW LENGTH(FEET) = 284.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 35.74
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 94.12
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 17.01
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 2603.00 FEET.

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 17.01
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.412
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      0.70    0.30    0.100  76
PUBLIC PARK           B      0.10    0.30    0.850  76
RESIDENTIAL
".4 DWELLING/ACRE"    B      0.80    0.30    0.900  76
COMMERCIAL            C      1.40    0.25    0.100  86
RESIDENTIAL
".4 DWELLING/ACRE"    C      2.30    0.25    0.900  86
RESIDENTIAL
"3-4 DWELLINGS/ACRE"  C      0.10    0.25    0.600  86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.582
SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 10.98
EFFECTIVE AREA(ACRES) = 50.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 50.4 PEAK FLOW RATE(CFS) = 104.66

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FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.01
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.412
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            D      2.10    0.20    0.100  91
RESIDENTIAL
".4 DWELLING/ACRE"    D      2.80    0.20    0.900  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.557
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 10.15
EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 114.81

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FLOW PROCESS FROM NODE 326.00 TO NODE 333.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 500.00
FLOW LENGTH(FEET) = 1644.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.69
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 114.81
PIPE TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 19.35
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 333.00 = 4247.00 FEET.

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FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.35
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      0.40    0.30    0.100  76
RESIDENTIAL
".4 DWELLING/ACRE"    B      2.20    0.30    0.900  76
COMMERCIAL            C      1.80    0.25    0.100  86
RESIDENTIAL
".4 DWELLING/ACRE"    C      0.30    0.25    0.900  86
COMMERCIAL            D      5.60    0.20    0.100  91
RESIDENTIAL
".4 DWELLING/ACRE"    D      4.10    0.20    0.900  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.467
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 27.65
EFFECTIVE AREA(ACRES) = 69.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 69.7 PEAK FLOW RATE(CFS) = 134.00

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FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 19.35
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE"  D      0.20    0.20    0.600  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.38
EFFECTIVE AREA(ACRES) = 69.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 69.9 PEAK FLOW RATE(CFS) = 134.38

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FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.35
RAINFALL INTENSITY(INCH/HR) = 2.24
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23
AREA-AVERAGED Ap = 0.47
EFFECTIVE STREAM AREA(ACRES) = 69.90
TOTAL STREAM AREA(ACRES) = 69.90

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PEAK FLOW RATE(CFS) AT CONFLUENCE =      134.38

*****
FLOW PROCESS FROM NODE      327.00 TO NODE      327.50 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =      329.00
ELEVATION DATA: UPSTREAM(FEET) =      615.00  DOWNSTREAM(FEET) =      614.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =      9.844
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =      3.287
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      0.40      0.25      0.100      86      9.84
PUBLIC PARK      C      0.20      0.25      0.850      86      15.64
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      0.10      0.25      0.400      86      12.11
COMMERCIAL      D      0.10      0.20      0.100      91      9.84
PUBLIC PARK      D      0.10      0.20      0.850      91      15.64
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =      0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =      0.383
SUBAREA RUNOFF(CFS) =      2.59
TOTAL AREA(ACRES) =      0.90  PEAK FLOW RATE(CFS) =      2.59

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*****
FLOW PROCESS FROM NODE      327.50 TO NODE      328.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =      614.00  DOWNSTREAM ELEVATION(FEET) =      610.00
STREET LENGTH(FEET) =      425.00  CURB HEIGHT(INCHES) =      8.0
STREET HALFWIDTH(FEET) =      30.00

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

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.55
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =      0.37
HALFSTREET FLOOD WIDTH(FEET) =      11.76
AVERAGE FLOW VELOCITY(FEET/SEC.) =      2.29
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =      0.85
STREET FLOW TRAVEL TIME(MIN.) =      3.09  Tc(MIN.) =      12.93
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =      2.817
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
  LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN

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COMMERCIAL      C      1.00      0.25      0.100      86
PUBLIC PARK      C      0.30      0.25      0.850      86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      0.20      0.25      0.400      86
COMMERCIAL      D      0.90      0.20      0.100      91
PUBLIC PARK      D      0.60      0.20      0.850      91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      D      0.20      0.20      0.400      91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =      0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =      0.348
SUBAREA AREA(ACRES) =      3.20  SUBAREA RUNOFF(CFS) =      7.89
EFFECTIVE AREA(ACRES) =      4.10  AREA-AVERAGED Fm(INCH/HR) =      0.08
AREA-AVERAGED Fp(INCH/HR) =      0.22  AREA-AVERAGED Ap =      0.36
TOTAL AREA(ACRES) =      4.1  PEAK FLOW RATE(CFS) =      10.10

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) =      0.42  HALFSTREET FLOOD WIDTH(FEET) =      14.18
FLOW VELOCITY(FEET/SEC.) =      2.54  DEPTH*VELOCITY(FT*FT/SEC.) =      1.06
LONGEST FLOWPATH FROM NODE      327.00 TO NODE      328.00 =      754.00 FEET.

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C-21.1

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*****
FLOW PROCESS FROM NODE      328.00 TO NODE      329.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =      610.00  DOWNSTREAM ELEVATION(FEET) =      595.00
STREET LENGTH(FEET) =      366.00  CURB HEIGHT(INCHES) =      8.0
STREET HALFWIDTH(FEET) =      30.00

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

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C-22

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.44
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =      0.40
HALFSTREET FLOOD WIDTH(FEET) =      13.09
AVERAGE FLOW VELOCITY(FEET/SEC.) =      5.06
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =      2.00
STREET FLOW TRAVEL TIME(MIN.) =      1.21  Tc(MIN.) =      14.14
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =      2.678
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
  LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
COMMERCIAL      C      0.10      0.25      0.100      86
PUBLIC PARK      C      0.20      0.25      0.850      86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      3.10      0.25      0.400      86
COMMERCIAL      D      0.50      0.20      0.100      91
PUBLIC PARK      D      0.30      0.20      0.850      91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      D      2.10      0.20      0.400      91

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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 14.66
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 24.25

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.04
FLOW VELOCITY(FEET/SEC.) = 5.48 DEPTH*VELOCITY(FT*FT/SEC.) = 2.36
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 329.00 = 1120.00 FEET.

FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

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

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.80	0.25	0.400	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	6.10	0.20	0.400	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.402
SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 20.99
EFFECTIVE AREA(ACRES) = 19.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 19.4 PEAK FLOW RATE(CFS) = 45.24

FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 595.00 DOWNSTREAM(FEET) = 575.00
FLOW LENGTH(FEET) = 378.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.82
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 45.24
PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 14.49
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 330.00 = 1498.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.49
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.641
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.90	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.10	0.25	0.600	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.50	0.25	0.400	86
COMMERCIAL	D	0.60	0.20	0.100	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	10.20	0.20	0.600	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	0.90	0.20	0.400	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 43.51
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 88.10

FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 555.00
FLOW LENGTH(FEET) = 457.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.80
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 88.10
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 14.88
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 331.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.88
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.602
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	1.10	0.25	0.850	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.80	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	10.50	0.25	0.600	86
COMMERCIAL	D	0.30	0.20	0.100	91
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.50	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	13.70	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.619
SUBAREA AREA(ACRES) = 26.90 SUBAREA RUNOFF(CFS) = 59.64
EFFECTIVE AREA(ACRES) = 65.50 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.54
TOTAL AREA (ACRES) = 65.5 PEAK FLOW RATE (CFS) = 146.40

FLOW PROCESS FROM NODE 331.00 TO NODE 332.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 555.00 DOWNSTREAM(Feet) = 520.00
FLOW LENGTH(Feet) = 324.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.2 INCHES
PIPE-FLOW VELOCITY (Feet/Sec.) = 31.36
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 146.40
PIPE TRAVEL TIME (Min.) = 0.17 Tc (Min.) = 15.05
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 332.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 332.00 TO NODE 332.00 IS CODE = 81

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

MAINLINE Tc (Min.) = 15.05
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.585

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.10	0.25	0.100	86
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	2.10	0.25	0.900	86
COMMERCIAL	D	3.70	0.20	0.100	91
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	5.00	0.20	0.900	91

SUBAREA AVERAGE Pervious Loss Rate, Fp (INCH/HR) = 0.21
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.621
SUBAREA AREA (ACRES) = 10.90 SUBAREA RUNOFF (CFS) = 24.06
EFFECTIVE AREA (ACRES) = 76.40 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.55
TOTAL AREA (ACRES) = 76.4 PEAK FLOW RATE (CFS) = 169.46

FLOW PROCESS FROM NODE 332.00 TO NODE 333.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 520.00 DOWNSTREAM(Feet) = 500.00
FLOW LENGTH(Feet) = 1740.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.2 INCHES
PIPE-FLOW VELOCITY (Feet/Sec.) = 13.80
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 169.46
PIPE TRAVEL TIME (Min.) = 2.10 Tc (Min.) = 17.15
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 333.00 = 4019.00 FEET.

FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 81

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

MAINLINE Tc (Min.) = 17.15

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.401

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.20	0.25	0.100	86
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	4.40	0.25	0.900	86
COMMERCIAL	D	3.90	0.20	0.100	91
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	9.80	0.20	0.900	91

SUBAREA AVERAGE Pervious Loss Rate, Fp (INCH/HR) = 0.22
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.689
SUBAREA AREA (ACRES) = 19.30 SUBAREA RUNOFF (CFS) = 39.13
EFFECTIVE AREA (ACRES) = 95.70 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.58
TOTAL AREA (ACRES) = 95.7 PEAK FLOW RATE (CFS) = 195.91

FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 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.) = 17.15
RAINFALL INTENSITY (INCH/HR) = 2.40
AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA (ACRES) = 95.70
TOTAL STREAM AREA (ACRES) = 95.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 195.91

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (Min.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	134.38	19.35	2.242	0.23 (0.11)	0.47	69.9	320.00
2	195.91	17.15	2.401	0.22 (0.13)	0.58	95.7	327.00

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	323.84	17.15	2.401	0.22 (0.12)	0.53	157.6	327.00
2	316.62	19.35	2.242	0.22 (0.12)	0.53	165.6	320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 323.84 Tc (Min.) = 17.15
EFFECTIVE AREA (ACRES) = 157.65 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.53
TOTAL AREA (ACRES) = 165.6

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 333.00 = 4247.00 FEET.

FLOW PROCESS FROM NODE 333.00 TO NODE 334.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 468.00

FLOW LENGTH(FEET) = 819.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 26.15

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 323.84

PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 17.67

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 334.00 = 5066.00 FEET.

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FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.67

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.361

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	D	4.00	0.20	0.200	91
COMMERCIAL	C	2.30	0.25	0.100	86
COMMERCIAL	D	1.00	0.20	0.100	91
PUBLIC PARK	C	0.40	0.25	0.850	86
PUBLIC PARK	D	2.40	0.20	0.850	91

RESIDENTIAL

"11+ DWELLINGS/ACRE" C 3.50 0.25 0.200 86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.310

SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 28.08

EFFECTIVE AREA(ACRES) = 171.25 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 179.2 PEAK FLOW RATE(CFS) = 346.19

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.67

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.361

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	2.00	0.20	0.200	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	1.60	0.25	0.400	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	2.10	0.20	0.400	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.330

SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 11.74

EFFECTIVE AREA(ACRES) = 176.95 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.51

TOTAL AREA(ACRES) = 184.9 PEAK FLOW RATE(CFS) = 357.93

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 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.) = 17.67

RAINFALL INTENSITY(INCH/HR) = 2.36

AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22

AREA-AVERAGED Ap = 0.51

EFFECTIVE STREAM AREA(ACRES) = 176.95

TOTAL STREAM AREA(ACRES) = 184.90

PEAK FLOW RATE(CFS) AT CONFLUENCE = 357.93

FLOW PROCESS FROM NODE 350.00 TO NODE 351.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 492.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.730

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.131

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	0.80	0.25	0.600	86	10.73
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	D	1.70	0.20	0.600	91	10.73

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 6.75

TOTAL AREA(ACRES) = 2.50 PEAK FLOW RATE(CFS) = 6.75

FLOW PROCESS FROM NODE 351.00 TO NODE 352.00 IS CODE = 62

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

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

UPSTREAM ELEVATION(FEET) = 492.00 DOWNSTREAM ELEVATION(FEET) = 488.00

STREET LENGTH(FEET) = 456.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

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OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.93
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 14.88
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
STREET FLOW TRAVEL TIME(MIN.) = 3.02 Tc(MIN.) = 13.75
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.721
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 3.20 0.25 0.600 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 0.40 0.20 0.600 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 8.34
EFFECTIVE AREA(ACRES) = 6.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 6.1 PEAK FLOW RATE(CFS) = 14.17

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.60
FLOW VELOCITY(FEET/SEC.) = 2.67 DEPTH*VELOCITY(FT*FT/SEC.) = 1.23
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 352.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 352.00 TO NODE 353.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 488.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 883.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.81
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.17
PIPE TRAVEL TIME(MIN.) = 3.06 Tc(MIN.) = 16.81
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 353.00 = 1669.00 FEET.

FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.429
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.50 0.30 0.600 76
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.10 0.30 0.400 76
PUBLIC PARK C 0.10 0.25 0.850 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.60 0.25 0.600 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 4.50 0.25 0.400 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 1.70 0.20 0.600 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.471
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 17.69
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 30.26

FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.429
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" D 0.30 0.20 0.400 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.63
EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 30.89

FLOW PROCESS FROM NODE 353.00 TO NODE 334.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 468.00
FLOW LENGTH(FEET) = 1136.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.16
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.89
PIPE TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 18.67
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 334.00 = 2805.00 FEET.

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.67
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL C 0.90 0.25 0.100 86
 PUBLIC PARK C 2.00 0.25 0.850 86
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" C 1.40 0.25 0.200 86
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" C 1.50 0.25 0.400 86
 COMMERCIAL D 0.50 0.20 0.100 91
 PUBLIC PARK D 1.50 0.20 0.850 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 15.23
 EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 44.24

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 FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.67
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" D 3.10 0.20 0.200 91
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" D 1.40 0.20 0.400 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.262
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 9.06
 EFFECTIVE AREA(ACRES) = 27.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 27.2 PEAK FLOW RATE(CFS) = 53.29

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 FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.67
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 PUBLIC PARK B 0.50 0.30 0.850 76
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 76
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.20 0.30 0.600 76
 PUBLIC PARK C 2.70 0.25 0.850 86
 RESIDENTIAL

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"4 DWELLING/ACRE" C 0.20 0.25 0.900 86
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" C 7.30 0.25 0.600 86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.674
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 22.84
 EFFECTIVE AREA(ACRES) = 39.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
 TOTAL AREA(ACRES) = 39.2 PEAK FLOW RATE(CFS) = 76.13

 FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.67
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 0.10 0.20 0.100 91
 PUBLIC PARK D 0.60 0.20 0.850 91
 SCHOOL D 3.10 0.20 0.600 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.40
 EFFECTIVE AREA(ACRES) = 43.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
 TOTAL AREA(ACRES) = 43.0 PEAK FLOW RATE(CFS) = 83.53

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 FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 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.) = 18.67
 RAINFALL INTENSITY(INCH/HR) = 2.29
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.24
 AREA-AVERAGED Ap = 0.54
 EFFECTIVE STREAM AREA(ACRES) = 43.00
 TOTAL STREAM AREA(ACRES) = 43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 83.53

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	357.93	17.67	2.361	0.22(0.11)	0.51	176.9	327.00
1	348.79	19.88	2.209	0.22(0.11)	0.51	184.9	320.00
2	83.53	18.67	2.288	0.24(0.13)	0.54	43.0	350.00

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	439.65	17.67	2.361	0.22(0.12)	0.52	217.7	327.00
2	437.33	18.67	2.288	0.22(0.12)	0.52	223.5	350.00
3	429.24	19.88	2.209	0.22(0.12)	0.52	227.9	320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 439.65 Tc(MIN.) = 17.67
EFFECTIVE AREA(ACRES) = 217.65 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 227.9
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 334.00 = 5066.00 FEET.

FLOW PROCESS FROM NODE 334.00 TO NODE 335.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	468.00	DOWNSTREAM(FEET) =	422.00
FLOW LENGTH(FEET) =	1086.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS	46.3 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	28.53		
ESTIMATED PIPE DIAMETER(INCH) =	57.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	439.65		
PIPE TRAVEL TIME(MIN.) =	0.63	Tc(MIN.) =	18.31
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 335.00 =	6152.00 FEET.		

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FLOW PROCESS FROM NODE 335.00 TO NODE 335.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 18.31
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	3.00	0.25	0.100	86
COMMERCIAL	D	4.20	0.20	0.100	91
PUBLIC PARK	C	0.60	0.25	0.850	86
PUBLIC PARK	D	10.80	0.20	0.850	91
RESIDENTIAL ".4 DWELLING/ACRE"	C	1.00	0.25	0.900	86
RESIDENTIAL ".4 DWELLING/ACRE"	D	3.90	0.20	0.900	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.21				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.631				
SUBAREA AREA(ACRES) =	23.50	SUBAREA RUNOFF(CFS) =	46.19		
EFFECTIVE AREA(ACRES) =	241.15	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.22	AREA-AVERAGED Ap =	0.53		
TOTAL AREA(ACRES) =	251.4	PEAK FLOW RATE(CFS) =	476.70		

FLOW PROCESS FROM NODE 335.00 TO NODE 335.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.31
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	86
RESIDENTIAL "3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	91
RESIDENTIAL "5-7 DWELLINGS/ACRE"	D	0.10	0.20	0.500	91
RESIDENTIAL "5-7 DWELLINGS/ACRE"	D	9.20	0.20	0.500	91
RESIDENTIAL "8-10 DWELLINGS/ACRE"	C	0.70	0.25	0.400	86
RESIDENTIAL "8-10 DWELLINGS/ACRE"	D	2.90	0.20	0.400	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.20				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.474				
SUBAREA AREA(ACRES) =	13.10	SUBAREA RUNOFF(CFS) =	26.15		
EFFECTIVE AREA(ACRES) =	254.25	AREA-AVERAGED Fm(INCH/HR) =	0.12		
AREA-AVERAGED Fp(INCH/HR) =	0.22	AREA-AVERAGED Ap =	0.53		
TOTAL AREA(ACRES) =	264.5	PEAK FLOW RATE(CFS) =	502.85		

FLOW PROCESS FROM NODE 335.00 TO NODE 336.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	422.00	DOWNSTREAM(FEET) =	380.00
FLOW LENGTH(FEET) =	780.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS	43.6 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	32.93		
ESTIMATED PIPE DIAMETER(INCH) =	60.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	502.85		
PIPE TRAVEL TIME(MIN.) =	0.39	Tc(MIN.) =	18.70
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 336.00 =	6932.00 FEET.		

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FLOW PROCESS FROM NODE 336.00 TO NODE 336.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 18.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	76
COMMERCIAL	C	0.60	0.25	0.100	86
COMMERCIAL	D	1.60	0.20	0.100	91
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL "11+ DWELLINGS/ACRE"	C	3.70	0.25	0.200	86
RESIDENTIAL "11+ DWELLINGS/ACRE"	D	5.60	0.20	0.200	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.22				

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.182
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 24.86
EFFECTIVE AREA(ACRES) = 266.55 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 276.8 PEAK FLOW RATE(CFS) = 521.36

FLOW PROCESS FROM NODE 336.00 TO NODE 336.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 76
RESIDENTIAL
".4 DWELLING/ACRE" C 0.50 0.25 0.900 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.60 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 3.40 0.25 0.600 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 16.80 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.70 0.25 0.400 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.611
SUBAREA AREA(ACRES) = 22.20 SUBAREA RUNOFF(CFS) = 43.09
EFFECTIVE AREA(ACRES) = 288.75 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 299.0 PEAK FLOW RATE(CFS) = 564.45

FLOW PROCESS FROM NODE 336.00 TO NODE 336.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286
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" D 6.30 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 12.51
EFFECTIVE AREA(ACRES) = 295.05 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 305.3 PEAK FLOW RATE(CFS) = 576.96

FLOW PROCESS FROM NODE 336.00 TO NODE 337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 380.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 803.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.46
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 576.96
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 19.16
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 337.00 = 7735.00 FEET.

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FLOW PROCESS FROM NODE 337.00 TO NODE 337.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.16
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.255
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.40 0.25 0.200 86
APARTMENTS D 3.00 0.20 0.200 91
COMMERCIAL B 1.30 0.30 0.100 76
COMMERCIAL C 2.70 0.25 0.100 86
COMMERCIAL D 6.00 0.20 0.100 91
PUBLIC PARK B 1.30 0.30 0.850 76
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.189
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 29.21
EFFECTIVE AREA(ACRES) = 309.75 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 320.0 PEAK FLOW RATE(CFS) = 597.98

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FLOW PROCESS FROM NODE 337.00 TO NODE 337.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.16
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.255
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 3.30 0.25 0.850 86
PUBLIC PARK D 1.50 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 2.50 0.25 0.200 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 6.70 0.20 0.200 91
RESIDENTIAL
".4 DWELLING/ACRE" D 2.20 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.10 0.25 0.600 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 31.50
EFFECTIVE AREA(ACRES) = 326.05 AREA-AVERAGED Fm(INCH/HR) = 0.11

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AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 336.3 PEAK FLOW RATE(CFS) = 629.48

FLOW PROCESS FROM NODE 337.00 TO NODE 337.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.16
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.255
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 0.60 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 4.60 0.25 0.400 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 2.90 0.20 0.400 91
SCHOOL B 0.20 0.30 0.600 76
SCHOOL C 5.90 0.25 0.600 86
SCHOOL D 6.00 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.526
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 38.84
EFFECTIVE AREA(ACRES) = 346.25 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 356.5 PEAK FLOW RATE(CFS) = 668.31

FLOW PROCESS FROM NODE 337.00 TO NODE 338.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 332.00
FLOW LENGTH(FEET) = 838.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.91
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 668.31
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 19.72
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 338.00 = 8573.00 FEET.

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS D 6.90 0.20 0.200 91
COMMERCIAL B 1.40 0.30 0.100 76
COMMERCIAL C 1.90 0.25 0.100 86
COMMERCIAL D 5.90 0.20 0.100 91

RESIDENTIAL
"11+ DWELLINGS/ACRE" B 3.60 0.30 0.200 76
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.10 0.25 0.200 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.154
SUBAREA AREA(ACRES) = 19.80 SUBAREA RUNOFF(CFS) = 38.90
EFFECTIVE AREA(ACRES) = 366.05 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 376.3 PEAK FLOW RATE(CFS) = 695.84

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 1.60 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.14
EFFECTIVE AREA(ACRES) = 367.65 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 377.9 PEAK FLOW RATE(CFS) = 698.98

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.10 0.40 0.100 52
COMMERCIAL B 8.50 0.30 0.100 76
COMMERCIAL C 1.90 0.25 0.100 86
COMMERCIAL D 0.70 0.20 0.100 91
PUBLIC PARK B 2.60 0.30 0.850 76
PUBLIC PARK D 0.60 0.20 0.850 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.246
SUBAREA AREA(ACRES) = 16.40 SUBAREA RUNOFF(CFS) = 31.70
EFFECTIVE AREA(ACRES) = 384.05 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 394.3 PEAK FLOW RATE(CFS) = 730.68

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.20 0.40 0.200 52
COMMERCIAL B 6.20 0.30 0.100 76
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 1.00 0.25 0.200 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 1.70 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 17.88
EFFECTIVE AREA(ACRES) = 393.15 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 403.4 PEAK FLOW RATE(CFS) = 748.56

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.70 0.40 0.100 52
COMMERCIAL B 1.70 0.30 0.100 76
COMMERCIAL C 0.80 0.25 0.100 86
COMMERCIAL D 2.00 0.20 0.100 91
PUBLIC PARK C 0.10 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.10 0.40 0.200 52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.116
SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 10.63
EFFECTIVE AREA(ACRES) = 398.55 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 408.8 PEAK FLOW RATE(CFS) = 759.19

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.20

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EFFECTIVE AREA(ACRES) = 398.65 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 408.9 PEAK FLOW RATE(CFS) = 759.39

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.30 0.40 0.100 52
COMMERCIAL B 0.10 0.30 0.100 76
COMMERCIAL C 1.10 0.25 0.100 86
SCHOOL A 0.20 0.40 0.600 52
SCHOOL B 0.50 0.30 0.600 76
SCHOOL C 1.20 0.25 0.600 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.316
SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 8.43
EFFECTIVE AREA(ACRES) = 403.05 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 413.3 PEAK FLOW RATE(CFS) = 767.81

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.40 0.40 0.100 52
COMMERCIAL B 3.50 0.30 0.100 76
COMMERCIAL C 4.70 0.25 0.100 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.30 0.40 0.200 52
SCHOOL A 0.60 0.40 0.600 52
SCHOOL B 0.60 0.30 0.600 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.145
SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 27.55
EFFECTIVE AREA(ACRES) = 417.15 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 427.4 PEAK FLOW RATE(CFS) = 795.36

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.72
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219

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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
SCHOOL	C	3.30	0.25	0.600	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.14
 EFFECTIVE AREA(ACRES) = 420.45 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 430.7 PEAK FLOW RATE(CFS) = 801.51

 FLOW PROCESS FROM NODE 338.00 TO NODE 339.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 332.00 DOWNSTREAM(FEET) = 301.00
 FLOW LENGTH(FEET) = 1956.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 68.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.10
 ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 801.51
 PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 21.13
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 339.00 = 10529.00 FEET.

 FLOW PROCESS FROM NODE 339.00 TO NODE 339.00 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	801.51	21.13	2.134	0.23(0.10)	0.45	420.5	327.00
2	788.98	22.14	2.078	0.23(0.10)	0.45	426.3	350.00
3	770.40	23.36	2.016	0.23(0.10)	0.45	430.7	320.00

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 339.00 = 10529.00 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	399.15	16.00	2.497	0.22(0.08)	0.38	178.8	300.00
2	315.25	27.23	1.848	0.22(0.09)	0.39	195.4	306.00

LONGEST FLOWPATH FROM NODE 306.00 TO NODE 339.00 = 9467.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1114.75	16.00	2.497	0.22(0.09)	0.42	497.2	300.00
2	1162.37	21.13	2.134	0.22(0.10)	0.43	606.8	327.00
3	1142.31	22.14	2.078	0.22(0.10)	0.43	614.2	350.00
4	1114.59	23.36	2.016	0.22(0.10)	0.43	620.4	320.00
5	1018.18	27.23	1.848	0.22(0.10)	0.43	626.1	306.00

TOTAL AREA(ACRES) = 626.1

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1162.37 Tc(MIN.) = 21.128
 EFFECTIVE AREA(ACRES) = 606.80 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 626.1
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 339.00 = 10529.00 FEET.

 FLOW PROCESS FROM NODE 339.00 TO NODE 340.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.0051
 GIVEN CHANNEL BASE(FEET) = 300.00 CHANNEL FREEBOARD(FEET) = 1.0
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) = 2.07
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	31.90	0.40	0.100	52
COMMERCIAL	B	2.30	0.30	0.100	76
COMMERCIAL	C	1.90	0.25	0.100	86
COMMERCIAL	D	1.00	0.20	0.100	91
PUBLIC PARK	A	3.10	0.40	0.850	52
PUBLIC PARK	B	0.80	0.30	0.850	76

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.38
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1199.64
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69
 AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 0.89
 Tc(MIN.) = 22.01
 SUBAREA AREA(ACRES) = 41.00 SUBAREA RUNOFF(CFS) = 74.52
 EFFECTIVE AREA(ACRES) = 647.80 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 667.1 PEAK FLOW RATE(CFS) = 1162.37
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
 GIVEN CHANNEL BASE(FEET) = 300.00 CHANNEL FREEBOARD(FEET) = 1.0
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) = 2.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 3.63
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 340.00 = 10725.00 FEET.

 FLOW PROCESS FROM NODE 340.00 TO NODE 340.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.01
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085

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"	A	4.00	0.40	0.900	52

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C-59

C-59

RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.80 0.30 0.900 76
 RESIDENTIAL
 ".4 DWELLING/ACRE" C 2.40 0.25 0.900 86
 PUBLIC PARK C 0.10 0.25 0.850 86
 PUBLIC PARK B 0.10 0.30 0.850 76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.33
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.899
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 13.50
 EFFECTIVE AREA(ACRES) = 656.20 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 675.5 PEAK FLOW RATE(CFS) = 1174.09

 FLOW PROCESS FROM NODE 340.00 TO NODE 374.00 IS CODE = 31
 =====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 298.00
 FLOW LENGTH(FEET) = 221.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 84.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.79
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1174.09
 PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 22.19
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 374.00 = 10946.00 FEET.

 FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 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	1143.96	17.08	2.407	0.23(0.10)	0.41	546.6	300.00
2	1174.09	22.19	2.075	0.23(0.10)	0.42	656.2	327.00
3	1155.77	23.21	2.023	0.23(0.10)	0.42	663.6	350.00
4	1130.87	24.44	1.965	0.23(0.10)	0.42	669.8	320.00
5	1043.26	28.36	1.806	0.23(0.10)	0.42	675.5	306.00

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 374.00 = 10946.00 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	256.26	35.48	1.591	0.26(0.20)	0.79	195.1	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 374.00 = 13836.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1339.77	17.08	2.407	0.24(0.11)	0.47	640.6	300.00
2	1390.24	22.19	2.075	0.24(0.11)	0.48	778.2	327.00
3	1375.56	23.21	2.023	0.24(0.11)	0.48	791.2	350.00
4	1354.90	24.44	1.965	0.24(0.11)	0.48	804.2	320.00
5	1279.81	28.36	1.806	0.24(0.12)	0.49	831.4	306.00

6 1168.14 35.48 1.591 0.24(0.12) 0.50 870.6 390.00
 TOTAL AREA(ACRES) = 870.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1390.24 Tc(MIN.) = 22.191
 EFFECTIVE AREA(ACRES) = 778.23 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 870.6
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 374.00 = 13836.00 FEET.

 FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 IS CODE = 12
 =====

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

 FLOW PROCESS FROM NODE 374.00 TO NODE 380.00 IS CODE = 31
 =====

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

ELEVATION DATA: UPSTREAM(FEET) = 298.00 DOWNSTREAM(FEET) = 261.00
 FLOW LENGTH(FEET) = 1402.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 77.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 31.88
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1390.24
 PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 22.92
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 380.00 = 15238.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 870.6 TC(MIN.) = 22.92
 EFFECTIVE AREA(ACRES) = 778.23 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.475
 PEAK FLOW RATE(CFS) = 1390.24

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1339.77	17.81	2.350	0.24(0.11)	0.47	640.6	300.00
2	1390.24	22.92	2.037	0.24(0.11)	0.48	778.2	327.00
3	1375.56	23.94	1.988	0.24(0.11)	0.48	791.2	350.00
4	1354.90	25.17	1.932	0.24(0.11)	0.48	804.2	320.00
5	1279.81	29.10	1.780	0.24(0.12)	0.49	831.4	306.00
6	1168.14	36.25	1.572	0.24(0.12)	0.50	870.6	390.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

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

* RMV PA-3 SUBAREA C ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC DECEMBER 2018 CCHI *

FILE NAME: PA3C00HC.DAT
TIME/DATE OF STUDY: 09:35 12/13/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 320.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.766
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.203
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	0.20	0.25	0.100	86	6.77
PUBLIC PARK	C	0.90	0.25	0.850	86	10.75
COMMERCIAL	D	0.30	0.20	0.100	91	6.77
PUBLIC PARK	D	1.90	0.20	0.850	91	10.75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.736
SUBAREA RUNOFF(CFS) = 14.98
TOTAL AREA(ACRES) = 3.30 PEAK FLOW RATE(CFS) = 14.98

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

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

=====

UPSTREAM ELEVATION(FEET) = 634.00 DOWNSTREAM ELEVATION(FEET) = 630.00
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.59
HALFSTREET FLOOD WIDTH(FEET) = 23.95
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.88
STREET FLOW TRAVEL TIME(MIN.) = 2.64 Tc(MIN.) = 9.40
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.308

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.50	0.25	0.100	86
PUBLIC PARK	C	2.10	0.25	0.850	86
SCHOOL	C	4.60	0.25	0.600	86
COMMERCIAL	D	0.30	0.20	0.100	91
PUBLIC PARK	D	1.40	0.20	0.850	91
SCHOOL	D	1.10	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.647
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 37.40
EFFECTIVE AREA(ACRES) = 13.30 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.67
TOTAL AREA(ACRES) = 13.3 PEAK FLOW RATE(CFS) = 49.72

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C-3

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 27.85
FLOW VELOCITY(FEET/SEC.) = 3.49 DEPTH*VELOCITY(FT*FT/SEC.) = 2.30
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 823.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 302.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.40
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.308
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 1.00 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 9.30 0.25 0.200 86
PUBLIC PARK D 0.40 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 1.30 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276
SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 45.81
EFFECTIVE AREA(ACRES) = 25.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 25.3 PEAK FLOW RATE(CFS) = 95.53

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 625.00
FLOW LENGTH(FEET) = 651.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.36
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.53
PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 10.45
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1474.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.055
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.40 0.25 0.100 86
PUBLIC PARK C 0.40 0.25 0.850 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 1.80 0.25 0.400 86

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SCHOOL C 1.30 0.25 0.600 86
COMMERCIAL D 0.60 0.20 0.100 91
PUBLIC PARK D 0.60 0.20 0.850 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.480
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 18.09
EFFECTIVE AREA(ACRES) = 30.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 107.86

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.055
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" D 3.50 0.20 0.400 91
SCHOOL D 5.20 0.20 0.600 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 30.94
EFFECTIVE AREA(ACRES) = 39.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 39.1 PEAK FLOW RATE(CFS) = 138.80

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FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.055
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 2.80 0.25 0.100 86
PUBLIC PARK C 0.40 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 7.40 0.25 0.200 86
PUBLIC PARK D 0.30 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.50 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.215
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 41.07
EFFECTIVE AREA(ACRES) = 50.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 50.5 PEAK FLOW RATE(CFS) = 179.87

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

C-4

C-5

C-6

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=====
MAINLINE Tc(MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.055
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              C      4.70    0.25    0.100    86
PUBLIC PARK             C      2.30    0.25    0.850    86
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C      4.90    0.25    0.200    86
COMMERCIAL              D      1.70    0.20    0.100    91
PUBLIC PARK             D      1.80    0.20    0.850    91
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      6.20    0.20    0.200    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.294
SUBAREA AREA(ACRES) = 21.60    SUBAREA RUNOFF(CFS) = 77.54
EFFECTIVE AREA(ACRES) = 72.10    AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23    AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 72.1    PEAK FLOW RATE(CFS) = 257.41

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*****
FLOW PROCESS FROM NODE 303.00 TO NODE 305.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 615.00
FLOW LENGTH(FEET) = 1029.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.55
ESTIMATED PIPE DIAMETER(INCH) = 63.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 257.41
PIPE TRAVEL TIME(MIN.) = 1.18    Tc(MIN.) = 11.63
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 2503.00 FEET.

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.814
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              C      2.10    0.25    0.100    86
PUBLIC PARK             C      1.80    0.25    0.850    86
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C      1.00    0.25    0.200    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"    C      5.00    0.25    0.400    86
COMMERCIAL              D      2.80    0.20    0.100    91
PUBLIC PARK             D      0.90    0.20    0.850    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA(ACRES) = 13.60    SUBAREA RUNOFF(CFS) = 45.61
EFFECTIVE AREA(ACRES) = 85.70    AREA-AVERAGED Fm(INCH/HR) = 0.09

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C-7

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AREA-AVERAGED Fp(INCH/HR) = 0.23    AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 85.7    PEAK FLOW RATE(CFS) = 287.40

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.814
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      1.80    0.20    0.200    91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"    D      1.20    0.20    0.400    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.280
SUBAREA AREA(ACRES) = 3.00    SUBAREA RUNOFF(CFS) = 10.15
EFFECTIVE AREA(ACRES) = 88.70    AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23    AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 88.7    PEAK FLOW RATE(CFS) = 297.55

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C-7

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*****
FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.63
RAINFALL INTENSITY(INCH/HR) = 3.81
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23
AREA-AVERAGED Ap = 0.38
EFFECTIVE STREAM AREA(ACRES) = 88.70
TOTAL STREAM AREA(ACRES) = 88.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 297.55

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*****
FLOW PROCESS FROM NODE 306.00 TO NODE 307.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 646.00 DOWNSTREAM(FEET) = 645.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.296
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260
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      0.40    0.25    0.850    86    15.30
RESIDENTIAL
".4 DWELLING/ACRE"      C      0.10    0.25    0.900    86    15.42

```

C-8

PUBLIC PARK D 1.50 0.20 0.850 91 15.30
RESIDENTIAL
".4 DWELLING/ACRE" D 0.20 0.20 0.900 91 15.42
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.857
SUBAREA RUNOFF(CFS) = 6.10
TOTAL AREA(ACRES) = 2.20 PEAK FLOW RATE(CFS) = 6.10

FLOW PROCESS FROM NODE 307.00 TO NODE 307.10 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 645.00 DOWNSTREAM ELEVATION(FEET) = 641.00
STREET LENGTH(FEET) = 375.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.51
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.42
HALFSTREET FLOOD WIDTH(FEET) = 14.57
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
STREET FLOW TRAVEL TIME(MIN.) = 2.27 Tc(MIN.) = 17.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.012
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.40	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	2.00	0.25	0.600	86
PUBLIC PARK	D	0.30	0.20	0.850	91
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.10	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	1.40	0.20	0.600	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.649
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.82
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 16.43

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.91
FLOW VELOCITY(FEET/SEC.) = 2.99 DEPTH*VELOCITY(FT*FT/SEC.) = 1.39
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 307.10 = 692.00 FEET.

FLOW PROCESS FROM NODE 307.10 TO NODE 308.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 635.00
STREET LENGTH(FEET) = 506.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.64
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.52
HALFSTREET FLOOD WIDTH(FEET) = 20.12
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.50
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.83
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.98
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.798
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.00	0.25	0.100	86
PUBLIC PARK	C	0.30	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.80	0.25	0.600	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	2.30	0.20	0.600	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.554
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 20.41
EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 35.60

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 22.62
FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH*VELOCITY(FT*FT/SEC.) = 2.12
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 308.00 = 1198.00 FEET.

FLOW PROCESS FROM NODE 308.00 TO NODE 305.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 615.00
FLOW LENGTH(FEET) = 1516.00 MANNING'S N = 0.013

C-9

C-8.1

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.11
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 35.60
PIPE TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 22.48
LONGEST FLOWPATH FROM NODE 306.00 TO NODE 305.00 = 2714.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.20	0.25	0.100	86
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					

"11+ DWELLINGS/ACRE"	C	2.20	0.25	0.200	86
RESIDENTIAL					

"3-4 DWELLINGS/ACRE"	C	0.80	0.25	0.600	86
RESIDENTIAL					

"8-10 DWELLINGS/ACRE"	C	0.50	0.25	0.400	86
SCHOOL	C	0.20	0.25	0.600	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.289					

SUBAREA AREA(ACRES) = 5.00	SUBAREA RUNOFF(CFS) = 11.44
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EFFECTIVE AREA(ACRES) = 19.90	AREA-AVERAGED Fm(INCH/HR) = 0.13
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AREA-AVERAGED Fp(INCH/HR) = 0.23	AREA-AVERAGED Ap = 0.54
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TOTAL AREA(ACRES) = 19.9	PEAK FLOW RATE(CFS) = 44.59
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FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.20	0.20	0.100	91
PUBLIC PARK	D	0.20	0.20	0.850	91
RESIDENTIAL					

"11+ DWELLINGS/ACRE"	D	2.30	0.20	0.200	91
RESIDENTIAL					

".4 DWELLING/ACRE"	D	0.30	0.20	0.900	91
RESIDENTIAL					

"3-4 DWELLINGS/ACRE"	D	4.00	0.20	0.600	91
RESIDENTIAL					

"8-10 DWELLINGS/ACRE"	D	6.60	0.20	0.400	91
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.415					

SUBAREA AREA(ACRES) = 14.60	SUBAREA RUNOFF(CFS) = 33.27
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EFFECTIVE AREA(ACRES) = 34.50	AREA-AVERAGED Fm(INCH/HR) = 0.11
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AREA-AVERAGED Fp(INCH/HR) = 0.22	AREA-AVERAGED Ap = 0.49
----------------------------------	-------------------------

TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 77.87

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
SCHOOL	D	0.20	0.20	0.600	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600					

SUBAREA AREA(ACRES) = 0.20	SUBAREA RUNOFF(CFS) = 0.45
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EFFECTIVE AREA(ACRES) = 34.70	AREA-AVERAGED Fm(INCH/HR) = 0.11
-------------------------------	----------------------------------

AREA-AVERAGED Fp(INCH/HR) = 0.22	AREA-AVERAGED Ap = 0.49
----------------------------------	-------------------------

TOTAL AREA(ACRES) = 34.7	PEAK FLOW RATE(CFS) = 78.31
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FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 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.) = 22.48

RAINFALL INTENSITY(INCH/HR) = 2.62

AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22

AREA-AVERAGED Ap = 0.49

EFFECTIVE STREAM AREA(ACRES) = 34.70

TOTAL STREAM AREA(ACRES) = 34.70

PEAK FLOW RATE(CFS) AT CONFLUENCE = 78.31

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	297.55	11.63	3.814	0.23(0.09)	0.38	88.7	300.00
2	78.31	22.48	2.615	0.22(0.11)	0.49	34.7	306.00

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	357.45	11.63	3.814	0.23(0.09)	0.40	106.7	300.00
2	280.11	22.48	2.615	0.23(0.09)	0.41	123.4	306.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 357.45 Tc(MIN.) = 11.63

EFFECTIVE AREA(ACRES) = 106.66 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 123.4

LONGEST FLOWPATH FROM NODE 306.00 TO NODE 305.00 = 2714.00 FEET.

C-10

C-10

C-10

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*****
FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
FLOW LENGTH(FEET) =  2954.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  28.36
ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =          357.45
PIPE TRAVEL TIME(MIN.) =   1.74    Tc(MIN.) =   13.37
LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =   5668.00 FEET.

*****
FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   13.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.522
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp      Ap      SCS
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              C         4.80    0.25    0.100    86
RESIDENTIAL
".4 DWELLING/ACRE"      C         0.40    0.25    0.900    86
RESIDENTIAL
"3-4 DWELLINGS/ACRE"    C         0.20    0.25    0.600    86
COMMERCIAL              D         2.30    0.20    0.100    91
RESIDENTIAL
".4 DWELLING/ACRE"      D         0.10    0.20    0.900    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
SUBAREA AREA(ACRES) =    7.80    SUBAREA RUNOFF(CFS) =   24.45
EFFECTIVE AREA(ACRES) =   114.46  AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =    131.2    PEAK FLOW RATE(CFS) =   357.45
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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C-11

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*****
FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   13.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.522
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp      Ap      SCS
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              D         0.10    0.20    0.100    91
PUBLIC PARK              C         0.20    0.25    0.850    86
PUBLIC PARK              D         2.30    0.20    0.850    91
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C         6.40    0.25    0.200    86
RESIDENTIAL

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C-12

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"11+ DWELLINGS/ACRE"      D         2.60    0.20    0.200    91
RESIDENTIAL
".4 DWELLING/ACRE"        C         0.70    0.25    0.900    86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
SUBAREA AREA(ACRES) =    12.30    SUBAREA RUNOFF(CFS) =   38.08
EFFECTIVE AREA(ACRES) =    126.76  AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.23  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =    143.5    PEAK FLOW RATE(CFS) =   391.93

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*****
FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   13.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.522
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp      Ap      SCS
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"      D         2.20    0.20    0.900    91
RESIDENTIAL
"3-4 DWELLINGS/ACRE"    C         0.10    0.25    0.600    86
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    C         0.80    0.25    0.500    86
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    D        10.20    0.20    0.500    91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"    C         2.50    0.25    0.400    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"    D         3.70    0.20    0.400    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
SUBAREA AREA(ACRES) =    19.50    SUBAREA RUNOFF(CFS) =   59.94
EFFECTIVE AREA(ACRES) =    146.26  AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =    163.0    PEAK FLOW RATE(CFS) =   451.87

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*****
FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
FLOW LENGTH(FEET) =  1056.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  57.0 INCH PIPE IS  45.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  30.14
ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =          451.87
PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   13.95
LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =   6724.00 FEET.

*****
FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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C-12

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=====
MAINLINE Tc(MIN.) = 13.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.437
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN
COMMERCIAL    C    1.60    0.25    0.100    86
COMMERCIAL    D    3.60    0.20    0.100    91
PUBLIC PARK    D    0.10    0.20    0.850    91
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C    3.90    0.25    0.200    86
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D    5.10    0.20    0.200    91
RESIDENTIAL
"3-4 DWELLINGS/ACRE"    C    0.80    0.25    0.600    86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.191
SUBAREA AREA(ACRES) = 15.10    SUBAREA RUNOFF(CFS) = 46.12
EFFECTIVE AREA(ACRES) = 161.36    AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.22    AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 178.1    PEAK FLOW RATE(CFS) = 486.77

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C-13

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*****
FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 13.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.437
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE"    D    6.70    0.20    0.600    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 6.70    SUBAREA RUNOFF(CFS) = 20.00
EFFECTIVE AREA(ACRES) = 168.06    AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.22    AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 184.8    PEAK FLOW RATE(CFS) = 506.78

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C-13

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*****
FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE = 31

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```

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

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=====
ELEVATION DATA: UPSTREAM(FEET) = 430.00    DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1373.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.90
ESTIMATED PIPE DIAMETER(INCH) = 63.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 506.78
PIPE TRAVEL TIME(MIN.) = 0.77    Tc(MIN.) = 14.72
LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 = 8097.00 FEET.

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*****
FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE = 81

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-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.72
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.333
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN
COMMERCIAL    A    1.50    0.40    0.100    52
COMMERCIAL    B    4.50    0.30    0.100    76
APARTMENTS    C    3.40    0.25    0.200    86
COMMERCIAL    D    0.30    0.20    0.100    91
PUBLIC PARK    C    0.10    0.25    0.850    86
RESIDENTIAL
".4 DWELLING/ACRE"    A    0.20    0.40    0.900    52
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.157
SUBAREA AREA(ACRES) = 10.00    SUBAREA RUNOFF(CFS) = 29.58
EFFECTIVE AREA(ACRES) = 178.06    AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.22    AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 194.8    PEAK FLOW RATE(CFS) = 520.69

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*****
FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 14.72
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.333
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN
RESIDENTIAL
".4 DWELLING/ACRE"    C    0.10    0.25    0.900    86
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B    0.40    0.30    0.500    76
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    C    0.10    0.25    0.500    86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.567
SUBAREA AREA(ACRES) = 0.60    SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 178.66    AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.22    AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 195.4    PEAK FLOW RATE(CFS) = 522.41

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*****
FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE = 31

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

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=====
ELEVATION DATA: UPSTREAM(FEET) = 373.00    DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 1370.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 32.74
ESTIMATED PIPE DIAMETER(INCH) = 60.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 522.41
PIPE TRAVEL TIME(MIN.) = 0.70    Tc(MIN.) = 15.41

```

```

LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

*****
FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====

*****
FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE = 13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<
=====

*****
FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =    317.00
ELEVATION DATA: UPSTREAM(FEET) =    860.00 DOWNSTREAM(FEET) =    775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.364
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
"CHAPARRAL,NARROWLEAF"    C        0.20    0.25    1.000    95    9.20
NATURAL FAIR COVER
"OPEN BRUSH"            C        1.20    0.25    1.000    92    9.20
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) =    5.18
TOTAL AREA(ACRES) =    1.40 PEAK FLOW RATE(CFS) =    5.18

*****
FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    775.00 DOWNSTREAM(FEET) =    700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    545.00 CHANNEL SLOPE = 0.1376
CHANNEL BASE(FEET) =    0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.024
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"    C        1.70    0.25    1.000    95
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"    D        0.60    0.20    1.000    97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

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OC-1

OC-2

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TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    9.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    6.49
AVERAGE FLOW DEPTH(FEET) =    0.68 TRAVEL TIME(MIN.) =    1.40
Tc(MIN.) =    10.59
SUBAREA AREA(ACRES) =    2.30 SUBAREA RUNOFF(CFS) =    7.84
EFFECTIVE AREA(ACRES) =    3.70 AREA-AVERAGED Fm(INCH/HR) =    0.24
AREA-AVERAGED Fp(INCH/HR) =    0.24 AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    3.7 PEAK FLOW RATE(CFS) =    12.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =    0.77 FLOW VELOCITY(FEET/SEC.) =    7.02
LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =    862.00 FEET.

*****
FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    700.00 DOWNSTREAM(FEET) =    635.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
CHANNEL BASE(FEET) =    0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.556
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"    C        1.40    0.25    1.000    91
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"    C        8.40    0.25    1.000    95
NATURAL FAIR COVER
"OPEN BRUSH"            C        2.70    0.25    1.000    92
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"    D        0.40    0.20    1.000    95
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF"    D        9.20    0.20    1.000    97
NATURAL FAIR COVER
"OPEN BRUSH"            D        0.60    0.20    1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    46.69
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    7.15
AVERAGE FLOW DEPTH(FEET) =    1.48 TRAVEL TIME(MIN.) =    2.55
Tc(MIN.) =    13.14
SUBAREA AREA(ACRES) =    22.70 SUBAREA RUNOFF(CFS) =    68.01
EFFECTIVE AREA(ACRES) =    26.40 AREA-AVERAGED Fm(INCH/HR) =    0.23
AREA-AVERAGED Fp(INCH/HR) =    0.23 AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    26.4 PEAK FLOW RATE(CFS) =    79.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =    1.80 FLOW VELOCITY(FEET/SEC.) =    8.15
LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 = 1955.00 FEET.

*****
FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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OC-3

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.280
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.60	0.25	1.000	91
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	C	5.50	0.25	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	C	1.80	0.25	1.000	92
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.60	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	1.00	0.20	1.000	95
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	D	6.80	0.20	1.000	97

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.54
AVERAGE FLOW DEPTH(FEET) = 2.13 TRAVEL TIME(MIN.) = 2.00
Tc(MIN.) = 15.14
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 47.52
EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 119.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 7.86
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.280
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	2.50	0.20	1.000	96
NATURAL FAIR COVER					
"WOODLAND,GRASS"	D	0.10	0.20	1.000	95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 127.19

FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 664.00 CHANNEL SLOPE = 0.0377
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.121
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	6.30	0.25	1.000	91
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	C	5.90	0.25	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	C	6.80	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.90	0.25	0.900	86
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.50	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.20	0.20	1.000	95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 153.83
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.11
AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 1.36
Tc(MIN.) = 16.50
SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 53.26
EFFECTIVE AREA(ACRES) = 66.90 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 66.9 PEAK FLOW RATE(CFS) = 173.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.64 FLOW VELOCITY(FEET/SEC.) = 8.35
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3523.00 FEET.

FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.121
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	D	12.60	0.20	1.000	97
NATURAL FAIR COVER					
"OPEN BRUSH"	D	3.10	0.20	1.000	96
RESIDENTIAL					
".4 DWELLING/ACRE"	D	2.40	0.20	0.900	91

NATURAL FAIR COVER

"WOODLAND,GRASS" D 0.10 0.20 1.000 95
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.987
SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 47.89
EFFECTIVE AREA(ACRES) = 85.10 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 85.1 PEAK FLOW RATE(CFS) = 221.76

FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 573.00 DOWNSTREAM(FEET) = 389.00
FLOW LENGTH(FEET) = 5717.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.04
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 221.76
PIPE TRAVEL TIME(MIN.) = 4.32 Tc(MIN.) = 20.83
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9240.00 FEET.

FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 389.00 DOWNSTREAM(FEET) = 345.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1996.00 CHANNEL SLOPE = 0.0220
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	D	2.90	0.20	1.000	96
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	4.40	0.25	1.000	91
COMMERCIAL	C	0.50	0.25	0.100	86
NATURAL FAIR COVER					
"GRASS"	C	6.60	0.25	1.000	93
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.60	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	6.10	0.25	0.900	86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.956					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 245.75					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.46					
AVERAGE FLOW DEPTH(FEET) = 3.31 TRAVEL TIME(MIN.) = 4.46					
Tc(MIN.) = 25.29					
SUBAREA AREA(ACRES) = 24.10 SUBAREA RUNOFF(CFS) = 47.96					
EFFECTIVE AREA(ACRES) = 109.20 AREA-AVERAGED Fm(INCH/HR) = 0.23					
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.99					
TOTAL AREA(ACRES) = 109.2 PEAK FLOW RATE(CFS) = 221.76					

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.19 FLOW VELOCITY(FEET/SEC.) = 7.28
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11236.00 FEET.

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 25.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	A	1.10	0.40	1.000	60
COMMERCIAL	A	1.10	0.40	0.100	52
NATURAL FAIR COVER					
"GRASS"	A	2.00	0.40	1.000	70
NATURAL FAIR COVER					
"OPEN BRUSH"	A	0.40	0.40	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	A	2.20	0.40	0.900	52
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	84
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.39					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830					
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 13.53					
EFFECTIVE AREA(ACRES) = 116.30 AREA-AVERAGED Fm(INCH/HR) = 0.23					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.98					
TOTAL AREA(ACRES) = 116.3 PEAK FLOW RATE(CFS) = 231.39					

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 25.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444
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"	B	0.70	0.30	0.900	76
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.20	0.30	1.000	83
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.10	0.25	0.500	86
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	3.00	0.25	1.000	92
NATURAL FAIR COVER					
"OPEN BRUSH"	D	1.40	0.20	1.000	96
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.975					
SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 10.92					

EFFECTIVE AREA(ACRES) = 121.80 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 121.8 PEAK FLOW RATE(CFS) = 242.30

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 25.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 1.40 0.20 0.900 91
NATURAL FAIR COVER
"WOODLAND,GRASS" D 0.10 0.20 1.000 95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.907
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 3.05
EFFECTIVE AREA(ACRES) = 123.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 123.3 PEAK FLOW RATE(CFS) = 245.36

FLOW PROCESS FROM NODE 371.00 TO NODE 372.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 488.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.47
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 245.36
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 25.53
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 372.00 = 11724.00 FEET.

FLOW PROCESS FROM NODE 372.00 TO NODE 373.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 300.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 924.00 CHANNEL SLOPE = 0.0011
GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 1.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
*ESTIMATED CHANNEL HEIGHT(FEET) = 3.79
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 32.30 0.40 0.100 52
COMMERCIAL B 2.70 0.30 0.100 76
COMMERCIAL C 0.60 0.25 0.100 86

COMMERCIAL D 1.80 0.20 0.100 91
PUBLIC PARK A 7.20 0.40 0.850 52
PUBLIC PARK B 9.80 0.30 0.850 76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.35

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.334

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 295.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.78

AVERAGE FLOW DEPTH(FEET) = 2.77 TRAVEL TIME(MIN.) = 5.53

Tc(MIN.) = 31.06

SUBAREA AREA(ACRES) = 54.40 SUBAREA RUNOFF(CFS) = 100.63

EFFECTIVE AREA(ACRES) = 177.70 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.78

TOTAL AREA(ACRES) = 177.7 PEAK FLOW RATE(CFS) = 315.83

GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 1.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

*ESTIMATED CHANNEL HEIGHT(FEET) = 3.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 2.85

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 373.00 = 12648.00 FEET.

FLOW PROCESS FROM NODE 373.00 TO NODE 373.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 31.06

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 2.60 0.25 0.850 86
PUBLIC PARK D 2.10 0.20 0.850 91
RESIDENTIAL
".4 DWELLING/ACRE" A 3.50 0.40 0.900 52
RESIDENTIAL
".4 DWELLING/ACRE" B 4.80 0.30 0.900 76
RESIDENTIAL
".4 DWELLING/ACRE" C 3.60 0.25 0.900 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.80 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886
SUBAREA AREA(ACRES) = 17.40 SUBAREA RUNOFF(CFS) = 30.04
EFFECTIVE AREA(ACRES) = 195.10 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 195.1 PEAK FLOW RATE(CFS) = 345.88

FLOW PROCESS FROM NODE 373.00 TO NODE 374.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 298.00
FLOW LENGTH(FEET) = 1188.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 96.0 INCH PIPE IS 76.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05

ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 345.88
PIPE TRAVEL TIME(MIN.) = 2.46 Tc(MIN.) = 33.52
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 374.00 = 13836.00 FEET.

FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 IS CODE = 13

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

FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 621.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.511
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.042

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.)
APARTMENTS	C	1.50	0.25	0.200	86	10.51
APARTMENTS	D	2.00	0.20	0.200	91	10.51

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200

SUBAREA RUNOFF(CFS) = 12.59

TOTAL AREA(ACRES) = 3.50 PEAK FLOW RATE(CFS) = 12.59

FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62

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

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

UPSTREAM ELEVATION(FEET) = 621.00 DOWNSTREAM ELEVATION(FEET) = 612.00
STREET LENGTH(FEET) = 569.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.15

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.47

HALFSTREET FLOOD WIDTH(FEET) = 17.30

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.69

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.74

STREET FLOW TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 13.08

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.566

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	C	2.20	0.25	0.200	86
APARTMENTS	C	3.20	0.25	0.200	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200

SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 17.09

EFFECTIVE AREA(ACRES) = 8.90 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.20

TOTAL AREA(ACRES) = 8.9 PEAK FLOW RATE(CFS) = 28.18

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.41

FLOW VELOCITY(FEET/SEC.) = 3.96 DEPTH*VELOCITY(FT*FT/SEC.) = 2.02

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 899.00 FEET.

FLOW PROCESS FROM NODE 322.00 TO NODE 324.00 IS CODE = 62

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

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

UPSTREAM ELEVATION(FEET) = 612.00 DOWNSTREAM ELEVATION(FEET) = 590.00

STREET LENGTH(FEET) = 891.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.77

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54

HALFSTREET FLOOD WIDTH(FEET) = 21.37

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.24

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.85

STREET FLOW TRAVEL TIME(MIN.) = 2.83 Tc(MIN.) = 15.92

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.187

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	3.00	0.25	0.400	86

RESIDENTIAL

C-16

C-15

C-17

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"8-10 DWELLINGS/ACRE"	D	5.70	0.20	0.400	91
CONDOMINIUMS	D	1.20	0.20	0.350	91
PUBLIC PARK	C	0.30	0.25	0.850	86
PUBLIC PARK	D	0.90	0.20	0.850	91
COMMERCIAL	C	0.80	0.25	0.100	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.420
SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 33.16
EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 58.30

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 23.71
FLOW VELOCITY(FEET/SEC.) = 5.59 DEPTH*VELOCITY(FT*FT/SEC.) = 3.28
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 1790.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.187
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.70	0.20	0.100	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.85
EFFECTIVE AREA(ACRES) = 22.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 22.5 PEAK FLOW RATE(CFS) = 63.15

FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 575.00
FLOW LENGTH(FEET) = 529.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.20
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.15
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 16.50
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 2319.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.122
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.50	0.25	0.100	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.30	0.25	0.600	86
COMMERCIAL	D	0.30	0.20	0.100	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	2.10	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 19.41
EFFECTIVE AREA(ACRES) = 29.70 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 29.7 PEAK FLOW RATE(CFS) = 81.25

FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.122
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.80	0.25	0.600	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	10.20	0.20	0.600	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.606
SUBAREA AREA(ACRES) = 15.30 SUBAREA RUNOFF(CFS) = 41.18
EFFECTIVE AREA(ACRES) = 45.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 45.0 PEAK FLOW RATE(CFS) = 122.43

FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 515.00
FLOW LENGTH(FEET) = 284.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.47
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 122.43
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 16.62
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 2603.00 FEET.

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

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

C-14

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=====
MAINLINE Tc(MIN.) = 16.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.109
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      0.70    0.30    0.100  76
PUBLIC PARK           B      0.10    0.30    0.850  76
RESIDENTIAL
".4 DWELLING/ACRE"    B      0.80    0.30    0.900  76
COMMERCIAL            C      1.40    0.25    0.100  86
RESIDENTIAL
".4 DWELLING/ACRE"    C      2.30    0.25    0.900  86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C      0.10    0.25    0.600  86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.582
SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 14.36
EFFECTIVE AREA(ACRES) = 50.40 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 50.4 PEAK FLOW RATE(CFS) = 136.25

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FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.109
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            D      2.10    0.20    0.100  91
RESIDENTIAL
".4 DWELLING/ACRE"    D      2.80    0.20    0.900  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.557
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 13.22
EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 149.47

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FLOW PROCESS FROM NODE 326.00 TO NODE 333.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 500.00
FLOW LENGTH(FEET) = 1644.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.29
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 149.47
PIPE TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 18.85
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 333.00 = 4247.00 FEET.

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FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.893
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      0.40    0.30    0.100  76
RESIDENTIAL
".4 DWELLING/ACRE"    B      2.20    0.30    0.900  76
COMMERCIAL            C      1.80    0.25    0.100  86
RESIDENTIAL
".4 DWELLING/ACRE"    C      0.30    0.25    0.900  86
COMMERCIAL            D      5.60    0.20    0.100  91
RESIDENTIAL
".4 DWELLING/ACRE"    D      4.10    0.20    0.900  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.467
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 36.08
EFFECTIVE AREA(ACRES) = 69.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 69.7 PEAK FLOW RATE(CFS) = 174.78

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*****
FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.893
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D      0.20    0.20    0.600  91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.50
EFFECTIVE AREA(ACRES) = 69.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 69.9 PEAK FLOW RATE(CFS) = 175.28

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*****
FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.85
RAINFALL INTENSITY(INCH/HR) = 2.89
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23
AREA-AVERAGED Ap = 0.47
EFFECTIVE STREAM AREA(ACRES) = 69.90
TOTAL STREAM AREA(ACRES) = 69.90

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PEAK FLOW RATE(CFS) AT CONFLUENCE =      175.28

*****
FLOW PROCESS FROM NODE      327.00 TO NODE      327.50 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =      329.00
ELEVATION DATA: UPSTREAM(FEET) =      615.00  DOWNSTREAM(FEET) =      614.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =      9.844
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =      4.197
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      0.40      0.25      0.100      86      9.84
PUBLIC PARK      C      0.20      0.25      0.850      86      15.64
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      0.10      0.25      0.400      86      12.11
COMMERCIAL      D      0.10      0.20      0.100      91      9.84
PUBLIC PARK      D      0.10      0.20      0.850      91      15.64
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =      0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =      0.383
SUBAREA RUNOFF(CFS) =      3.33
TOTAL AREA(ACRES) =      0.90  PEAK FLOW RATE(CFS) =      3.33

*****
FLOW PROCESS FROM NODE      327.50 TO NODE      328.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =      614.00  DOWNSTREAM ELEVATION(FEET) =      610.00
STREET LENGTH(FEET) =      425.00  CURB HEIGHT(INCHES) =      8.0
STREET HALFWIDTH(FEET) =      30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.44
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =      0.40
HALFSTREET FLOOD WIDTH(FEET) =      13.09
AVERAGE FLOW VELOCITY(FEET/SEC.) =      2.45
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =      0.97
STREET FLOW TRAVEL TIME(MIN.) =      2.89  Tc(MIN.) =      12.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =      3.621
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
  LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
COMMERCIAL      C      0.10      0.25      0.100      86
PUBLIC PARK      C      0.20      0.25      0.850      86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      3.10      0.25      0.400      86
COMMERCIAL      D      0.50      0.20      0.100      91
PUBLIC PARK      D      0.30      0.20      0.850      91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      D      2.10      0.20      0.400      91

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COMMERCIAL      C      1.00      0.25      0.100      86
PUBLIC PARK      C      0.30      0.25      0.850      86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      0.20      0.25      0.400      86
COMMERCIAL      D      0.90      0.20      0.100      91
PUBLIC PARK      D      0.60      0.20      0.850      91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      D      0.20      0.20      0.400      91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =      0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =      0.348
SUBAREA AREA(ACRES) =      3.20  SUBAREA RUNOFF(CFS) =      10.21
EFFECTIVE AREA(ACRES) =      4.10  AREA-AVERAGED Fm(INCH/HR) =      0.08
AREA-AVERAGED Fp(INCH/HR) =      0.22  AREA-AVERAGED Ap =      0.36
TOTAL AREA(ACRES) =      4.1  PEAK FLOW RATE(CFS) =      13.07

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) =      0.45  HALFSTREET FLOOD WIDTH(FEET) =      15.82
FLOW VELOCITY(FEET/SEC.) =      2.69  DEPTH*VELOCITY(FT*FT/SEC.) =      1.20
LONGEST FLOWPATH FROM NODE      327.00 TO NODE      328.00 =      754.00 FEET.

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C-21.1

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*****
FLOW PROCESS FROM NODE      328.00 TO NODE      329.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =      610.00  DOWNSTREAM ELEVATION(FEET) =      595.00
STREET LENGTH(FEET) =      366.00  CURB HEIGHT(INCHES) =      8.0
STREET HALFWIDTH(FEET) =      30.00

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

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C-22

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

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.58
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =      0.42
HALFSTREET FLOOD WIDTH(FEET) =      14.57
AVERAGE FLOW VELOCITY(FEET/SEC.) =      5.40
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =      2.28
STREET FLOW TRAVEL TIME(MIN.) =      1.13  Tc(MIN.) =      13.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =      3.449
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
  LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
COMMERCIAL      C      0.10      0.25      0.100      86
PUBLIC PARK      C      0.20      0.25      0.850      86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C      3.10      0.25      0.400      86
COMMERCIAL      D      0.50      0.20      0.100      91
PUBLIC PARK      D      0.30      0.20      0.850      91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      D      2.10      0.20      0.400      91

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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 19.03
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 31.46

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.76
FLOW VELOCITY(FEET/SEC.) = 5.82 DEPTH*VELOCITY(FT*FT/SEC.) = 2.69
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 329.00 = 1120.00 FEET.

FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.449
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 2.80 0.25 0.400 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 0.10 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 6.10 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.402
SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 27.24
EFFECTIVE AREA(ACRES) = 19.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 19.4 PEAK FLOW RATE(CFS) = 58.70

FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 595.00 DOWNSTREAM(FEET) = 575.00
FLOW LENGTH(FEET) = 378.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.14
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 58.70
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 14.19
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 330.00 = 1498.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.403
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 0.90 0.25 0.850 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 4.10 0.25 0.600 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 2.50 0.25 0.400 86
COMMERCIAL D 0.60 0.20 0.100 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 10.20 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.90 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 56.68
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 114.57

FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 555.00
FLOW LENGTH(FEET) = 457.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.08
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 114.57
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.56
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 331.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.354
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 1.10 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.80 0.25 0.900 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 10.50 0.25 0.600 86
COMMERCIAL D 0.30 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.50 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 13.70 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.619
SUBAREA AREA(ACRES) = 26.90 SUBAREA RUNOFF(CFS) = 77.85
EFFECTIVE AREA(ACRES) = 65.50 AREA-AVERAGED Fm(INCH/HR) = 0.12

C-24

C-23

C-25

AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.54
TOTAL AREA (ACRES) = 65.5 PEAK FLOW RATE (CFS) = 190.73

FLOW PROCESS FROM NODE 331.00 TO NODE 332.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 555.00 DOWNSTREAM(Feet) = 520.00
FLOW LENGTH(Feet) = 324.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.1 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 33.37
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 190.73
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 14.72
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 332.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 332.00 TO NODE 332.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.72
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.333

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.10	0.25	0.100	86
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	2.10	0.25	0.900	86
COMMERCIAL	D	3.70	0.20	0.100	91
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	5.00	0.20	0.900	91

SUBAREA AVERAGE Pervious Loss Rate, Fp (INCH/HR) = 0.21
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.621
SUBAREA AREA (ACRES) = 10.90 SUBAREA RUNOFF (CFS) = 31.39
EFFECTIVE AREA (ACRES) = 76.40 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.55
TOTAL AREA (ACRES) = 76.4 PEAK FLOW RATE (CFS) = 220.88

FLOW PROCESS FROM NODE 332.00 TO NODE 333.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 520.00 DOWNSTREAM(Feet) = 500.00
FLOW LENGTH(Feet) = 1740.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.6 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 14.84
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 220.88
PIPE TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 327.00 TO NODE 333.00 = 4019.00 FEET.

FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.67

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.103

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	1.20	0.25	0.100	86
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	4.40	0.25	0.900	86
COMMERCIAL	D	3.90	0.20	0.100	91
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	9.80	0.20	0.900	91

SUBAREA AVERAGE Pervious Loss Rate, Fp (INCH/HR) = 0.22
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.689
SUBAREA AREA (ACRES) = 19.30 SUBAREA RUNOFF (CFS) = 51.33
EFFECTIVE AREA (ACRES) = 95.70 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.58
TOTAL AREA (ACRES) = 95.7 PEAK FLOW RATE (CFS) = 256.41

FLOW PROCESS FROM NODE 333.00 TO NODE 333.00 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.) = 16.67
RAINFALL INTENSITY (INCH/HR) = 3.10
AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA (ACRES) = 95.70
TOTAL STREAM AREA (ACRES) = 95.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 256.41

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	175.28	18.85	2.893	0.23 (0.11)	0.47	69.9	320.00
2	256.41	16.67	3.103	0.22 (0.13)	0.58	95.7	327.00

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	423.16	16.67	3.103	0.22 (0.12)	0.53	157.5	327.00
2	413.53	18.85	2.893	0.22 (0.12)	0.53	165.6	320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 423.16 Tc(MIN.) = 16.67
EFFECTIVE AREA (ACRES) = 157.52 AREA-AVERAGED Fm (INCH/HR) = 0.12
AREA-AVERAGED Fp (INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.53
TOTAL AREA (ACRES) = 165.6

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 333.00 = 4247.00 FEET.

FLOW PROCESS FROM NODE 333.00 TO NODE 334.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 468.00
FLOW LENGTH(FEET) = 819.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.40
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 423.16
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 17.17
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 334.00 = 5066.00 FEET.

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FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	D	4.00	0.20	0.200	91
COMMERCIAL	C	2.30	0.25	0.100	86
COMMERCIAL	D	1.00	0.20	0.100	91
PUBLIC PARK	C	0.40	0.25	0.850	86
PUBLIC PARK	D	2.40	0.20	0.850	91
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	3.50	0.25	0.200	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.310
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 36.53
EFFECTIVE AREA(ACRES) = 171.12 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 179.2 PEAK FLOW RATE(CFS) = 452.34

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	2.00	0.20	0.200	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	1.60	0.25	0.400	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	2.10	0.20	0.400	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.330
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 15.29
EFFECTIVE AREA(ACRES) = 176.82 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 184.9 PEAK FLOW RATE(CFS) = 467.62

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 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.) = 17.17
RAINFALL INTENSITY(INCH/HR) = 3.05
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.51
EFFECTIVE STREAM AREA(ACRES) = 176.82
TOTAL STREAM AREA(ACRES) = 184.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 467.62

FLOW PROCESS FROM NODE 350.00 TO NODE 351.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 492.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.730
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.995
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	0.80	0.25	0.600	86	10.73
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	D	1.70	0.20	0.600	91	10.73

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA RUNOFF(CFS) = 8.70
TOTAL AREA(ACRES) = 2.50 PEAK FLOW RATE(CFS) = 8.70

FLOW PROCESS FROM NODE 351.00 TO NODE 352.00 IS CODE = 62

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

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

UPSTREAM ELEVATION(FEET) = 492.00 DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 456.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.13
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(Feet) = 0.46
HALFSTREET FLOOD WIDTH(Feet) = 16.52
AVERAGE FLOW VELOCITY(Feet/Sec.) = 2.68
PRODUCT OF DEPTH&VELOCITY(Feet*Feet/Sec.) = 1.23
STREET FLOW TRAVEL TIME(Min.) = 2.83 Tc(Min.) = 13.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	3.20	0.25	0.600	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.40	0.20	0.600	91
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.600					
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 10.84					
EFFECTIVE AREA(ACRES) = 6.10 AREA-AVERAGED Fm(INCH/HR) = 0.14					
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.60					
TOTAL AREA(ACRES) = 6.1 PEAK FLOW RATE(CFS) = 18.41					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(Feet) = 0.49 HALFSTREET FLOOD WIDTH(Feet) = 18.48
FLOW VELOCITY(Feet/Sec.) = 2.84 DEPTH*VELOCITY(Feet*Feet/Sec.) = 1.40
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 352.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 352.00 TO NODE 353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 488.00 DOWNSTREAM(Feet) = 485.00
FLOW LENGTH(Feet) = 883.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 5.15
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.41
PIPE TRAVEL TIME(Min.) = 2.86 Tc(Min.) = 16.42
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 353.00 = 1669.00 FEET.

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FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

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

MAINLINE Tc(Min.) = 16.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.130
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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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.50	0.30	0.600	76
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	76
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.60	0.25	0.600	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	4.50	0.25	0.400	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	1.70	0.20	0.600	91
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.471					
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 23.06					
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52					
TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 39.48					

FLOW PROCESS FROM NODE 353.00 TO NODE 353.00 IS CODE = 81

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

MAINLINE Tc(Min.) = 16.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.130
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	0.30	0.20	0.400	91
SUBAREA AVERAGE Pervious Loss Rate, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE Pervious Area Fraction, Ap = 0.400					
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.82					
EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52					
TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 40.30					

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FLOW PROCESS FROM NODE 353.00 TO NODE 334.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 485.00 DOWNSTREAM(Feet) = 468.00
FLOW LENGTH(Feet) = 1136.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.2 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 10.88
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 40.30
PIPE TRAVEL TIME(Min.) = 1.74 Tc(Min.) = 18.16
LONGEST FLOWPATH FROM NODE 350.00 TO NODE 334.00 = 2805.00 FEET.

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.16
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.955
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.90	0.25	0.100	86
PUBLIC PARK	C	2.00	0.25	0.850	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	1.40	0.25	0.200	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	1.50	0.25	0.400	86
COMMERCIAL	D	0.50	0.20	0.100	91
PUBLIC PARK	D	1.50	0.20	0.850	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 19.90
EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 57.85

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.16
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.955
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	3.10	0.20	0.200	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	1.40	0.20	0.400	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.262
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 11.75
EFFECTIVE AREA(ACRES) = 27.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 27.2 PEAK FLOW RATE(CFS) = 69.60

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.16
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.955
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.50	0.30	0.850	76
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	76
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.20	0.30	0.600	76
PUBLIC PARK	C	2.70	0.25	0.850	86
RESIDENTIAL					

"4 DWELLING/ACRE"	C	0.20	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	7.30	0.25	0.600	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.674
SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 30.03
EFFECTIVE AREA(ACRES) = 39.20 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 39.2 PEAK FLOW RATE(CFS) = 99.64

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.16
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.955
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.10	0.20	0.100	91
PUBLIC PARK	D	0.60	0.20	0.850	91
SCHOOL	D	3.10	0.20	0.600	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 9.68
EFFECTIVE AREA(ACRES) = 43.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 43.0 PEAK FLOW RATE(CFS) = 109.31

FLOW PROCESS FROM NODE 334.00 TO NODE 334.00 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.) = 18.16
RAINFALL INTENSITY(INCH/HR) = 2.95
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24
AREA-AVERAGED Ap = 0.54
EFFECTIVE STREAM AREA(ACRES) = 43.00
TOTAL STREAM AREA(ACRES) = 43.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 109.31

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	467.62	17.17	3.051	0.22(0.11)	0.51	176.8	327.00
1	455.44	19.35	2.850	0.22(0.11)	0.51	184.9	320.00
2	109.31	18.16	2.955	0.24(0.13)	0.54	43.0	350.00

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

** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	574.50	17.17	3.051	0.22(0.12)	0.52	217.5	327.00
2	571.39	18.16	2.955	0.22(0.12)	0.52	223.5	350.00
3	560.69	19.35	2.850	0.22(0.12)	0.52	227.9	320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 574.50 Tc(MIN.) = 17.17
 EFFECTIVE AREA(ACRES) = 217.47 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 227.9
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 334.00 = 5066.00 FEET.

 FLOW PROCESS FROM NODE 334.00 TO NODE 335.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 422.00
 FLOW LENGTH(FEET) = 1086.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.50
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 574.50
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 17.76
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 335.00 = 6152.00 FEET.

 FLOW PROCESS FROM NODE 335.00 TO NODE 335.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 17.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.993
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	3.00	0.25	0.100	86
COMMERCIAL	D	4.20	0.20	0.100	91
PUBLIC PARK	C	0.60	0.25	0.850	86
PUBLIC PARK	D	10.80	0.20	0.850	91
RESIDENTIAL					
"4 DWELLING/ACRE"	C	1.00	0.25	0.900	86
RESIDENTIAL					
"4 DWELLING/ACRE"	D	3.90	0.20	0.900	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
 SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 60.55
 EFFECTIVE AREA(ACRES) = 240.97 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.53
 TOTAL AREA(ACRES) = 251.4 PEAK FLOW RATE(CFS) = 623.53

 FLOW PROCESS FROM NODE 335.00 TO NODE 335.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 17.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.993
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	91
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	0.10	0.20	0.500	91
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	9.20	0.20	0.500	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	0.70	0.25	0.400	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	2.90	0.20	0.400	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.474
 SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 34.15
 EFFECTIVE AREA(ACRES) = 254.07 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.53
 TOTAL AREA(ACRES) = 264.5 PEAK FLOW RATE(CFS) = 657.68

 FLOW PROCESS FROM NODE 335.00 TO NODE 336.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 380.00
 FLOW LENGTH(FEET) = 780.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 35.16
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 657.68
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 18.13
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 336.00 = 6932.00 FEET.

 FLOW PROCESS FROM NODE 336.00 TO NODE 336.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 18.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.957
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	76
COMMERCIAL	C	0.60	0.25	0.100	86
COMMERCIAL	D	1.60	0.20	0.100	91
PUBLIC PARK	C	0.10	0.25	0.850	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	3.70	0.25	0.200	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	5.60	0.20	0.200	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

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SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.182
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 32.29
EFFECTIVE AREA(ACRES) = 266.37 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 276.8 PEAK FLOW RATE(CFS) = 681.94

FLOW PROCESS FROM NODE 336.00 TO NODE 336.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.957
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 76
RESIDENTIAL
".4 DWELLING/ACRE" C 0.50 0.25 0.900 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.60 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 3.40 0.25 0.600 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 16.80 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.70 0.25 0.400 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.611
SUBAREA AREA(ACRES) = 22.20 SUBAREA RUNOFF(CFS) = 56.51
EFFECTIVE AREA(ACRES) = 288.57 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 299.0 PEAK FLOW RATE(CFS) = 738.45

FLOW PROCESS FROM NODE 336.00 TO NODE 336.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.957
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" D 6.30 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 16.32
EFFECTIVE AREA(ACRES) = 294.87 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 305.3 PEAK FLOW RATE(CFS) = 754.76

FLOW PROCESS FROM NODE 336.00 TO NODE 337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 380.00 DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 803.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 57.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.30
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 754.76
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 18.56
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 337.00 = 7735.00 FEET.

FLOW PROCESS FROM NODE 337.00 TO NODE 337.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.40 0.25 0.200 86
APARTMENTS D 3.00 0.20 0.200 91
COMMERCIAL B 1.30 0.30 0.100 76
COMMERCIAL C 2.70 0.25 0.100 86
COMMERCIAL D 6.00 0.20 0.100 91
PUBLIC PARK B 1.30 0.30 0.850 76
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.189
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 37.98
EFFECTIVE AREA(ACRES) = 309.57 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 320.0 PEAK FLOW RATE(CFS) = 782.33

FLOW PROCESS FROM NODE 337.00 TO NODE 337.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 3.30 0.25 0.850 86
PUBLIC PARK D 1.50 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 2.50 0.25 0.200 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 6.70 0.20 0.200 91
RESIDENTIAL
".4 DWELLING/ACRE" D 2.20 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.10 0.25 0.600 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 41.23
EFFECTIVE AREA(ACRES) = 325.87 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 336.3 PEAK FLOW RATE(CFS) = 823.56

FLOW PROCESS FROM NODE 337.00 TO NODE 337.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 0.60 0.20 0.600 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 4.60 0.25 0.400 86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 2.90 0.20 0.400 91
SCHOOL B 0.20 0.30 0.600 76
SCHOOL C 5.90 0.25 0.600 86
SCHOOL D 6.00 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.526
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 50.89
EFFECTIVE AREA(ACRES) = 346.07 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 356.5 PEAK FLOW RATE(CFS) = 874.44

FLOW PROCESS FROM NODE 337.00 TO NODE 338.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 332.00
FLOW LENGTH(FEET) = 838.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.7 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 26.31
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 874.44
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 19.09
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 338.00 = 8573.00 FEET.

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS D 6.90 0.20 0.200 91
COMMERCIAL B 1.40 0.30 0.100 76
COMMERCIAL C 1.90 0.25 0.100 86
COMMERCIAL D 5.90 0.20 0.100 91

RESIDENTIAL
"11+ DWELLINGS/ACRE" B 3.60 0.30 0.200 76
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.10 0.25 0.200 86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.154
SUBAREA AREA(ACRES) = 19.80 SUBAREA RUNOFF(CFS) = 50.53
EFFECTIVE AREA(ACRES) = 365.87 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 376.3 PEAK FLOW RATE(CFS) = 910.41

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 1.60 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 4.08
EFFECTIVE AREA(ACRES) = 367.47 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 377.9 PEAK FLOW RATE(CFS) = 914.49

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 2.10 0.40 0.100 52
COMMERCIAL B 8.50 0.30 0.100 76
COMMERCIAL C 1.90 0.25 0.100 86
COMMERCIAL D 0.70 0.20 0.100 91
PUBLIC PARK B 2.60 0.30 0.850 76
PUBLIC PARK D 0.60 0.20 0.850 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.246
SUBAREA AREA(ACRES) = 16.40 SUBAREA RUNOFF(CFS) = 41.33
EFFECTIVE AREA(ACRES) = 383.87 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 394.3 PEAK FLOW RATE(CFS) = 955.82

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.20 0.40 0.200 52
COMMERCIAL B 6.20 0.30 0.100 76
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 1.00 0.25 0.200 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 1.70 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 23.23
EFFECTIVE AREA(ACRES) = 392.97 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 403.4 PEAK FLOW RATE(CFS) = 979.05

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 0.70 0.40 0.100 52
COMMERCIAL B 1.70 0.30 0.100 76
COMMERCIAL C 0.80 0.25 0.100 86
COMMERCIAL D 2.00 0.20 0.100 91
PUBLIC PARK C 0.10 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.10 0.40 0.200 52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.116
SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 13.80
EFFECTIVE AREA(ACRES) = 398.37 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 408.8 PEAK FLOW RATE(CFS) = 992.85

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.25

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EFFECTIVE AREA(ACRES) = 398.47 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 408.9 PEAK FLOW RATE(CFS) = 993.11

FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.30 0.40 0.100 52
COMMERCIAL B 0.10 0.30 0.100 76
COMMERCIAL C 1.10 0.25 0.100 86
SCHOOL A 0.20 0.40 0.600 52
SCHOOL B 0.50 0.30 0.600 76
SCHOOL C 1.20 0.25 0.600 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.316
SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 11.01
EFFECTIVE AREA(ACRES) = 402.87 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 413.3 PEAK FLOW RATE(CFS) = 1004.12

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 4.40 0.40 0.100 52
COMMERCIAL B 3.50 0.30 0.100 76
COMMERCIAL C 4.70 0.25 0.100 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" A 0.30 0.40 0.200 52
SCHOOL A 0.60 0.40 0.600 52
SCHOOL B 0.60 0.30 0.600 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.33
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.145
SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 35.83
EFFECTIVE AREA(ACRES) = 416.97 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 427.4 PEAK FLOW RATE(CFS) = 1039.95

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FLOW PROCESS FROM NODE 338.00 TO NODE 338.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871

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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
SCHOOL	C	3.30	0.25	0.600	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 8.08
 EFFECTIVE AREA(ACRES) = 420.27 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 430.7 PEAK FLOW RATE(CFS) = 1048.03

 FLOW PROCESS FROM NODE 338.00 TO NODE 339.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 332.00 DOWNSTREAM(FEET) = 301.00
 FLOW LENGTH(FEET) = 1956.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 75.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.68
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1048.03
 PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 20.41
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 339.00 = 10529.00 FEET.

 FLOW PROCESS FROM NODE 339.00 TO NODE 339.00 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	1048.03	20.41	2.763	0.23(0.10)	0.45	420.3	327.00
2	1031.18	21.41	2.689	0.23(0.10)	0.45	426.3	350.00
3	1006.82	22.60	2.606	0.23(0.10)	0.45	430.7	320.00

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 339.00 = 10529.00 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	522.41	15.41	3.246	0.22(0.08)	0.38	178.7	300.00
2	410.04	26.51	2.379	0.22(0.09)	0.39	195.4	306.00

LONGEST FLOWPATH FROM NODE 306.00 TO NODE 339.00 = 9467.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1457.20	15.41	3.246	0.22(0.09)	0.42	496.0	300.00
2	1519.85	20.41	2.763	0.22(0.10)	0.43	606.5	327.00
3	1492.84	21.41	2.689	0.22(0.10)	0.43	614.0	350.00
4	1456.43	22.60	2.606	0.22(0.10)	0.43	620.2	320.00
5	1325.36	26.51	2.379	0.22(0.10)	0.43	626.1	306.00

TOTAL AREA(ACRES) = 626.1

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1519.85 Tc(MIN.) = 20.412
 EFFECTIVE AREA(ACRES) = 606.47 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 626.1
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 339.00 = 10529.00 FEET.

 FLOW PROCESS FROM NODE 339.00 TO NODE 340.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.0051
 GIVEN CHANNEL BASE(FEET) = 300.00 CHANNEL FREEBOARD(FEET) = 1.0
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) = 2.26
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.703

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	31.90	0.40	0.100	52
COMMERCIAL	B	2.30	0.30	0.100	76
COMMERCIAL	C	1.90	0.25	0.100	86
COMMERCIAL	D	1.00	0.20	0.100	91
PUBLIC PARK	A	3.10	0.40	0.850	52
PUBLIC PARK	B	0.80	0.30	0.850	76

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.38
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1568.52
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.09
 AVERAGE FLOW DEPTH(FEET) = 1.26 TRAVEL TIME(MIN.) = 0.80
 Tc(MIN.) = 21.21
 SUBAREA AREA(ACRES) = 41.00 SUBAREA RUNOFF(CFS) = 97.35
 EFFECTIVE AREA(ACRES) = 647.47 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 667.1 PEAK FLOW RATE(CFS) = 1520.54
 GIVEN CHANNEL BASE(FEET) = 300.00 CHANNEL FREEBOARD(FEET) = 1.0
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) = 2.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 4.04
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 340.00 = 10725.00 FEET.

 FLOW PROCESS FROM NODE 340.00 TO NODE 340.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 21.21
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.703
 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"	A	4.00	0.40	0.900	52
RESIDENTIAL					

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"4 DWELLING/ACRE" B 1.80 0.30 0.900 76
RESIDENTIAL
"4 DWELLING/ACRE" C 2.40 0.25 0.900 86
PUBLIC PARK C 0.10 0.25 0.850 86
PUBLIC PARK B 0.10 0.30 0.850 76
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.33
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.899
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 18.18
EFFECTIVE AREA(ACRES) = 655.87 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 675.5 PEAK FLOW RATE(CFS) = 1538.72

FLOW PROCESS FROM NODE 340.00 TO NODE 374.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 298.00
FLOW LENGTH(FEET) = 221.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 126.0 INCH PIPE IS 93.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.23
ESTIMATED PIPE DIAMETER(INCH) = 126.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1538.72
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 21.38
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 374.00 = 10946.00 FEET.

FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 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	1500.41	16.39	3.134	0.23(0.10)	0.41	545.4	300.00
2	1538.72	21.38	2.691	0.23(0.10)	0.42	655.9	327.00
3	1513.88	22.38	2.621	0.23(0.10)	0.42	663.4	350.00
4	1480.90	23.59	2.544	0.23(0.10)	0.42	669.6	320.00
5	1361.50	27.53	2.328	0.23(0.10)	0.42	675.5	306.00

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 374.00 = 10946.00 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	345.88	33.52	2.080	0.26(0.20)	0.79	195.1	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 374.00 = 13836.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1764.46	16.39	3.134	0.24(0.11)	0.47	640.8	300.00
2	1831.14	21.38	2.691	0.24(0.11)	0.48	780.3	327.00
3	1811.47	22.38	2.621	0.24(0.11)	0.48	793.7	350.00
4	1784.43	23.59	2.544	0.24(0.11)	0.48	806.9	320.00
5	1683.14	27.53	2.328	0.24(0.12)	0.49	835.7	306.00
6	1555.72	33.52	2.080	0.24(0.12)	0.50	870.6	390.00

TOTAL AREA(ACRES) = 870.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1831.14 Tc(MIN.) = 21.375
EFFECTIVE AREA(ACRES) = 780.27 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 870.6
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 374.00 = 13836.00 FEET.

FLOW PROCESS FROM NODE 374.00 TO NODE 374.00 IS CODE = 12

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

FLOW PROCESS FROM NODE 374.00 TO NODE 380.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 298.00 DOWNSTREAM(FEET) = 261.00
FLOW LENGTH(FEET) = 1402.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 108.0 INCH PIPE IS 84.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.43
ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1831.14
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 22.05
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 380.00 = 15238.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 870.6 TC(MIN.) = 22.05
EFFECTIVE AREA(ACRES) = 780.27 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.476
PEAK FLOW RATE(CFS) = 1831.14

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1764.46	17.07	3.062	0.24(0.11)	0.47	640.8	300.00
2	1831.14	22.05	2.644	0.24(0.11)	0.48	780.3	327.00
3	1811.47	23.06	2.577	0.24(0.11)	0.48	793.7	350.00
4	1784.43	24.27	2.503	0.24(0.11)	0.48	806.9	320.00
5	1683.14	28.21	2.296	0.24(0.12)	0.49	835.7	306.00
6	1555.72	34.23	2.055	0.24(0.12)	0.50	870.6	390.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

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

* RMV PA-3 SUBAREA D ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC OCTOBER 2018 ROKAMOTO *

FILE NAME: PA3D25HC.DAT
TIME/DATE OF STUDY: 08:39 10/11/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 586.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.417

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.859

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"4 DWELLING/ACRE"	C	1.20	0.25	0.900	69	8.77
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	1.30	0.25	0.600	69	7.42
PUBLIC PARK	C	2.40	0.25	0.850	69	8.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.796
SUBAREA RUNOFF(CFS) = 16.14
TOTAL AREA(ACRES) = 4.90 PEAK FLOW RATE(CFS) = 16.14

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62

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

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

=====

UPSTREAM ELEVATION(FEET) = 586.00 DOWNSTREAM ELEVATION(FEET) = 583.00
STREET LENGTH(FEET) = 333.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.63

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54

HALFSTREET FLOOD WIDTH(FEET) = 21.29

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.70

STREET FLOW TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 9.19

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.419

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
PUBLIC PARK	C	0.40	0.25	0.850	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	1.90	0.25	0.400	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.70	0.25	0.600	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.565
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 20.94
EFFECTIVE AREA(ACRES) = 12.00 AREA-AVERAGED Fm(INCH/HR) = 0.16

D-1

D-2

AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.66
TOTAL AREA (ACRES) = 12.0 PEAK FLOW RATE (CFS) = 35.14

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 23.71
FLOW VELOCITY (FEET/SEC.) = 3.37 DEPTH*VELOCITY (FT*FT/SEC.) = 1.97
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 663.00 FEET.

FLOW PROCESS FROM NODE 402.00 TO NODE 402.50 IS CODE = 62

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

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

UPSTREAM ELEVATION (FEET) = 583.00 DOWNSTREAM ELEVATION (FEET) = 580.00
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 41.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.61
HALFSTREET FLOOD WIDTH (FEET) = 25.04
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.58
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.19
STREET FLOW TRAVEL TIME (MIN.) = 1.46 Tc (MIN.) = 10.65
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.144

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.50	0.25	0.850	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	1.80	0.25	0.600	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.10	0.25	0.500	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.30	0.25	0.400	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527					
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 12.74					
EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.16					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.62					
TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 44.92					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 25.82
FLOW VELOCITY (FEET/SEC.) = 3.65 DEPTH*VELOCITY (FT*FT/SEC.) = 2.28
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.50 = 978.00 FEET.

FLOW PROCESS FROM NODE 402.50 TO NODE 403.00 IS CODE = 62

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

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

UPSTREAM ELEVATION (FEET) = 580.00 DOWNSTREAM ELEVATION (FEET) = 579.00
STREET LENGTH (FEET) = 394.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.61

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.76
HALFSTREET FLOOD WIDTH (FEET) = 34.79
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.34
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.78
STREET FLOW TRAVEL TIME (MIN.) = 2.80 Tc (MIN.) = 13.46
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.755

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.20	0.25	0.850	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.80	0.25	0.400	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.435					
SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 7.38					
EFFECTIVE AREA (ACRES) = 19.80 AREA-AVERAGED Fm (INCH/HR) = 0.15					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.59					
TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 46.45					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.75 HALFSTREET FLOOD WIDTH (FEET) = 34.30
FLOW VELOCITY (FEET/SEC.) = 2.31 DEPTH*VELOCITY (FT*FT/SEC.) = 1.74
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1372.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 62

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

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

UPSTREAM ELEVATION (FEET) = 579.00 DOWNSTREAM ELEVATION (FEET) = 560.00
STREET LENGTH (FEET) = 974.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.76
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.60
HALFSTREET FLOOD WIDTH(FEET) = 24.41
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.05
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.02
STREET FLOW TRAVEL TIME(MIN.) = 3.21 Tc(MIN.) = 16.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 5.80 0.25 0.100 69
COMMERCIAL D 0.70 0.20 0.100 75
PUBLIC PARK C 1.10 0.25 0.850 69
PUBLIC PARK D 0.70 0.20 0.850 75
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.10 0.25 0.200 69
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C 0.30 0.25 0.400 69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.267
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 18.61
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 59.46

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 25.04
FLOW VELOCITY(FEET/SEC.) = 5.13 DEPTH*VELOCITY(FT*FT/SEC.) = 3.13
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2346.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" C 0.10 0.25 1.000 77
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.10 0.25 0.600 69
RESIDENTIAL
".4 DWELLING/ACRE" C 2.30 0.25 0.900 69
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 2.70 0.25 0.500 69
RESIDENTIAL

"8-10 DWELLINGS/ACRE" C 3.40 0.25 0.400 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 5.30 0.25 0.200 69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.432
SUBAREA AREA(ACRES) = 13.90 SUBAREA RUNOFF(CFS) = 29.18
EFFECTIVE AREA(ACRES) = 42.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 42.4 PEAK FLOW RATE(CFS) = 88.64

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" D 0.20 0.20 0.900 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 42.60 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 42.6 PEAK FLOW RATE(CFS) = 89.04

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.10 0.25 0.100 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.10 0.25 0.200 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 75
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 0.20 0.20 0.400 75
PUBLIC PARK D 1.50 0.20 0.850 75
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 2.50 0.20 0.500 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.590
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 9.40
EFFECTIVE AREA(ACRES) = 47.10 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 47.1 PEAK FLOW RATE(CFS) = 98.45

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 2.80 0.25 0.850 69
RESIDENTIAL
".4 DWELLING/ACRE" C 3.00 0.25 0.900 69
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 6.40 0.25 0.500 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 6.70 0.25 0.600 69
RESIDENTIAL
".4 DWELLING/ACRE" D 4.30 0.20 0.900 75
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 8.70 0.20 0.600 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.671
SUBAREA AREA(ACRES) = 31.90 SUBAREA RUNOFF(CFS) = 65.65
EFFECTIVE AREA(ACRES) = 79.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 79.0 PEAK FLOW RATE(CFS) = 164.10

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FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 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.) = 16.67
RAINFALL INTENSITY(INCH/HR) = 2.44
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24
AREA-AVERAGED Ap = 0.56
EFFECTIVE STREAM AREA(ACRES) = 79.00
TOTAL STREAM AREA(ACRES) = 79.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 164.10

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 729.00 DOWNSTREAM(FEET) = 630.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.120
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.433
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER

OD-1

"CHAPARRAL,NARROWLEAF" C 0.10 0.25 1.000 81 9.12
NATURAL FAIR COVER
"OPEN BRUSH" C 1.30 0.25 1.000 77 9.12
NATURAL FAIR COVER
"OPEN BRUSH" D 0.10 0.20 1.000 83 9.12
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 4.30
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.30

FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.332

OD-2

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" C 1.70 0.25 1.000 77
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" D 0.10 0.20 1.000 86
NATURAL FAIR COVER
"OPEN BRUSH" D 0.10 0.20 1.000 83
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.60
AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 0.50
Tc(MIN.) = 9.62
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 5.28
EFFECTIVE AREA(ACRES) = 3.40 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 9.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 7.08
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 570.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1111
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.221
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

OD-3

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"1.4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.80	0.25	1.000	77
NATURAL FAIR COVER					
"WOODLAND, GRASS"	C	0.30	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL, NARROWLEAF"	D	0.10	0.20	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.20	0.20	1.000	83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.47					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 6.86					
AVERAGE FLOW DEPTH(Feet) = 0.87 TRAVEL TIME(MIN.) = 0.59					
Tc(MIN.) = 10.21					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 12.05					
EFFECTIVE AREA(ACRES) = 7.90 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 7.9 PEAK FLOW RATE(CFS) = 21.15					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(Feet) = 0.97 FLOW VELOCITY(Feet/Sec.) = 7.44
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 768.00 FEET.

 FLOW PROCESS FROM NODE 433.00 TO NODE 433.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(Feet) = 570.00 DOWNSTREAM(Feet) = 564.00
 FLOW LENGTH(Feet) = 1076.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.3 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 6.29
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 21.15
 PIPE TRAVEL TIME(MIN.) = 2.85 Tc(MIN.) = 13.06
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.10 = 1844.00 FEET.

 FLOW PROCESS FROM NODE 433.10 TO NODE 433.10 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.06
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.802
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
PUBLIC PARK	C	0.50	0.25	0.850	69
RESIDENTIAL					
"1.4 DWELLING/ACRE"	C	1.70	0.25	0.900	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	5.40	0.25	0.500	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.613					

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SUBAREA AREA(ACRES) = 7.60	SUBAREA RUNOFF(CFS) = 18.12
EFFECTIVE AREA(ACRES) = 15.50	AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.25	AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 15.5	PEAK FLOW RATE(CFS) = 36.29

 FLOW PROCESS FROM NODE 433.10 TO NODE 404.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(Feet) = 564.00 DOWNSTREAM(Feet) = 560.00
 FLOW LENGTH(Feet) = 830.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.9 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 6.94
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 36.29
 PIPE TRAVEL TIME(MIN.) = 1.99 Tc(MIN.) = 15.05
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 404.00 = 2674.00 FEET.

 FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 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) = 2.59
 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.25
 AREA-AVERAGED Ap = 0.81
 EFFECTIVE STREAM AREA(ACRES) = 15.50
 TOTAL STREAM AREA(ACRES) = 15.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 36.29

** CONFLUENCE DATA **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	164.10	16.67	2.440	0.24(0.13)	0.56	79.0	400.00
2	36.29	15.05	2.585	0.25(0.20)	0.81	15.5	430.00

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

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	193.78	15.05	2.585	0.24(0.14)	0.60	86.8	430.00
2	198.18	16.67	2.440	0.24(0.14)	0.60	94.5	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 198.18 Tc(MIN.) = 16.67
 EFFECTIVE AREA(ACRES) = 94.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.60
 TOTAL AREA(ACRES) = 94.5
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 404.00 = 2674.00 FEET.

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*****
FLOW PROCESS FROM NODE    404.00 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) =   560.00  DOWNSTREAM(FEET) =   557.00
FLOW LENGTH(FEET) =   377.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   12.70
ESTIMATED PIPE DIAMETER(INCH) =   60.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       198.18
PIPE TRAVEL TIME(MIN.) =    0.49    Tc(MIN.) =   17.16
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =   3051.00 FEET.

*****
FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   17.16
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =   2.400
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          C         1.30    0.25    0.100    69
PUBLIC PARK         C         0.90    0.25    0.850    69
RESIDENTIAL
"11+ DWELLINGS/ACRE" C         0.20    0.25    0.200    69
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C         4.50    0.25    0.500    69
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C         3.20    0.25    0.400    69
COMMERCIAL          D         1.20    0.20    0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   0.406
SUBAREA AREA(ACRES) =   11.30    SUBAREA RUNOFF(CFS) =   23.38
EFFECTIVE AREA(ACRES) =   105.80    AREA-AVERAGED Fm(INCH/HR) =   0.14
AREA-AVERAGED Fp(INCH/HR) =   0.24    AREA-AVERAGED Ap =   0.58
TOTAL AREA(ACRES) =   105.8    PEAK FLOW RATE(CFS) =   215.32

*****
FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   17.16
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =   2.400
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK         D         0.20    0.20    0.850    75
RESIDENTIAL
"11+ DWELLINGS/ACRE" D         0.10    0.20    0.200    75
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D         4.20    0.20    0.500    75
RESIDENTIAL

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"8-10 DWELLINGS/ACRE"    D         3.80    0.20    0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   0.459
SUBAREA AREA(ACRES) =    8.30    SUBAREA RUNOFF(CFS) =   17.24
EFFECTIVE AREA(ACRES) =   114.10    AREA-AVERAGED Fm(INCH/HR) =   0.14
AREA-AVERAGED Fp(INCH/HR) =   0.24    AREA-AVERAGED Ap =   0.57
TOTAL AREA(ACRES) =   114.1    PEAK FLOW RATE(CFS) =   232.56

*****
FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   17.16
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =   2.400
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" C         4.80    0.25    0.200    69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C         0.10    0.25    0.600    69
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C         5.20    0.25    0.400    69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   0.307
SUBAREA AREA(ACRES) =   10.10    SUBAREA RUNOFF(CFS) =   21.12
EFFECTIVE AREA(ACRES) =   124.20    AREA-AVERAGED Fm(INCH/HR) =   0.13
AREA-AVERAGED Fp(INCH/HR) =   0.24    AREA-AVERAGED Ap =   0.55
TOTAL AREA(ACRES) =   124.2    PEAK FLOW RATE(CFS) =   253.68

*****
FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
FLOW LENGTH(FEET) =   525.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   25.15
ESTIMATED PIPE DIAMETER(INCH) =   48.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       253.68
PIPE TRAVEL TIME(MIN.) =    0.35    Tc(MIN.) =   17.51
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =   3576.00 FEET.

*****
FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   17.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =   2.373
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   C         0.30    0.25    0.900    69

```

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
PUBLIC PARK	C	0.90	0.25	0.850	69
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	8.70	0.25	0.200	69
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.10	0.20	0.900	75
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	75
PUBLIC PARK	D	0.40	0.20	0.850	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.311
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 21.71
EFFECTIVE AREA(ACRES) = 134.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 134.7 PEAK FLOW RATE(CFS) = 272.37

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.373
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 9.00 0.20 0.200 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 18.90
EFFECTIVE AREA(ACRES) = 143.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 143.7 PEAK FLOW RATE(CFS) = 291.26

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	292.17	15.89	2.507	0.24(0.12)	0.51	136.0	430.00
2	291.26	17.51	2.373	0.24(0.12)	0.51	143.7	400.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 292.17 Tc(MIN.) = 15.89
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.24
AREA-AVERAGED Ap = 0.51 EFFECTIVE AREA(ACRES) = 136.04

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.89
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.507
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.30 0.30 0.600 56
RESIDENTIAL
".4 DWELLING/ACRE" C 0.50 0.25 0.900 69

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	18.70	0.25	0.600	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	1.00	0.20	0.600	75
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.10	0.20	0.900	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.609
SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 43.67
EFFECTIVE AREA(ACRES) = 156.64 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 164.3 PEAK FLOW RATE(CFS) = 335.84

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 311.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.63
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 335.84
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 16.04
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 407.00 = 3887.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.04
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 0.10 0.25 0.500 69
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 69
COMMERCIAL C 2.20 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" D 0.40 0.20 0.900 75
COMMERCIAL D 1.10 0.20 0.100 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.353
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 10.63
EFFECTIVE AREA(ACRES) = 161.54 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 169.2 PEAK FLOW RATE(CFS) = 344.60

FLOW PROCESS FROM NODE 407.00 TO NODE 408.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 624.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.22
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.60
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 16.41
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 408.00 = 4511.00 FEET.

FLOW PROCESS FROM NODE 408.00 TO NODE 408.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.70	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.60	0.30	0.600	56
COMMERCIAL	C	1.40	0.25	0.100	69
RESIDENTIAL					
"4 DWELLING/ACRE"	C	4.80	0.25	0.900	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.20	0.25	0.600	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	2.20	0.25	0.500	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.649
SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 30.76
EFFECTIVE AREA(ACRES) = 176.44 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 184.1 PEAK FLOW RATE(CFS) = 370.73

FLOW PROCESS FROM NODE 408.00 TO NODE 408.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.30	0.20	0.100	75
RESIDENTIAL					
"4 DWELLING/ACRE"	D	2.10	0.20	0.900	75
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	6.60	0.20	0.600	75
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	2.00	0.20	0.500	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.625
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 23.13

EFFECTIVE AREA(ACRES) = 187.44 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 195.1 PEAK FLOW RATE(CFS) = 393.86

FLOW PROCESS FROM NODE 408.00 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) = 480.00 DOWNSTREAM(FEET) = 460.00
FLOW LENGTH(FEET) = 368.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.97
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 393.86
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 16.61
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 409.00 = 4879.00 FEET.

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.445
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.70	0.30	0.850	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.20	0.30	0.600	56
APARTMENTS	C	0.20	0.25	0.200	69
COMMERCIAL	C	0.60	0.25	0.100	69
PUBLIC PARK	C	1.80	0.25	0.850	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 11.81
EFFECTIVE AREA(ACRES) = 193.24 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 200.9 PEAK FLOW RATE(CFS) = 402.86

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.445
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	C	1.20	0.25	0.900	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	2.90	0.25	0.600	69

RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 3.30 0.25 0.500 69
APARTMENTS D 0.10 0.20 0.200 75
COMMERCIAL D 0.40 0.20 0.100 75
RESIDENTIAL
".4 DWELLING/ACRE" D 1.20 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.616
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 18.81
EFFECTIVE AREA(ACRES) = 202.34 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 210.0 PEAK FLOW RATE(CFS) = 421.67

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.445
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 3.80 0.20 0.600 75
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 2.00 0.20 0.500 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.566
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 12.17
EFFECTIVE AREA(ACRES) = 208.14 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 215.8 PEAK FLOW RATE(CFS) = 433.84

FLOW PROCESS FROM NODE 409.00 TO NODE 410.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 291.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.8 INCHES
PIPE-FLOW VELOCITY(FT/SEC.) = 31.18
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 433.84
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.77
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 410.00 = 5170.00 FEET.

FLOW PROCESS FROM NODE 410.00 TO NODE 410.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 0.90 0.30 0.850 56
APARTMENTS C 1.50 0.25 0.200 69
COMMERCIAL C 0.80 0.25 0.100 69
PUBLIC PARK C 2.30 0.25 0.850 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 1.40 0.25 0.600 69
APARTMENTS D 3.10 0.20 0.200 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 20.86
EFFECTIVE AREA(ACRES) = 218.14 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 225.8 PEAK FLOW RATE(CFS) = 452.29

FLOW PROCESS FROM NODE 410.00 TO NODE 410.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK D 1.10 0.20 0.850 75
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 75
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 4.00 0.20 0.600 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 10.78
EFFECTIVE AREA(ACRES) = 223.34 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 231.0 PEAK FLOW RATE(CFS) = 463.07

FLOW PROCESS FROM NODE 410.00 TO NODE 410.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 2.10 0.25 0.200 69
APARTMENTS D 8.90 0.20 0.200 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 23.66
EFFECTIVE AREA(ACRES) = 234.34 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 242.0 PEAK FLOW RATE(CFS) = 486.73

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 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) = 445.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 324.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.23
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 486.73
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.92
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 411.00 = 5494.00 FEET.

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

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>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 16.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.419
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.10 0.25 0.200 69
COMMERCIAL C 0.20 0.25 0.100 69
PUBLIC PARK C 1.70 0.25 0.850 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.70 0.25 0.200 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.20 0.25 0.600 69
COMMERCIAL D 0.70 0.20 0.100 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.504
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 7.43
EFFECTIVE AREA(ACRES) = 237.94 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 245.6 PEAK FLOW RATE(CFS) = 491.45

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

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>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 16.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.419
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK D 0.90 0.20 0.850 75
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 8.80 0.20 0.200 75
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 0.20 0.20 0.600 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.267
SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 21.08
EFFECTIVE AREA(ACRES) = 247.84 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.51

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TOTAL AREA(ACRES) = 255.5 PEAK FLOW RATE(CFS) = 512.53

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

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>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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MAINLINE Tc(MIN.) = 16.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.419
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.50 0.25 0.200 69
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 2.10 0.25 0.600 69
APARTMENTS D 0.70 0.20 0.200 75
RESIDENTIAL
".4 DWELLING/ACRE" D 0.10 0.20 0.900 75
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 4.30 0.20 0.600 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.546
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 16.15
EFFECTIVE AREA(ACRES) = 255.64 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 263.3 PEAK FLOW RATE(CFS) = 528.68

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*****
FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 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) = 425.00 DOWNSTREAM(FEET) = 392.00
FLOW LENGTH(FEET) = 641.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 32.47
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 528.68
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 17.25
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 412.00 = 6135.00 FEET.

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

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>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 17.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.393
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.60 0.25 0.100 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 5.30 0.25 0.200 69
RESIDENTIAL

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```

".4 DWELLING/ACRE"      C      0.10    0.25    0.900    69
COMMERCIAL              D      1.10    0.20    0.100    75
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      7.30    0.20    0.200    75
RESIDENTIAL
".4 DWELLING/ACRE"      D      0.10    0.20    0.900    75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.198
SUBAREA AREA(ACRES) = 14.50    SUBAREA RUNOFF(CFS) = 30.66
EFFECTIVE AREA(ACRES) = 270.14    AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 277.8    PEAK FLOW RATE(CFS) = 553.30

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.393
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B      0.20    0.30    0.200    56
COMMERCIAL              C      0.20    0.25    0.100    69
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C      4.10    0.25    0.200    69
RESIDENTIAL
".4 DWELLING/ACRE"      C      0.60    0.25    0.900    69
RESIDENTIAL
"8-10 DWELLINGS/ACRE"    C      3.10    0.25    0.400    69
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      0.50    0.20    0.200    75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.317
SUBAREA AREA(ACRES) = 8.70    SUBAREA RUNOFF(CFS) = 18.12
EFFECTIVE AREA(ACRES) = 278.84    AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 286.5    PEAK FLOW RATE(CFS) = 571.42

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.393
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"      D      0.50    0.20    0.900    75
RESIDENTIAL
"8-10 DWELLINGS/ACRE"    D      4.00    0.20    0.400    75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456
SUBAREA AREA(ACRES) = 4.50    SUBAREA RUNOFF(CFS) = 9.32

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EFFECTIVE AREA(ACRES) = 283.34    AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 291.0    PEAK FLOW RATE(CFS) = 580.74

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 420.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 392.00    DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 1358.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.56
ESTIMATED PIPE DIAMETER(INCH) = 69.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 580.74
PIPE TRAVEL TIME(MIN.) = 0.82    Tc(MIN.) = 18.07
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 420.00 = 7493.00 FEET.

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*****
FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.07
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              C      0.50    0.25    0.100    69
COMMERCIAL              D      1.30    0.20    0.100    75
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      0.10    0.20    0.200    75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.105
SUBAREA AREA(ACRES) = 1.90    SUBAREA RUNOFF(CFS) = 3.95
EFFECTIVE AREA(ACRES) = 285.24    AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 292.9    PEAK FLOW RATE(CFS) = 580.74
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 346.00    DOWNSTREAM(FEET) = 320.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1617.00    CHANNEL SLOPE = 0.0161
CHANNEL BASE(FEET) = 200.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              B      6.90    0.30    0.100    56
COMMERCIAL              C      3.60    0.25    0.100    69
COMMERCIAL              D      2.20    0.20    0.100    75

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D-32

D-32

RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" C 0.40 0.25 0.900 69
 RESIDENTIAL
 ".4 DWELLING/ACRE" D 1.30 0.20 0.900 75
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 593.88
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 4.62
 AVERAGE FLOW DEPTH(Feet) = 0.64 TRAVEL TIME(MIN.) = 5.83
 Tc(MIN.) = 23.90
 SUBAREA AREA(ACRES) = 15.10 SUBAREA RUNOFF(CFS) = 26.27
 EFFECTIVE AREA(ACRES) = 300.34 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 308.0 PEAK FLOW RATE(CFS) = 580.74
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(Feet) = 0.63 FLOW VELOCITY(Feet/Sec.) = 4.58
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 421.00 = 9110.00 FEET.

 FLOW PROCESS FROM NODE 421.00 TO NODE 421.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 23.90
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	1.10	0.30	0.850	56
PUBLIC PARK	C	2.50	0.25	0.850	69
PUBLIC PARK	D	3.60	0.20	0.850	75

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 11.61
 EFFECTIVE AREA(ACRES) = 307.54 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 315.2 PEAK FLOW RATE(CFS) = 580.74
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

D-34

 FLOW PROCESS FROM NODE 421.00 TO NODE 427.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(Feet) = 320.00 DOWNSTREAM(Feet) = 310.00
 FLOW LENGTH(Feet) = 1453.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 70.8 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 15.58
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 580.74
 PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 25.46
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 427.00 = 10563.00 FEET.

 FLOW PROCESS FROM NODE 427.00 TO NODE 427.00 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.) = 25.46
 RAINFALL INTENSITY(INCH/HR) = 1.92
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24
 AREA-AVERAGED Ap = 0.48
 EFFECTIVE STREAM AREA(ACRES) = 307.54
 TOTAL STREAM AREA(ACRES) = 315.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 580.74

 FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(Feet) = 330.00
 ELEVATION DATA: UPSTREAM(Feet) = 515.00 DOWNSTREAM(Feet) = 497.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.533
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.555
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	C	0.10	0.25	0.100	69	5.53
PUBLIC PARK	C	1.10	0.25	0.850	69	8.79
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	69	7.50
COMMERCIAL	D	0.10	0.20	0.100	75	5.53
PUBLIC PARK	D	0.30	0.20	0.850	75	8.79
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	D	1.50	0.20	0.600	75	7.50

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.678
 SUBAREA RUNOFF(CFS) = 12.68
 TOTAL AREA(ACRES) = 3.20 PEAK FLOW RATE(CFS) = 12.68

D-21

 FLOW PROCESS FROM NODE 414.00 TO NODE 414.10 IS CODE = 62

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

=====

UPSTREAM ELEVATION(Feet) = 497.00 DOWNSTREAM ELEVATION(Feet) = 493.00
 STREET LENGTH(Feet) = 371.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(Feet) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.66
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 18.55
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.56
STREET FLOW TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 7.49
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.838
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 1.40 0.25 0.850 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 1.40 0.25 0.600 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 2.00 0.20 0.600 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673
SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 15.91
EFFECTIVE AREA(ACRES) = 8.00 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.68
TOTAL AREA(ACRES) = 8.0 PEAK FLOW RATE(CFS) = 26.52

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.51
FLOW VELOCITY(FEET/SEC.) = 3.36 DEPTH*VELOCITY(FT*FT/SEC.) = 1.78
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 414.10 = 701.00 FEET.

FLOW PROCESS FROM NODE 414.10 TO NODE 414.20 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 493.00 DOWNSTREAM ELEVATION(FEET) = 490.00
STREET LENGTH(FEET) = 476.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.35
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.61
HALFSTREET FLOOD WIDTH(FEET) = 25.20
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.93
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.79

STREET FLOW TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 10.20
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	C	0.10	0.25	0.200	69
COMMERCIAL	C	0.50	0.25	0.100	69
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	3.40	0.25	0.600	69
COMMERCIAL	D	0.40	0.20	0.100	75
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	1.20	0.20	0.600	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.512					
SUBAREA AREA(ACRES) = 5.60		SUBAREA RUNOFF(CFS) = 15.63			
EFFECTIVE AREA(ACRES) = 13.60		AREA-AVERAGED Fm(INCH/HR) = 0.14			
AREA-AVERAGED Fp(INCH/HR) = 0.23		AREA-AVERAGED Ap = 0.61			
TOTAL AREA(ACRES) = 13.6		PEAK FLOW RATE(CFS) = 37.72			

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.63 HALFSTREET FLOOD WIDTH(FEET) = 26.13
FLOW VELOCITY(FEET/SEC.) = 3.00 DEPTH*VELOCITY(FT*FT/SEC.) = 1.89
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 414.20 = 1177.00 FEET.

FLOW PROCESS FROM NODE 414.20 TO NODE 415.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 490.00 DOWNSTREAM(FEET) = 465.00
FLOW LENGTH(FEET) = 488.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.09
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.72
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 10.67
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 415.00 = 1665.00 FEET.

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.140
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 69
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 2.30 0.25 0.600 69
APARTMENTS D 0.10 0.20 0.200 75
COMMERCIAL D 0.80 0.20 0.100 75
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 3.20 0.20 0.600 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22

D-23

D-22

D-24

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 17.68
EFFECTIVE AREA(ACRES) = 20.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 54.40

FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 465.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 497.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.51
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 54.40
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 11.12
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 416.00 = 2162.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.068
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.80	0.20	0.100	75
RESIDENTIAL					
"4 DWELLING/ACRE"	D	0.40	0.20	0.900	75
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	3.70	0.20	0.400	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.392					
SUBAREA AREA(ACRES) = 4.90					
SUBAREA RUNOFF(CFS) = 13.19					
EFFECTIVE AREA(ACRES) = 25.00					
AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.22					
AREA-AVERAGED Ap = 0.55					
TOTAL AREA(ACRES) = 25.0					
PEAK FLOW RATE(CFS) = 66.28					

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.068
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	1.80	0.25	0.200	69
RESIDENTIAL					
"4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
RESIDENTIAL					

"3-4 DWELLINGS/ACRE" C 1.60 0.25 0.600 69
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 3.60 0.20 0.200 75
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 3.00 0.20 0.600 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.389
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 27.12
EFFECTIVE AREA(ACRES) = 35.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 35.1 PEAK FLOW RATE(CFS) = 93.40

FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 420.00
FLOW LENGTH(FEET) = 437.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.36
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 93.40
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 11.48
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 417.00 = 2599.00 FEET.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	1.50	0.25	0.200	69
COMMERCIAL	D	0.70	0.20	0.100	75
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	3.40	0.20	0.200	75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.188					
SUBAREA AREA(ACRES) = 5.60					
SUBAREA RUNOFF(CFS) = 14.99					
EFFECTIVE AREA(ACRES) = 40.70					
AREA-AVERAGED Fm(INCH/HR) = 0.10					
AREA-AVERAGED Fp(INCH/HR) = 0.22					
AREA-AVERAGED Ap = 0.46					
TOTAL AREA(ACRES) = 40.7					
PEAK FLOW RATE(CFS) = 106.66					

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	C	4.60	0.25	0.100	69
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	4.00	0.25	0.200	69
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	69
COMMERCIAL	D	1.50	0.20	0.100	75
PUBLIC PARK	D	2.10	0.20	0.850	75
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	1.60	0.20	0.200	75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.264
 SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 37.24
 EFFECTIVE AREA(ACRES) = 54.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 54.7 PEAK FLOW RATE(CFS) = 143.91

 FLOW PROCESS FROM NODE 417.00 TO NODE 418.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 400.00
 FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.97
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 143.91
 PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 11.99
 LONGEST FLOWPATH FROM NODE 413.00 TO NODE 418.00 = 3218.00 FEET.

 FLOW PROCESS FROM NODE 418.00 TO NODE 418.00 IS CODE = 81

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

 MAINLINE Tc(MIN.) = 11.99
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	C	2.10	0.25	0.100	69
COMMERCIAL	D	3.90	0.20	0.100	75
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	69
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	3.20	0.25	0.500	69

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.333
 SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 39.99
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 180.25

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 FLOW PROCESS FROM NODE 418.00 TO NODE 418.00 IS CODE = 81

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

 MAINLINE Tc(MIN.) = 11.99
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	0.30	0.20	0.500	75
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	3.10	0.25	0.400	69
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	0.20	0.20	0.400	75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.22
 EFFECTIVE AREA(ACRES) = 74.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 74.3 PEAK FLOW RATE(CFS) = 190.47

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 FLOW PROCESS FROM NODE 418.00 TO NODE 418.00 IS CODE = 81

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

 MAINLINE Tc(MIN.) = 11.99
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
COMMERCIAL	C	3.70	0.25	0.100	69
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	3.50	0.25	0.200	69
COMMERCIAL	D	0.70	0.20	0.100	75
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	0.10	0.20	0.200	75

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.154
 SUBAREA AREA(ACRES) = 10.80 SUBAREA RUNOFF(CFS) = 28.18
 EFFECTIVE AREA(ACRES) = 85.10 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 85.1 PEAK FLOW RATE(CFS) = 218.65

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 FLOW PROCESS FROM NODE 418.00 TO NODE 425.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 320.00

FLOW LENGTH(FEET) = 1179.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.15
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 218.65
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 12.67
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 425.00 = 4397.00 FEET.

FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.850
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL C 0.40 0.25 0.100 69
COMMERCIAL D 0.90 0.20 0.100 75
PUBLIC PARK B 5.30 0.30 0.850 56
PUBLIC PARK C 3.10 0.25 0.850 69
PUBLIC PARK D 9.10 0.20 0.850 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.777
SUBAREA AREA(ACRES) = 19.40 SUBAREA RUNOFF(CFS) = 46.52
EFFECTIVE AREA(ACRES) = 104.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 104.5 PEAK FLOW RATE(CFS) = 258.31

FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.850
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 1.30 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" C 1.90 0.25 0.900 69
RESIDENTIAL
".4 DWELLING/ACRE" D 1.90 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 12.07
EFFECTIVE AREA(ACRES) = 109.60 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 109.6 PEAK FLOW RATE(CFS) = 270.38

FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 316.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 870.00 CHANNEL SLOPE = 0.0046
GIVEN CHANNEL BASE(FEET) = 200.00 CHANNEL FREEBOARD(FEET) = 1.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
*ESTIMATED CHANNEL HEIGHT(FEET) = 1.60
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.277

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 3.40 0.40 0.100 32
COMMERCIAL B 3.30 0.30 0.100 56
PUBLIC PARK A 0.80 0.40 0.850 32
PUBLIC PARK B 0.30 0.30 0.850 56

RESIDENTIAL
".4 DWELLING/ACRE" A 0.90 0.40 0.900 32
RESIDENTIAL
".4 DWELLING/ACRE" B 2.30 0.30 0.900 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.408
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 280.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.35
AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 6.17
Tc(MIN.) = 18.84
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 21.17
EFFECTIVE AREA(ACRES) = 120.60 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 120.6 PEAK FLOW RATE(CFS) = 270.38
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
GIVEN CHANNEL BASE(FEET) = 200.00 CHANNEL FREEBOARD(FEET) = 1.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030
*ESTIMATED CHANNEL HEIGHT(FEET) = 1.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 2.32
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 426.00 = 5267.00 FEET.

FLOW PROCESS FROM NODE 426.00 TO NODE 426.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.84
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.277
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 1.50 0.40 0.100 32
RESIDENTIAL
".4 DWELLING/ACRE" A 1.70 0.40 0.900 32
PUBLIC PARK A 0.50 0.40 0.850 32
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.569
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 6.82
EFFECTIVE AREA(ACRES) = 124.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 124.3 PEAK FLOW RATE(CFS) = 270.38

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
FLOW LENGTH(FEET) =   321.00  MANNING'S N =   0.013
DEPTH OF FLOW IN   57.0 INCH PIPE IS   43.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   18.86
ESTIMATED PIPE DIAMETER(INCH) =   57.00  NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       270.38
PIPE TRAVEL TIME(MIN.) =    0.28  Tc(MIN.) =   19.12
LONGEST FLOWPATH FROM NODE   413.00 TO NODE   427.00 =   5588.00 FEET.

*****
FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   19.12
RAINFALL INTENSITY(INCH/HR) =    2.26
AREA-AVERAGED Fm(INCH/HR) =    0.12
AREA-AVERAGED Fp(INCH/HR) =    0.25
AREA-AVERAGED Ap =    0.46
EFFECTIVE STREAM AREA(ACRES) =   124.30
TOTAL STREAM AREA(ACRES) =   124.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =   270.38

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1          580.74  25.46   1.920  0.24( 0.11) 0.48   307.5  430.00
1          565.34  27.17   1.851  0.24( 0.11) 0.49   315.2  400.00
2          270.38  19.12   2.258  0.25( 0.12) 0.46   124.3  413.00

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

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1          788.11  19.12   2.258  0.24( 0.11) 0.48   355.3  413.00
2          808.50  25.46   1.920  0.24( 0.11) 0.48   431.8  430.00
3          784.34  27.17   1.851  0.24( 0.11) 0.48   439.5  400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    808.50  Tc(MIN.) =   25.46
EFFECTIVE AREA(ACRES) =   431.84  AREA-AVERAGED Fm(INCH/HR) =   0.11
AREA-AVERAGED Fp(INCH/HR) =    0.24  AREA-AVERAGED Ap =   0.48
TOTAL AREA(ACRES) =   439.5
LONGEST FLOWPATH FROM NODE   430.00 TO NODE   427.00 =  10563.00 FEET.
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*****
FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
FLOW LENGTH(FEET) =   789.00  MANNING'S N =   0.013
DEPTH OF FLOW IN   72.0 INCH PIPE IS   56.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   34.07
ESTIMATED PIPE DIAMETER(INCH) =   72.00  NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       808.50
PIPE TRAVEL TIME(MIN.) =    0.39  Tc(MIN.) =   25.84
LONGEST FLOWPATH FROM NODE   430.00 TO NODE   428.00 =  11352.00 FEET.

=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) =   439.5  TC(MIN.) =   25.84
EFFECTIVE AREA(ACRES) =   431.84  AREA-AVERAGED Fm(INCH/HR) =   0.11
AREA-AVERAGED Fp(INCH/HR) =    0.24  AREA-AVERAGED Ap =   0.477
PEAK FLOW RATE(CFS) =   808.50

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1          788.11  19.51   2.232  0.24( 0.11) 0.48   355.3  413.00
2          808.50  25.84   1.904  0.24( 0.11) 0.48   431.8  430.00
3          784.34  27.56   1.836  0.24( 0.11) 0.48   439.5  400.00

=====
END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA D ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC OCTOBER 2018 ROKAMOTO *

FILE NAME: PA3D00HC.DAT
TIME/DATE OF STUDY: 08:38 10/11/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 586.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.417

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.936

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	1.20	0.25	0.900	86	8.77
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	1.30	0.25	0.600	86	7.42
PUBLIC PARK	C	2.40	0.25	0.850	86	8.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.796
SUBAREA RUNOFF(CFS) = 20.89
TOTAL AREA(ACRES) = 4.90 PEAK FLOW RATE(CFS) = 20.89

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 586.00 DOWNSTREAM ELEVATION(FEET) = 583.00
STREET LENGTH(FEET) = 333.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.50
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.58
HALFSTREET FLOOD WIDTH(FEET) = 23.55
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.95
STREET FLOW TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 9.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

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	0.10	0.25	0.900	86
PUBLIC PARK	C	0.40	0.25	0.850	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	1.90	0.25	0.400	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.70	0.25	0.600	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.565
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 27.20
EFFECTIVE AREA(ACRES) = 12.00 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.66
TOTAL AREA (ACRES) = 12.0 PEAK FLOW RATE (CFS) = 45.71

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.63 HALFSTREET FLOOD WIDTH (FEET) = 26.29
FLOW VELOCITY (FEET/SEC.) = 3.59 DEPTH*VELOCITY (FT*FT/SEC.) = 2.27
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 663.00 FEET.

FLOW PROCESS FROM NODE 402.00 TO NODE 402.50 IS CODE = 62

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

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

UPSTREAM ELEVATION (FEET) = 583.00 DOWNSTREAM ELEVATION (FEET) = 580.00
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.02

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.66
HALFSTREET FLOOD WIDTH (FEET) = 27.77
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.81
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.51
STREET FLOW TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.056

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.50	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	1.80	0.25	0.600	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	0.10	0.25	0.500	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.30	0.25	0.400	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527					
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 16.60					
EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.16					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.62					
TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 58.62					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.67 HALFSTREET FLOOD WIDTH (FEET) = 29.00
FLOW VELOCITY (FEET/SEC.) = 3.90 DEPTH*VELOCITY (FT*FT/SEC.) = 2.63
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.50 = 978.00 FEET.

FLOW PROCESS FROM NODE 402.50 TO NODE 403.00 IS CODE = 62

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

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

UPSTREAM ELEVATION (FEET) = 580.00 DOWNSTREAM ELEVATION (FEET) = 579.00
STREET LENGTH (FEET) = 394.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 63.46

STREET FLOWING FULL

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.82
HALFSTREET FLOOD WIDTH (FEET) = 37.60
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.56
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.09
STREET FLOW TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 13.02
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.576

SUBAREA LOSS RATE DATA (AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	0.20	0.25	0.850	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	2.80	0.25	0.400	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.435					
SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 9.67					
EFFECTIVE AREA (ACRES) = 19.80 AREA-AVERAGED Fm (INCH/HR) = 0.15					
AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.59					
TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 61.08					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.81 HALFSTREET FLOOD WIDTH (FEET) = 37.17
FLOW VELOCITY (FEET/SEC.) = 2.52 DEPTH*VELOCITY (FT*FT/SEC.) = 2.05
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1372.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 62

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

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

UPSTREAM ELEVATION (FEET) = 579.00 DOWNSTREAM ELEVATION (FEET) = 560.00
STREET LENGTH (FEET) = 974.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 73.26
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.65
HALFSTREET FLOOD WIDTH(FEET) = 27.15
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.41
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.50
STREET FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 16.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	5.80	0.25	0.100	86
COMMERCIAL	D	0.70	0.20	0.100	91
PUBLIC PARK	C	1.10	0.25	0.850	86
PUBLIC PARK	D	0.70	0.20	0.850	91
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	0.10	0.25	0.200	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	0.30	0.25	0.400	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.267					
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 24.37					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.49					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 78.30					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 27.85
FLOW VELOCITY(FEET/SEC.) = 5.50 DEPTH*VELOCITY(FT*FT/SEC.) = 3.63
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2346.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.10	0.25	1.000	92
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	2.30	0.25	0.900	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	2.70	0.25	0.500	86
RESIDENTIAL					

"8-10 DWELLINGS/ACRE"	C	3.40	0.25	0.400	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	5.30	0.25	0.200	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.432					
SUBAREA AREA(ACRES) = 13.90 SUBAREA RUNOFF(CFS) = 38.36					
EFFECTIVE AREA(ACRES) = 42.40 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.47					
TOTAL AREA(ACRES) = 42.4 PEAK FLOW RATE(CFS) = 116.66					

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175
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"	D	0.20	0.20	0.900	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900					
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.54					
EFFECTIVE AREA(ACRES) = 42.60 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.47					
TOTAL AREA(ACRES) = 42.6 PEAK FLOW RATE(CFS) = 117.20					

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.10	0.25	0.100	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	0.10	0.25	0.200	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	0.10	0.20	0.200	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	0.20	0.20	0.400	91
PUBLIC PARK	D	1.50	0.20	0.850	91
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	2.50	0.20	0.500	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.590					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 12.38					
EFFECTIVE AREA(ACRES) = 47.10 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.49					
TOTAL AREA(ACRES) = 47.1 PEAK FLOW RATE(CFS) = 129.58					

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	C	2.80	0.25	0.850	86
RESIDENTIAL					
"1.4 DWELLING/ACRE"	C	3.00	0.25	0.900	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	6.40	0.25	0.500	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	6.70	0.25	0.600	86
RESIDENTIAL					
"1.4 DWELLING/ACRE"	D	4.30	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	8.70	0.20	0.600	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.671					
SUBAREA AREA(ACRES) = 31.90					
SUBAREA RUNOFF(CFS) = 86.74					
EFFECTIVE AREA(ACRES) = 79.00					
AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.24					
AREA-AVERAGED Ap = 0.56					
TOTAL AREA(ACRES) = 79.0					
PEAK FLOW RATE(CFS) = 216.32					

D-6

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 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.) = 16.02
RAINFALL INTENSITY(INCH/HR) = 3.17
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24
AREA-AVERAGED Ap = 0.56
EFFECTIVE STREAM AREA(ACRES) = 79.00
TOTAL STREAM AREA(ACRES) = 79.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 216.32

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 729.00 DOWNSTREAM(FEET) = 630.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.120
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.385
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						

OD-1

"CHAPARRAL,NARROWLEAF"	C	0.10	0.25	1.000	95	9.12
NATURAL FAIR COVER						
"OPEN BRUSH"	C	1.30	0.25	1.000	92	9.12
NATURAL FAIR COVER						
"OPEN BRUSH"	D	0.10	0.20	1.000	96	9.12
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 5.59						
TOTAL AREA(ACRES) = 1.50						
PEAK FLOW RATE(CFS) = 5.59						

FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.262

OD-2

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	1.70	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	D	0.10	0.20	1.000	97
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.10	0.20	1.000	96
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.02					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.05					
AVERAGE FLOW DEPTH(FEET) = 0.65					
TRAVEL TIME(MIN.) = 0.46					
Tc(MIN.) = 9.58					
SUBAREA AREA(ACRES) = 1.90					
SUBAREA RUNOFF(CFS) = 6.87					
EFFECTIVE AREA(ACRES) = 3.40					
AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25					
AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 3.4					
PEAK FLOW RATE(CFS) = 12.29					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 7.58
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 570.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1111
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.127
SUBAREA LOSS RATE DATA(AMC III):

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

OD-3

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
".4 DWELLING/ACRE"      C      0.10      0.25      0.900      86
NATURAL FAIR COVER
"OPEN BRUSH"           C      3.80      0.25      1.000      92
NATURAL FAIR COVER
"WOODLAND,GRASS"       C      0.30      0.25      1.000      92
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" D      0.10      0.20      1.000      97
NATURAL FAIR COVER
"OPEN BRUSH"           D      0.20      0.20      1.000      96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 7.31
AVERAGE FLOW DEPTH(Feet) = 0.96 TRAVEL TIME(Min.) = 0.55
Tc(Min.) = 10.14
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 15.72
EFFECTIVE AREA(ACRES) = 7.90 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.9 PEAK FLOW RATE(CFS) = 27.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(Feet) = 1.08 FLOW VELOCITY(Feet/Sec.) = 7.91
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 768.00 FEET.

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FLOW PROCESS FROM NODE 433.00 TO NODE 433.10 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) = 570.00 DOWNSTREAM(Feet) = 564.00
FLOW LENGTH(Feet) = 1076.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.3 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 6.74
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.59
PIPE TRAVEL TIME(Min.) = 2.66 Tc(Min.) = 12.80
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.10 = 1844.00 FEET.

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*****
FLOW PROCESS FROM NODE 433.10 TO NODE 433.10 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(Min.) = 12.80
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.611
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 0.50 0.25 0.850 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.70 0.25 0.900 86
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 5.40 0.25 0.500 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.613

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SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 23.65
EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 15.5 PEAK FLOW RATE(CFS) = 47.57

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*****
FLOW PROCESS FROM NODE 433.10 TO NODE 404.00 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) = 564.00 DOWNSTREAM(Feet) = 560.00
FLOW LENGTH(Feet) = 830.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.3 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 7.39
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 47.57
PIPE TRAVEL TIME(Min.) = 1.87 Tc(Min.) = 14.67
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 404.00 = 2674.00 FEET.

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*****
FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(Min.) = 14.67
RAINFALL INTENSITY(INCH/HR) = 3.34
AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.81
EFFECTIVE STREAM AREA(ACRES) = 15.50
TOTAL STREAM AREA(ACRES) = 15.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 47.57

```

```

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (Min.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 216.32 16.02 3.175 0.24( 0.13) 0.56 79.0 400.00
2 47.57 14.67 3.339 0.25( 0.20) 0.81 15.5 430.00

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

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** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (Min.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 256.36 14.67 3.339 0.24( 0.14) 0.60 87.8 430.00
2 261.40 16.02 3.175 0.24( 0.14) 0.60 94.5 400.00

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 261.40 Tc(Min.) = 16.02
EFFECTIVE AREA(ACRES) = 94.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 94.5
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 404.00 = 2674.00 FEET.

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*****
FLOW PROCESS FROM NODE    404.00 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) =   560.00  DOWNSTREAM(FEET) =   557.00
FLOW LENGTH(FEET) =   377.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  66.0 INCH PIPE IS  49.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  13.57
ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      261.40
PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   16.49
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =   3051.00 FEET.

*****
FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   16.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.123
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          C          1.30    0.25    0.100    86
PUBLIC PARK         C          0.90    0.25    0.850    86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C          0.20    0.25    0.200    86
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C          4.50    0.25    0.500    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C          3.20    0.25    0.400    86
COMMERCIAL          D          1.20    0.20    0.100    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.406
SUBAREA AREA(ACRES) =  11.30    SUBAREA RUNOFF(CFS) =   30.74
EFFECTIVE AREA(ACRES) =  105.80    AREA-AVERAGED Fm(INCH/HR) =  0.14
AREA-AVERAGED Fp(INCH/HR) =  0.24    AREA-AVERAGED Ap =  0.58
TOTAL AREA(ACRES) =   105.8    PEAK FLOW RATE(CFS) =   284.18

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*****
FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   16.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.123
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK         D          0.20    0.20    0.850    91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D          0.10    0.20    0.200    91
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D          4.20    0.20    0.500    91
RESIDENTIAL

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"8-10 DWELLINGS/ACRE"    D          3.80    0.20    0.400    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.459
SUBAREA AREA(ACRES) =    8.30    SUBAREA RUNOFF(CFS) =   22.64
EFFECTIVE AREA(ACRES) =   114.10    AREA-AVERAGED Fm(INCH/HR) =  0.14
AREA-AVERAGED Fp(INCH/HR) =  0.24    AREA-AVERAGED Ap =  0.57
TOTAL AREA(ACRES) =   114.1    PEAK FLOW RATE(CFS) =   306.82

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*****
FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   16.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.123
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" C          4.80    0.25    0.200    86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C          0.10    0.25    0.600    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE" C          5.20    0.25    0.400    86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.307
SUBAREA AREA(ACRES) =   10.10    SUBAREA RUNOFF(CFS) =   27.69
EFFECTIVE AREA(ACRES) =   124.20    AREA-AVERAGED Fm(INCH/HR) =  0.13
AREA-AVERAGED Fp(INCH/HR) =  0.24    AREA-AVERAGED Ap =  0.55
TOTAL AREA(ACRES) =   124.2    PEAK FLOW RATE(CFS) =   334.52

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*****
FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
FLOW LENGTH(FEET) =   525.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  27.08
ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      334.52
PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   16.81
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =   3576.00 FEET.

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*****
FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   16.81
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.089
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" C          0.30    0.25    0.900    86

*****
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DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
PUBLIC PARK	C	0.90	0.25	0.850	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	8.70	0.25	0.200	86
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.10	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	0.10	0.20	0.600	91
PUBLIC PARK	D	0.40	0.20	0.850	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.311					
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 28.48					
EFFECTIVE AREA(ACRES) = 134.70 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.53					
TOTAL AREA(ACRES) = 134.7 PEAK FLOW RATE(CFS) = 359.13					

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.81
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.089
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 9.00 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 24.69
EFFECTIVE AREA(ACRES) = 143.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 143.7 PEAK FLOW RATE(CFS) = 383.82

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	384.82	15.46	3.240	0.24(0.12)	0.51	137.0	430.00
2	383.82	16.81	3.089	0.24(0.12)	0.51	143.7	400.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 384.82 Tc(MIN.) = 15.46
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.24
AREA-AVERAGED Ap = 0.51 EFFECTIVE AREA(ACRES) = 137.04

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.30 0.30 0.600 76
RESIDENTIAL
".4 DWELLING/ACRE" C 0.50 0.25 0.900 86

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	18.70	0.25	0.600	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	1.00	0.20	0.600	91
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.10	0.20	0.900	91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.609					
SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 57.28					
EFFECTIVE AREA(ACRES) = 157.64 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52					
TOTAL AREA(ACRES) = 164.3 PEAK FLOW RATE(CFS) = 442.09					

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 311.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.48
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 442.09
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 15.60
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 407.00 = 3887.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.60
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.223
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 0.10 0.25 0.500 86
RESIDENTIAL
".4 DWELLING/ACRE" C 1.10 0.25 0.900 86
COMMERCIAL C 2.20 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.40 0.20 0.900 91
COMMERCIAL D 1.10 0.20 0.100 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.353
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 13.85
EFFECTIVE AREA(ACRES) = 162.54 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 169.2 PEAK FLOW RATE(CFS) = 453.54

FLOW PROCESS FROM NODE 407.00 TO NODE 408.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 624.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.36
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 453.54
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 15.94
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 408.00 = 4511.00 FEET.

FLOW PROCESS FROM NODE 408.00 TO NODE 408.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.94
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.184
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"	B	0.70	0.30	0.900	76
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.60	0.30	0.600	76
COMMERCIAL	C	1.40	0.25	0.100	86
RESIDENTIAL					
"4 DWELLING/ACRE"	C	4.80	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	4.20	0.25	0.600	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	2.20	0.25	0.500	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.649
SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 40.44
EFFECTIVE AREA(ACRES) = 177.44 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 184.1 PEAK FLOW RATE(CFS) = 488.15

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FLOW PROCESS FROM NODE 408.00 TO NODE 408.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.94
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.184
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.30	0.20	0.100	91
RESIDENTIAL					
"4 DWELLING/ACRE"	D	2.10	0.20	0.900	91
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	D	6.60	0.20	0.600	91
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	2.00	0.20	0.500	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.625
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 30.28

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EFFECTIVE AREA(ACRES) = 188.44 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 195.1 PEAK FLOW RATE(CFS) = 518.43

FLOW PROCESS FROM NODE 408.00 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) = 480.00 DOWNSTREAM(FEET) = 460.00
FLOW LENGTH(FEET) = 368.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.20
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 518.43
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 16.13
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 409.00 = 4879.00 FEET.

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.163
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.70	0.30	0.850	76
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.30	0.30	0.900	76
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.20	0.30	0.600	76
APARTMENTS	C	0.20	0.25	0.200	86
COMMERCIAL	C	0.60	0.25	0.100	86
PUBLIC PARK	C	1.80	0.25	0.850	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 15.55
EFFECTIVE AREA(ACRES) = 194.24 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 200.9 PEAK FLOW RATE(CFS) = 530.43

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FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.163
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	1.20	0.25	0.900	86
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	C	2.90	0.25	0.600	86

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RESIDENTIAL
"5-7 DWELLINGS/ACRE" C 3.30 0.25 0.500 86
APARTMENTS D 0.10 0.20 0.200 91
COMMERCIAL D 0.40 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 1.20 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.616
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 24.69
EFFECTIVE AREA(ACRES) = 203.34 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 210.0 PEAK FLOW RATE(CFS) = 555.12

FLOW PROCESS FROM NODE 409.00 TO NODE 409.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.163
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 3.80 0.20 0.600 91
RESIDENTIAL
"5-7 DWELLINGS/ACRE" D 2.00 0.20 0.500 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.566
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 15.92
EFFECTIVE AREA(ACRES) = 209.14 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 215.8 PEAK FLOW RATE(CFS) = 571.04

FLOW PROCESS FROM NODE 409.00 TO NODE 410.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 291.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.37
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 571.04
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 16.27
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 410.00 = 5170.00 FEET.

FLOW PROCESS FROM NODE 410.00 TO NODE 410.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 0.90 0.30 0.850 76
APARTMENTS C 1.50 0.25 0.200 86
COMMERCIAL C 0.80 0.25 0.100 86
PUBLIC PARK C 2.30 0.25 0.850 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 1.40 0.25 0.600 86
APARTMENTS D 3.10 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 27.29
EFFECTIVE AREA(ACRES) = 219.14 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 225.8 PEAK FLOW RATE(CFS) = 595.28

FLOW PROCESS FROM NODE 410.00 TO NODE 410.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK D 1.10 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 0.10 0.20 0.200 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 4.00 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 14.12
EFFECTIVE AREA(ACRES) = 224.34 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 231.0 PEAK FLOW RATE(CFS) = 609.40

FLOW PROCESS FROM NODE 410.00 TO NODE 410.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 2.10 0.25 0.200 86
APARTMENTS D 8.90 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 30.73
EFFECTIVE AREA(ACRES) = 235.34 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 242.0 PEAK FLOW RATE(CFS) = 640.13

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 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) = 445.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 324.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.63
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 640.13
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 16.42
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 411.00 = 5494.00 FEET.

*****
FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.130
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.10 0.25 0.200 86
COMMERCIAL C 0.20 0.25 0.100 86
PUBLIC PARK C 1.70 0.25 0.850 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 0.70 0.25 0.200 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 0.20 0.25 0.600 86
COMMERCIAL D 0.70 0.20 0.100 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.504
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 9.74
EFFECTIVE AREA(ACRES) = 238.94 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 245.6 PEAK FLOW RATE(CFS) = 646.43

*****
FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.130
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK D 0.90 0.20 0.850 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 8.80 0.20 0.200 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 0.20 0.20 0.600 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.267
SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 27.41
EFFECTIVE AREA(ACRES) = 248.84 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.51

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TOTAL AREA(ACRES) = 255.5 PEAK FLOW RATE(CFS) = 673.85

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*****
FLOW PROCESS FROM NODE 411.00 TO NODE 411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.130
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS C 0.50 0.25 0.200 86
RESIDENTIAL
"4 DWELLING/ACRE" C 0.10 0.25 0.900 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 2.10 0.25 0.600 86
APARTMENTS D 0.70 0.20 0.200 91
RESIDENTIAL
"4 DWELLING/ACRE" D 0.10 0.20 0.900 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 4.30 0.20 0.600 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.546
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 21.14
EFFECTIVE AREA(ACRES) = 256.64 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 263.3 PEAK FLOW RATE(CFS) = 694.99

*****
FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 392.00
FLOW LENGTH(FEET) = 641.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.65
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 694.99
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 16.73
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 412.00 = 6135.00 FEET.

*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.60 0.25 0.100 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 5.30 0.25 0.200 86
RESIDENTIAL

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".4 DWELLING/ACRE"      C      0.10    0.25    0.900    86
COMMERCIAL              D      1.10    0.20    0.100    91
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      7.30    0.20    0.200    91
RESIDENTIAL
".4 DWELLING/ACRE"      D      0.10    0.20    0.900    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.198
SUBAREA AREA(ACRES) = 14.50    SUBAREA RUNOFF(CFS) = 39.85
EFFECTIVE AREA(ACRES) = 271.14    AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 277.8    PEAK FLOW RATE(CFS) = 727.17

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 16.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B      0.20    0.30    0.200    76
COMMERCIAL              C      0.20    0.25    0.100    86
RESIDENTIAL
"11+ DWELLINGS/ACRE"    C      4.10    0.25    0.200    86
RESIDENTIAL
".4 DWELLING/ACRE"      C      0.60    0.25    0.900    86
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   C      3.10    0.25    0.400    86
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      0.50    0.20    0.200    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.317
SUBAREA AREA(ACRES) = 8.70    SUBAREA RUNOFF(CFS) = 23.63
EFFECTIVE AREA(ACRES) = 279.84    AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 286.5    PEAK FLOW RATE(CFS) = 750.80

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 16.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"      D      0.50    0.20    0.900    91
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   D      4.00    0.20    0.400    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456
SUBAREA AREA(ACRES) = 4.50    SUBAREA RUNOFF(CFS) = 12.17

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EFFECTIVE AREA(ACRES) = 284.34    AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 291.0    PEAK FLOW RATE(CFS) = 762.98

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*****
FLOW PROCESS FROM NODE 412.00 TO NODE 420.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 392.00    DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 1358.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.26
ESTIMATED PIPE DIAMETER(INCH) = 75.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 762.98
PIPE TRAVEL TIME(MIN.) = 0.77    Tc(MIN.) = 17.50
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 420.00 = 7493.00 FEET.

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*****
FLOW PROCESS FROM NODE 420.00 TO NODE 420.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.018
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              C      0.50    0.25    0.100    86
COMMERCIAL              D      1.30    0.20    0.100    91
RESIDENTIAL
"11+ DWELLINGS/ACRE"    D      0.10    0.20    0.200    91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.105
SUBAREA AREA(ACRES) = 1.90    SUBAREA RUNOFF(CFS) = 5.12
EFFECTIVE AREA(ACRES) = 286.24    AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.24    AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 292.9    PEAK FLOW RATE(CFS) = 762.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 346.00    DOWNSTREAM(FEET) = 320.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1617.00    CHANNEL SLOPE = 0.0161
CHANNEL BASE(FEET) = 200.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.597
SUBAREA LOSS RATE DATA(AMC III):

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DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              B      6.90    0.30    0.100    76
COMMERCIAL              C      3.60    0.25    0.100    86
COMMERCIAL              D      2.20    0.20    0.100    91

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D-32

D-32

D-35

D-34

RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 76
 RESIDENTIAL
 ".4 DWELLING/ACRE" C 0.40 0.25 0.900 86
 RESIDENTIAL
 ".4 DWELLING/ACRE" D 1.30 0.20 0.900 91
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 780.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 5.14
 AVERAGE FLOW DEPTH(Feet) = 0.75 TRAVEL TIME(MIN.) = 5.24
 Tc(MIN.) = 22.75
 SUBAREA AREA(ACRES) = 15.10 SUBAREA RUNOFF(CFS) = 34.53
 EFFECTIVE AREA(ACRES) = 301.34 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 308.0 PEAK FLOW RATE(CFS) = 762.98
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(Feet) = 0.74 FLOW VELOCITY(Feet/Sec.) = 5.08
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 421.00 = 9110.00 FEET.

 FLOW PROCESS FROM NODE 421.00 TO NODE 421.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.597
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	1.10	0.30	0.850	76
PUBLIC PARK	C	2.50	0.25	0.850	86
PUBLIC PARK	D	3.60	0.20	0.850	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 15.55
 EFFECTIVE AREA(ACRES) = 308.54 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 315.2 PEAK FLOW RATE(CFS) = 762.98
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

D-34

 FLOW PROCESS FROM NODE 421.00 TO NODE 427.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(Feet) = 320.00 DOWNSTREAM(Feet) = 310.00
 FLOW LENGTH(Feet) = 1453.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 76.0 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 16.84
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 762.98
 PIPE TRAVEL TIME(MIN.) = 1.44 Tc(MIN.) = 24.19
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 427.00 = 10563.00 FEET.

 FLOW PROCESS FROM NODE 427.00 TO NODE 427.00 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.) = 24.19
 RAINFALL INTENSITY(INCH/HR) = 2.51
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.24
 AREA-AVERAGED Ap = 0.48
 EFFECTIVE STREAM AREA(ACRES) = 308.54
 TOTAL STREAM AREA(ACRES) = 315.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 762.98

 FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(Feet) = 330.00
 ELEVATION DATA: UPSTREAM(Feet) = 515.00 DOWNSTREAM(Feet) = 497.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.533
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.839
 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	0.10	0.25	0.100	86	5.53
PUBLIC PARK	C	1.10	0.25	0.850	86	8.79
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	C	0.10	0.25	0.600	86	7.50
COMMERCIAL	D	0.10	0.20	0.100	91	5.53
PUBLIC PARK	D	0.30	0.20	0.850	91	8.79
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	D	1.50	0.20	0.600	91	7.50

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.678
 SUBAREA RUNOFF(CFS) = 16.38
 TOTAL AREA(ACRES) = 3.20 PEAK FLOW RATE(CFS) = 16.38

 FLOW PROCESS FROM NODE 414.00 TO NODE 414.10 IS CODE = 62

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

UPSTREAM ELEVATION(Feet) = 497.00 DOWNSTREAM ELEVATION(Feet) = 493.00
 STREET LENGTH(Feet) = 371.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(Feet) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.53
HALFSTREET FLOOD WIDTH(FEET) = 20.59
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.36
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.78
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 7.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.954

SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK C 1.40 0.25 0.850 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" C 1.40 0.25 0.600 86
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 2.00 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673
SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 20.73
EFFECTIVE AREA(ACRES) = 8.00 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.68
TOTAL AREA(ACRES) = 8.0 PEAK FLOW RATE(CFS) = 34.56

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 22.77
FLOW VELOCITY(FEET/SEC.) = 3.58 DEPTH*VELOCITY(FT*FT/SEC.) = 2.04
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 414.10 = 701.00 FEET.

FLOW PROCESS FROM NODE 414.10 TO NODE 414.20 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 493.00 DOWNSTREAM ELEVATION(FEET) = 490.00
STREET LENGTH(FEET) = 476.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.80
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.66
HALFSTREET FLOOD WIDTH(FEET) = 27.93
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.13
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.07

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 23.16
EFFECTIVE AREA(ACRES) = 20.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 71.36

FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 465.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 497.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.83
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.36
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.77
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 416.00 = 2162.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.77
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL D 0.80 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.40 0.20 0.900 91
RESIDENTIAL
"8-10 DWELLINGS/ACRE" D 3.70 0.20 0.400 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.392
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 17.24
EFFECTIVE AREA(ACRES) = 25.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 25.0 PEAK FLOW RATE(CFS) = 86.94

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.77
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 1.80 0.25 0.200 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 86
RESIDENTIAL

"3-4 DWELLINGS/ACRE" C 1.60 0.25 0.600 86
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 3.60 0.20 0.200 91
RESIDENTIAL
"3-4 DWELLINGS/ACRE" D 3.00 0.20 0.600 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.389
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 35.47
EFFECTIVE AREA(ACRES) = 35.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 35.1 PEAK FLOW RATE(CFS) = 122.41

FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 420.00
FLOW LENGTH(FEET) = 437.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.69
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 122.41
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 11.10
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 417.00 = 2599.00 FEET.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.917
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" C 1.50 0.25 0.200 86
COMMERCIAL D 0.70 0.20 0.100 91
RESIDENTIAL
"11+ DWELLINGS/ACRE" D 3.40 0.20 0.200 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.188
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 19.54
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 139.75

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.917
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	C	4.60	0.25	0.100	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	4.00	0.25	0.200	86
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	86
COMMERCIAL	D	1.50	0.20	0.100	91
PUBLIC PARK	D	2.10	0.20	0.850	91
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	1.60	0.20	0.200	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.264
 SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 48.63
 EFFECTIVE AREA(ACRES) = 54.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 54.7 PEAK FLOW RATE(CFS) = 188.38

 FLOW PROCESS FROM NODE 417.00 TO NODE 418.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 400.00
 FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.17
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 188.38
 PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.59
 LONGEST FLOWPATH FROM NODE 413.00 TO NODE 418.00 = 3218.00 FEET.

 FLOW PROCESS FROM NODE 418.00 TO NODE 418.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.822
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	76
COMMERCIAL	C	2.10	0.25	0.100	86
COMMERCIAL	D	3.90	0.20	0.100	91
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.20	0.25	0.900	86
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.50	0.30	0.500	76
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	C	3.20	0.25	0.500	86

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.333
 SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 52.38
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 236.07

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 FLOW PROCESS FROM NODE 418.00 TO NODE 418.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.822
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	D	0.30	0.20	0.500	91
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	76
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	C	3.10	0.25	0.400	86
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	D	0.20	0.20	0.400	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 13.40
 EFFECTIVE AREA(ACRES) = 74.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 74.3 PEAK FLOW RATE(CFS) = 249.46

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 FLOW PROCESS FROM NODE 418.00 TO NODE 418.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.822
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	76
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	76
COMMERCIAL	C	3.70	0.25	0.100	86
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	C	3.50	0.25	0.200	86
COMMERCIAL	D	0.70	0.20	0.100	91
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	D	0.10	0.20	0.200	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.154
 SUBAREA AREA(ACRES) = 10.80 SUBAREA RUNOFF(CFS) = 36.76
 EFFECTIVE AREA(ACRES) = 85.10 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 85.1 PEAK FLOW RATE(CFS) = 286.22

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 FLOW PROCESS FROM NODE 418.00 TO NODE 425.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 320.00

FLOW LENGTH(FEET) = 1179.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.81
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 286.22
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 12.23
LONGEST FLOWPATH FROM NODE 413.00 TO NODE 425.00 = 4397.00 FEET.

FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.706

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	76
COMMERCIAL	C	0.40	0.25	0.100	86
COMMERCIAL	D	0.90	0.20	0.100	91
PUBLIC PARK	B	5.30	0.30	0.850	76
PUBLIC PARK	C	3.10	0.25	0.850	86
PUBLIC PARK	D	9.10	0.20	0.850	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.777

SUBAREA AREA(ACRES) = 19.40 SUBAREA RUNOFF(CFS) = 61.47

EFFECTIVE AREA(ACRES) = 104.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.44

TOTAL AREA(ACRES) = 104.5 PEAK FLOW RATE(CFS) = 338.84

FLOW PROCESS FROM NODE 425.00 TO NODE 425.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.706

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"	B	1.30	0.30	0.900	76
RESIDENTIAL ".4 DWELLING/ACRE"	C	1.90	0.25	0.900	86
RESIDENTIAL ".4 DWELLING/ACRE"	D	1.90	0.20	0.900	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900

SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 16.00

EFFECTIVE AREA(ACRES) = 109.60 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.46

TOTAL AREA(ACRES) = 109.6 PEAK FLOW RATE(CFS) = 354.84

FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 316.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 870.00 CHANNEL SLOPE = 0.0046
GIVEN CHANNEL BASE(FEET) = 200.00 CHANNEL FREEBOARD(FEET) = 1.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

*ESTIMATED CHANNEL HEIGHT(FEET) = 1.70

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.992

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.40	0.40	0.100	52
COMMERCIAL	B	3.30	0.30	0.100	76
PUBLIC PARK	A	0.80	0.40	0.850	52
PUBLIC PARK	B	0.30	0.30	0.850	76

RESIDENTIAL

".4 DWELLING/ACRE" A 0.90 0.40 0.900 52

RESIDENTIAL

".4 DWELLING/ACRE" B 2.30 0.30 0.900 76

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.34

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.408

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 368.99

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.62

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 5.54

Tc(MIN.) = 17.76

SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 28.25

EFFECTIVE AREA(ACRES) = 120.60 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46

TOTAL AREA(ACRES) = 120.6 PEAK FLOW RATE(CFS) = 354.84

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 200.00 CHANNEL FREEBOARD(FEET) = 1.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

*ESTIMATED CHANNEL HEIGHT(FEET) = 1.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 2.58

LONGEST FLOWPATH FROM NODE 413.00 TO NODE 426.00 = 5267.00 FEET.

FLOW PROCESS FROM NODE 426.00 TO NODE 426.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.992

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	1.50	0.40	0.100	52
RESIDENTIAL ".4 DWELLING/ACRE"	A	1.70	0.40	0.900	52
PUBLIC PARK	A	0.50	0.40	0.850	52

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.40

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.569

SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 9.21

EFFECTIVE AREA(ACRES) = 124.30 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.46

TOTAL AREA(ACRES) = 124.3 PEAK FLOW RATE(CFS) = 354.84

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NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 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) =   316.00  DOWNSTREAM(FEET) =   310.00
FLOW LENGTH(FEET) =   321.00  MANNING'S N =   0.013
DEPTH OF FLOW IN   63.0 INCH PIPE IS   47.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   20.17
ESTIMATED PIPE DIAMETER(INCH) =   63.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =       354.84
PIPE TRAVEL TIME(MIN.) =    0.27    Tc(MIN.) =   18.03
LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =   5588.00 FEET.

*****
FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   18.03
RAINFALL INTENSITY(INCH/HR) =    2.97
AREA-AVERAGED Fm(INCH/HR) =    0.12
AREA-AVERAGED Fp(INCH/HR) =    0.25
AREA-AVERAGED Ap =    0.46
EFFECTIVE STREAM AREA(ACRES) =   124.30
TOTAL STREAM AREA(ACRES) =   124.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =   354.84

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae  HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1         762.98  24.19   2.507  0.24( 0.11) 0.48   308.5  430.00
1         745.44  25.57   2.429  0.24( 0.11) 0.49   315.2  400.00
2         354.84  18.03   2.967  0.25( 0.12) 0.46   124.3  413.00

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

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae  HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1         1032.86  18.03   2.967  0.24( 0.11) 0.48   354.3  413.00
2         1060.64  24.19   2.507  0.24( 0.11) 0.48   432.8  430.00
3         1033.31  25.57   2.429  0.24( 0.11) 0.48   439.5  400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   1060.64    Tc(MIN.) =   24.19
EFFECTIVE AREA(ACRES) =   432.84    AREA-AVERAGED Fm(INCH/HR) =   0.11
AREA-AVERAGED Fp(INCH/HR) =   0.24    AREA-AVERAGED Ap =   0.48
TOTAL AREA(ACRES) =   439.5
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =  10563.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
FLOW LENGTH(FEET) =   789.00  MANNING'S N =   0.013
DEPTH OF FLOW IN   81.0 INCH PIPE IS   61.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   36.71
ESTIMATED PIPE DIAMETER(INCH) =   81.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =   1060.64
PIPE TRAVEL TIME(MIN.) =    0.36    Tc(MIN.) =   24.54
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =  11352.00 FEET.

=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) =   439.5    TC(MIN.) =   24.54
EFFECTIVE AREA(ACRES) =   432.84    AREA-AVERAGED Fm(INCH/HR) =   0.11
AREA-AVERAGED Fp(INCH/HR) =   0.24    AREA-AVERAGED Ap =   0.477
PEAK FLOW RATE(CFS) =   1060.64

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae  HEADWATER
NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)  (ACRES)  NODE
1         1032.86  18.40   2.933  0.24( 0.11) 0.48   354.3  413.00
2         1060.64  24.54   2.486  0.24( 0.11) 0.48   432.8  430.00
3         1033.31  25.94   2.409  0.24( 0.11) 0.48   439.5  400.00

=====
END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC MAY 2018 JMITAL *

FILE NAME: PA4E25HC.DAT
TIME/DATE OF STUDY: 09:56 06/03/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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 LIP (FT) (FT)	MANNING HIKE (FT) (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.824

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SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
" .4 DWELLING/ACRE"	C	0.20	0.25	0.900	69	8.00
COMMERCIAL	D	0.80	0.20	0.100	75	5.00
RESIDENTIAL						
" .4 DWELLING/ACRE"	D	0.50	0.20	0.900	75	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 6.38
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 6.38

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.77
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 13.71
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.28
STREET FLOW TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 6.43
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.183

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SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.10	0.25	0.100	69
COMMERCIAL	D	2.10	0.20	0.100	75
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	0.70	0.20	0.900	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 10.76
EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 16.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.74
 FLOW VELOCITY(FEET/SEC.) = 3.38 DEPTH*VELOCITY(FT*FT/SEC.) = 1.50
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

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

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

UPSTREAM ELEVATION(FEET) = 451.00 DOWNSTREAM ELEVATION(FEET) = 445.00
 STREET LENGTH(FEET) = 391.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.21
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.50
 HALFSTREET FLOOD WIDTH(FEET) = 19.02
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.83
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.92
 STREET FLOW TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 8.14
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.662

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SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
COMMERCIAL	C	3.00	0.25	0.100	69
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
COMMERCIAL	D	1.70	0.20	0.100	75
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.50	0.20	0.900	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 19.84
 EFFECTIVE AREA(ACRES) = 10.50 AREA-AVERAGED Fm(INCH/HR) = 0.06
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.27
 TOTAL AREA(ACRES) = 10.5 PEAK FLOW RATE(CFS) = 34.05

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 21.05
 FLOW VELOCITY(FEET/SEC.) = 4.10 DEPTH*VELOCITY(FT*FT/SEC.) = 2.21
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPE SIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 398.00
 FLOW LENGTH(FEET) = 843.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.80
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 34.05
 PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 8.97
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.97
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.465
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	C	2.00	0.25	0.900	69
RESIDENTIAL					
".4 DWELLING/ACRE"	D	2.20	0.20	0.900	75
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56
COMMERCIAL	B	5.30	0.30	0.100	56
COMMERCIAL	D	7.10	0.20	0.100	75
COMMERCIAL	C	8.60	0.25	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.329
 SUBAREA AREA(ACRES) = 29.40 SUBAREA RUNOFF(CFS) = 89.43
 EFFECTIVE AREA(ACRES) = 39.90 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 121.62

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FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.97
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.465
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	A	0.60	0.40	0.900	32
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.30	0.30	0.900	56
COMMERCIAL	A	5.60	0.40	0.100	32
COMMERCIAL	B	8.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 48.33

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EFFECTIVE AREA(ACRES) = 55.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 55.7 PEAK FLOW RATE(CFS) = 169.95

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 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.) = 8.97
RAINFALL INTENSITY(INCH/HR) = 3.46
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA(ACRES) = 55.70
TOTAL STREAM AREA(ACRES) = 55.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 169.95

FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 705.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.431

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	D	0.10	0.20	1.000	81	9.13
NATURAL FAIR COVER						
"OPEN BRUSH"	D	0.10	0.20	1.000	83	9.13
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	C	0.20	0.25	1.000	75	9.13
NATURAL FAIR COVER						
"OPEN BRUSH"	C	0.50	0.25	1.000	77	9.13
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 2.59						
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.59						

FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 705.00 DOWNSTREAM(FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00 CHANNEL SLOPE = 0.2590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.188

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	2.10	0.20	1.000	83
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	3.10	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.20	0.25	1.000	77
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.74					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.17					
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 1.26					
Tc(MIN.) = 10.39					
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 22.31					
EFFECTIVE AREA(ACRES) = 9.30 AREA-AVERAGED Fm(INCH/HR) = 0.24					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 9.3 PEAK FLOW RATE(CFS) = 24.70					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 10.58

LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0644
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.840

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.70	0.30	1.000	65
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	1.20	0.20	1.000	81
NATURAL FAIR COVER					
"OPEN BRUSH"	C	5.80	0.25	1.000	77
NATURAL FAIR COVER					
"OPEN BRUSH"	D	6.30	0.20	1.000	83
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.64					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.15					
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 2.35					
Tc(MIN.) = 12.75					
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 33.86					

EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 55.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.55 FLOW VELOCITY(FEET/SEC.) = 7.68
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) =	12.75				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.840				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	10.40	0.25	1.000	75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) =		10.40	SUBAREA RUNOFF(CFS) =		24.24
EFFECTIVE AREA(ACRES) =		34.10	AREA-AVERAGED Fm(INCH/HR) =		0.24
AREA-AVERAGED Fp(INCH/HR) =		0.24	AREA-AVERAGED Ap =		1.00
TOTAL AREA(ACRES) =		34.1	PEAK FLOW RATE(CFS) =		79.88

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FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) =	460.00	DOWNSTREAM(FEET) =	398.00		
FLOW LENGTH(FEET) =	1046.00	MANNING'S N =	0.013		
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.1 INCHES					
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.64					
ESTIMATED PIPE DIAMETER(INCH) =		30.00	NUMBER OF PIPES =	1	
PIPE-FLOW(CFS) =		79.88			
PIPE TRAVEL TIME(MIN.) =		0.81	Tc(MIN.) =	13.55	
LONGEST FLOWPATH FROM NODE		810.00	TO NODE	808.00 =	3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 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.) =	13.55
RAINFALL INTENSITY(INCH/HR) =	2.74
AREA-AVERAGED Fm(INCH/HR) =	0.24
AREA-AVERAGED Fp(INCH/HR) =	0.24
AREA-AVERAGED Ap =	1.00
EFFECTIVE STREAM AREA(ACRES) =	34.10
TOTAL STREAM AREA(ACRES) =	34.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =	79.88

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.95	8.97	3.465	0.27(0.07)	0.28	55.7	800.00
2	79.88	13.55	2.743	0.24(0.24)	1.00	34.1	810.00

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	238.06	8.97	3.465	0.25(0.12)	0.49	78.3	800.00
2	213.67	13.55	2.743	0.25(0.14)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 238.06 Tc(MIN.) = 8.97
EFFECTIVE AREA(ACRES) = 78.27 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 89.8
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) =	398.00	DOWNSTREAM(FEET) =	341.00		
FLOW LENGTH(FEET) =	756.00	MANNING'S N =	0.013		
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.4 INCHES					
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.86					
ESTIMATED PIPE DIAMETER(INCH) =		42.00	NUMBER OF PIPES =	1	
PIPE-FLOW(CFS) =		238.06			
PIPE TRAVEL TIME(MIN.) =		0.41	Tc(MIN.) =	9.38	
LONGEST FLOWPATH FROM NODE		810.00	TO NODE	809.00 =	3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

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

MAINLINE Tc(MIN.) =	9.38				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.379				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	A	5.60	0.40	0.200	32
APARTMENTS	B	12.30	0.30	0.200	56
COMMERCIAL	A	0.50	0.40	0.100	32
COMMERCIAL	B	5.40	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	A	4.70	0.40	0.900	32
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372					

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SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 95.66
EFFECTIVE AREA(ACRES) = 110.97 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 325.11

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.379
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.90 0.40 0.100 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 29.75
EFFECTIVE AREA(ACRES) = 120.87 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 354.85

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 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.) = 9.38
RAINFALL INTENSITY(INCH/HR) = 3.38
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.42
EFFECTIVE STREAM AREA(ACRES) = 120.87
TOTAL STREAM AREA(ACRES) = 132.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 354.85

FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.488
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D 0.10 0.20 1.000 81 8.86
NATURAL FAIR COVER
"OPEN BRUSH" C 0.30 0.25 1.000 77 8.86

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C 0.60 0.25 1.000 75 8.86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.92
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.92

FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.10 0.25 0.100 69
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
COMMERCIAL B 1.30 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" D 0.80 0.20 1.000 83
NATURAL FAIR COVER
"OPEN BRUSH" C 2.40 0.25 1.000 77
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D 3.20 0.20 1.000 81
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.80
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.49
AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 3.00
Tc(MIN.) = 11.86
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 21.65
EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 24.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 7.50
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.86
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.00 0.30 1.000 63

NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" C 7.10 0.25 1.000 75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 26.87
 EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 50.96

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.86
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	3.40	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.80	0.25	1.000	75
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	3.60	0.20	1.000	81
COMMERCIAL	B	1.00	0.30	0.100	56
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.50	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913					
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 25.53					
EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.23					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.93					
TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 76.49					

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FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.86
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	4.60	0.25	1.000	77
NATURAL FAIR COVER					
"OPEN BRUSH"	D	2.60	0.20	1.000	83
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997					
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 18.15					
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.23					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.94					

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TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 94.64

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
 FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.18
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 94.64
 PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 12.88
 LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 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.) = 12.88
 RAINFALL INTENSITY(INCH/HR) = 2.82
 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.25
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 38.60
 TOTAL STREAM AREA(ACRES) = 38.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 94.64

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	354.85	9.38	3.379	0.27(0.12)	0.42	120.9	800.00
1	306.06	13.98	2.696	0.27(0.13)	0.47	132.4	810.00
2	94.64	12.88	2.823	0.25(0.23)	0.94	38.6	818.00

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	438.55	9.38	3.379	0.27(0.14)	0.52	149.0	800.00
2	412.36	12.88	2.823	0.26(0.15)	0.57	168.2	818.00
3	396.03	13.98	2.696	0.26(0.15)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 438.55 Tc(MIN.) = 9.38
 EFFECTIVE AREA(ACRES) = 148.98 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 171.0
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.38
EFFECTIVE AREA(ACRES) = 148.98 AREA-AVERAGED Fm(INCH/HR)= 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.522
PEAK FLOW RATE(CFS) = 438.55

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	438.55	9.38	3.379	0.27(0.14)	0.52	149.0	800.00
2	412.36	12.88	2.823	0.26(0.15)	0.57	168.2	818.00
3	396.03	13.98	2.696	0.26(0.15)	0.58	171.0	810.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC MAY 2018 JMITAL *

FILE NAME: PA4E00HC.DAT
TIME/DATE OF STUDY: 16:03 05/31/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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 LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.187
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	0.20	0.25	0.900	86	8.00
COMMERCIAL	D	0.80	0.20	0.100	91	5.00
RESIDENTIAL						
" .4 DWELLING/ACRE"	D	0.50	0.20	0.900	91	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 8.22
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 8.22

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.34
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.45
STREET FLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 6.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.396

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.10	0.25	0.100	86
COMMERCIAL	D	2.10	0.20	0.100	91
RESIDENTIAL					
" .4 DWELLING/ACRE"	D	0.70	0.20	0.900	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 13.93
EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 21.08

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.54
FLOW VELOCITY(FEET/SEC.) = 3.58 DEPTH*VELOCITY(FT*FT/SEC.) = 1.71
LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 451.00 DOWNSTREAM ELEVATION(FEET) = 445.00
STREET LENGTH(FEET) = 391.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.99
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.54
HALFSTREET FLOOD WIDTH(FEET) = 21.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.20
STREET FLOW TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 7.94
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.747

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SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 76
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 76
COMMERCIAL C 3.00 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" C 0.10 0.25 0.900 86
COMMERCIAL D 1.70 0.20 0.100 91
RESIDENTIAL
".4 DWELLING/ACRE" D 0.50 0.20 0.900 91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 25.79
EFFECTIVE AREA(ACRES) = 10.50 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.27
TOTAL AREA(ACRES) = 10.5 PEAK FLOW RATE(CFS) = 44.30

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.40
FLOW VELOCITY(FEET/SEC.) = 4.36 DEPTH*VELOCITY(FT*FT/SEC.) = 2.53
LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 398.00
FLOW LENGTH(FEET) = 843.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.18
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.30
PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 8.71
LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.71
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.501
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" C 2.00 0.25 0.900 86
RESIDENTIAL
".4 DWELLING/ACRE" D 2.20 0.20 0.900 91
RESIDENTIAL
".4 DWELLING/ACRE" B 4.20 0.30 0.900 76
COMMERCIAL B 5.30 0.30 0.100 76
COMMERCIAL D 7.10 0.20 0.100 91
COMMERCIAL C 8.60 0.25 0.100 86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.329
SUBAREA AREA(ACRES) = 29.40 SUBAREA RUNOFF(CFS) = 116.84
EFFECTIVE AREA(ACRES) = 39.90 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 158.82

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FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.71
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.501
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" A 0.60 0.40 0.900 52
RESIDENTIAL
".4 DWELLING/ACRE" B 1.30 0.30 0.900 76
COMMERCIAL A 5.60 0.40 0.100 52
COMMERCIAL B 8.30 0.30 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 63.06

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EFFECTIVE AREA(ACRES) = 55.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 55.7 PEAK FLOW RATE(CFS) = 221.88

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 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.) = 8.71
RAINFALL INTENSITY(INCH/HR) = 4.50
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA(ACRES) = 55.70
TOTAL STREAM AREA(ACRES) = 55.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 221.88

FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 705.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.382
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						
"CHAPARRAL,BROADLEAF"	D	0.10	0.20	1.000	95	9.13
NATURAL FAIR COVER						
"OPEN BRUSH"	D	0.10	0.20	1.000	96	9.13
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	C	0.20	0.25	1.000	91	9.13
NATURAL FAIR COVER						
"OPEN BRUSH"	C	0.50	0.25	1.000	92	9.13
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 3.36						
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 3.36						

FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 705.00 DOWNSTREAM(FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00 CHANNEL SLOPE = 0.2590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.085

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	2.10	0.20	1.000	96
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	3.10	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.20	0.25	1.000	92
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.92					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.74					
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 1.19					
Tc(MIN.) = 10.32					
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 29.09					
EFFECTIVE AREA(ACRES) = 9.30 AREA-AVERAGED Fm(INCH/HR) = 0.24					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 9.3 PEAK FLOW RATE(CFS) = 32.20					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 11.32
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0644
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.658

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	81
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	84
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.70	0.30	1.000	83
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	1.20	0.20	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	C	5.80	0.25	1.000	92
NATURAL FAIR COVER					
"OPEN BRUSH"	D	6.30	0.20	1.000	96
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 54.45					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.67					
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 2.19					
Tc(MIN.) = 12.51					
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 44.45					

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EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 73.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.72 FLOW VELOCITY(FEET/SEC.) = 8.24
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) =	12.51				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.658				
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	10.40	0.25	1.000	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) =		10.40	SUBAREA RUNOFF(CFS) =		31.90
EFFECTIVE AREA(ACRES) =		34.10	AREA-AVERAGED Fm(INCH/HR) =		0.24
AREA-AVERAGED Fp(INCH/HR) =		0.24	AREA-AVERAGED Ap =		1.00
TOTAL AREA(ACRES) =		34.1	PEAK FLOW RATE(CFS) =		104.98

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FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) =	460.00	DOWNSTREAM(FEET) =	398.00
FLOW LENGTH(FEET) = 1046.00 MANNING'S N = 0.013			
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.6 INCHES			
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.12			
ESTIMATED PIPE DIAMETER(INCH) =		33.00	NUMBER OF PIPES = 1
PIPE-FLOW(CFS) =		104.98	
PIPE TRAVEL TIME(MIN.) =		0.75	Tc(MIN.) = 13.27
LONGEST FLOWPATH FROM NODE		810.00 TO NODE	808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 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.) =	13.27
RAINFALL INTENSITY(INCH/HR) =	3.54
AREA-AVERAGED Fm(INCH/HR) =	0.24
AREA-AVERAGED Fp(INCH/HR) =	0.24
AREA-AVERAGED Ap =	1.00
EFFECTIVE STREAM AREA(ACRES) =	34.10
TOTAL STREAM AREA(ACRES) =	34.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =	104.98

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	221.88	8.71	4.501	0.27(0.07)	0.28	55.7	800.00
2	104.98	13.27	3.537	0.24(0.24)	1.00	34.1	810.00

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	310.96	8.71	4.501	0.25(0.12)	0.49	78.1	800.00
2	278.56	13.27	3.537	0.25(0.14)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 310.96 Tc(MIN.) = 8.71
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 89.8
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) =	398.00	DOWNSTREAM(FEET) =	341.00
FLOW LENGTH(FEET) = 756.00 MANNING'S N = 0.013			
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.4 INCHES			
PIPE-FLOW VELOCITY(FEET/SEC.) = 32.51			
ESTIMATED PIPE DIAMETER(INCH) =		45.00	NUMBER OF PIPES = 1
PIPE-FLOW(CFS) =		310.96	
PIPE TRAVEL TIME(MIN.) =		0.39	Tc(MIN.) = 9.10
LONGEST FLOWPATH FROM NODE		810.00 TO NODE	809.00 = 3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

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

MAINLINE Tc(MIN.) =	9.10				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.390				
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	A	5.60	0.40	0.200	52
APARTMENTS	B	12.30	0.30	0.200	76
COMMERCIAL	A	0.50	0.40	0.100	52
COMMERCIAL	B	5.40	0.30	0.100	76
RESIDENTIAL					
".4 DWELLING/ACRE"	A	4.70	0.40	0.900	52
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372					

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SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 125.42
EFFECTIVE AREA(ACRES) = 110.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 425.44

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.390
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 9.90 0.40 0.100 52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 38.76
EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 464.20

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 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.) = 9.10
RAINFALL INTENSITY(INCH/HR) = 4.39
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.27
AREA-AVERAGED Ap = 0.42
EFFECTIVE STREAM AREA(ACRES) = 120.70
TOTAL STREAM AREA(ACRES) = 132.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 464.20

FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.457
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
"CHAPARRAL,BROADLEAF" D 0.10 0.20 1.000 95 8.86
NATURAL FAIR COVER
"OPEN BRUSH" C 0.30 0.25 1.000 92 8.86

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C 0.60 0.25 1.000 91 8.86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.79
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.79

FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.810
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL C 0.10 0.25 0.100 86
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 76
COMMERCIAL B 1.30 0.30 0.100 76
NATURAL FAIR COVER
"OPEN BRUSH" D 0.80 0.20 1.000 96
NATURAL FAIR COVER
"OPEN BRUSH" C 2.40 0.25 1.000 92
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" D 3.20 0.20 1.000 95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.00
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.97
AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 2.79
Tc(MIN.) = 11.66
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 28.31
EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 31.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.15 FLOW VELOCITY(FEET/SEC.) = 7.98
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.810
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.00 0.30 1.000 81

NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" C 7.10 0.25 1.000 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 35.38
 EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 66.90

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.66
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.810
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	3.40	0.30	1.000	81
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.80	0.25	1.000	91
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	3.60	0.20	1.000	95
COMMERCIAL	B	1.00	0.30	0.100	76
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.50	0.30	1.000	84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913					
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 33.50					
EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.23					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.93					
TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 100.40					

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.66
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.810
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	4.60	0.25	1.000	92
NATURAL FAIR COVER					
"OPEN BRUSH"	D	2.60	0.20	1.000	96
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997					
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 23.82					
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.23					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.94					

TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 124.22

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
 FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.48
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 124.22
 PIPE TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 12.61
 LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 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.) = 12.61
 RAINFALL INTENSITY(INCH/HR) = 3.64
 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.25
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 38.60
 TOTAL STREAM AREA(ACRES) = 38.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 124.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	464.20	9.10	4.390	0.27(0.12)	0.42	120.7	800.00
1	399.38	13.66	3.479	0.27(0.13)	0.47	132.4	810.00
2	124.22	12.61	3.641	0.25(0.23)	0.94	38.6	818.00

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	573.54	9.10	4.390	0.27(0.14)	0.52	148.6	800.00
2	538.50	12.61	3.641	0.26(0.15)	0.57	168.3	818.00
3	517.67	13.66	3.479	0.26(0.15)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 573.54 Tc(MIN.) = 9.10
 EFFECTIVE AREA(ACRES) = 148.55 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 171.0
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.10
EFFECTIVE AREA(ACRES) = 148.55 AREA-AVERAGED Fm(INCH/HR)= 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.27 AREA-AVERAGED Ap = 0.521
PEAK FLOW RATE(CFS) = 573.54

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	573.54	9.10	4.390	0.27(0.14)	0.52	148.6	800.00
2	538.50	12.61	3.641	0.26(0.15)	0.57	168.3	818.00
3	517.67	13.66	3.479	0.26(0.15)	0.58	171.0	810.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
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***** DESCRIPTION OF STUDY *****

* RMV PA-4 SUBAREA F ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC AUG 2018 CCHIU *

FILE NAME: PA4F25HC.DAT
TIME/DATE OF STUDY: 15:03 08/06/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.720

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	D	0.70	0.20	1.000	81	13.76
NATURAL FAIR COVER						
"OPEN BRUSH"	D	0.50	0.20	1.000	83	13.76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 2.72						
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.72						

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.57
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.72
PIPE TRAVEL TIME(MIN.) = 2.77 Tc(MIN.) = 16.53
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 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.) = 16.53
RAINFALL INTENSITY(INCH/HR) = 2.45
AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 1.20
TOTAL STREAM AREA(ACRES) = 1.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.72

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 612.00

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

F-1

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.142
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.660
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	C	0.10	0.25	1.000	75	8.14
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	D	0.50	0.20	1.000	81	8.14
NATURAL FAIR COVER						
"OPEN BRUSH"	D	1.00	0.20	1.000	83	8.14

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 4.98
 TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 4.98

OF-1

 FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 612.00 DOWNSTREAM(FEET) = 525.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 458.00 CHANNEL SLOPE = 0.1900
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.435

OF-2

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.00	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.60	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	2.30	0.20	1.000	81
NATURAL FAIR COVER					
"OPEN BRUSH"	D	1.00	0.20	1.000	83

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.08
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.89
 AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 0.97
 Tc(MIN.) = 9.11
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 14.19
 EFFECTIVE AREA(ACRES) = 6.50 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 18.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 8.82
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

 FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 470.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 618.00 CHANNEL SLOPE = 0.0890
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.190

OF-3

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	4.60	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	4.00	0.25	1.000	77
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.60	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	2.70	0.20	1.000	81
NATURAL FAIR COVER					
"OPEN BRUSH"	D	5.10	0.20	1.000	83

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.23
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.10
 AVERAGE FLOW DEPTH(FEET) = 1.31 TRAVEL TIME(MIN.) = 1.27
 Tc(MIN.) = 10.38
 SUBAREA AREA(ACRES) = 17.10 SUBAREA RUNOFF(CFS) = 45.60
 EFFECTIVE AREA(ACRES) = 23.60 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 63.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 8.97
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

 FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 459.00
 FLOW LENGTH(FEET) = 890.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 63.01
 PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 11.70
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 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.) = 11.70
RAINFALL INTENSITY (INCH/HR) = 2.98
AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 23.60
TOTAL STREAM AREA(ACRES) = 23.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.01

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.72	16.53	2.452	0.20(0.20)	1.00	1.2	900.00
2	63.01	11.70	2.982	0.22(0.22)	1.00	23.6	910.00

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	65.39	11.70	2.982	0.22(0.22)	1.00	24.4	910.00
2	53.63	16.53	2.452	0.22(0.22)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 65.39 Tc(MIN.) = 11.70
EFFECTIVE AREA(ACRES) = 24.45 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.8
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.982
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.20	0.30	1.000	63
COMMERCIAL	B	5.50	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	0.10	0.25	1.000	75
COMMERCIAL	C	1.00	0.25	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.29
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 18.73
EFFECTIVE AREA(ACRES) = 31.55 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 79.43

F-2

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.982
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.20	0.25	1.000	77
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	3.20	0.20	1.000	81
COMMERCIAL	D	3.40	0.20	0.100	75
NATURAL FAIR COVER					
"OPEN BRUSH"	D	3.30	0.20	1.000	83
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.70	0.20	0.900	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.712
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 27.84
EFFECTIVE AREA(ACRES) = 42.45 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 107.27

F-2

FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.60
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 107.27
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 12.20
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 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.) = 12.20
RAINFALL INTENSITY(INCH/HR) = 2.91
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.45
TOTAL STREAM AREA(ACRES) = 42.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 107.27

FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 286.00

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 712.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.737

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.768

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	C	0.20	0.25	1.000	77	7.74

NATURAL FAIR COVER

"OPEN BRUSH" D 0.70 0.20 1.000 83 7.74

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 2.88

TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.88

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FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 600.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.1886

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.502

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	D	0.20	0.20	1.000	82

NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" C 1.00 0.25 1.000 75

NATURAL FAIR COVER

"OPEN BRUSH" C 1.40 0.25 1.000 77

NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" D 4.40 0.20 1.000 81

NATURAL FAIR COVER

"OPEN BRUSH" D 6.70 0.20 1.000 83

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.29

AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 1.07

Tc(MIN.) = 8.80

SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 40.61

EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.21

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AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 43.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.15 FLOW VELOCITY(FEET/SEC.) = 10.81

LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 604.00 CHANNEL SLOPE = 0.0828

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.258

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.70	0.20	1.000	81

NATURAL FAIR COVER

"WOODLAND,GRASS" D 1.40 0.20 1.000 82

NATURAL FAIR COVER

"OPEN BRUSH" D 5.40 0.20 1.000 83

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.38

AVERAGE FLOW DEPTH(FEET) = 1.46 TRAVEL TIME(MIN.) = 1.20

Tc(MIN.) = 10.00

SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 20.64

EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 60.70

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 8.64

LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 495.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0648

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.984

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.60	0.30	1.000	65

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NATURAL FAIR COVER
 "WOODLAND,GRASS" C 0.80 0.25 1.000 77
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.80 0.30 1.000 66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.10 0.30 1.000 63
 NATURAL FAIR COVER
 "WOODLAND,GRASS" D 5.20 0.20 1.000 82
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" C 6.30 0.25 1.000 75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 78.97
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.43
 AVERAGE FLOW DEPTH(FEET) = 1.77 TRAVEL TIME(MIN.) = 1.68
 Tc(MIN.) = 11.68
 SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 36.54
 EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 91.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.87 FLOW VELOCITY(FEET/SEC.) = 8.73
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

 FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.68
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.984
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	9.70	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	17.00	0.20	1.000	81
NATURAL FAIR COVER					
"OPEN BRUSH"	D	36.60	0.20	1.000	83

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 63.30 SUBAREA RUNOFF(CFS) = 158.16
 EFFECTIVE AREA(ACRES) = 100.20 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 100.2 PEAK FLOW RATE(CFS) = 249.94

 FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 607.00 CHANNEL SLOPE = 0.0626
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

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* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.30	0.30	1.000	65
NATURAL FAIR COVER					
"GRASS"	C	0.60	0.25	1.000	79
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.70	0.30	1.000	66
NATURAL FAIR COVER					
"WOODLAND,GRASS"	D	0.90	0.20	1.000	82
NATURAL FAIR COVER					
"GRASS"	B	0.90	0.30	1.000	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 254.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.12
 AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 0.91
 Tc(MIN.) = 12.59
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.17
 EFFECTIVE AREA(ACRES) = 103.70 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 103.7 PEAK FLOW RATE(CFS) = 249.94
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 2.74 FLOW VELOCITY(FEET/SEC.) = 11.08
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

 FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.59
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.860
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	3.80	0.20	1.000	83
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	4.20	0.20	1.000	81
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	5.10	0.25	1.000	77
NATURAL FAIR COVER					
"OPEN BRUSH"	C	7.00	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	12.00	0.25	1.000	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 32.10 SUBAREA RUNOFF(CFS) = 75.76
 EFFECTIVE AREA(ACRES) = 135.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 135.8 PEAK FLOW RATE(CFS) = 322.70

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*****
FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   440.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00  CHANNEL SLOPE =   0.0192
CHANNEL BASE(FEET) =     0.00  "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) =   30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"                D          0.50    0.20    1.000    84
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B          0.70    0.30    1.000    63
NATURAL FAIR COVER
"WOODLAND,GRASS"      C          2.30    0.25    1.000    77
NATURAL FAIR COVER
"OPEN BRUSH"          B          2.40    0.30    1.000    66
NATURAL FAIR COVER
"GRASS"                B          2.50    0.30    1.000    69
NATURAL FAIR COVER
"GRASS"                C          3.20    0.25    1.000    79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 335.05
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.66
AVERAGE FLOW DEPTH(FEET) = 3.82  TRAVEL TIME(MIN.) = 1.92
Tc(MIN.) = 14.52
SUBAREA AREA(ACRES) = 11.60  SUBAREA RUNOFF(CFS) = 24.71
EFFECTIVE AREA(ACRES) = 147.40  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 147.4  PEAK FLOW RATE(CFS) = 322.70
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.77  FLOW VELOCITY(FEET/SEC.) = 7.58
LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 = 3824.00 FEET.
```

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*****
FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.52
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"      D          7.40    0.20    1.000    82
NATURAL FAIR COVER
"OPEN BRUSH"          C         12.40    0.25    1.000    77
NATURAL FAIR COVER
```

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"OPEN BRUSH"                D          28.20    0.20    1.000    83
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"      D          31.40    0.20    1.000    81
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"      C          42.40    0.25    1.000    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 121.80  SUBAREA RUNOFF(CFS) = 264.86
EFFECTIVE AREA(ACRES) = 269.20  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 269.2  PEAK FLOW RATE(CFS) = 585.23
```

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*****
FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
FLOW LENGTH(FEET) = 1341.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.30
ESTIMATED PIPE DIAMETER(INCH) = 84.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 585.23
PIPE TRAVEL TIME(MIN.) = 1.22  Tc(MIN.) = 15.74
LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 = 5165.00 FEET.

*****
FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 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.) = 15.74
RAINFALL INTENSITY(INCH/HR) = 2.52
AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 269.20
TOTAL STREAM AREA(ACRES) = 269.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 585.23
```

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*****
FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 715.00  DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.954
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.709
SUBAREA Tc AND LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS    Tc
    LAND USE        GROUP  (ACRES) (INCH/HR) (DECIMAL) CN  (MIN.)
```

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NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C 0.60 0.25 1.000 75 7.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.87
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.87

FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	517.00	DOWNSTREAM(FEET) =	430.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	443.00	CHANNEL SLOPE =	0.1964
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.472		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
COMMERCIAL	C	0.40	0.25	0.100	69
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.30	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	4.30	0.25	1.000	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.927

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.49

AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.99

Tc(MIN.) = 8.94

SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 14.87

EFFECTIVE AREA(ACRES) = 5.70 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.94

TOTAL AREA(ACRES) = 5.7 PEAK FLOW RATE(CFS) = 16.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 8.69

LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	430.00	DOWNSTREAM(FEET) =	426.00
FLOW LENGTH(FEET) =	254.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS	15.3 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	8.85		
ESTIMATED PIPE DIAMETER(INCH) =	21.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	16.61		
PIPE TRAVEL TIME(MIN.) =	0.48	Tc(MIN.) =	9.42
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 =	1027.00 FEET.		

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 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.) =	9.42
RAINFALL INTENSITY(INCH/HR) =	3.37
AREA-AVERAGED Fm(INCH/HR) =	0.23
AREA-AVERAGED Fp(INCH/HR) =	0.25
AREA-AVERAGED Ap =	0.94
EFFECTIVE STREAM AREA(ACRES) =	5.70
TOTAL STREAM AREA(ACRES) =	5.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =	16.61

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.27	12.20	2.911	0.22(0.17)	0.79	42.4	910.00
1	87.74	17.05	2.409	0.22(0.17)	0.79	42.8	900.00
2	585.23	15.74	2.521	0.22(0.22)	1.00	269.2	920.00
3	16.61	9.42	3.371	0.25(0.23)	0.94	5.7	930.00

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	593.11	9.42	3.371	0.22(0.22)	0.96	199.6	930.00
2	652.34	12.20	2.911	0.22(0.22)	0.96	256.9	910.00
3	690.37	15.74	2.521	0.22(0.22)	0.97	317.6	920.00
4	656.06	17.05	2.409	0.22(0.22)	0.97	317.7	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 690.37 Tc(MIN.) = 15.74

EFFECTIVE AREA(ACRES) = 317.61 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 317.7

LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) =	15.74
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.521
SUBAREA LOSS RATE DATA(AMC II):	

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	C	0.50	0.25	0.900	69
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.10	0.30	0.900	56
RESIDENTIAL					

```
" .4 DWELLING/ACRE"      D      3.00    0.20    0.900    75
COMMERCIAL                D      5.90    0.20    0.100    75
COMMERCIAL                C      7.70    0.25    0.100    69
COMMERCIAL                B     13.60    0.30    0.100    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80 SUBAREA RUNOFF(CFS) = 72.67
EFFECTIVE AREA(ACRES) = 350.41 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.90
TOTAL AREA(ACRES) = 350.5 PEAK FLOW RATE(CFS) = 731.27
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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
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ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.03
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 731.27
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 16.13
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.
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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.13
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.80 0.30 0.100 56
COMMERCIAL C 0.60 0.25 0.100 69
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
RESIDENTIAL
".4 DWELLING/ACRE" B 2.40 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" C 2.20 0.25 0.900 69
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 75
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 19.81
EFFECTIVE AREA(ACRES) = 359.81 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 359.9 PEAK FLOW RATE(CFS) = 740.06
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FLOW PROCESS FROM NODE 904.00 TO NODE 905.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.69
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 740.06
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 16.56
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.
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FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1
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```
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.56
RAINFALL INTENSITY(INCH/HR) = 2.45
AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.89
EFFECTIVE STREAM AREA(ACRES) = 359.81
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 740.06
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*****
FLOW PROCESS FROM NODE 940.00 TO NODE 941.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
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```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 304.00
ELEVATION DATA: UPSTREAM(FEET) = 858.00 DOWNSTREAM(FEET) = 675.00
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.692
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.780
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C 0.10 0.25 1.000 75 7.69
NATURAL FAIR COVER
"OPEN BRUSH" C 1.10 0.25 1.000 77 7.69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.81
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.81
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*****
FLOW PROCESS FROM NODE 941.00 TO NODE 942.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.2679
```

F-4

OF-13

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.414
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.80	0.30	1.000	65
NATURAL FAIR COVER "OPEN BRUSH"	B	1.10	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	C	1.50	0.25	1.000	77
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	C	3.60	0.25	1.000	75
NATURAL FAIR COVER "OPEN BRUSH"	C	10.20	0.25	1.000	77

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.26
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.46
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.06
 AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.52
 Tc (MIN.) = 9.21
 SUBAREA AREA (ACRES) = 17.30 SUBAREA RUNOFF (CFS) = 49.17
 EFFECTIVE AREA (ACRES) = 18.50 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.26 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 18.5 PEAK FLOW RATE (CFS) = 52.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 12.93
 LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.

OF-14

 FLOW PROCESS FROM NODE 942.00 TO NODE 905.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 330.00
 FLOW LENGTH (FEET) = 1041.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.79
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 52.58
 PIPE TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 10.05
 LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 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.) = 10.05
 RAINFALL INTENSITY (INCH/HR) = 3.25
 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.26
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA (ACRES) = 18.50
 TOTAL STREAM AREA (ACRES) = 18.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 52.58

 FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21

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

 INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 1053.00 DOWNSTREAM (FEET) = 990.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.965
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.265
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	C	0.40	0.25	1.000	77	9.96
NATURAL FAIR COVER "OPEN BRUSH"	D	1.00	0.20	1.000	83	9.96

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.21
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF (CFS) = 3.84
 TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 3.84

OF-15

 FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

 ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 950.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 439.00 CHANNEL SLOPE = 0.0911
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.023
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	D	0.10	0.20	1.000	83
NATURAL FAIR COVER "OPEN BRUSH"	C	0.40	0.25	1.000	77
NATURAL FAIR COVER "GRASS"	C	0.60	0.25	1.000	79
NATURAL FAIR COVER "GRASS"	D	0.70	0.20	1.000	84

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.23
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.11
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.03
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 1.45
 Tc (MIN.) = 11.42

OF-16

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.53
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 8.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 5.41
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.60	0.20	1.000	81
NATURAL FAIR COVER					
"GRASS"	D	1.50	0.20	1.000	84
NATURAL FAIR COVER					
"GRASS"	C	1.70	0.25	1.000	79
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.40	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	7.20	0.25	1.000	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.06

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.73

AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 1.15

Tc(MIN.) = 12.57

SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 33.96

EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 41.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.02 FLOW VELOCITY(FEET/SEC.) = 13.33

LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	D	0.10	0.20	1.000	84
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.10	0.20	1.000	83
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.60	0.30	1.000	66
NATURAL FAIR COVER					
"GRASS"	C	2.10	0.25	1.000	79
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	8.90	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	14.80	0.25	1.000	77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.75

AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 1.25

Tc(MIN.) = 13.82

SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 58.96

EFFECTIVE AREA(ACRES) = 44.20 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 44.2 PEAK FLOW RATE(CFS) = 98.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.54 FLOW VELOCITY(FEET/SEC.) = 13.83

LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 410.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0799

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.574

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.40	0.20	1.000	81
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.40	0.20	1.000	83
NATURAL FAIR COVER					
"OPEN BRUSH"	B	2.90	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	C	5.20	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	9.50	0.25	1.000	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 117.45
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 10.06
 AVERAGE FLOW DEPTH(Feet) = 1.97 TRAVEL TIME(Min.) = 1.35
 Tc(Min.) = 15.17
 SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 38.60
 EFFECTIVE AREA(ACRES) = 62.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 62.7 PEAK FLOW RATE(CFS) = 131.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(Feet) = 2.06 FLOW VELOCITY(Feet/Sec.) = 10.34
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

 FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(Feet) = 410.00 DOWNSTREAM(Feet) = 375.00
 CHANNEL LENGTH THRU SUBAREA(Feet) = 643.00 CHANNEL SLOPE = 0.0544
 CHANNEL BASE(Feet) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(Feet) = 30.00
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.20	0.30	1.000	63
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.50	0.30	1.000	65
NATURAL FAIR COVER					
"GRASS"	C	1.20	0.25	1.000	79
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	3.60	0.25	1.000	77
NATURAL FAIR COVER					
"GRASS"	B	3.80	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.28
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 146.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 9.21
 AVERAGE FLOW DEPTH(Feet) = 2.30 TRAVEL TIME(Min.) = 1.16
 Tc(Min.) = 16.33
 SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 30.27
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 155.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(Feet) = 2.35 FLOW VELOCITY(Feet/Sec.) = 9.35
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

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

MAINLINE Tc(Min.) = 16.33
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	14.30	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	21.60	0.25	1.000	77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 71.68
 EFFECTIVE AREA(ACRES) = 114.00 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 114.0 PEAK FLOW RATE(CFS) = 227.20

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

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

MAINLINE Tc(Min.) = 16.33
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.30	0.20	1.000	83
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.30	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.60	0.20	1.000	81
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	2.30	0.25	1.000	77
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	3.20	0.25	1.000	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 13.42
 EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 120.7 PEAK FLOW RATE(CFS) = 240.62

 FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(Feet) = 375.00 DOWNSTREAM(Feet) = 330.00
 FLOW LENGTH(Feet) = 1304.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.4 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 22.92
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 240.62
 PIPE TRAVEL TIME(Min.) = 0.95 Tc(Min.) = 17.28

LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 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.) = 17.28
RAINFALL INTENSITY(INCH/HR) = 2.39
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 120.70
TOTAL STREAM AREA(ACRES) = 120.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 240.62

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	674.58	10.27	3.210	0.23(0.19)	0.85	241.8	930.00
1	716.91	13.03	2.805	0.23(0.20)	0.87	299.1	910.00
1	740.06	16.56	2.449	0.22(0.20)	0.89	359.8	920.00
1	705.16	17.89	2.345	0.22(0.20)	0.89	359.9	900.00
2	52.58	10.05	3.250	0.26(0.26)	1.00	18.5	940.00
3	240.62	17.28	2.391	0.25(0.25)	1.00	120.7	950.00

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	917.45	10.05	3.250	0.23(0.21)	0.89	325.2	940.00
2	924.24	10.27	3.210	0.23(0.21)	0.89	332.0	930.00
3	978.29	13.03	2.805	0.23(0.21)	0.90	408.6	910.00
4	1015.48	16.56	2.449	0.23(0.21)	0.92	494.0	920.00
5	999.31	17.28	2.391	0.23(0.22)	0.92	499.1	950.00
6	977.27	17.89	2.345	0.23(0.22)	0.92	499.1	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1015.48 Tc(MIN.) = 16.56
EFFECTIVE AREA(ACRES) = 494.00 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 499.1
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.56
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.449
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	12.30	0.40	0.100	32
COMMERCIAL	B	26.80	0.30	0.100	56
COMMERCIAL	C	2.00	0.25	0.100	69
RESIDENTIAL					
" .4 DWELLING/ACRE"	A	2.70	0.40	0.900	32
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	2.10	0.25	0.900	69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.33					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.196					
SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 100.22					
EFFECTIVE AREA(ACRES) = 540.70 AREA-AVERAGED Fm(INCH/HR) = 0.20					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.86					
TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 1093.48					

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.56
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.449
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.00 0.40 0.100 32
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 17.34
EFFECTIVE AREA(ACRES) = 548.70 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 553.8 PEAK FLOW RATE(CFS) = 1110.83

=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 16.56
EFFECTIVE AREA(ACRES) = 548.70 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.848
PEAK FLOW RATE(CFS) = 1110.83

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1047.32	10.05	3.250	0.24(0.19)	0.79	379.9	940.00
2	1051.97	10.27	3.210	0.24(0.19)	0.79	386.7	930.00
3	1088.92	13.03	2.805	0.24(0.19)	0.82	463.3	910.00
4	1110.83	16.56	2.449	0.24(0.20)	0.85	548.7	920.00
5	1091.90	17.28	2.391	0.24(0.20)	0.85	553.8	950.00
6	1068.95	17.89	2.345	0.24(0.20)	0.85	553.8	900.00

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

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

* RMV PA-4 SUBAREA F ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC AUG 2018 CCHIU *

FILE NAME: PA4F00HC.DAT
TIME/DATE OF STUDY: 14:48 08/06/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.464

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						
"CHAPARRAL,BROADLEAF"	D	0.70	0.20	1.000	95	13.76
NATURAL FAIR COVER						
"OPEN BRUSH"	D	0.50	0.20	1.000	96	13.76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 3.52						
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.52						

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.07
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.52
PIPE TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 16.33
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 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.) = 16.33
RAINFALL INTENSITY(INCH/HR) = 3.14
AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 1.20
TOTAL STREAM AREA(ACRES) = 1.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.52

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

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

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 612.00

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

F-1

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.142
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.679
 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						
"CHAPARRAL,BROADLEAF"	C	0.10	0.25	1.000	91	8.14
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	D	0.50	0.20	1.000	95	8.14
NATURAL FAIR COVER						
"OPEN BRUSH"	D	1.00	0.20	1.000	96	8.14
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.20						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 6.45						
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 6.45						

OF-1

 FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 612.00 DOWNSTREAM(FEET) = 525.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 458.00 CHANNEL SLOPE = 0.1900
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.404

OF-2

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.00	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.60	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	2.30	0.20	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	D	1.00	0.20	1.000	96
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.22					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.69					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.41					
AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 0.91					
Tc(MIN.) = 9.05					
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 18.47					
EFFECTIVE AREA(ACRES) = 6.50 AREA-AVERAGED Fm(INCH/HR) = 0.21					
AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 24.52					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 9.38
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

 FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 470.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 618.00 CHANNEL SLOPE = 0.0890
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.103

OF-3

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	84
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	4.60	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	4.00	0.25	1.000	92
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.60	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	2.70	0.20	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	D	5.10	0.20	1.000	96
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.23					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 54.35					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.66					
AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 1.19					
Tc(MIN.) = 10.24					
SUBAREA AREA(ACRES) = 17.10 SUBAREA RUNOFF(CFS) = 59.65					
EFFECTIVE AREA(ACRES) = 23.60 AREA-AVERAGED Fm(INCH/HR) = 0.22					
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 23.6 PEAK FLOW RATE(CFS) = 82.40					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.69 FLOW VELOCITY(FEET/SEC.) = 9.61
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

 FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 459.00
 FLOW LENGTH(FEET) = 890.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.94
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 82.40
 PIPE TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 11.48
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 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.) = 11.48
RAINFALL INTENSITY(INCH/HR) = 3.84
AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 23.60
TOTAL STREAM AREA(ACRES) = 23.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 82.40

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.52	16.33	3.140	0.20(0.20)	1.00	1.2	900.00
2	82.40	11.48	3.843	0.22(0.22)	1.00	23.6	910.00

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	85.47	11.48	3.843	0.22(0.22)	1.00	24.4	910.00
2	69.93	16.33	3.140	0.22(0.22)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 85.47 Tc(MIN.) = 11.48
EFFECTIVE AREA(ACRES) = 24.44 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.8
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.843

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.20	0.30	1.000	81
COMMERCIAL	B	5.50	0.30	0.100	76
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	84
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	76
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	0.10	0.25	1.000	91
COMMERCIAL	C	1.00	0.25	0.100	86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.29

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175

SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 24.23

EFFECTIVE AREA(ACRES) = 31.54 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 103.86

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FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.48
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.843

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.20	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	3.20	0.20	1.000	95
COMMERCIAL	D	3.40	0.20	0.100	91
NATURAL FAIR COVER					
"OPEN BRUSH"	D	3.30	0.20	1.000	96
RESIDENTIAL					
".4 DWELLING/ACRE"	D	0.70	0.20	0.900	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.712

SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 36.29

EFFECTIVE AREA(ACRES) = 42.44 AREA-AVERAGED Fm(INCH/HR) = 0.17

AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.79

TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 140.15

FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.92
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 140.15
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 11.96
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 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.) = 11.96

RAINFALL INTENSITY(INCH/HR) = 3.75

AREA-AVERAGED Fm(INCH/HR) = 0.17

AREA-AVERAGED Fp(INCH/HR) = 0.22

AREA-AVERAGED Ap = 0.79

EFFECTIVE STREAM AREA(ACRES) = 42.44

TOTAL STREAM AREA(ACRES) = 42.80

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PEAK FLOW RATE(CFS) AT CONFLUENCE = 140.15

FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 286.00

ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 712.00

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.737

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.818

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						
"OPEN BRUSH"	C	0.20	0.25	1.000	92	7.74
NATURAL FAIR COVER						
"OPEN BRUSH"	D	0.70	0.20	1.000	96	7.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 3.73						
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 3.73						

FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 600.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.1886

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.493

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	D	0.20	0.20	1.000	95
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.00	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	1.40	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	4.40	0.20	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	D	6.70	0.20	1.000	96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.17					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.86					
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 1.00					
Tc(MIN.) = 8.74					
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 52.82					
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.21					

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AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 56.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.28 FLOW VELOCITY(FEET/SEC.) = 11.51

LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 604.00 CHANNEL SLOPE = 0.0828

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.191

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.70	0.20	1.000	95
NATURAL FAIR COVER					
"WOODLAND,GRASS"	D	1.40	0.20	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	D	5.40	0.20	1.000	96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 69.76					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.94					
AVERAGE FLOW DEPTH(FEET) = 1.61 TRAVEL TIME(MIN.) = 1.13					
Tc(MIN.) = 9.87					
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 26.94					
EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.21					
AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 79.27					

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.69 FLOW VELOCITY(FEET/SEC.) = 9.24

LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 495.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0648

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.851

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.60	0.30	1.000	83

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NATURAL FAIR COVER
 "WOODLAND,GRASS" C 0.80 0.25 1.000 92
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.80 0.30 1.000 84
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.10 0.30 1.000 81
 NATURAL FAIR COVER
 "WOODLAND,GRASS" D 5.20 0.20 1.000 95
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" C 6.30 0.25 1.000 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 103.33
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.00
 AVERAGE FLOW DEPTH(FEET) = 1.96 TRAVEL TIME(MIN.) = 1.57
 Tc(MIN.) = 11.44
 SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 48.09
 EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 120.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 2.07 FLOW VELOCITY(FEET/SEC.) = 9.36
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

 FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.44
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.851
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" C 9.70 0.25 1.000 92
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" D 17.00 0.20 1.000 95
 NATURAL FAIR COVER
 "OPEN BRUSH" D 36.60 0.20 1.000 96
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 63.30 SUBAREA RUNOFF(CFS) = 207.56
 EFFECTIVE AREA(ACRES) = 100.20 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 100.2 PEAK FLOW RATE(CFS) = 328.14

 FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 607.00 CHANNEL SLOPE = 0.0626
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

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* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.696
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 81
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 83
 NATURAL FAIR COVER
 "GRASS" C 0.60 0.25 1.000 93
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.70 0.30 1.000 84
 NATURAL FAIR COVER
 "WOODLAND,GRASS" D 0.90 0.20 1.000 95
 NATURAL FAIR COVER
 "GRASS" B 0.90 0.30 1.000 86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 333.54
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.90
 AVERAGE FLOW DEPTH(FEET) = 3.06 TRAVEL TIME(MIN.) = 0.85
 Tc(MIN.) = 12.29
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 10.81
 EFFECTIVE AREA(ACRES) = 103.70 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.21 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 103.7 PEAK FLOW RATE(CFS) = 328.14
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 3.04 FLOW VELOCITY(FEET/SEC.) = 11.84
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

 FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.29
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.696
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" D 3.80 0.20 1.000 96
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" D 4.20 0.20 1.000 95
 NATURAL FAIR COVER
 "WOODLAND,GRASS" C 5.10 0.25 1.000 92
 NATURAL FAIR COVER
 "OPEN BRUSH" C 7.00 0.25 1.000 92
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" C 12.00 0.25 1.000 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 32.10 SUBAREA RUNOFF(CFS) = 99.91
 EFFECTIVE AREA(ACRES) = 135.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 135.8 PEAK FLOW RATE(CFS) = 424.88

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FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   440.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00  CHANNEL SLOPE =   0.0192
CHANNEL BASE(FEET) =     0.00  "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) =   30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.418
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"                D          0.50    0.20    1.000    96
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B          0.70    0.30    1.000    81
NATURAL FAIR COVER
"WOODLAND,GRASS"      C          2.30    0.25    1.000    92
NATURAL FAIR COVER
"OPEN BRUSH"          B          2.40    0.30    1.000    84
NATURAL FAIR COVER
"GRASS"                B          2.50    0.30    1.000    86
NATURAL FAIR COVER
"GRASS"                C          3.20    0.25    1.000    93
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  441.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  8.19
AVERAGE FLOW DEPTH(FEET) =  4.24  TRAVEL TIME(MIN.) =  1.80
Tc(MIN.) =  14.09
SUBAREA AREA(ACRES) =   11.60    SUBAREA RUNOFF(CFS) =   32.84
EFFECTIVE AREA(ACRES) =   147.40    AREA-AVERAGED Fm(INCH/HR) =  0.22
AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =   147.4    PEAK FLOW RATE(CFS) =   424.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  4.18  FLOW VELOCITY(FEET/SEC.) =  8.12
LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =   3824.00 FEET.
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*****
FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =   14.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   3.418
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE        GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"      D          7.40    0.20    1.000    95
NATURAL FAIR COVER
"OPEN BRUSH"          C         12.40    0.25    1.000    92
NATURAL FAIR COVER
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"OPEN BRUSH"                D          28.20    0.20    1.000    96
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"      D          31.40    0.20    1.000    95
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"      C          42.40    0.25    1.000    91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) =   121.80    SUBAREA RUNOFF(CFS) =   350.26
EFFECTIVE AREA(ACRES) =   269.20    AREA-AVERAGED Fm(INCH/HR) =  0.22
AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =   269.2    PEAK FLOW RATE(CFS) =   773.99
```

```
*****
FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
FLOW LENGTH(FEET) =  1341.00  MANNING'S N =  0.013
DEPTH OF FLOW IN  93.0 INCH PIPE IS  72.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  19.60
ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =   773.99
PIPE TRAVEL TIME(MIN.) =  1.14    Tc(MIN.) =  15.23
LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =   5165.00 FEET.

*****
FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 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.) =  15.23
RAINFALL INTENSITY(INCH/HR) =  3.27
AREA-AVERAGED Fm(INCH/HR) =  0.22
AREA-AVERAGED Fp(INCH/HR) =  0.22
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   269.20
TOTAL STREAM AREA(ACRES) =   269.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =   773.99
```

```
*****
FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
ELEVATION DATA: UPSTREAM(FEET) =   715.00  DOWNSTREAM(FEET) =   517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =  7.954
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.742
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.)
```

OF-10

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" C 0.60 0.25 1.000 91 7.95
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.43
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.43

FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	517.00	DOWNSTREAM(FEET) =	430.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	443.00	CHANNEL SLOPE =	0.1964
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.452		

OF-11

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	0.10	0.25	0.900	86
COMMERCIAL	C	0.40	0.25	0.100	86
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	0.30	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	4.30	0.25	1.000	91

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.927
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FT/SEC.) = 7.96
AVERAGE FLOW DEPTH(FT) = 0.71 TRAVEL TIME(MIN.) = 0.93
Tc(MIN.) = 8.88
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 19.37
EFFECTIVE AREA(ACRES) = 5.70 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 5.7 PEAK FLOW RATE(CFS) = 21.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FT) = 0.88 FLOW VELOCITY(FT/SEC.) = 9.27
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	430.00	DOWNSTREAM(FEET) =	426.00
FLOW LENGTH(FT) =	254.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	24.0 INCH PIPE IS	16.3 INCHES	
PIPE-FLOW VELOCITY(FT/SEC.) =	9.53		
ESTIMATED PIPE DIAMETER(INCH) =	24.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	21.64		
PIPE TRAVEL TIME(MIN.) =	0.44	Tc(MIN.) =	9.33
LONGEST FLOWPATH FROM NODE	930.00 TO NODE	903.00 =	1027.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 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.) =	9.33
RAINFALL INTENSITY(INCH/HR) =	4.33
AREA-AVERAGED Fm(INCH/HR) =	0.23
AREA-AVERAGED Fp(INCH/HR) =	0.25
AREA-AVERAGED Ap =	0.94
EFFECTIVE STREAM AREA(ACRES) =	5.70
TOTAL STREAM AREA(ACRES) =	5.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =	21.64

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.15	11.96	3.754	0.22(0.17)	0.79	42.4	910.00
1	114.25	16.82	3.088	0.22(0.17)	0.79	42.8	900.00
2	773.99	15.23	3.269	0.22(0.22)	1.00	269.2	920.00
3	21.64	9.33	4.329	0.25(0.23)	0.94	5.7	930.00

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	787.54	9.33	4.329	0.22(0.22)	0.96	203.7	930.00
2	863.45	11.96	3.754	0.22(0.22)	0.96	259.5	910.00
3	912.76	15.23	3.269	0.22(0.22)	0.97	317.6	920.00
4	857.28	16.82	3.088	0.22(0.22)	0.97	317.7	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 912.76 Tc(MIN.) = 15.23
EFFECTIVE AREA(ACRES) = 317.58 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) =	15.23
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.269
SUBAREA LOSS RATE DATA(AMC III):	

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	C	0.50	0.25	0.900	86
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.10	0.30	0.900	76
RESIDENTIAL					

```
"4 DWELLING/ACRE"      D      3.00    0.20    0.900    91
COMMERCIAL              D      5.90    0.20    0.100    91
COMMERCIAL              C      7.70    0.25    0.100    86
COMMERCIAL              B     13.60    0.30    0.100    76
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80    SUBAREA RUNOFF(CFS) = 94.75
EFFECTIVE AREA(ACRES) = 350.38    AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.22    AREA-AVERAGED Ap = 0.90
TOTAL AREA(ACRES) = 350.5    PEAK FLOW RATE(CFS) = 967.07
```

```
*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
-----
```

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

```
ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 56.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 40.46
ESTIMATED PIPE DIAMETER(INCH) = 72.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 967.07
PIPE TRAVEL TIME(MIN.) = 0.37    Tc(MIN.) = 15.60
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
-----
```

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

```
MAINLINE Tc(MIN.) = 15.60
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.224
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.80 0.30 0.100 76
COMMERCIAL C 0.60 0.25 0.100 86
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 86
RESIDENTIAL
".4 DWELLING/ACRE" B 2.40 0.30 0.900 76
RESIDENTIAL
".4 DWELLING/ACRE" C 2.20 0.25 0.900 86
RESIDENTIAL
".4 DWELLING/ACRE" D 0.30 0.20 0.900 91
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.27
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40    SUBAREA RUNOFF(CFS) = 26.06
EFFECTIVE AREA(ACRES) = 359.78    AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.22    AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 359.9    PEAK FLOW RATE(CFS) = 979.08
```

```
*****
FLOW PROCESS FROM NODE 904.00 TO NODE 905.00 IS CODE = 31
-----
```

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.42
ESTIMATED PIPE DIAMETER(INCH) = 78.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 979.08
PIPE TRAVEL TIME(MIN.) = 0.40    Tc(MIN.) = 16.00
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 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.) = 16.00
RAINFALL INTENSITY(INCH/HR) = 3.18
AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.22
AREA-AVERAGED Ap = 0.89
EFFECTIVE STREAM AREA(ACRES) = 359.78
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 979.08
```

```
*****
FLOW PROCESS FROM NODE 940.00 TO NODE 941.00 IS CODE = 21
-----
```

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

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 304.00
ELEVATION DATA: UPSTREAM(FEET) = 858.00 DOWNSTREAM(FEET) = 675.00
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.692
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.834
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
"CHAPARRAL,BROADLEAF" C 0.10 0.25 1.000 91 7.69
NATURAL FAIR COVER
"OPEN BRUSH" C 1.10 0.25 1.000 92 7.69
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 4.95
TOTAL AREA(ACRES) = 1.20    PEAK FLOW RATE(CFS) = 4.95
```

```
*****
FLOW PROCESS FROM NODE 941.00 TO NODE 942.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
```

```
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00    CHANNEL SLOPE = 0.2679
```

F-4

OF-13

OF-14

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.91
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.22 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 10.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 5.75
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.678

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.60	0.20	1.000	95
NATURAL FAIR COVER					
"GRASS"	D	1.50	0.20	1.000	96
NATURAL FAIR COVER					
"GRASS"	C	1.70	0.25	1.000	93
NATURAL FAIR COVER					
"OPEN BRUSH"	C	3.40	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	7.20	0.25	1.000	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.54

AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 1.08

Tc(MIN.) = 12.39

SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 44.52

EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 54.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.13 FLOW VELOCITY(FEET/SEC.) = 14.32

LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	D	0.10	0.20	1.000	96
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.10	0.20	1.000	96
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.60	0.30	1.000	84
NATURAL FAIR COVER					
"GRASS"	C	2.10	0.25	1.000	93
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	8.90	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	14.80	0.25	1.000	92

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 93.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.58

AVERAGE FLOW DEPTH(FEET) = 1.51 TRAVEL TIME(MIN.) = 1.17

Tc(MIN.) = 13.56

SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 77.61

EFFECTIVE AREA(ACRES) = 44.20 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 44.2 PEAK FLOW RATE(CFS) = 129.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.71 FLOW VELOCITY(FEET/SEC.) = 14.79

LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0799
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.319

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	86
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.40	0.20	1.000	95
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.40	0.20	1.000	96
NATURAL FAIR COVER					
"OPEN BRUSH"	B	2.90	0.30	1.000	84
NATURAL FAIR COVER					
"OPEN BRUSH"	C	5.20	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	9.50	0.25	1.000	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26

OF-18

OF-17

OF-19

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 154.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.78
 AVERAGE FLOW DEPTH(FEET) = 2.19 TRAVEL TIME(MIN.) = 1.26
 Tc(MIN.) = 14.82
 SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 51.01
 EFFECTIVE AREA(ACRES) = 62.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 62.7 PEAK FLOW RATE(CFS) = 173.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 2.28 FLOW VELOCITY(FEET/SEC.) = 11.07
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

 FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 375.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 643.00 CHANNEL SLOPE = 0.0544
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.187
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.20	0.30	1.000	81
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.50	0.30	1.000	83
NATURAL FAIR COVER					
"GRASS"	C	1.20	0.25	1.000	93
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	3.60	0.25	1.000	92
NATURAL FAIR COVER					
"GRASS"	B	3.80	0.30	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.10	0.30	1.000	84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.28					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 193.39					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.85					
AVERAGE FLOW DEPTH(FEET) = 2.56 TRAVEL TIME(MIN.) = 1.09					
Tc(MIN.) = 15.91					
SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 40.23					
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.26					
AREA-AVERAGED Fp(INCH/HR) = 0.26 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 206.05					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 2.62 FLOW VELOCITY(FEET/SEC.) = 10.01
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.91
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.187
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	14.30	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	21.60	0.25	1.000	92
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 94.90					
EFFECTIVE AREA(ACRES) = 114.00 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 114.0 PEAK FLOW RATE(CFS) = 300.95					

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.91
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.187
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	D	0.30	0.20	1.000	96
NATURAL FAIR COVER					
"OPEN BRUSH"	C	0.30	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	D	0.60	0.20	1.000	95
NATURAL FAIR COVER					
"WOODLAND,GRASS"	C	2.30	0.25	1.000	92
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	3.20	0.25	1.000	91
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.24					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 17.75					
EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 120.7 PEAK FLOW RATE(CFS) = 318.70					

 FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 330.00
 FLOW LENGTH(FEET) = 1304.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.72
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 318.70
 PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.79

LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 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.) = 16.79
RAINFALL INTENSITY(INCH/HR) = 3.09
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 120.70
TOTAL STREAM AREA(ACRES) = 120.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 318.70

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	893.84	10.11	4.132	0.23(0.19)	0.85	245.9	930.00
1	948.62	12.74	3.621	0.23(0.20)	0.87	301.7	910.00
1	979.08	16.00	3.178	0.22(0.20)	0.89	359.8	920.00
1	922.72	17.60	3.008	0.22(0.20)	0.89	359.9	900.00
2	68.84	9.88	4.189	0.26(0.26)	1.00	18.5	940.00
3	318.70	16.79	3.091	0.25(0.25)	1.00	120.7	950.00

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	1214.28	9.88	4.189	0.23(0.21)	0.89	329.6	940.00
2	1224.15	10.11	4.132	0.23(0.21)	0.89	337.1	930.00
3	1294.44	12.74	3.621	0.23(0.21)	0.91	411.8	910.00
4	1343.15	16.00	3.178	0.23(0.21)	0.92	493.3	920.00
5	1319.50	16.79	3.091	0.23(0.22)	0.92	499.0	950.00
6	1280.37	17.60	3.008	0.23(0.22)	0.92	499.1	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1343.15 Tc(MIN.) = 16.00
EFFECTIVE AREA(ACRES) = 493.26 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.23 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 499.1
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.178
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	A	12.30	0.40	0.100	52
COMMERCIAL	B	26.80	0.30	0.100	76
COMMERCIAL	C	2.00	0.25	0.100	86
RESIDENTIAL					
" .4 DWELLING/ACRE"	A	2.70	0.40	0.900	52
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	76
RESIDENTIAL					
" .4 DWELLING/ACRE"	C	2.10	0.25	0.900	86
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.33					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.196					
SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 130.86					
EFFECTIVE AREA(ACRES) = 539.96 AREA-AVERAGED Fm(INCH/HR) = 0.20					
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.86					
TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 1446.20					

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.178
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 8.00 0.40 0.100 52
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 22.59
EFFECTIVE AREA(ACRES) = 547.96 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 553.8 PEAK FLOW RATE(CFS) = 1468.79

=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 16.00
EFFECTIVE AREA(ACRES) = 547.96 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.847
PEAK FLOW RATE(CFS) = 1468.79

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1383.90	9.88	4.189	0.24(0.19)	0.79	384.3	940.00
2	1390.74	10.11	4.132	0.24(0.19)	0.79	391.8	930.00
3	1438.89	12.74	3.621	0.24(0.19)	0.82	466.5	910.00
4	1468.79	16.00	3.178	0.24(0.20)	0.85	548.0	920.00
5	1440.56	16.79	3.091	0.24(0.20)	0.85	553.7	950.00
6	1399.75	17.60	3.008	0.24(0.20)	0.85	553.8	900.00

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

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

* RMV PA-3 SUBAREA G ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC SEPTEMBER 2018 CCHIU *

FILE NAME: PA3G25HC.DAT
TIME/DATE OF STUDY: 13:36 09/25/2018

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 292.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.507
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.156
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	A	2.60	0.40	0.100	32	6.51

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 9.63
TOTAL AREA(ACRES) = 2.60 PEAK FLOW RATE(CFS) = 9.63

FLOW PROCESS FROM NODE 501.00 TO NODE 502.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 292.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 566.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.40
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 16.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.98
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.39
STREET FLOW TRAVEL TIME(MIN.) = 3.16 Tc(MIN.) = 9.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.321
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	3.20	0.40	0.100	32
PUBLIC PARK	A	1.50	0.40	0.850	32

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.339
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 13.47
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 21.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 18.79
FLOW VELOCITY(FEET/SEC.) = 3.16 DEPTH*VELOCITY(FT*FT/SEC.) = 1.57
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 502.00 = 896.00 FEET.

FLOW PROCESS FROM NODE 502.00 TO NODE 503.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 311.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.73
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.15
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 10.26
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 503.00 = 1207.00 FEET.

FLOW PROCESS FROM NODE 503.00 TO NODE 503.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.26
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.211
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.60 0.40 0.100 32
PUBLIC PARK A 6.50 0.40 0.850 32
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.503
SUBAREA AREA(ACRES) = 12.10 SUBAREA RUNOFF(CFS) = 32.78
EFFECTIVE AREA(ACRES) = 19.40 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 19.4 PEAK FLOW RATE(CFS) = 53.21

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 19.4 TC(MIN.) = 10.26
EFFECTIVE AREA(ACRES) = 19.40 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.409
PEAK FLOW RATE(CFS) = 53.21

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

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

* RMV PA-3 SUBAREA G ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC SEPTEMBER 2018 CCHIU *

FILE NAME: PA3G00HC.DAT
TIME/DATE OF STUDY: 13:36 09/25/2018

=====

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 = 0.90
DATA BANK RAINFALL USED
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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 292.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 6.507
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.320
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	A	2.60	0.40	0.100	52	6.51

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.40
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 12.36
TOTAL AREA(ACRES) = 2.60 PEAK FLOW RATE(CFS) = 12.36

FLOW PROCESS FROM NODE 501.00 TO NODE 502.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 292.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 566.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.79
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.16
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.58
STREET FLOW TRAVEL TIME(MIN.) = 2.98 T_c (MIN.) = 9.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.286

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	A	3.20	0.40	0.100	52
PUBLIC PARK	A	1.50	0.40	0.850	52

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.40
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 0.339
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 17.56
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED F_m (INCH/HR) = 0.10
AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.25
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 27.49

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.82
FLOW VELOCITY(FEET/SEC.) = 3.38 DEPTH*VELOCITY(FT*FT/SEC.) = 1.81
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 502.00 = 896.00 FEET.

FLOW PROCESS FROM NODE 502.00 TO NODE 503.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 311.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.36
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.49
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.04
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 503.00 = 1207.00 FEET.

FLOW PROCESS FROM NODE 503.00 TO NODE 503.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.04
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.149
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL A 5.60 0.40 0.100 52
PUBLIC PARK A 6.50 0.40 0.850 52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.503
SUBAREA AREA(ACRES) = 12.10 SUBAREA RUNOFF(CFS) = 43.00
EFFECTIVE AREA(ACRES) = 19.40 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 19.4 PEAK FLOW RATE(CFS) = 69.59

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 19.4 TC(MIN.) = 10.04
EFFECTIVE AREA(ACRES) = 19.40 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.40 AREA-AVERAGED Ap = 0.409
PEAK FLOW RATE(CFS) = 69.59

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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

* RMV PA-3 SUBAREA O ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 25-YR HC MAY 2018 JMITAL *

FILE NAME: PA3O25HC.DAT
TIME/DATE OF STUDY: 12:22 05/23/2018

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II 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 LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.267
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	C	0.80	0.25	1.000	77	9.95

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.17
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.17

0-1

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.096

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	2.90	0.25	1.000	77

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.90
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.99
Tc(MIN.) = 10.95
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 7.43
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 9.48

0-2

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 6.64
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.803
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
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0-3

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	14.80	0.25	1.000	77
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.63					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.93					
AVERAGE FLOW DEPTH(FEET) = 1.13 TRAVEL TIME(MIN.) = 2.10					
Tc(MIN.) = 13.04					
SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 34.24					
EFFECTIVE AREA(ACRES) = 18.60 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 18.6 PEAK FLOW RATE(CFS) = 42.74					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.35 FLOW VELOCITY(FEET/SEC.) = 7.85
 LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

 FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	0.10	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	11.70	0.25	1.000	77
RESIDENTIAL					
".4 DWELLING/ACRE"	C	1.10	0.25	0.900	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.64					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.48					
AVERAGE FLOW DEPTH(FEET) = 1.49 TRAVEL TIME(MIN.) = 1.44					
Tc(MIN.) = 14.49					
SUBAREA AREA(ACRES) = 12.90 SUBAREA RUNOFF(CFS) = 27.79					
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 67.83					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.60 FLOW VELOCITY(FEET/SEC.) = 8.84
 LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

 FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
 FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.69
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 67.83
 PIPE TRAVEL TIME(MIN.) = 2.18 Tc(MIN.) = 16.66
 LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

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

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	A	0.10	0.40	1.000	44
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.40	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.60	0.30	1.000	65
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.00	0.25	1.000	75
NATURAL FAIR COVER					
"OPEN BRUSH"	C	8.30	0.25	1.000	77
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988					
SUBAREA AREA(ACRES) = 11.70 SUBAREA RUNOFF(CFS) = 22.99					
EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.99					
TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 85.12					

 FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

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

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	C	5.20	0.25	0.900	69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900					
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 10.37					
EFFECTIVE AREA(ACRES) = 48.40 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.98					

TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 95.49

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END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 48.4 TC (MIN.) = 16.66

EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED F_m (INCH/HR) = 0.25

AREA-AVERAGED F_p (INCH/HR) = 0.25 AREA-AVERAGED A_p = 0.984

PEAK FLOW RATE (CFS) = 95.49

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA O ROMP 2018 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL *
* 100-YR HC MAY 2018 JMITAL *

FILE NAME: PA3000HC.DAT
TIME/DATE OF STUDY: 14:42 05/07/2018

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*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 = 0.90
DATA BANK RAINFALL USED
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 LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.171
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						
"OPEN BRUSH"	C	0.80	0.25	1.000	92	9.95

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.82
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.82

0-1

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.963

0-2

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	2.90	0.25	1.000	92

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.67
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.32
AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.93
Tc(MIN.) = 10.88
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 9.69
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 12.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.76 FLOW VELOCITY(FEET/SEC.) = 7.13
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.606
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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0-3

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER					
"OPEN BRUSH"	C	14.80	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	0.10	0.25	0.900	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.89					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.46					
AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.95					
Tc(MIN.) = 12.83					
SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 45.01					
EFFECTIVE AREA(ACRES) = 18.60 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 18.6 PEAK FLOW RATE(CFS) = 56.18					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.50 FLOW VELOCITY(FEET/SEC.) = 8.34
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	0.10	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	11.70	0.25	1.000	92
RESIDENTIAL					
".4 DWELLING/ACRE"	C	1.10	0.25	0.900	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.52					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.03					
AVERAGE FLOW DEPTH(FEET) = 1.66 TRAVEL TIME(MIN.) = 1.35					
Tc(MIN.) = 14.18					
SUBAREA AREA(ACRES) = 12.90 SUBAREA RUNOFF(CFS) = 36.65					
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 89.47					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 9.47
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.07
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.47
PIPE TRAVEL TIME(MIN.) = 2.03 Tc(MIN.) = 16.21
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

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

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	A	0.10	0.40	1.000	64
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	84
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.40	0.30	0.900	76
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.60	0.30	1.000	83
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	C	1.00	0.25	1.000	91
NATURAL FAIR COVER					
"OPEN BRUSH"	C	8.30	0.25	1.000	92
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.26					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988					
SUBAREA AREA(ACRES) = 11.70 SUBAREA RUNOFF(CFS) = 30.49					
EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.99					
TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 112.82					

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

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

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	C	5.20	0.25	0.900	86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900					
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 13.70					
EFFECTIVE AREA(ACRES) = 48.40 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.98					

TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 126.52

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END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 48.4 TC (MIN.) = 16.21

EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED F_m (INCH/HR) = 0.25

AREA-AVERAGED F_p (INCH/HR) = 0.25 AREA-AVERAGED A_p = 0.984

PEAK FLOW RATE (CFS) = 126.52

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END OF RATIONAL METHOD ANALYSIS