

Appendices

Appendix I Hydrology Reports

Appendix I1: Preliminary Hydrology Calculations

Appendix I2: Preliminary Water Quality Management Plan

Appendices

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**PRELIMINARY HYDROLOGY
CALCULATIONS**

FOR

**ONTARIO RANCH BUSINESS PARK
SOUTHEAST CORNER OF
EUCLID AVENUE AND EUCALYPTUS AVENUE
ONTARIO, CA**

PREPARED FOR

**EUCLID LAND VENTURE, LLC
4450 MACARTHUR BLVD, SUITE 100
NEWPORT BEACH, CA 92660
PHONE: (949) 216-7300**

**JULY 25, 2018
REVISED: JUNE 19, 2019
REVISED: JULY 25, 2019**

JOB NO. 3635

PREPARED BY

**THIENES ENGINEERING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
P. (714) 521-4811
FAX. (714) 521-4173**

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

ONTARIO RANCH BUSINESS PARK

**PREPARED BY RICKY HWA
UNDER THE SUPERVISION OF**

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/20

INTRODUCTION

A: PROJECT LOCATION

The project site is located on the east side of Euclid Avenue, south of Eucalyptus Avenue and north of Merrill Avenue in the City of Ontario, California. Please see next page for vicinity map.

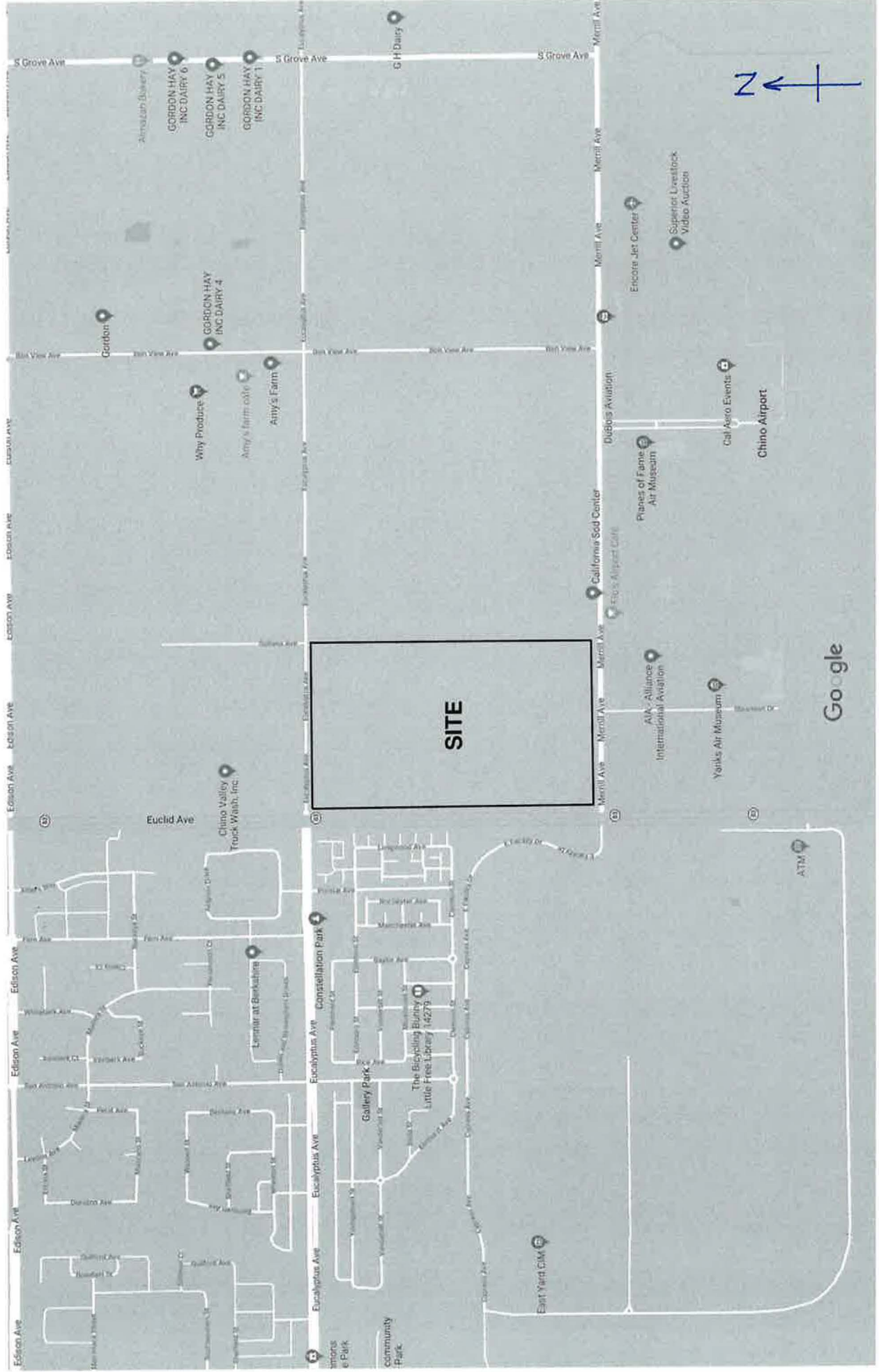
B: STUDY PURPOSE

The purpose of this study is to determine 25-year and 100-year, existing and proposed condition peak flow rates from the project site.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Ricky Hwa



VICINITY MAP

DISCUSSION

The project site encompasses approximately 84.05 acres. Proposed improvements to the site include eight industrial buildings ranging from 37,770 square feet to 588,353 square feet. There will be a truck yard adjacent to each building and vehicle parking lots scattered throughout the project site. Proposed landscaping will be along the site's property lines and scattered throughout the site. Public storm drains will be constructed in Eucalyptus Avenue (to intercept northerly street flow prior to entering the site), Euclid Avenue (per master drainage plan, fronting the site), Merrill Avenue (also per master drainage plan and fronting the site), and Euclid Avenue south of Merrill Avenue (discharging to existing earthen channel).

Master Plan Hydrology

Per the City of Ontario's Master Plan of Drainage dated March 2012 by Hunsaker & Associates, the project site is tabled to a proposed Master Plan storm drain in Merrill Avenue (MERL-XIV-1), a 9.5ft by 9.5ft reinforced concrete box tributary to an existing earthen channel adjacent to Euclid Avenue south of Merrill Avenue.

Although the project site will construct the above mentioned Master Plan storm drains, the ultimate discharge location downstream in Euclid Avenue is currently not fully improved. The existing earthen channel adjacent to Euclid Avenue does not have the capacity to convey Master Plan peak flow rates. Therefore, proposed condition discharge from the project site to Euclid Avenue via proposed Master Plan storm drains will be limited to existing condition 25-year runoffs from the site, with the difference between existing condition 25-year runoff and proposed condition 100-year runoff detained onsite.

Please see Appendix "A" for the City's Master Plan of Drainage and other pertinent reference materials.

Existing Condition

The project site is currently an open agricultural lot. The southeast portion of the site (Nodes 100-201, 9.60 acres) surface drains southerly to a dirt swale adjacent to Merrill Avenue, then westerly to a set of four corrugated steel pipes, then southerly to an earthen channel adjacent to Euclid Avenue. The 25-year and 100-year existing condition peak flow rates from this area are approximately 6.2 cfs and 11.6 cfs, respectively.

The remainder of the project site (Nodes 200-234, 74.45 acres) surface drains southerly to an onsite detention basin, then further south to the dirt swale adjacent to Merrill Avenue via a concrete spillway (at Node 234). Likewise, runoff is then conveyed westerly to the set of four corrugated steel pipes, then southerly to the earthen channel adjacent to Euclid Avenue. The 25-year and 100-year existing condition peak flow rates from this area are approximately 73.4 cfs and 114.0 cfs, respectively.

The total existing condition 25-year and 100-year peak flow rates from the project site are approximately 79.6 cfs and 125.6 cfs, respectively.

See Appendix "B" for existing condition hydrology calculations and Appendix "D" for existing condition hydrology map.

Proposed Condition

In general, proposed condition runoff from the project site will surface drain to proposed catch basin throughout the site. B.M.P. flows tributary to each catch basin will be conveyed via proposed storm drains from the catch basin to a Debris Separating Baffle Box (D.S.B.B.) for pre-treatment, then to a set of 96-inch C.M.P.'s for main water quality treatment. Once water quality volume has been met, when the 96-inch C.M.P.'s are full, higher flows at the catch basins will be conveyed away from the project site via a larger onsite storm drain system. The proposed onsite storm drain system will be sufficiently sized to limit proposed condition project site discharge to less than existing condition 25-year discharge. Flows beyond the allowable rate will be forced to temporarily detain above ground in the proposed truck yards throughout the site, and then slowly released via the proposed onsite storm drain at a rate below the existing condition 25-year discharge. See "Detention Analysis" section below for more details regarding detention in truck yards.

The proposed Building 8, Building 7, their southerly truck yards, westerly and northerly parking lots (Nodes 100-112, 8.20 acres) drain to catch basins in the truck yards. Runoff is then conveyed westerly via a proposed onsite storm drain south of the proposed buildings.

The proposed onsite storm drain will then traverse southerly in the drive aisle west of Building 1 and Building 2, ultimately discharging to the proposed Merrill Avenue storm drain, which will drain westerly to the proposed Euclid Avenue storm drain. The proposed onsite storm drain will also accept onsite runoffs at Node 122 (Building 6, 1.55 acres), Node 206 (north half of Building 1, 12.70 acres), Node 212 (Building 5, 3.00 acres), Node 222 (Building 4, 4.55 acres), Node 308 (south half of Building 1, 8.65 acres), Node 324 (parking lots west of Buildings 4-6, 4.00 acres), Node 414 (north half of Building 2, 18.20 acres), Node 423 (Building 3, 9.10 acres), and Node 505 (south half of Building 2, 11.65 acres).

The total proposed condition 25-year and 100-year peak flow rates from the project site (Nodes 100-505, 81.60 acres) tributary to the proposed Merrill Avenue storm drain, via the proposed onsite storm drain system, are approximately 162.8 cfs and 202.1 cfs, respectively.

The landscape area west of Building 3 (Nodes 640-641, 0.80 acres) will surface drain westerly to Euclid Avenue. The project site's southerly driveway (Nodes 620-621, 0.35 acres), south-westerly landscape areas (Nodes 630-631, 0.30 acres) and south-easterly landscape areas (Nodes 610-611, 0.85 acres and Nodes 600-601, 0.15 acres) fronting

Merrill Avenue will surface drain southerly to Merrill Avenue. These surface draining runoffs will be intercepted by proposed street catch basins and conveyed to the proposed Merrill Avenue storm drain via storm drain laterals. The total proposed condition 25-year and 100-year surface flows from the aforementioned site's frontage (at Nodes 601, 611, 621, 631 and 641) are approximately 6.4 cfs (0.4 cfs at Node 601 + 1.7 cfs at Node 611 + 1.1 cfs at Node 621 + 0.9 cfs at Node 631 + 2.3 cfs at Node 641) and 8.7 cfs (0.5 + 2.4 + 1.4 + 1.2 + 3.2), respectively.

The total proposed condition 25-year and 100-year runoffs from the entire project site (84.05 acres) tributary to the proposed Merrill Avenue storm drain, via onsite storm drain (81.60 acres) and surface flows to the street (2.45 acres), are approximately 169.2 cfs and 210.8 cfs.

See Appendix "B" for proposed condition hydrology calculations and Appendix "D" for proposed condition hydrology map.

Detention Analysis

As previously mentioned, proposed condition discharge to the Merrill Avenue storm drain from the project site will be limited to existing condition 25-year runoff. Proposed onsite truck yards will be utilized to detain the difference between existing condition 25-year runoff and proposed condition 100-year runoff.

See Appendix "C" for detention calculations for each onsite truck yard. The following is a summary of required detention volume and post-detention 100-year discharge for each truck yard.

Truck Yard	Node	Area	Volume	Ponding Depth	Q100 Tributary	Q100 Discharge
Building 1 North	205	12.70 ac.	0.635 ac-ft	1.03 ft	38.7 cfs	5.4 cfs
Building 1 South	307	8.65 ac.	0.314 ac-ft	1.25 ft	27.0 cfs	5.7 cfs
Building 2 North	413	18.20 ac.	1.291 ac-ft	1.43 ft	39.3 cfs	5.9 cfs
Building 2 South	504	11.65 ac.	0.547 ac-ft	0.96 ft	28.4 cfs	5.3 cfs
Building 3	422	9.10 ac.	0.349 ac-ft	1.44 ft	21.7 cfs	5.9 cfs
Building 4	221	4.55 ac.	0.134 ac-ft	0.94 ft	12.1 cfs	5.2 cfs
Building 5	211	3.00 ac.	0.085 ac-ft	0.78 ft	8.8 cfs	3.5 cfs
Building 6	121	1.55 ac.	0.038 ac-ft	0.76 ft	5.8 cfs	2.2 cfs
Building 7	111	4.50 ac.	0.146 ac-ft	1.36 ft	11.1 cfs	4.0 cfs
Building 8	101	3.70 ac.	0.112 ac-ft	1.38 ft	9.4 cfs	4.1 cfs

Total Q100 Discharge from truck yards = 47.2 cfs

With onsite detention, the total proposed condition 100-year discharge from the project site to Merrill Avenue will be approximately 65.5 cfs (47.2 cfs from truck yards + 9.6 cfs from undetained parking lots, Nodes 300-323 + 8.7 cfs from site's southerly frontage, Nodes

600-641). This is less than the existing condition 25-year discharge (79.6 cfs) from the site to Merrill Avenue.

See the following table for runoffs from the entire project site under existing and proposed conditions, for 25-year and 100-year storm events.

	Existing 25-Year	Existing 100-Year	Proposed 25-Year	Proposed 100-Year Without Detention	Proposed 100-Year With Detention
Site Runoff	79.6 cfs	125.6 cfs	169.2 cfs	210.8 cfs	65.5 cfs

Storm drain pipe sizes and hydraulics will be determined during final design phase to limit the proposed condition 100-year site discharge to below the existing condition 25-year discharge.

Methodology

Hydrology calculations were computed using San Bernardino County Rational Method program (by AES Software). The soil type is "B" per the San Bernardino County Hydrology Manual. The San Bernardino County Small Area Unit Hydrograph Model (also by AES Software) was used for detention calculations. See Appendix "A" for reference materials.

APPENDIX

DESCRIPTION

A

REFERENCE MATERIALS

B

HYDROLOGY CALCULATIONS

C

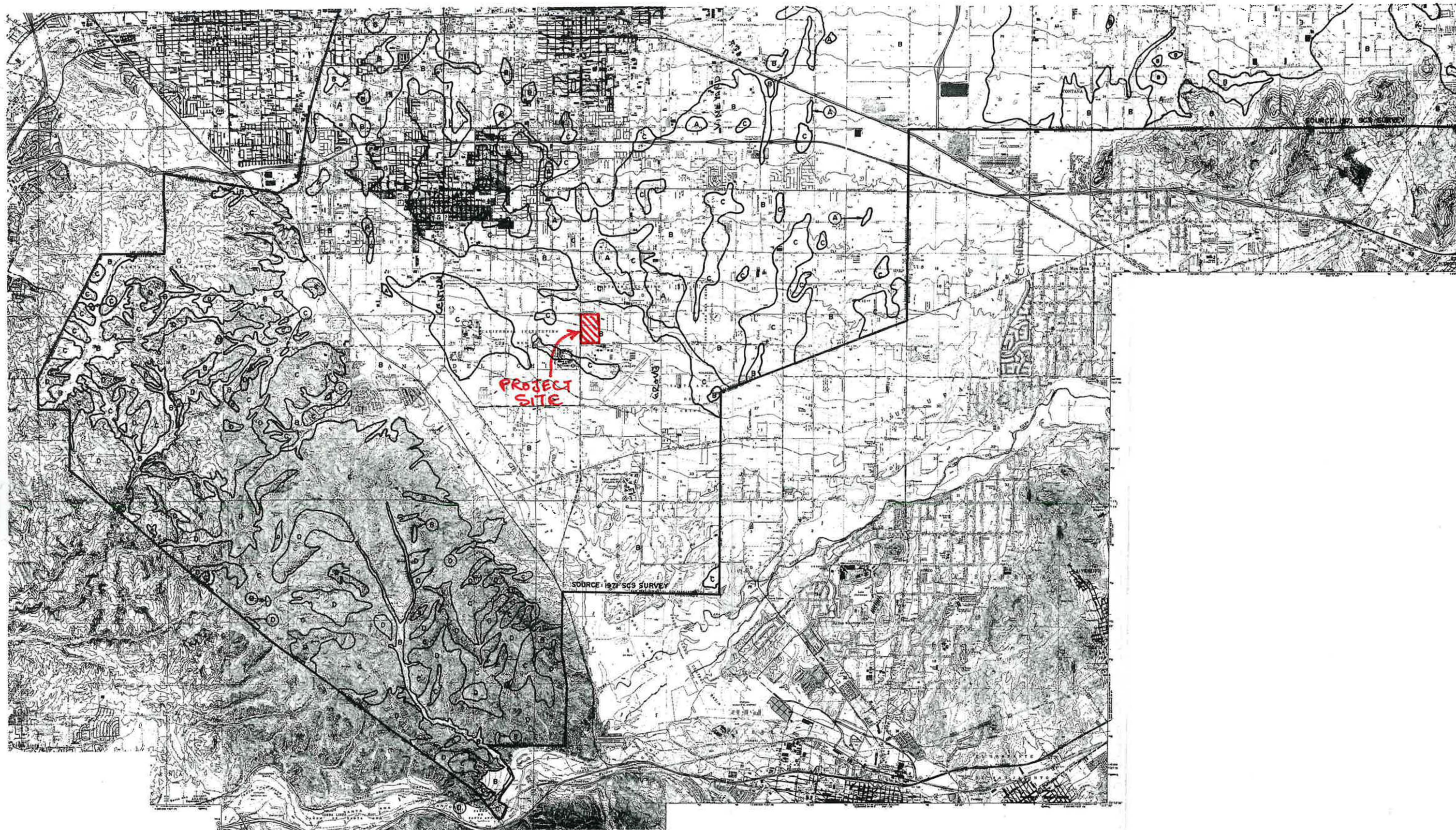
DETENTION ANALYSIS

D

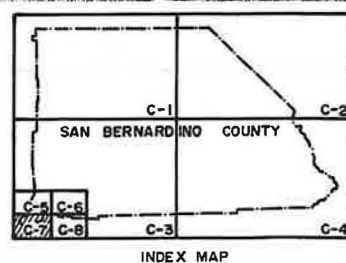
HYDROLOGY MAP

APPENDIX A

REFERENCE MATERIALS



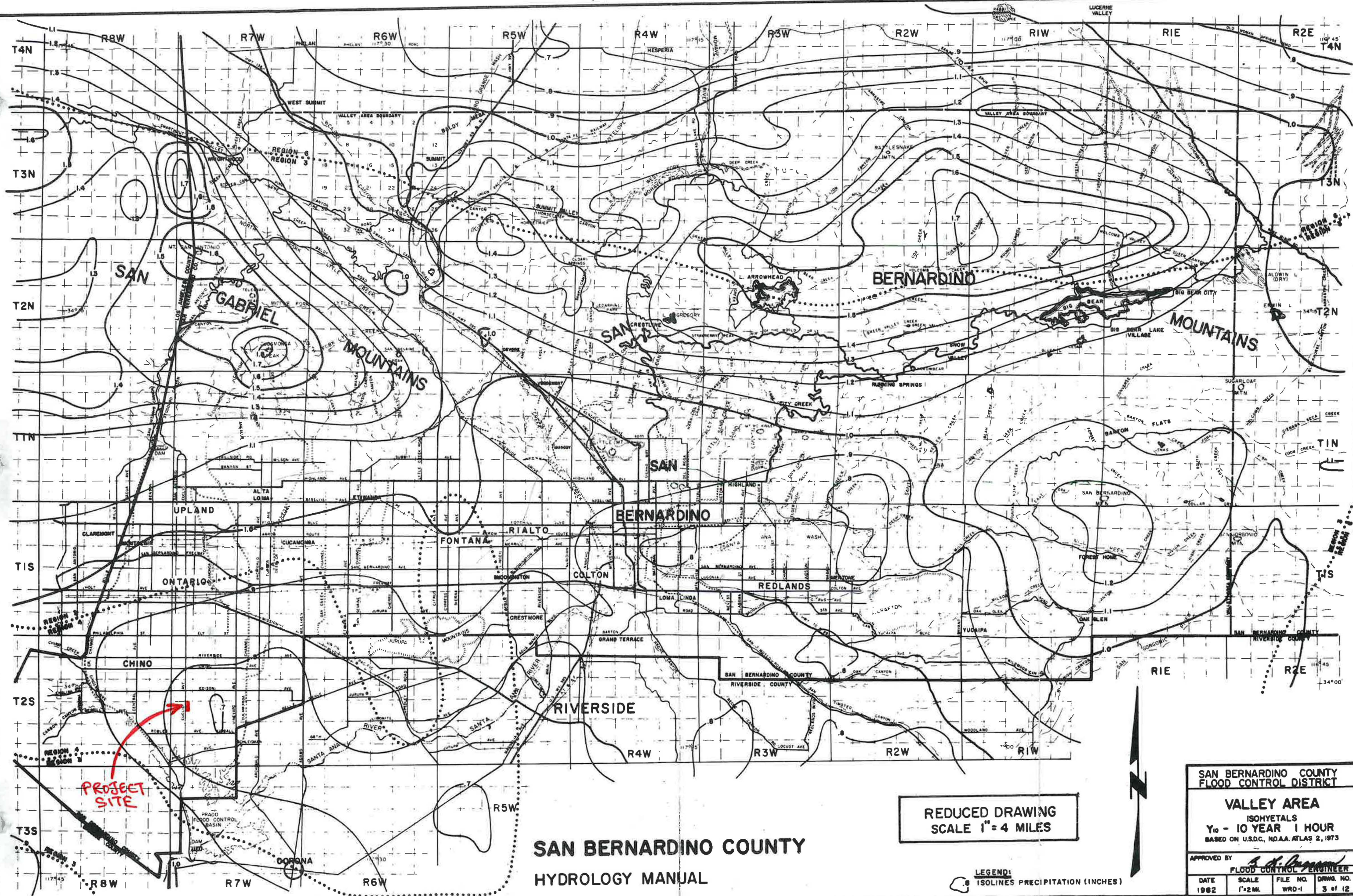
SAN BERNARDINO COUNTY
HYDROLOGY MANUAL



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

SCALE REDUCED BY 1/2

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-C AREA



REDUCED DRAWING
SCALE 1" = 4 MILES

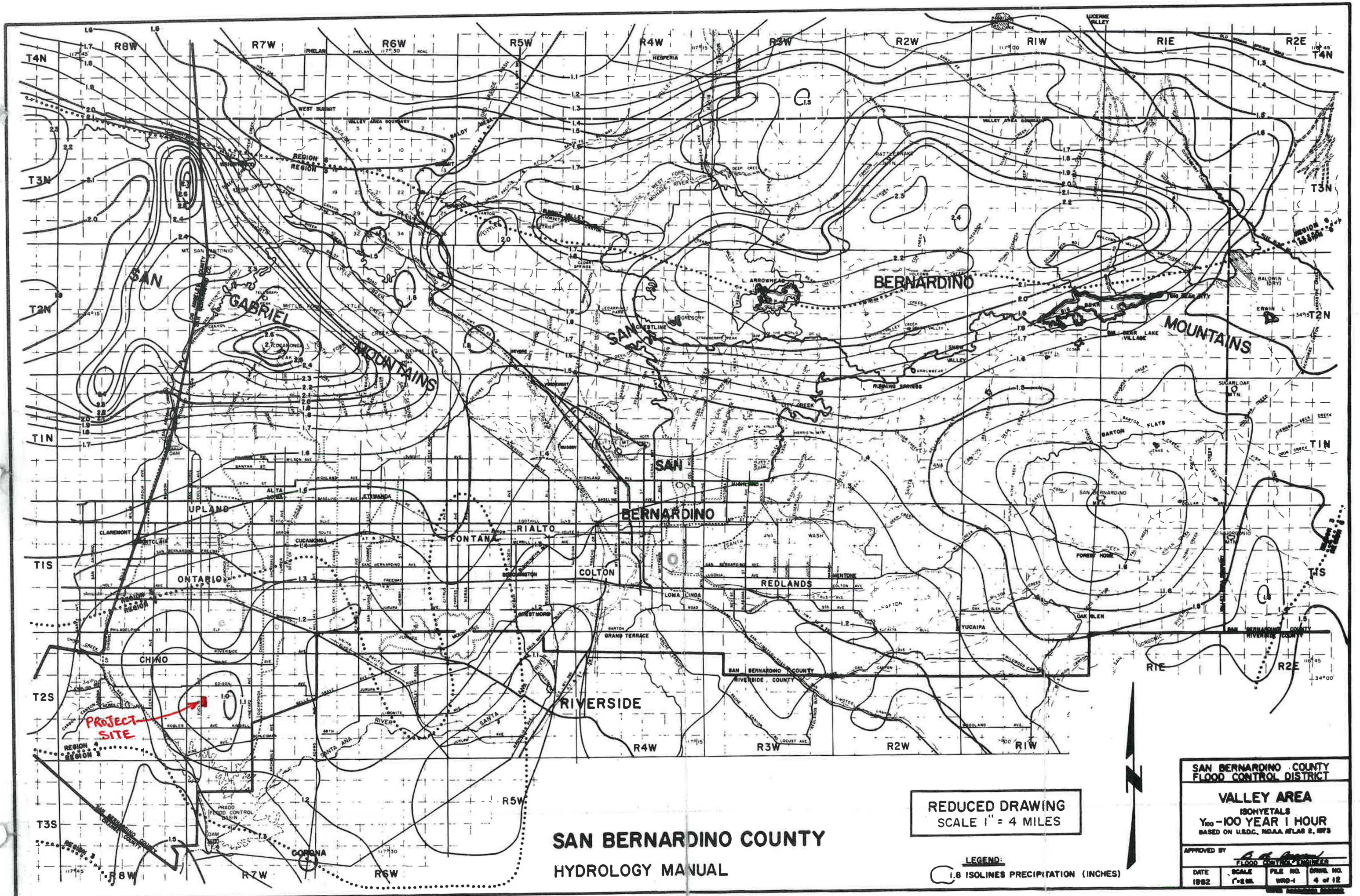
LEGEND:
ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

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

APPROVED BY *[Signature]*
FLOOD CONTROL ENGINEER

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



**SAN BERNARDINO COUNTY
HYDROLOGY MANUAL**

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

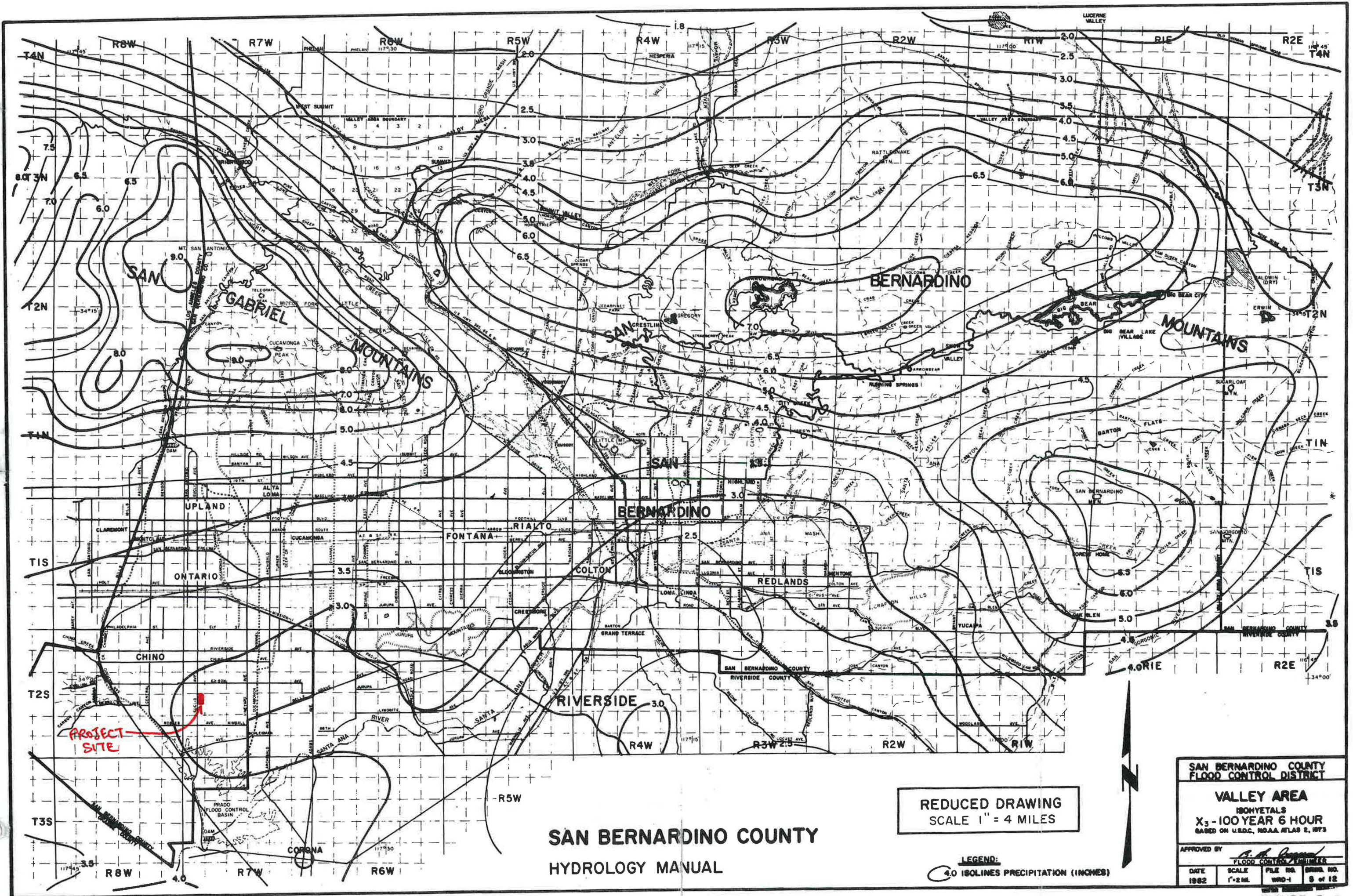
LEGEND:
1.8 ISOLINES PRECIPITATION (INCHES)

**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

VALLEY AREA
ISOHYETALS
Y₁₀₀ - 100 YEAR 1 HOUR
BASED ON U.S.D.C. NOAA ATLAS 2, 1973

APPROVED BY *[Signature]*

DATE	SCALE	FILE NO.	DRAW. NO.
1982	1"=2 MI.	WB-1	4 of 12



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

REDUCED DRAWING
SCALE 1" = 4 MILES

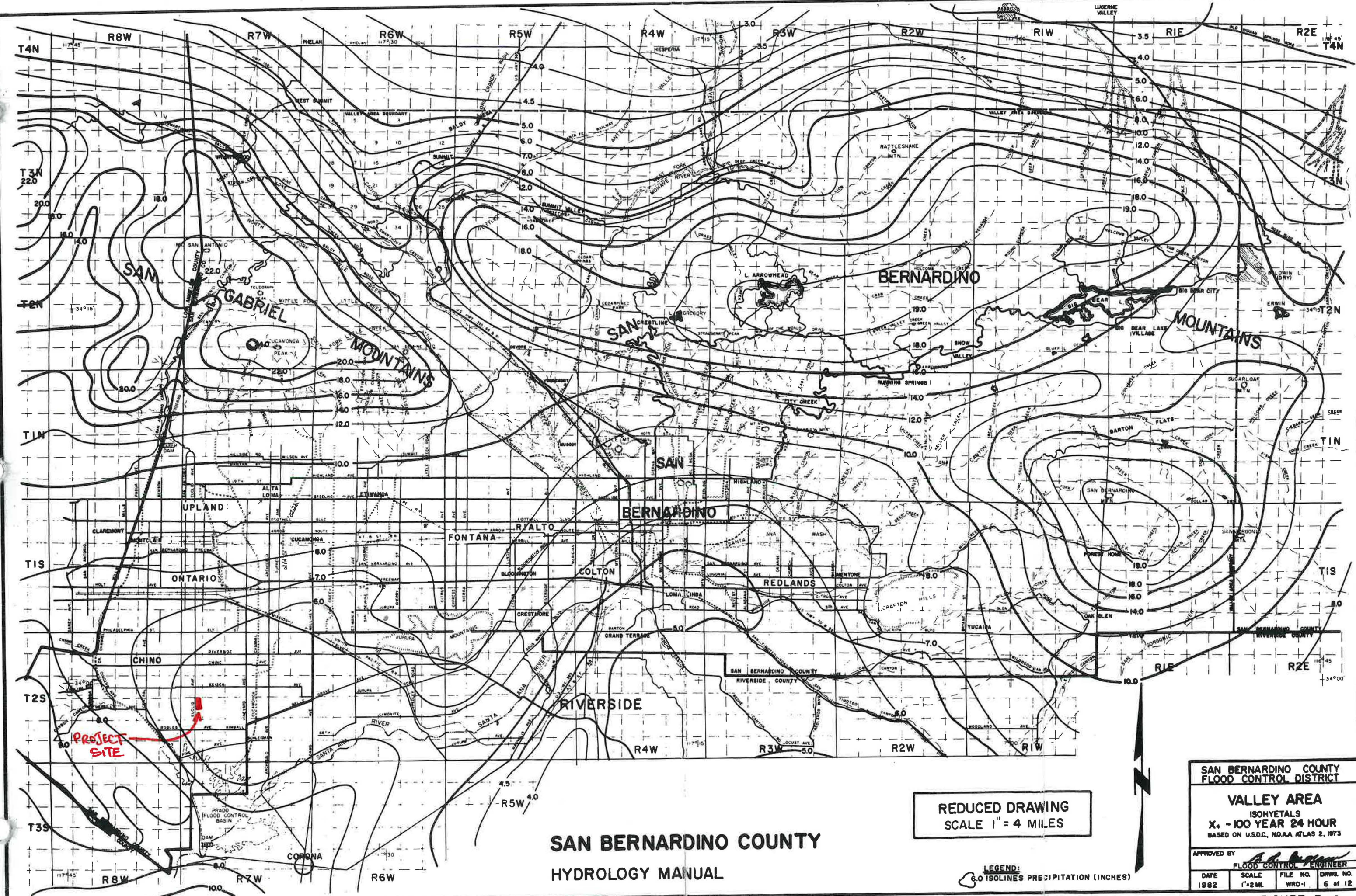
LEGEND:
4.0 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

VALLEY AREA

ISOHYETALS
X₃ - 100 YEAR 6 HOUR
BASED ON U.S.D.C. NOAA ATLAS 2, 1973

APPROVED BY: *[Signature]*
FLOOD CONTROL ENGINEER
DATE: 1982 SCALE: 1" = 2 MI. FILE NO.: WND-1 SHEET NO.: 6 OF 12



**SAN BERNARDINO COUNTY
HYDROLOGY MANUAL**

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

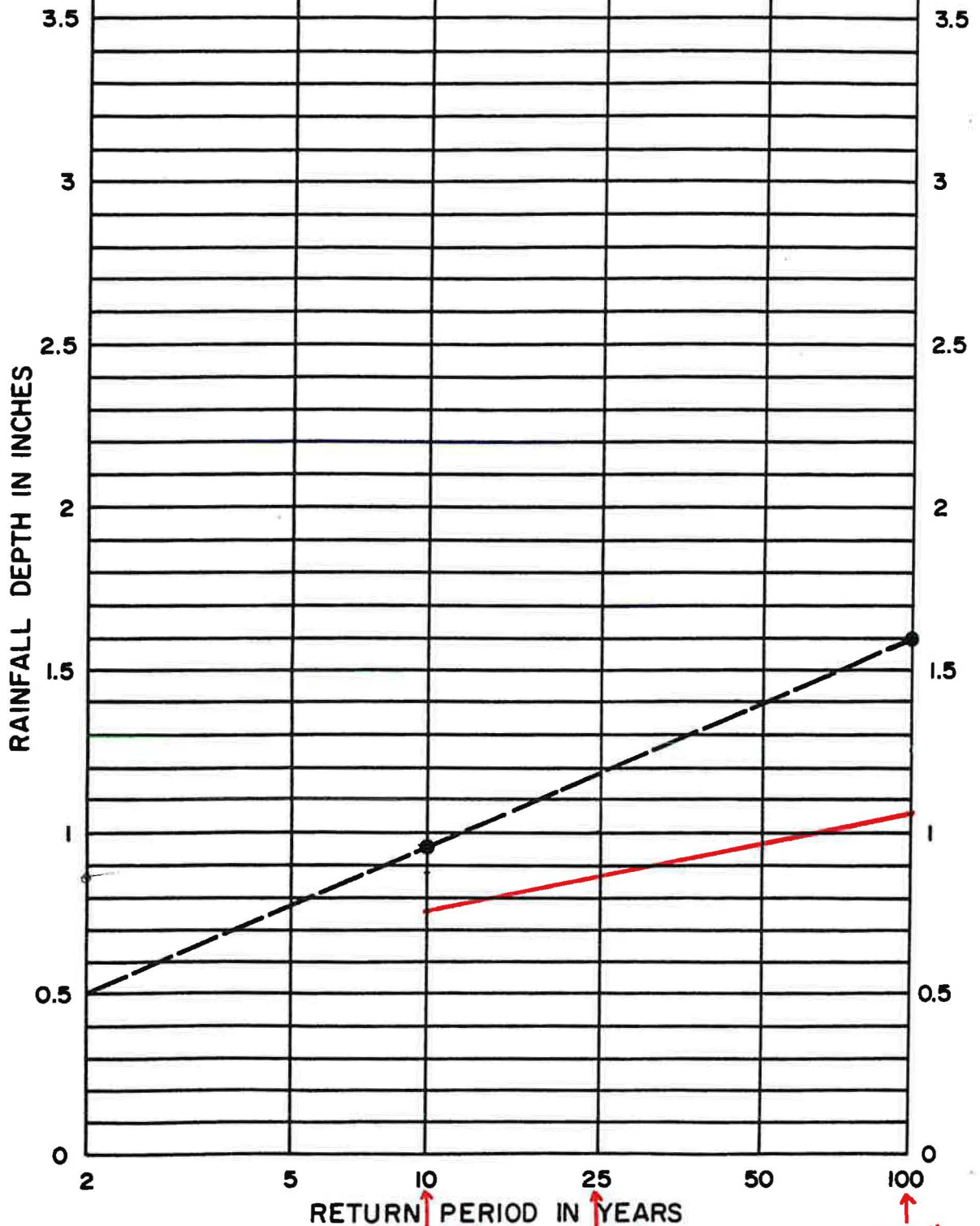
LEGEND:
6.0 ISOLINES PRECIPITATION (INCHES)

**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

**VALLEY AREA
ISOHYETALS
X4 - 100 YEAR 24 HOUR
BASED ON U.S.D.C. NO. AA. ATLAS 2, 1973**

APPROVED BY *[Signature]*
FLOOD CONTROL ENGINEER

DATE 1982	SCALE 1" = 2 MI.	FILE NO. WRD-1	DRWG. NO. 6 of 12
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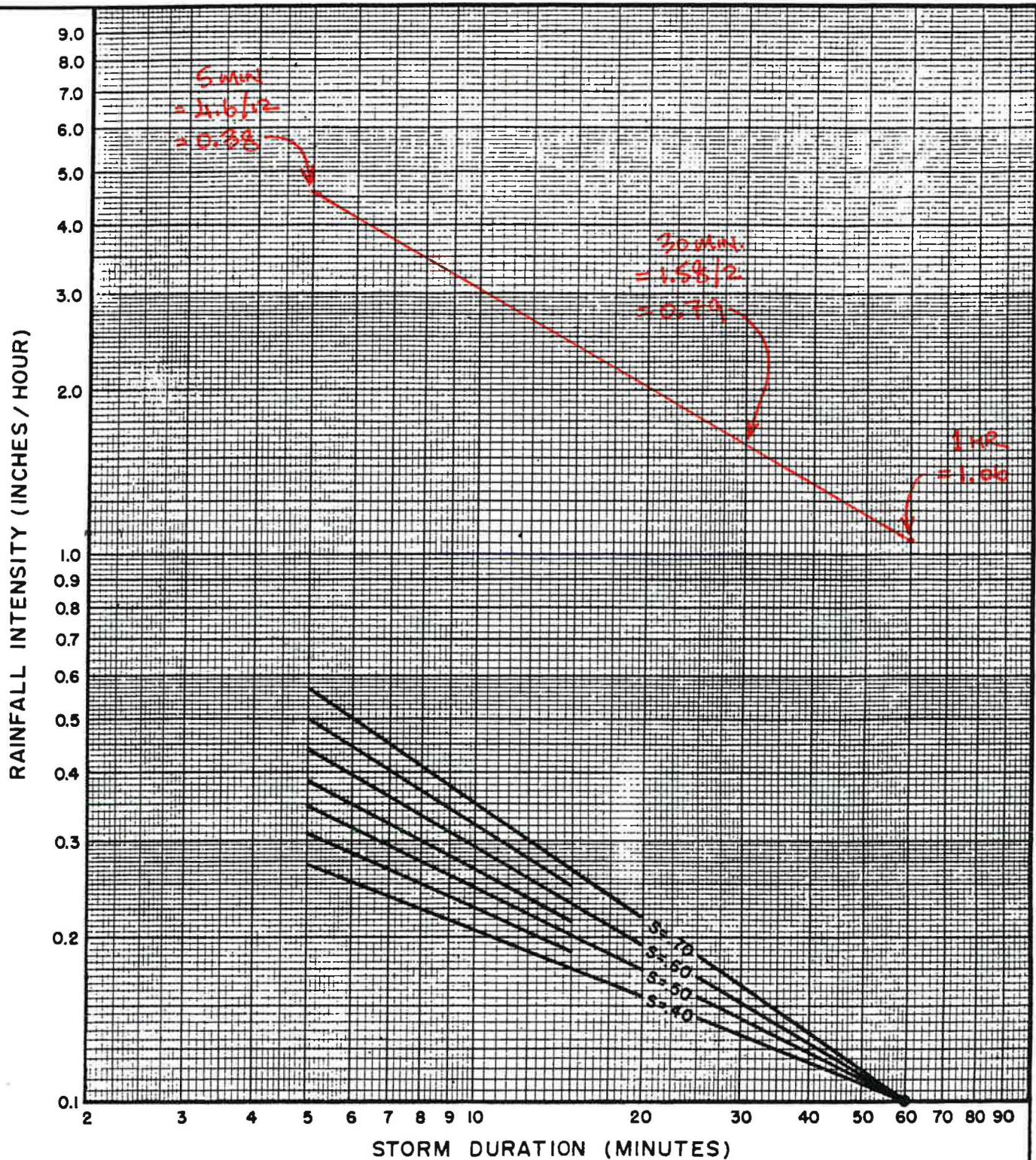
NOTE:

1. FOR INTERMEDIATE RETURN PERIODS PLOT 10-YEAR AND 100-YEAR ONE HOUR VALUES FROM MAPS, THEN CONNECT POINTS AND READ VALUE FOR DESIRED RETURN PERIOD. FOR EXAMPLE GIVEN 10-YEAR ONE HOUR = 0.95" AND 100-YEAR ONE HOUR = 1.60", 25-YEAR ONE HOUR = 1.18".

REFERENCE: NOAA ATLAS 2, VOLUME II - CAL., 1973

**SAN BERNARDINO COUNTY
HYDROLOGY MANUAL**

**RAINFALL DEPTH VERSUS
RETURN PERIOD FOR
PARTIAL DURATION SERIES**



DESIGN STORM FREQUENCY = 100 YEARS

ONE HOUR POINT RAINFALL = 1.06 INCHES

LOG-LOG SLOPE = 0.60

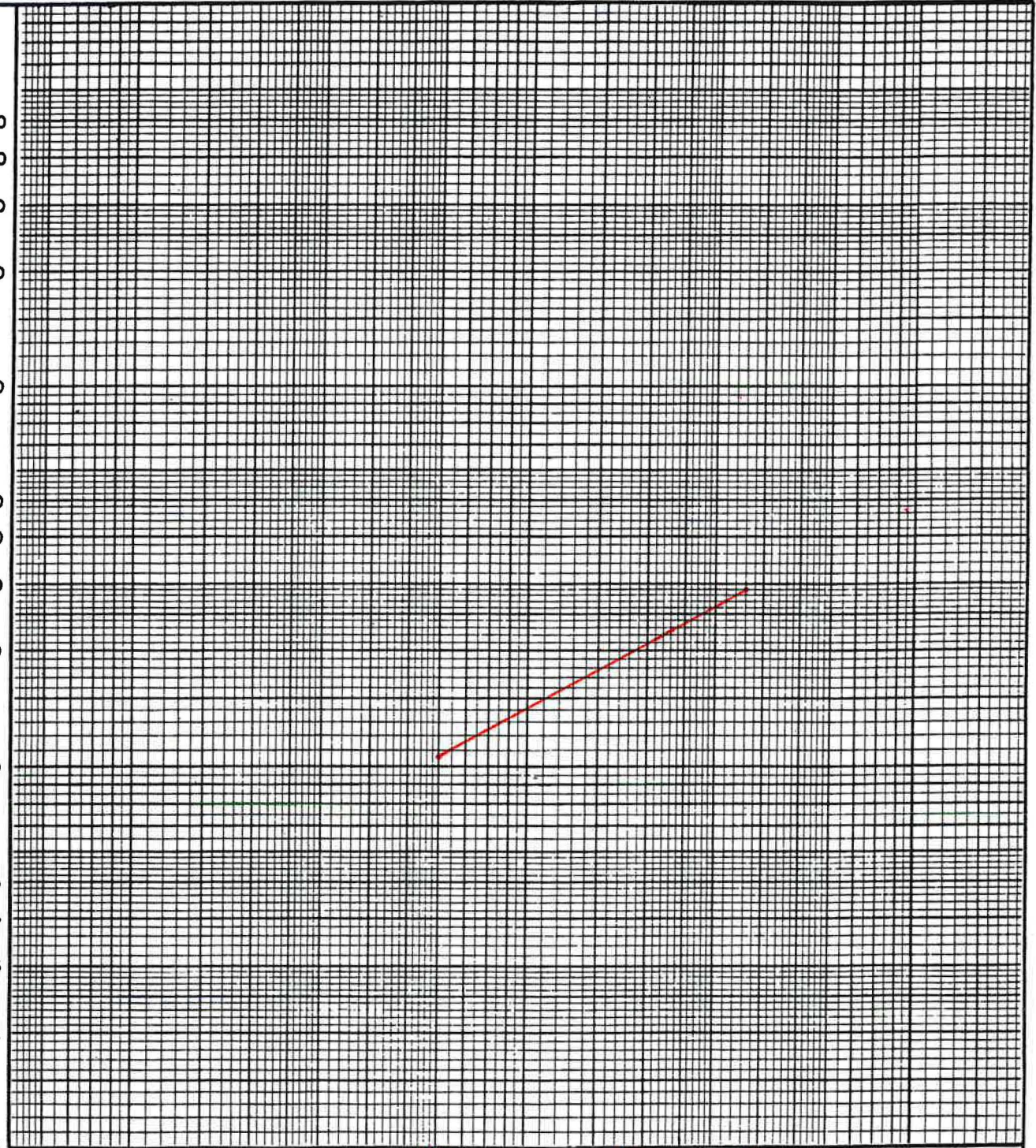
PROJECT LOCATION = S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

**INTENSITY - DURATION
CURVES
CALCULATION SHEET**

POINT RAINFALL - INCHES

50.0
40.0
30.0
20.0
10.0
5.0
4.0
3.0
2.0
1.0
0.5
0.4
0.3
0.2
0.1



5 10 20 30 40 50 100 200 300 400 500 1000

1 HR 1.06 3 HR 1.95 6 HR 2.9

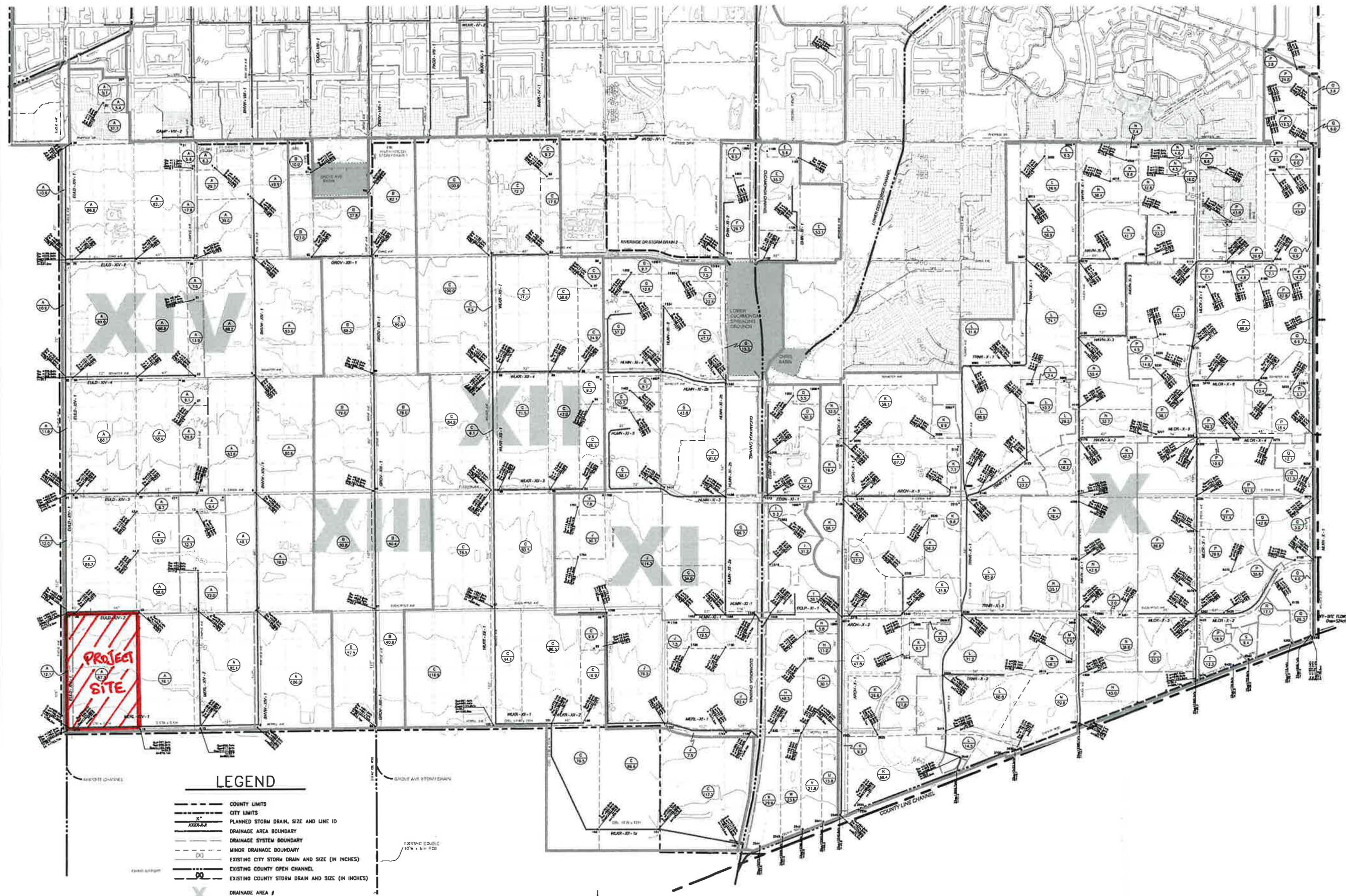
STORM DURATION - MINUTES

PROJECT LOCATION S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO

NOTES _____

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

AREA - AVERAGED
MASS RAINFALL
PLOTting SHEET

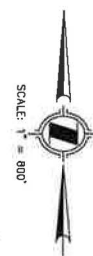


LEGEND

- COUNTY LIMITS
- CITY LIMITS
- PLANNED STORM DRAIN, SIZE AND LINE ID
- DRAINAGE AREA BOUNDARY
- DRAINAGE SYSTEM BOUNDARY
- MINOR DRAINAGE BOUNDARY
- EXISTING CITY STORM DRAIN AND SIZE (IN INCHES)
- EXISTING COUNTY OPEN CHANNEL
- EXISTING COUNTY STORM DRAIN AND SIZE (IN INCHES)
- DRAINAGE AREA #

DRAINAGE SYSTEM NAME
WLKR-XII-3
 SYSTEM IDENTIFICATION
 DRAINAGE AREA NUMBER
 LINE NUMBER
 AREA DESIGNATION
 AREA ACREAGE (IN ACRES)
 X X

Q₁₀ = 861.0 cfs
 Q₂₅ = 981.1 cfs
 Q₅₀ = 1213.7 cfs
 T₁₀ = 36 min
 A = 942.7 ac
 PEAK FLOW RATE
 TIME OF CONCENTRATION
 AREA



800 400 0 800 2400
 GRAPHIC SCALE 1" = 800'

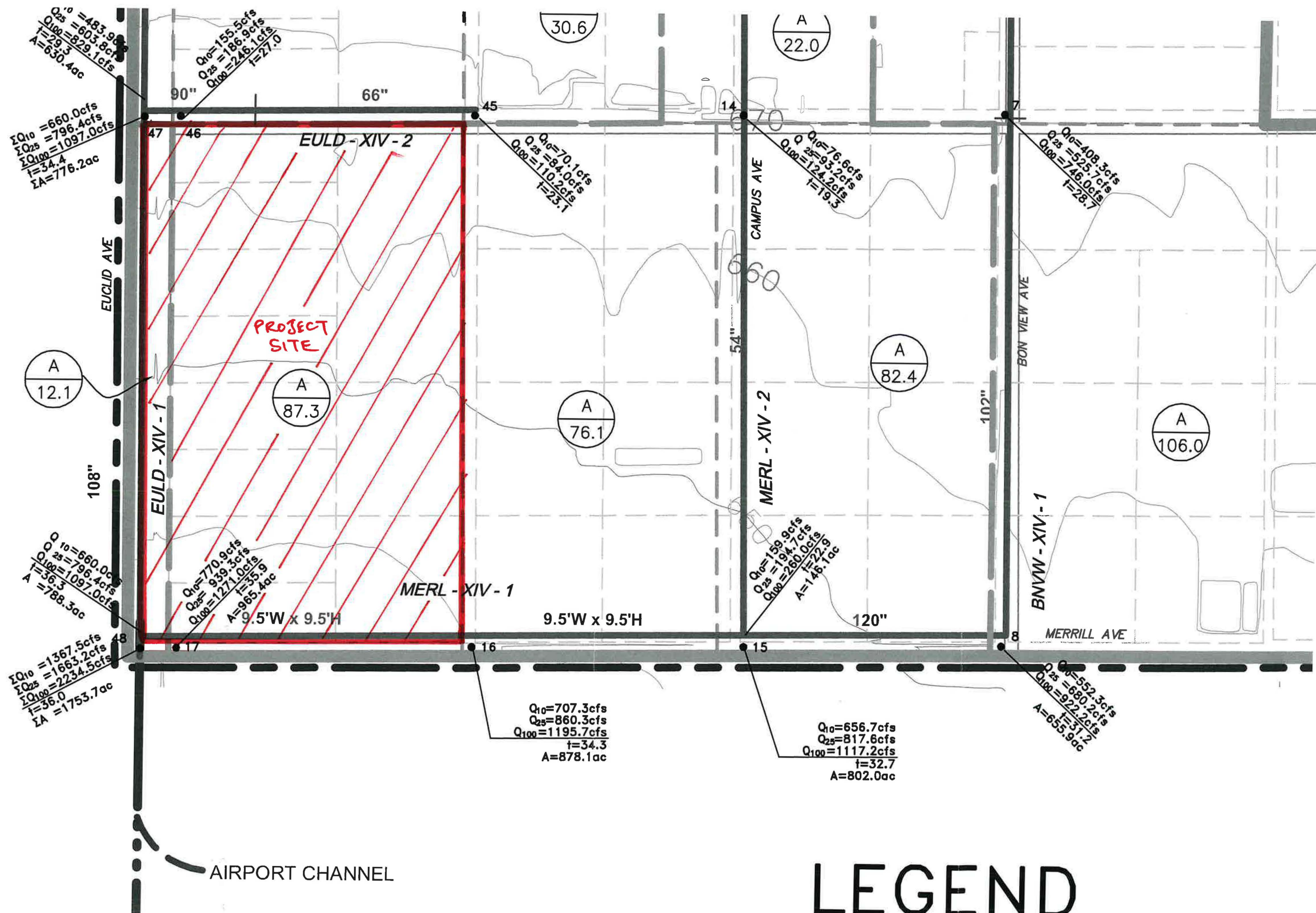
REVISIONS

HUNSAKER & ASSOCIATES
 IRVINE, INC.
 PLANNING • ENGINEERING • SURVEYING
 Three Hughes • Irvine, CA 92618 • P: (949) 563-1010 • F: (949) 563-0759

MARCH 2012

CITY OF ONTARIO
 MASTER PLAN OF DRAINAGE

HYDROLOGY MAP
 NEW MODEL COLONY



LEGEND

APPENDIX B

HYDROLOGY CALCULATIONS

EXISTING CONDITION
25-YEAR

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
 (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
 (c) Copyright 1983-2016 Advanced Engineering Software (aes)
 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

THIENES ENGINEERING, INC.
 14349 FIRESTONE BLVD
 LA MIRADA, CA 90638

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * EXISTING CONDITION 25-YEAR *
 * SOUTHEAST PORTION OF SITE (NODES 100-102) *

FILE NAME: W:\3635\EX25A.DAT
 TIME/DATE OF STUDY: 11:16 07/09/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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 GUTTER-GEOMETRIES: HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 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) = 810.00
 ELEVATION DATA: UPSTREAM(FEET) = 651.20 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 24.670
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.483
 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"	B	4.40	0.61	1.000	66	24.67

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 3.44
 TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 3.44

EX25A.RES

 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	641.00	DOWNSTREAM(FEET) =	637.50
CHANNEL LENGTH THRU SUBAREA(FEET) =	470.00	CHANNEL SLOPE =	0.0074
CHANNEL FLOW THRU SUBAREA(CFS) =	3.44		
FLOW VELOCITY(FEET/SEC) =	1.67	(PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)	
TRAVEL TIME(MIN.) =	4.69	Tc(MIN.) =	29.36
LONGEST FLOWPATH FROM NODE	100.00	TO NODE	102.00 = 1280.00 FEET.

 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 29.36
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.336
 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	5.20	0.61	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 5.20		SUBAREA RUNOFF(CFS) = 3.38			
EFFECTIVE AREA(ACRES) = 9.60		AREA-AVERAGED Fm(INCH/HR) = 0.61			
AREA-AVERAGED Fp(INCH/HR) = 0.61		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 9.6		PEAK FLOW RATE(CFS) = 6.24			

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES)	=	9.6	TC(MIN.) =	29.36
EFFECTIVE AREA(ACRES)	=	9.60	AREA-AVERAGED Fm(INCH/HR) =	0.61
AREA-AVERAGED Fp(INCH/HR)	=	0.61	AREA-AVERAGED Ap =	1.000
PEAK FLOW RATE(CFS)	=	6.24		

=====

END OF RATIONAL METHOD ANALYSIS

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
 (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

THIENES ENGINEERING, INC.
 14349 FIRESTONE BLVD
 LA MIRADA, CA 90638

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * EXISTING CONDITION 25-YEAR *
 * REMAINDER OF SITE (NODES 200-234) *

FILE NAME: W:\3635\EX25B.DAT
 TIME/DATE OF STUDY: 11:22 07/09/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
 *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 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) = 910.00
 ELEVATION DATA: UPSTREAM(FEET) = 665.30 DOWNSTREAM(FEET) = 655.30

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 11.437
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352
 SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	B	6.00	0.61	1.000	66	26.56
COMMERCIAL	B	0.10	0.75	0.100	56	11.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.61
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.985
 SUBAREA RUNOFF(CFS) = 9.59
 TOTAL AREA(ACRES) = 6.10 PEAK FLOW RATE(CFS) = 9.59

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	655.30	DOWNSTREAM(FEET) =	646.50
CHANNEL LENGTH THRU SUBAREA(FEET) =	610.00	CHANNEL SLOPE =	0.0144
CHANNEL FLOW THRU SUBAREA(CFS) =	9.59		
FLOW VELOCITY(FEET/SEC) =	2.97	(PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)	
TRAVEL TIME(MIN.) =	3.42	Tc(MIN.) =	14.86
LONGEST FLOWPATH FROM NODE	200.00 TO NODE	202.00 =	1520.00 FEET.

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.86					
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.010					
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	7.40	0.61	1.000	66
COMMERCIAL	B	2.55	0.75	0.100	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.62					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.769					
SUBAREA AREA(ACRES) = 9.95 SUBAREA RUNOFF(CFS) = 13.74					
EFFECTIVE AREA(ACRES) = 16.05 AREA-AVERAGED Fm(INCH/HR) = 0.52					
AREA-AVERAGED Fp(INCH/HR) = 0.62 AREA-AVERAGED Ap = 0.85					
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 21.45					

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.86					
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.010					
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	0.20	0.61	1.000	66
COMMERCIAL	B	0.85	0.75	0.100	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.65					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.271					
SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 1.73					
EFFECTIVE AREA(ACRES) = 17.10 AREA-AVERAGED Fm(INCH/HR) = 0.50					
AREA-AVERAGED Fp(INCH/HR) = 0.62 AREA-AVERAGED Ap = 0.82					
TOTAL AREA(ACRES) = 17.1 PEAK FLOW RATE(CFS) = 23.18					

 FLOW PROCESS FROM NODE 202.00 TO NODE 213.00 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.) =	14.86
RAINFALL INTENSITY(INCH/HR) =	2.01
AREA-AVERAGED Fm(INCH/HR) =	0.50
AREA-AVERAGED Fp(INCH/HR) =	0.62
AREA-AVERAGED Ap =	0.82
EFFECTIVE STREAM AREA(ACRES) =	17.10
TOTAL STREAM AREA(ACRES) =	17.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =	23.18

 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) = 700.00
 ELEVATION DATA: UPSTREAM(FEET) = 664.50 DOWNSTREAM(FEET) = 654.50

$$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 9.771

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.585

SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	B	5.00	0.61	1.000	66	22.69
COMMERCIAL	B	0.15	0.75	0.100	56	9.77

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.61
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.974
 SUBAREA RUNOFF(CFS) = 9.21
 TOTAL AREA(ACRES) = 5.15 PEAK FLOW RATE(CFS) = 9.21

 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 9.77

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.585

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
RESIDENTIAL					
"2 DWELLINGS/ACRE"	R	0.40	0.75	0.700	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.700
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.74
 EFFECTIVE AREA(ACRES) = 5.55 AREA-AVERAGED F_m (INCH/HR) = 0.59
 AREA-AVERAGED F_p (INCH/HR) = 0.62 AREA-AVERAGED A_p = 0.95
 TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 9.95

 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 654.50 DOWNSTREAM(FEET) = 644.50
 CHANNEL LENGTH THRU SUBAREA(FEET) = 680.00 CHANNEL SLOPE = 0.0147
 CHANNEL FLOW THRU SUBAREA(CFS) = 9.95
 FLOW VELOCITY(FEET/SEC) = 3.03 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 3.74 T_c (MIN.) = 13.51
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1380.00 FEET.

 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 13.51

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.128

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.30	0.61	1.000	66
COMMERCIAL	B	0.20	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.61
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.972
 SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.95
 EFFECTIVE AREA(ACRES) = 12.05 AREA-AVERAGED F_m (INCH/HR) = 0.60
 AREA-AVERAGED F_p (INCH/HR) = 0.62 AREA-AVERAGED A_p = 0.96
 TOTAL AREA(ACRES) = 12.1 PEAK FLOW RATE(CFS) = 16.62

 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 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.) = 13.51
RAINFALL INTENSITY(INCH/HR) = 2.13
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.62
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 12.05
TOTAL STREAM AREA(ACRES) = 12.05
PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.62
```

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.18	14.86	2.010	0.62 (0.50)	0.82	17.1	200.00
2	16.62	13.51	2.128	0.62 (0.60)	0.96	12.1	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	39.35	13.51	2.128	0.62 (0.54)	0.88	27.6	210.00
2	38.53	14.86	2.010	0.62 (0.54)	0.88	29.1	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 39.35 Tc(MIN.) = 13.51
EFFECTIVE AREA(ACRES) = 27.60 AREA-AVERAGED Fm(INCH/HR) = 0.54
AREA-AVERAGED Fp(INCH/HR) = 0.62 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 29.1
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 213.00 = 1520.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

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

```
=====
MAINLINE Tc(MIN.) = 13.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.128
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"          B        3.10    0.61    1.000    66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.22
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.55
AREA-AVERAGED Fp(INCH/HR) = 0.62 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 32.2 PEAK FLOW RATE(CFS) = 43.58
```

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 644.40 DOWNSTREAM(FEET) = 637.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 590.00 CHANNEL SLOPE = 0.0125
CHANNEL FLOW THRU SUBAREA(CFS) = 43.58
FLOW VELOCITY(FEET/SEC) = 4.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 15.87
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 214.00 = 2110.00 FEET.
```

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 81

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

```
=====
MAINLINE Tc(MIN.) = 15.87
```

EX25B.RES

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.932

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	7.75	0.61	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 7.75 SUBAREA RUNOFF(CFS) = 9.19					
EFFECTIVE AREA(ACRES) = 38.45 AREA-AVERAGED Fm(INCH/HR) = 0.56					
AREA-AVERAGED Fp(INCH/HR) = 0.62 AREA-AVERAGED Ap = 0.91					
TOTAL AREA(ACRES) = 40.0 PEAK FLOW RATE(CFS) = 47.36					

FLOW PROCESS FROM NODE 214.00 TO NODE 234.00 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.) = 15.87
RAINFALL INTENSITY(INCH/HR) = 1.93
AREA-AVERAGED Fm(INCH/HR) = 0.56
AREA-AVERAGED Fp(INCH/HR) = 0.62
AREA-AVERAGED Ap = 0.91
EFFECTIVE STREAM AREA(ACRES) = 38.45
TOTAL STREAM AREA(ACRES) = 40.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 47.36

FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 770.00
ELEVATION DATA: UPSTREAM(FEET) = 664.20 DOWNSTREAM(FEET) = 655.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.520
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.473
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"	B	2.95	0.61	1.000	66	24.43
COMMERCIAL	B	0.15	0.75	0.100	56	10.52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.956						
SUBAREA RUNOFF(CFS) = 5.26						
TOTAL AREA(ACRES) = 3.10 PEAK FLOW RATE(CFS) = 5.26						

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 655.00 DOWNSTREAM(FEET) = 648.10
CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0133
CHANNEL FLOW THRU SUBAREA(CFS) = 5.26
FLOW VELOCITY(FEET/SEC) = 2.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 14.04
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 1290.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.04
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.079
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	2.95	0.61	1.000	66
COMMERCIAL	B	0.15	0.75	0.100	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.956					
SUBAREA RUNOFF(CFS) = 5.26					
TOTAL AREA(ACRES) = 3.10 PEAK FLOW RATE(CFS) = 5.26					

```

                                EX25B.RES
      LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"      B        2.60      0.61      1.000      66
COMMERCIAL        B        0.25      0.75      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.62
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.921
SUBAREA AREA(ACRES) = 2.85      SUBAREA RUNOFF(CFS) = 3.88
EFFECTIVE AREA(ACRES) = 5.95      AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.61      AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 5.9      PEAK FLOW RATE(CFS) = 8.04

*****
FLOW PROCESS FROM NODE      222.00 TO NODE      223.00 IS CODE = 52
=====
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 648.10 DOWNSTREAM(FEET) = 641.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 740.00 CHANNEL SLOPE = 0.0096
CHANNEL FLOW THRU SUBAREA(CFS) = 8.04
FLOW VELOCITY(FEET/SEC) = 2.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 5.32      Tc(MIN.) = 19.36
LONGEST FLOWPATH FROM NODE      220.00 TO NODE      223.00 = 2030.00 FEET.

*****
FLOW PROCESS FROM NODE      222.00 TO NODE      223.00 IS CODE = 81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 19.36
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.715
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"      B        5.20      0.61      1.000      66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20      SUBAREA RUNOFF(CFS) = 5.15
EFFECTIVE AREA(ACRES) = 11.15      AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.61      AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 11.1      PEAK FLOW RATE(CFS) = 11.24

*****
FLOW PROCESS FROM NODE      223.00 TO NODE      224.00 IS CODE = 52
=====
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 641.00 DOWNSTREAM(FEET) = 637.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 310.00 CHANNEL SLOPE = 0.0129
CHANNEL FLOW THRU SUBAREA(CFS) = 11.24
FLOW VELOCITY(FEET/SEC) = 2.92 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.77      Tc(MIN.) = 21.13
LONGEST FLOWPATH FROM NODE      220.00 TO NODE      224.00 = 2340.00 FEET.

*****
FLOW PROCESS FROM NODE      223.00 TO NODE      224.00 IS CODE = 81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 21.13
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.627
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"      B        2.90      0.61      1.000      66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.90      SUBAREA RUNOFF(CFS) = 2.64
EFFECTIVE AREA(ACRES) = 14.05      AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.61      AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 14.0      PEAK FLOW RATE(CFS) = 13.01

```

 FLOW PROCESS FROM NODE 224.00 TO NODE 234.00 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.) = 21.13
 RAINFALL INTENSITY(INCH/HR) = 1.63
 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.61
 AREA-AVERAGED Ap = 0.97
 EFFECTIVE STREAM AREA(ACRES) = 14.05
 TOTAL STREAM AREA(ACRES) = 14.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.01

 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 850.00
 ELEVATION DATA: UPSTREAM(FEET) = 662.90 DOWNSTREAM(FEET) = 655.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 35.395
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.194
 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.)
AGRICULTURAL GOOD COVER						
"ROW CROPS, STRAIGHT ROW"	B	4.55	0.42	1.000	78	35.39
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 3.19						
TOTAL AREA(ACRES) = 4.55 PEAK FLOW RATE(CFS) = 3.19						

 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 655.00 DOWNSTREAM(FEET) = 647.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0145
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.19
 FLOW VELOCITY(FEET/SEC) = 2.30 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 3.99 Tc(MIN.) = 39.39
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1400.00 FEET.

 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 39.39
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.120
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
AGRICULTURAL GOOD COVER					
"ROW CROPS, STRAIGHT ROW"	B	4.20	0.42	1.000	78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 2.66					
EFFECTIVE AREA(ACRES) = 8.75 AREA-AVERAGED Fm(INCH/HR) = 0.42					
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 8.8 PEAK FLOW RATE(CFS) = 5.54					

 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 647.00 DOWNSTREAM(FEET) = 637.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.00 CHANNEL SLOPE = 0.0103
CHANNEL FLOW THRU SUBAREA(CFS) = 5.54
FLOW VELOCITY(FEET/SEC) = 2.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 7.37 Tc(MIN.) = 46.75
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 2370.00 FEET.

FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 46.75
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.010
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW" B 6.25 0.42 1.000 78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.25 SUBAREA RUNOFF(CFS) = 3.34
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 8.03

FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 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.) = 46.75
RAINFALL INTENSITY(INCH/HR) = 1.01
AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 15.00
TOTAL STREAM AREA(ACRES) = 15.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.03

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	47.36	15.87	1.932	0.62(0.56)	0.91	38.5	210.00
1	45.99	17.24	1.839	0.62(0.56)	0.91	40.0	200.00
2	13.01	21.13	1.627	0.61(0.60)	0.97	14.0	220.00
3	8.03	46.75	1.010	0.42(0.42)	1.00	15.0	230.00

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	66.97	15.87	1.932	0.60(0.56)	0.93	54.1	210.00
2	65.87	17.24	1.839	0.60(0.55)	0.93	57.0	200.00
3	58.77	21.13	1.627	0.59(0.55)	0.94	60.8	220.00
4	29.41	46.75	1.010	0.57(0.54)	0.94	69.0	230.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 66.97 Tc(MIN.) = 15.87
EFFECTIVE AREA(ACRES) = 54.10 AREA-AVERAGED Fm(INCH/HR) = 0.56
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 69.0
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2370.00 FEET.

FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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

```

=====
MAINLINE Tc(MIN.) = 15.87
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.932
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"          B        5.40      0.61      1.000      66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.61
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.40      SUBAREA RUNOFF(CFS) = 6.40
EFFECTIVE AREA(ACRES) = 59.50   AREA-AVERAGED Fm(INCH/HR) = 0.56
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 74.4      PEAK FLOW RATE(CFS) = 73.38
=====

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END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 74.4      TC(MIN.) = 15.87
EFFECTIVE AREA(ACRES) = 59.50 AREA-AVERAGED Fm(INCH/HR) = 0.56
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.940
PEAK FLOW RATE(CFS) = 73.38

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** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.38	15.87	1.932	0.60(0.56)	0.94	59.5	210.00
2	71.82	17.24	1.839	0.60(0.56)	0.94	62.4	200.00
3	63.70	21.13	1.627	0.59(0.56)	0.94	66.2	220.00
4	31.33	46.75	1.010	0.57(0.54)	0.95	74.4	230.00

END OF RATIONAL METHOD ANALYSIS

EXISTING CONDITION
100-YEAR

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Analysis prepared by:

THIENES ENGINEERING, INC.
 14349 FIRESTONE BLVD
 LA MIRADA, CA 90638

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * EXISTING CONDITION 100-YEAR *
 * SOUTHEAST PORTION OF SITE (NODES 100-102) *

FILE NAME: W:\3635\EX100A.DAT
 TIME/DATE OF STUDY: 16:53 05/03/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN 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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 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) = 810.00
 ELEVATION DATA: UPSTREAM(FEET) = 651.20 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 24.670
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.807
 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"	B	4.40	0.31	1.000	84	24.67

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 5.93
 TOTAL AREA(ACRES) = 4.40 PEAK FLOW RATE(CFS) = 5.93

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*****
EX100A.RES
*****
FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
=====
>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    641.00 DOWNSTREAM(FEET) =    637.50
CHANNEL LENGTH THRU SUBAREA(FEET) =    470.00 CHANNEL SLOPE =    0.0074
CHANNEL FLOW THRU SUBAREA(CFS) =      5.93
FLOW VELOCITY(FEET/SEC) =    1.90 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =    4.13 Tc(MIN.) =    28.80
LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1280.00 FEET.
*****
FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  81
=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =    28.80
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =    1.646
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"        B        5.20        0.31        1.000        84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
SUBAREA AREA(ACRES) =    5.20 SUBAREA RUNOFF(CFS) =    6.26
EFFECTIVE AREA(ACRES) =    9.60 AREA-AVERAGED Fm(INCH/HR) =    0.31
AREA-AVERAGED Fp(INCH/HR) =    0.31 AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =    9.6 PEAK FLOW RATE(CFS) =    11.56
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) =    9.6 TC(MIN.) =    28.80
EFFECTIVE AREA(ACRES) =    9.60 AREA-AVERAGED Fm(INCH/HR) =    0.31
AREA-AVERAGED Fp(INCH/HR) =    0.31 AREA-AVERAGED Ap =    1.000
PEAK FLOW RATE(CFS) =    11.56
=====
END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

THIENES ENGINEERING, INC.
 14349 FIRESTONE BLVD
 LA MIRADA, CA 90638

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * EXISTING CONDITION 100-YEAR *
 * REMAINDER OF SITE (NODES 200-234) *

FILE NAME: W:\3635\EX100B.DAT
 TIME/DATE OF STUDY: 10:55 07/09/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
					WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 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) = 910.00
 ELEVATION DATA: UPSTREAM(FEET) = 665.30 DOWNSTREAM(FEET) = 655.30

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 11.437
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.866
 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.)
NATURAL FAIR COVER						
"OPEN BRUSH"	B	6.00	0.31	1.000	84	26.56
COMMERCIAL	B	0.10	0.42	0.100	76	11.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.31
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.985
 SUBAREA RUNOFF(CFS) = 14.07
 TOTAL AREA(ACRES) = 6.10 PEAK FLOW RATE(CFS) = 14.07

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	655.30	DOWNSTREAM(FEET) =	646.50
CHANNEL LENGTH THRU SUBAREA(FEET) =	610.00	CHANNEL SLOPE =	0.0144
CHANNEL FLOW THRU SUBAREA(CFS) =	14.07		
FLOW VELOCITY(FEET/SEC) =	3.28	(PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)	
TRAVEL TIME(MIN.) =	3.10	Tc(MIN.) =	14.54
LONGEST FLOWPATH FROM NODE	200.00 TO NODE	202.00 =	1520.00 FEET.

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.54					
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481					
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	7.40	0.31	1.000	84
COMMERCIAL	B	2.55	0.42	0.100	76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.769					
SUBAREA AREA(ACRES) = 9.95 SUBAREA RUNOFF(CFS) = 20.07					
EFFECTIVE AREA(ACRES) = 16.05 AREA-AVERAGED Fm(INCH/HR) = 0.26					
AREA-AVERAGED Fp(INCH/HR) = 0.31 AREA-AVERAGED Ap = 0.85					
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 32.03					

 FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.54					
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481					
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	0.20	0.31	1.000	84
COMMERCIAL	B	0.85	0.42	0.100	76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.34					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.271					
SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 2.26					
EFFECTIVE AREA(ACRES) = 17.10 AREA-AVERAGED Fm(INCH/HR) = 0.25					
AREA-AVERAGED Fp(INCH/HR) = 0.31 AREA-AVERAGED Ap = 0.82					
TOTAL AREA(ACRES) = 17.1 PEAK FLOW RATE(CFS) = 34.28					

 FLOW PROCESS FROM NODE 202.00 TO NODE 213.00 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.) =	14.54
RAINFALL INTENSITY(INCH/HR) =	2.48
AREA-AVERAGED Fm(INCH/HR) =	0.25
AREA-AVERAGED Fp(INCH/HR) =	0.31
AREA-AVERAGED Ap =	0.82
EFFECTIVE STREAM AREA(ACRES) =	17.10
TOTAL STREAM AREA(ACRES) =	17.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =	34.28

 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) = 700.00
 ELEVATION DATA: UPSTREAM(FEET) = 664.50 DOWNSTREAM(FEET) = 654.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.771
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.149
 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"	B	5.00	0.31	1.000	84	22.69
COMMERCIAL	B	0.15	0.42	0.100	76	9.77

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.974
 SUBAREA RUNOFF(CFS) = 13.21
 TOTAL AREA(ACRES) = 5.15 PEAK FLOW RATE(CFS) = 13.21

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 81

=====

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

=====

MAINLINE Tc(MIN.) = 9.77
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.149
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"2 DWELLINGS/ACRE"	B	0.40	0.42	0.700	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.700
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.03
 EFFECTIVE AREA(ACRES) = 5.55 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.31 AREA-AVERAGED Ap = 0.95
 TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 14.23

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 52

=====

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 654.50 DOWNSTREAM(FEET) = 644.50
 CHANNEL LENGTH THRU SUBAREA(FEET) = 680.00 CHANNEL SLOPE = 0.0147
 CHANNEL FLOW THRU SUBAREA(CFS) = 14.23
 FLOW VELOCITY(FEET/SEC) = 3.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) = 3.41 Tc(MIN.) = 13.19
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1380.00 FEET.

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 81

=====

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

=====

MAINLINE Tc(MIN.) = 13.19
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.631
 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	6.30	0.31	1.000	84
COMMERCIAL	B	0.20	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972
 SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 13.64
 EFFECTIVE AREA(ACRES) = 12.05 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.31 AREA-AVERAGED Ap = 0.96
 TOTAL AREA(ACRES) = 12.1 PEAK FLOW RATE(CFS) = 25.28

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 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.) = 13.19
RAINFALL INTENSITY(INCH/HR) = 2.63
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.31
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 12.05
TOTAL STREAM AREA(ACRES) = 12.05
PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.28
```

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	34.28	14.54	2.481	0.31(0.25)	0.82	17.1	200.00
2	25.28	13.19	2.631	0.31(0.30)	0.96	12.1	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	58.47	13.19	2.631	0.31(0.27)	0.88	27.6	210.00
2	57.94	14.54	2.481	0.31(0.27)	0.88	29.1	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 58.47 Tc(MIN.) = 13.19
EFFECTIVE AREA(ACRES) = 27.56 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.31 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 29.1
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 213.00 = 1520.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

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

```
=====
MAINLINE Tc(MIN.) = 13.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.631
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"           B       3.10     0.31     1.000    84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.48
EFFECTIVE AREA(ACRES) = 30.66 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.31 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 32.2 PEAK FLOW RATE(CFS) = 64.95
```

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 52

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 644.40 DOWNSTREAM(FEET) = 637.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 590.00 CHANNEL SLOPE = 0.0125
CHANNEL FLOW THRU SUBAREA(CFS) = 64.95
FLOW VELOCITY(FEET/SEC) = 4.68 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 15.29
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 214.00 = 2110.00 FEET.
```

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 81

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

```
=====
MAINLINE Tc(MIN.) = 15.29
```



```

                                EX100B.RES
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.408
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"              B        7.75      0.31      1.000      84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.75      SUBAREA RUNOFF(CFS) = 14.65
EFFECTIVE AREA(ACRES) = 38.41  AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.31  AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 40.0      PEAK FLOW RATE(CFS) = 73.43

*****
FLOW PROCESS FROM NODE 214.00 TO NODE 234.00 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.) = 15.29
RAINFALL INTENSITY(INCH/HR) = 2.41
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.31
AREA-AVERAGED Ap = 0.91
EFFECTIVE STREAM AREA(ACRES) = 38.41
TOTAL STREAM AREA(ACRES) = 40.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 73.43

*****
FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21
=====
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 770.00
ELEVATION DATA: UPSTREAM(FEET) = 664.20 DOWNSTREAM(FEET) = 655.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.520
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.013
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"              B        2.95      0.31      1.000      84      24.43
COMMERCIAL                 B        0.15      0.42      0.100      76      10.52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.956
SUBAREA RUNOFF(CFS) = 7.58
TOTAL AREA(ACRES) = 3.10  PEAK FLOW RATE(CFS) = 7.58

*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 52
=====
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 655.00 DOWNSTREAM(FEET) = 648.10
CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0133
CHANNEL FLOW THRU SUBAREA(CFS) = 7.58
FLOW VELOCITY(FEET/SEC) = 2.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 3.23 Tc(MIN.) = 13.75
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 1290.00 FEET.

*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 13.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.566
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

```

```

                                EX100B.RES
      LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"      B      2.60      0.31      1.000      84
COMMERCIAL        B      0.25      0.42      0.100      76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.921
SUBAREA AREA(ACRES) = 2.85      SUBAREA RUNOFF(CFS) = 5.85
EFFECTIVE AREA(ACRES) = 5.95      AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.31      AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 5.9      PEAK FLOW RATE(CFS) = 12.19

*****
FLOW PROCESS FROM NODE      222.00 TO NODE      223.00 IS CODE = 52
-----
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 648.10 DOWNSTREAM(FEET) = 641.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 740.00 CHANNEL SLOPE = 0.0096
CHANNEL FLOW THRU SUBAREA(CFS) = 12.19
FLOW VELOCITY(FEET/SEC) = 2.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 4.79 Tc(MIN.) = 18.54
LONGEST FLOWPATH FROM NODE      220.00 TO NODE      223.00 = 2030.00 FEET.

*****
FLOW PROCESS FROM NODE      222.00 TO NODE      223.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 18.54
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.145
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"      B      5.20      0.31      1.000      84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20      SUBAREA RUNOFF(CFS) = 8.60
EFFECTIVE AREA(ACRES) = 11.15      AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.31      AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 11.1      PEAK FLOW RATE(CFS) = 18.53

*****
FLOW PROCESS FROM NODE      223.00 TO NODE      224.00 IS CODE = 52
-----
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 641.00 DOWNSTREAM(FEET) = 637.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 310.00 CHANNEL SLOPE = 0.0129
CHANNEL FLOW THRU SUBAREA(CFS) = 18.53
FLOW VELOCITY(FEET/SEC) = 3.33 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE      220.00 TO NODE      224.00 = 2340.00 FEET.

*****
FLOW PROCESS FROM NODE      223.00 TO NODE      224.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 20.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
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"      B      2.90      0.31      1.000      84
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.90      SUBAREA RUNOFF(CFS) = 4.53
EFFECTIVE AREA(ACRES) = 14.05      AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.31      AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 14.0      PEAK FLOW RATE(CFS) = 22.05

```

EX100B.RES

```

*****
FLOW PROCESS FROM NODE      224.00 TO NODE      234.00 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.) =   20.08
RAINFALL INTENSITY(INCH/HR) =   2.04
AREA-AVERAGED Fm(INCH/HR) =   0.30
AREA-AVERAGED Fp(INCH/HR) =   0.31
AREA-AVERAGED Ap =   0.97
EFFECTIVE STREAM AREA(ACRES) =      14.05
TOTAL STREAM AREA(ACRES) =      14.05
PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.05

*****
FLOW PROCESS FROM NODE      230.00 TO NODE      231.00 IS CODE =   21
=====
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) =   850.00
ELEVATION DATA: UPSTREAM(FEET) =   662.90 DOWNSTREAM(FEET) =   655.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   35.395
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   1.455
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.)
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW"  B        4.55      0.18      1.000    93  35.39
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   1.000
SUBAREA RUNOFF(CFS) =      5.22
TOTAL AREA(ACRES) =      4.55  PEAK FLOW RATE(CFS) =      5.22

*****
FLOW PROCESS FROM NODE      231.00 TO NODE      232.00 IS CODE =   52
=====
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   655.00 DOWNSTREAM(FEET) =   647.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00 CHANNEL SLOPE =   0.0145
CHANNEL FLOW THRU SUBAREA(CFS) =      5.22
FLOW VELOCITY(FEET/SEC) =   2.57 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   3.57  Tc(MIN.) =   38.96
LONGEST FLOWPATH FROM NODE      230.00 TO NODE      232.00 =   1400.00 FEET.

*****
FLOW PROCESS FROM NODE      231.00 TO NODE      232.00 IS CODE =   81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) =   38.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =   1.373
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW"  B        4.20      0.18      1.000    93
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =   0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =   1.000
SUBAREA AREA(ACRES) =      4.20  SUBAREA RUNOFF(CFS) =      4.51
EFFECTIVE AREA(ACRES) =      8.75  AREA-AVERAGED Fm(INCH/HR) =   0.18
AREA-AVERAGED Fp(INCH/HR) =   0.18  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =      8.8  PEAK FLOW RATE(CFS) =      9.40

*****
FLOW PROCESS FROM NODE      232.00 TO NODE      233.00 IS CODE =   52
=====

```

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<

```
=====
ELEVATION DATA: UPSTREAM( FEET) =    647.00  DOWNSTREAM( FEET) =    637.00
CHANNEL LENGTH THRU SUBAREA( FEET) =    970.00  CHANNEL SLOPE =    0.0103
CHANNEL FLOW THRU SUBAREA( CFS) =      9.40
FLOW VELOCITY( FEET/SEC) =    2.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME( MIN.) =    6.47  Tc( MIN.) =    45.43
LONGEST FLOWPATH FROM NODE    230.00 TO NODE    233.00 =    2370.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =    81
=====
```

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

```
=====
MAINLINE Tc( MIN.) =    45.43
* 100 YEAR RAINFALL INTENSITY( INCH/HR) =    1.253
SUBAREA LOSS RATE DATA( AMC III):
  DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
    LAND USE          GROUP    ( ACRES)    ( INCH/HR)    ( DECIMAL)    CN
AGRICULTURAL GOOD COVER
"ROW CROPS, STRAIGHT ROW"      B          6.25      0.18      1.000      93
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) =    0.18
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    1.000
SUBAREA AREA( ACRES) =    6.25      SUBAREA RUNOFF( CFS) =    6.03
EFFECTIVE AREA( ACRES) =    15.00      AREA-AVERAGED Fm( INCH/HR) =    0.18
AREA-AVERAGED Fp( INCH/HR) =    0.18      AREA-AVERAGED Ap =    1.00
TOTAL AREA( ACRES) =    15.0      PEAK FLOW RATE( CFS) =    14.48
```

```
*****
FLOW PROCESS FROM NODE    233.00 TO NODE    234.00 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.) =    45.43
RAINFALL INTENSITY( INCH/HR) =    1.25
AREA-AVERAGED Fm( INCH/HR) =    0.18
AREA-AVERAGED Fp( INCH/HR) =    0.18
AREA-AVERAGED Ap =    1.00
EFFECTIVE STREAM AREA( ACRES) =    15.00
TOTAL STREAM AREA( ACRES) =    15.00
PEAK FLOW RATE( CFS) AT CONFLUENCE =    14.48
```

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.43	15.29	2.408	0.31(0.28)	0.91	38.4	210.00
1	72.18	16.65	2.287	0.31(0.28)	0.91	40.0	200.00
2	22.05	20.08	2.044	0.31(0.30)	0.97	14.0	220.00
3	14.48	45.43	1.253	0.18(0.18)	1.00	15.0	230.00

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	103.83	15.29	2.408	0.30(0.28)	0.93	54.1	210.00
2	103.44	16.65	2.287	0.30(0.28)	0.93	57.1	200.00
3	96.59	20.08	2.044	0.29(0.28)	0.93	60.7	220.00
4	61.44	45.43	1.253	0.28(0.26)	0.94	69.0	230.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```
PEAK FLOW RATE( CFS) =    103.83  Tc( MIN.) =    15.29
EFFECTIVE AREA( ACRES) =    54.15      AREA-AVERAGED Fm( INCH/HR) =    0.28
AREA-AVERAGED Fp( INCH/HR) =    0.30      AREA-AVERAGED Ap =    0.93
TOTAL AREA( ACRES) =    69.0
LONGEST FLOWPATH FROM NODE    230.00 TO NODE    234.00 =    2370.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE    234.00 TO NODE    234.00 IS CODE =    81
=====
```

=====

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

=====

MAINLINE Tc(MIN.) = 15.29
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.408
 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" B 5.40 0.31 1.000 84
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.31
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 10.20
 EFFECTIVE AREA(ACRES) = 59.55 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 74.4 PEAK FLOW RATE(CFS) = 114.03

=====

END OF STUDY SUMMARY:
 TOTAL AREA(ACRES) = 74.4 TC(MIN.) = 15.29
 EFFECTIVE AREA(ACRES) = 59.55 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.940
 PEAK FLOW RATE(CFS) = 114.03

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	114.03	15.29	2.408	0.30(0.28)	0.94	59.5	210.00
2	113.06	16.65	2.287	0.30(0.28)	0.94	62.5	200.00
3	105.03	20.08	2.044	0.30(0.28)	0.94	66.1	220.00
4	66.03	45.43	1.253	0.28(0.27)	0.95	74.4	230.00

=====

END OF RATIONAL METHOD ANALYSIS

**PROPOSED CONDITION
25-YEAR**

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
(c) Copyright 1983-2016 Advanced Engineering Software (aes)
Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
* PROPOSED CONDITION 25-YEAR *
* SITE AREAS TRIBUTARY TO MERRILL AVE STORM DRAIN (NODES 100-505) *

FILE NAME: W:\3635\PR25A.DAT
TIME/DATE OF STUDY: 15:00 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 750.00
ELEVATION DATA: UPSTREAM(FEET) = 666.70 DOWNSTREAM(FEET) = 661.15

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 11.457$

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350

SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
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PR25A

COMMERCIAL B 3.70 0.75 0.100 56 11.46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 7.57
 TOTAL AREA(ACRES) = 3.70 PEAK FLOW RATE(CFS) = 7.57

FLOW PROCESS FROM NODE 101.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 657.15 DOWNSTREAM(FEET) = 654.60
 FLOW LENGTH(FEET) = 510.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.05
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.57
 PIPE TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 13.14
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1260.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 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.) = 13.14
 RAINFALL INTENSITY(INCH/HR) = 2.16
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 3.70
 TOTAL STREAM AREA(ACRES) = 3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.57

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) = 835.00
 ELEVATION DATA: UPSTREAM(FEET) = 665.96 DOWNSTREAM(FEET) = 659.77

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290
 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	4.50	0.75	0.100	56	11.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 8.97
 TOTAL AREA(ACRES) = 4.50 PEAK FLOW RATE(CFS) = 8.97

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 655.77 DOWNSTREAM(FEET) = 655.67
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.3 INCHES

PR25A

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.99
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 8.97
 PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 11.98
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 845.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 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.) = 11.98
 RAINFALL INTENSITY(INCH/HR) = 2.29
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 4.50
 TOTAL STREAM AREA(ACRES) = 4.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.97

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.57	13.14	2.164	0.75(0.07)	0.10	3.7	100.00
2	8.97	11.98	2.288	0.75(0.07)	0.10	4.5	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	16.29	11.98	2.288	0.75(0.07)	0.10	7.9	110.00
2	16.05	13.14	2.164	0.75(0.07)	0.10	8.2	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 16.29 Tc(MIN.) = 11.98
 EFFECTIVE AREA(ACRES) = 7.87 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 8.2
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1260.00 FEET.

FLOW PROCESS FROM NODE 112.00 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) = 654.60 DOWNSTREAM(FEET) = 652.41
 FLOW LENGTH(FEET) = 146.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.46
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 16.29
 PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.24
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 1406.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

PR25A

TIME OF CONCENTRATION(MIN.) = 12.24
 RAINFALL INTENSITY(INCH/HR) = 2.26
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 7.87
 TOTAL STREAM AREA(ACRES) = 8.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.29

 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) = 275.00
 ELEVATION DATA: UPSTREAM(FEET) = 664.40 DOWNSTREAM(FEET) = 657.89

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.078
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.437
 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	1.55	0.75	0.100	56	6.08

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 4.69
 TOTAL AREA(ACRES) = 1.55 PEAK FLOW RATE(CFS) = 4.69

 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) = 653.89 DOWNSTREAM(FEET) = 652.92
 FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.48
 ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.69
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 6.80
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 469.00 FEET.

 FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 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.) = 6.80
 RAINFALL INTENSITY(INCH/HR) = 3.21
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 1.55
 TOTAL STREAM AREA(ACRES) = 1.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.69

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	16.29	12.24	2.259	0.75(0.07)	0.10	7.9	110.00
1	16.05	13.40	2.139	0.75(0.07)	0.10	8.2	100.00

2 4.69 6.80 3.213 0.75(0.07) 0.10 1.5 120.00 PR25A

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	17.70	6.80	3.213	0.75(0.07)	0.10	5.9	120.00
2	19.55	12.24	2.259	0.75(0.07)	0.10	9.4	110.00
3	19.13	13.40	2.139	0.75(0.07)	0.10	9.8	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 19.55 Tc(MIN.) = 12.24
EFFECTIVE AREA(ACRES) = 9.42 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 9.8
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 1406.00 FEET.

FLOW PROCESS FROM NODE 122.00 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) = 652.41 DOWNSTREAM(FEET) = 643.80
FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.55
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 12.42
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 206.00 = 1576.00 FEET.

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.42
RAINFALL INTENSITY(INCH/HR) = 2.24
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 9.42
TOTAL STREAM AREA(ACRES) = 9.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.55

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) = 450.00
ELEVATION DATA: UPSTREAM(FEET) = 663.60 DOWNSTREAM(FEET) = 651.58

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.225

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.098

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	3.70	0.75	0.100	56	7.22

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75

PR25A

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA RUNOFF(CFS) = 10.07
 TOTAL AREA(ACRES) = 3.70 PEAK FLOW RATE(CFS) = 10.07

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 647.58 DOWNSTREAM(FEET) = 647.43
 FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.52
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.07
 PIPE TRAVEL TIME(MIN.) = 0.09 T_c (MIN.) = 7.32
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 480.00 FEET.

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

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

MAINLINE T_c (MIN.) = 7.32
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.075
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.70
 EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED F_m (INCH/HR) = 0.07
 AREA-AVERAGED F_p (INCH/HR) = 0.75 AREA-AVERAGED $A_p = 0.10$
 TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 12.69

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 647.43 DOWNSTREAM(FEET) = 646.68
 FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.91
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 12.69
 PIPE TRAVEL TIME(MIN.) = 0.42 T_c (MIN.) = 7.74
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 630.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 203.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 7.74
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.973
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
COMMERCIAL	B	2.00	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.22
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED F_m (INCH/HR) = 0.07


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PR25A
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 17.48
*****
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) = 646.68 DOWNSTREAM(FEET) = 645.90
FLOW LENGTH(FEET) = 155.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.41
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.48
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 8.14
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 785.00 FEET.
*****
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.14
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.884
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.06
EFFECTIVE AREA(ACRES) = 8.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 8.7 PEAK FLOW RATE(CFS) = 22.00
*****
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) = 645.90 DOWNSTREAM(FEET) = 645.10
FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.62
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.00
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 8.54
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 945.00 FEET.
*****
FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.54
* 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
COMMERCIAL B 4.00 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.82
EFFECTIVE AREA(ACRES) = 12.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10

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PR25A
TOTAL AREA(ACRES) = 12.7 PEAK FLOW RATE(CFS) = 31.17

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) =	645.10	DOWNSTREAM(FEET) =	643.80
FLOW LENGTH(FEET) =	260.00	MANNING'S N =	0.012
DEPTH OF FLOW IN 33.0 INCH PIPE IS	22.1	INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	7.37		
ESTIMATED PIPE DIAMETER(INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	31.17		
PIPE TRAVEL TIME(MIN.) =	0.59	Tc(MIN.) =	9.13
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 206.00 =	1205.00	FEET.	

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:	
TIME OF CONCENTRATION(MIN.) =	9.13
RAINFALL INTENSITY(INCH/HR) =	2.69
AREA-AVERAGED Fm(INCH/HR) =	0.07
AREA-AVERAGED Fp(INCH/HR) =	0.75
AREA-AVERAGED Ap =	0.10
EFFECTIVE STREAM AREA(ACRES) =	12.70
TOTAL STREAM AREA(ACRES) =	12.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =	31.17

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.70	6.98	3.162	0.75(0.07)	0.10	5.9	120.00
1	19.55	12.42	2.239	0.75(0.07)	0.10	9.4	110.00
1	19.13	13.58	2.122	0.75(0.07)	0.10	9.8	100.00
2	31.17	9.13	2.692	0.75(0.07)	0.10	12.7	200.00

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	45.81	6.98	3.162	0.75(0.07)	0.10	15.6	120.00
2	49.60	9.13	2.692	0.75(0.07)	0.10	20.0	200.00
3	45.32	12.42	2.239	0.75(0.07)	0.10	22.1	110.00
4	43.51	13.58	2.122	0.75(0.07)	0.10	22.5	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) =	49.60	Tc(MIN.) =	9.13
EFFECTIVE AREA(ACRES) =	20.01	AREA-AVERAGED Fm(INCH/HR) =	0.07
AREA-AVERAGED Fp(INCH/HR) =	0.75	AREA-AVERAGED Ap =	0.10
TOTAL AREA(ACRES) =	22.5		
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 206.00 =	1576.00	FEET.	

FLOW PROCESS FROM NODE 206.00 TO NODE 212.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	643.80	DOWNSTREAM(FEET) =	643.40
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PR25A

FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.04
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 49.60
 PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 9.30
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 212.00 = 1656.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 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.) = 9.30
 RAINFALL INTENSITY(INCH/HR) = 2.66
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 20.01
 TOTAL STREAM AREA(ACRES) = 22.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.60

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) = 600.00
 ELEVATION DATA: UPSTREAM(FEET) = 665.18 DOWNSTREAM(FEET) = 655.52

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.970
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.721
 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	3.00	0.75	0.100	56	8.97

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 7.15
 TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 7.15

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 651.52 DOWNSTREAM(FEET) = 643.90
 FLOW LENGTH(FEET) = 104.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 12.0 INCH PIPE IS 7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.04
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.15
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 9.09
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 704.00 FEET.

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 9.09
 RAINFALL INTENSITY(INCH/HR) = 2.70
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 3.00
 TOTAL STREAM AREA(ACRES) = 3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.15

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	45.81	7.15	3.117	0.75(0.07)	0.10	15.6	120.00
1	49.60	9.30	2.663	0.75(0.07)	0.10	20.0	200.00
1	45.32	12.58	2.221	0.75(0.07)	0.10	22.1	110.00
1	43.51	13.75	2.106	0.75(0.07)	0.10	22.5	100.00
2	7.15	9.09	2.699	0.75(0.07)	0.10	3.0	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	52.33	7.15	3.117	0.75(0.07)	0.10	18.0	120.00
2	56.38	9.09	2.699	0.75(0.07)	0.10	22.6	210.00
3	56.64	9.30	2.663	0.75(0.07)	0.10	23.0	200.00
4	51.16	12.58	2.221	0.75(0.07)	0.10	25.1	110.00
5	49.04	13.75	2.106	0.75(0.07)	0.10	25.5	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 56.64 Tc(MIN.) = 9.30
 EFFECTIVE AREA(ACRES) = 23.01 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 25.5
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 212.00 = 1656.00 FEET.

FLOW PROCESS FROM NODE 212.00 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) = 643.40 DOWNSTREAM(FEET) = 640.40

FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.43

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 56.64

PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 10.48

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 222.00 = 2256.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 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.) = 10.48

RAINFALL INTENSITY(INCH/HR) = 2.48

AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.75

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 23.01

TOTAL STREAM AREA(ACRES) = 25.45

PEAK FLOW RATE(CFS) AT CONFLUENCE = 56.64

FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 705.00
ELEVATION DATA: UPSTREAM(FEET) = 655.42 DOWNSTREAM(FEET) = 648.58

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.587
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 4.55 0.75 0.100 56 10.59
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 9.78
TOTAL AREA(ACRES) = 4.55 PEAK FLOW RATE(CFS) = 9.78

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) = 644.58 DOWNSTREAM(FEET) = 641.18
FLOW LENGTH(FEET) = 85.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.09
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.78
PIPE TRAVEL TIME(MIN.) = 0.12 T_c (MIN.) = 10.70
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 790.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 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.) = 10.70
RAINFALL INTENSITY(INCH/HR) = 2.45
AREA-AVERAGED F_m (INCH/HR) = 0.07
AREA-AVERAGED F_p (INCH/HR) = 0.75
AREA-AVERAGED A_p = 0.10
EFFECTIVE STREAM AREA(ACRES) = 4.55
TOTAL STREAM AREA(ACRES) = 4.55
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.78

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	52.33	8.35	2.841	0.75(0.07)	0.10	18.0	120.00
1	56.38	10.28	2.507	0.75(0.07)	0.10	22.6	210.00
1	56.64	10.48	2.478	0.75(0.07)	0.10	23.0	200.00
1	51.16	13.79	2.102	0.75(0.07)	0.10	25.1	110.00
1	49.04	14.99	2.000	0.75(0.07)	0.10	25.5	100.00
2	9.78	10.70	2.447	0.75(0.07)	0.10	4.6	220.00

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	61.22	8.35	2.841	0.75(0.07)	0.10	21.5	120.00
2	66.01	10.28	2.507	0.75(0.07)	0.10	27.0	210.00
3	66.35	10.48	2.478	0.75(0.07)	0.10	27.5	200.00
4	66.06	10.70	2.447	0.75(0.07)	0.10	27.7	220.00
5	59.52	13.79	2.102	0.75(0.07)	0.10	29.7	110.00
6	56.98	14.99	2.000	0.75(0.07)	0.10	30.0	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 66.35 Tc(MIN.) = 10.48
 EFFECTIVE AREA(ACRES) = 27.46 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 30.0
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 222.00 = 2256.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 308.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 640.40 DOWNSTREAM(FEET) = 639.65
 FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.82
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 66.35
 PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 10.77
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 308.00 = 2406.00 FEET.

 FLOW PROCESS FROM NODE 308.00 TO NODE 308.00 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.) = 10.77
 RAINFALL INTENSITY(INCH/HR) = 2.44
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 27.46
 TOTAL STREAM AREA(ACRES) = 30.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 66.35

 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) = 260.00
 ELEVATION DATA: UPSTREAM(FEET) = 652.57 DOWNSTREAM(FEET) = 649.07

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.653
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.255
 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	2.40	0.75	0.100	56	6.65

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

PR25A

SUBAREA RUNOFF(CFS) = 6.87
 TOTAL AREA(ACRES) = 2.40 PEAK FLOW RATE(CFS) = 6.87

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 645.07 DOWNSTREAM(FEET) = 644.52
 FLOW LENGTH(FEET) = 110.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.01
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.87
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 7.02
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 370.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 302.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.02
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.152
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.32
 EFFECTIVE AREA(ACRES) = 3.60 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 3.6 PEAK FLOW RATE(CFS) = 9.97

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) = 644.52 DOWNSTREAM(FEET) = 644.07
 FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.52
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.97
 PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 7.29
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 460.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.29
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.081
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.80	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.16
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10

```

                                PR25A
TOTAL AREA(ACRES) =          4.4      PEAK FLOW RATE(CFS) =          11.91
*****
FLOW PROCESS FROM NODE      303.00 TO NODE      304.00 IS CODE =  31
=====
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  644.07  DOWNSTREAM(FEET) =  643.62
FLOW LENGTH(FEET) =  90.00  MANNING'S N =  0.012
DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  5.83
ESTIMATED PIPE DIAMETER(INCH) =  24.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  11.91
PIPE TRAVEL TIME(MIN.) =  0.26  Tc(MIN.) =  7.55
LONGEST FLOWPATH FROM NODE      300.00 TO NODE      304.00 =  550.00 FEET.
*****
FLOW PROCESS FROM NODE      304.00 TO NODE      304.00 IS CODE =  81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) =  7.55
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              B      1.20      0.75      0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =  1.20  SUBAREA RUNOFF(CFS) =  3.18
EFFECTIVE AREA(ACRES) =  5.60  AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =  5.6  PEAK FLOW RATE(CFS) =  14.83
*****
FLOW PROCESS FROM NODE      304.00 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) =  643.62  DOWNSTREAM(FEET) =  643.17
FLOW LENGTH(FEET) =  90.00  MANNING'S N =  0.012
DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  6.07
ESTIMATED PIPE DIAMETER(INCH) =  24.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  14.83
PIPE TRAVEL TIME(MIN.) =  0.25  Tc(MIN.) =  7.80
LONGEST FLOWPATH FROM NODE      300.00 TO NODE      305.00 =  640.00 FEET.
*****
FLOW PROCESS FROM NODE      305.00 TO NODE      305.00 IS CODE =  81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) =  7.80
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.960
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              B      1.20      0.75      0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =  1.20  SUBAREA RUNOFF(CFS) =  3.12
EFFECTIVE AREA(ACRES) =  6.80  AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.75  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =  6.8  PEAK FLOW RATE(CFS) =  17.66

```

 FLOW PROCESS FROM NODE 305.00 TO NODE 306.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 643.17 DOWNSTREAM(FEET) = 642.72
 FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.41
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 17.66
 PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 8.03
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 306.00 = 730.00 FEET.

 FLOW PROCESS FROM NODE 306.00 TO NODE 306.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 8.03
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.80	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.04
 EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 19.38

 FLOW PROCESS FROM NODE 306.00 TO NODE 307.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.72 DOWNSTREAM(FEET) = 642.27
 FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.52
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 19.38
 PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 8.26
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 8.26
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.859
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.05	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 2.63
 EFFECTIVE AREA(ACRES) = 8.65 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 8.7 PEAK FLOW RATE(CFS) = 21.68

PR25A

 FLOW PROCESS FROM NODE 307.00 TO NODE 308.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 642.27 DOWNSTREAM(FEET) = 640.62
 FLOW LENGTH(FEET) = 165.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.62
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 21.68
 PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 8.58
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 308.00 = 985.00 FEET.

 FLOW PROCESS FROM NODE 308.00 TO NODE 308.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 8.58
 RAINFALL INTENSITY(INCH/HR) = 2.79
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 8.65
 TOTAL STREAM AREA(ACRES) = 8.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.68

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.22	8.64	2.782	0.75(0.07)	0.10	21.5	120.00
1	66.01	10.56	2.467	0.75(0.07)	0.10	27.0	210.00
1	66.35	10.77	2.439	0.75(0.07)	0.10	27.5	200.00
1	66.06	10.99	2.409	0.75(0.07)	0.10	27.7	220.00
1	59.52	14.08	2.076	0.75(0.07)	0.10	29.7	110.00
1	56.98	15.29	1.976	0.75(0.07)	0.10	30.0	100.00
2	21.68	8.58	2.795	0.75(0.07)	0.10	8.7	300.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	82.72	8.58	2.795	0.75(0.07)	0.10	30.0	300.00
2	82.80	8.64	2.782	0.75(0.07)	0.10	30.2	120.00
3	85.07	10.56	2.467	0.75(0.07)	0.10	35.6	210.00
4	85.19	10.77	2.439	0.75(0.07)	0.10	36.1	200.00
5	84.66	10.99	2.409	0.75(0.07)	0.10	36.3	220.00
6	75.47	14.08	2.076	0.75(0.07)	0.10	38.3	110.00
7	72.13	15.29	1.976	0.75(0.07)	0.10	38.7	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 85.19 Tc(MIN.) = 10.77
 EFFECTIVE AREA(ACRES) = 36.11 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 38.7
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 308.00 = 2406.00 FEET.

 FLOW PROCESS FROM NODE 308.00 TO NODE 324.00 IS CODE = 31

PR25A

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 639.65 DOWNSTREAM(FEET) = 639.30
FLOW LENGTH(FEET) = 70.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.30
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 85.19
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 10.89
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 324.00 = 2476.00 FEET.
```

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

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

```
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 530.00
ELEVATION DATA: UPSTREAM(FEET) = 664.10 DOWNSTREAM(FEET) = 658.86

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.644
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS  Tc
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL            B      1.00      0.75      0.100  56  9.41
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 2.31
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.31
```

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 31

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 654.86 DOWNSTREAM(FEET) = 654.58
FLOW LENGTH(FEET) = 55.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 12.0 INCH PIPE IS 8.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.84
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.31
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 9.65
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 585.00 FEET.
```

FLOW PROCESS FROM NODE 312.00 TO NODE 312.00 IS CODE = 81

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

```
=====
MAINLINE Tc(MIN.) = 9.65
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.605
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      0.10      0.75      0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
```

```

                                PR25A
SUBAREA AREA(ACRES) = 0.10      SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 1.10    AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1        PEAK FLOW RATE(CFS) = 2.50

*****
FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31
=====
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 654.58 DOWNSTREAM(FEET) = 650.08
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.00
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.50
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 10.48
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 885.00 FEET.

*****
FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81
=====
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 10.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.478
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.85 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.85 SUBAREA RUNOFF(CFS) = 1.84
EFFECTIVE AREA(ACRES) = 1.95 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 4.22

*****
FLOW PROCESS FROM NODE 313.00 TO NODE 322.00 IS CODE = 31
=====
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 650.08 DOWNSTREAM(FEET) = 641.68
FLOW LENGTH(FEET) = 730.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.18
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.22
PIPE TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 12.45
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 322.00 = 1615.00 FEET.

*****
FLOW PROCESS FROM NODE 322.00 TO NODE 322.00 IS CODE = 1
=====
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.45
RAINFALL INTENSITY(INCH/HR) = 2.24
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 1.95
TOTAL STREAM AREA(ACRES) = 1.95

```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.22

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) = 720.00

ELEVATION DATA: UPSTREAM(FEET) = 655.42 DOWNSTREAM(FEET) = 646.06

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

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.070

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.539

SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	B	1.45	0.75	0.100	56	10.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.75

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF(CFS) = 3.22

TOTAL AREA(ACRES) = 1.45 PEAK FLOW RATE(CFS) = 3.22

FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 642.06 DOWNSTREAM(FEET) = 641.81

FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.21

ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.22

PIPE TRAVEL TIME(MIN.) = 0.20 T_c (MIN.) = 10.27

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 770.00 FEET.

FLOW PROCESS FROM NODE 322.00 TO NODE 322.00 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.) = 10.27

RAINFALL INTENSITY(INCH/HR) = 2.51

AREA-AVERAGED F_m (INCH/HR) = 0.07

AREA-AVERAGED F_p (INCH/HR) = 0.75

AREA-AVERAGED A_p = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.45

TOTAL STREAM AREA(ACRES) = 1.45

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	4.22	12.45	2.235	0.75(0.07)	0.10	2.0	310.00
2	3.22	10.27	2.509	0.75(0.07)	0.10	1.5	320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	4.22	12.45	2.235	0.75(0.07)	0.10	2.0	310.00
2	3.22	10.27	2.509	0.75(0.07)	0.10	1.5	320.00

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1	7.13	10.27	2.509	0.75(0.07)	0.10	3.1	320.00
2	7.07	12.45	2.235	0.75(0.07)	0.10	3.4	310.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 7.13 Tc(MIN.) = 10.27
 EFFECTIVE AREA(ACRES) = 3.06 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 3.4
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 322.00 = 1615.00 FEET.

 FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 641.68 DOWNSTREAM(FEET) = 640.50
 FLOW LENGTH(FEET) = 235.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.04
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.13
 PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.04
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 323.00 = 1850.00 FEET.

 FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 11.04
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.402
 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	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.26
 EFFECTIVE AREA(ACRES) = 3.66 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 7.66

 FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 640.50 DOWNSTREAM(FEET) = 639.80
 FLOW LENGTH(FEET) = 140.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.06
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.66
 PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 11.51
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 324.00 = 1990.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 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
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

PR25A

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.66	11.51	2.343	0.75(0.07)	0.10	3.7	320.00
2	7.49	13.69	2.111	0.75(0.07)	0.10	4.0	310.00

LONGEST FLOWPATH FROM NODE 310.00 TO NODE 324.00 = 1990.00 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	82.72	8.70	2.770	0.75(0.07)	0.10	30.0	300.00
2	82.80	8.77	2.758	0.75(0.07)	0.10	30.2	120.00
3	85.07	10.69	2.449	0.75(0.07)	0.10	35.6	210.00
4	85.19	10.89	2.422	0.75(0.07)	0.10	36.1	200.00
5	84.66	11.11	2.393	0.75(0.07)	0.10	36.3	220.00
6	75.47	14.21	2.065	0.75(0.07)	0.10	38.3	110.00
7	72.13	15.42	1.966	0.75(0.07)	0.10	38.7	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 324.00 = 2476.00 FEET.

** PEAK FLOW RATE TABLE **

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	89.61	8.70	2.770	0.75(0.07)	0.10	32.8	300.00
2	89.70	8.77	2.758	0.75(0.07)	0.10	33.0	120.00
3	92.52	10.69	2.449	0.75(0.07)	0.10	39.0	210.00
4	92.69	10.89	2.422	0.75(0.07)	0.10	39.6	200.00
5	92.22	11.11	2.393	0.75(0.07)	0.10	39.9	220.00
6	91.16	11.51	2.343	0.75(0.07)	0.10	40.3	320.00
7	84.50	13.69	2.111	0.75(0.07)	0.10	42.0	310.00
8	82.79	14.21	2.065	0.75(0.07)	0.10	42.3	110.00
9	79.08	15.42	1.966	0.75(0.07)	0.10	42.7	100.00

TOTAL AREA(ACRES) = 42.7

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 92.69 Tc(MIN.) = 10.892
 EFFECTIVE AREA(ACRES) = 39.58 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 42.7
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 324.00 = 2476.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 12

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

 FLOW PROCESS FROM NODE 324.00 TO NODE 414.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 639.30 DOWNSTREAM(FEET) = 630.34
 FLOW LENGTH(FEET) = 140.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.05
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 92.69
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 10.99
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 414.00 = 2616.00 FEET.

 FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 10

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

 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) = 840.00
 ELEVATION DATA: UPSTREAM(FEET) = 658.50 DOWNSTREAM(FEET) = 650.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.260
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.374
 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	2.10	0.75	0.100	56	11.26

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 4.35
 TOTAL AREA(ACRES) = 2.10 PEAK FLOW RATE(CFS) = 4.35

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) = 650.00 DOWNSTREAM ELEVATION(FEET) = 644.71
 STREET LENGTH(FEET) = 310.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.20
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.71
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 5.72

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.16
 FLOW VELOCITY(FEET/SEC.) = 3.28 DEPTH*VELOCITY(FT*FT/SEC.) = 1.31
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 1150.00 FEET.

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

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

PR25A

ELEVATION DATA: UPSTREAM(FEET) = 641.21 DOWNSTREAM(FEET) = 637.54
 FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.17
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 5.72
 PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 12.90
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1180.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.90
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.188
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.35	0.75	0.100	56
COMMERCIAL	B	0.10	0.75	0.100	56
COMMERCIAL	B	0.25	0.75	0.100	56
COMMERCIAL	B	0.15	0.75	0.100	56
COMMERCIAL	B	0.15	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 1.90
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 7.61

FLOW PROCESS FROM NODE 403.00 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) = 637.54 DOWNSTREAM(FEET) = 636.39
 FLOW LENGTH(FEET) = 230.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.06
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.61
 PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 13.65
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 1410.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.65
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.115
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.25	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.25 SUBAREA RUNOFF(CFS) = 0.46
 EFFECTIVE AREA(ACRES) = 4.25 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 7.80

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) = 636.39 DOWNSTREAM(Feet) = 636.24
 FLOW LENGTH(Feet) = 30.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.7 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 5.06
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.80
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 13.75
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 1440.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.75
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.106
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.85	0.75	0.100	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.85 SUBAREA RUNOFF(CFS) = 1.55
 EFFECTIVE AREA(ACRES) = 5.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 9.32

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) = 636.24 DOWNSTREAM(Feet) = 634.14
 FLOW LENGTH(Feet) = 210.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.6 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 7.04
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.32
 PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 14.25
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 1650.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.25
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.061
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.75	0.100	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.08
 EFFECTIVE AREA(ACRES) = 8.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 8.5 PEAK FLOW RATE(CFS) = 15.20

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

PR25A

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 634.14 DOWNSTREAM(FEET) = 633.39
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.09
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.20
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 14.66
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 1800.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 14.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.026
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.95	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 3.43
EFFECTIVE AREA(ACRES) = 10.45 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 18.36

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) = 633.39 DOWNSTREAM(FEET) = 632.61
FLOW LENGTH(FEET) = 155.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.47
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.36
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 15.06
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 408.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 408.00 TO NODE 408.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.06
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.994
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.95	0.75	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 3.37
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 21.42

FLOW PROCESS FROM NODE 408.00 TO NODE 413.00 IS CODE = 31

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

PR25A

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 632.61 DOWNSTREAM(FEET) = 631.81
FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.61
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.42
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 15.46
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 413.00 = 2115.00 FEET.
```

FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 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.) = 15.46
RAINFALL INTENSITY(INCH/HR) = 1.96
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 12.40
TOTAL STREAM AREA(ACRES) = 12.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.42
```

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

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

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

```
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 835.00
ELEVATION DATA: UPSTREAM(FEET) = 655.62 DOWNSTREAM(FEET) = 640.07
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.944
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.558
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS  Tc
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL             B      2.40      0.75      0.100    56   9.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 5.36
TOTAL AREA(ACRES) = 2.40 PEAK FLOW RATE(CFS) = 5.36
```

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) = 636.35 DOWNSTREAM(FEET) = 635.00
FLOW LENGTH(FEET) = 270.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.78
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.36
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 10.89
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 1105.00 FEET.
```

FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

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


```

=====
MAINLINE Tc(MIN.) = 10.89
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.423
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 0.75 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.18
EFFECTIVE AREA(ACRES) = 5.80 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 12.26

```

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*****

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FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

```

```

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

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 634.90 DOWNSTREAM(FEET) = 632.10
FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.82
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.26
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 10.93
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1145.00 FEET.

```

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FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 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.) = 10.93
RAINFALL INTENSITY(INCH/HR) = 2.42
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 5.80
TOTAL STREAM AREA(ACRES) = 5.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.26

```

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.42	15.46	1.963	0.75(0.07)	0.10	12.4	400.00
2	12.26	10.93	2.417	0.75(0.07)	0.10	5.8	410.00

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	31.04	10.93	2.417	0.75(0.07)	0.10	14.6	410.00
2	31.30	15.46	1.963	0.75(0.07)	0.10	18.2	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE(CFS) = 31.30 Tc(MIN.) = 15.46
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 18.2
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 413.00 = 2115.00 FEET.

```

 FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 631.81 DOWNSTREAM(FEET) = 630.51
 FLOW LENGTH(FEET) = 260.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.38
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 31.30
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 16.05
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 414.00 = 2375.00 FEET.

 FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 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	31.04	11.52	2.342	0.75(0.07)	0.10	14.6	410.00
2	31.30	16.05	1.919	0.75(0.07)	0.10	18.2	400.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 414.00 = 2375.00 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	89.61	8.80	2.753	0.75(0.07)	0.10	32.8	300.00
2	89.70	8.86	2.741	0.75(0.07)	0.10	33.0	120.00
3	92.52	10.78	2.437	0.75(0.07)	0.10	39.0	210.00
4	92.69	10.99	2.409	0.75(0.07)	0.10	39.6	200.00
5	92.22	11.21	2.381	0.75(0.07)	0.10	39.9	220.00
6	91.16	11.60	2.332	0.75(0.07)	0.10	40.3	320.00
7	84.50	13.79	2.103	0.75(0.07)	0.10	42.0	310.00
8	82.79	14.30	2.056	0.75(0.07)	0.10	42.3	110.00
9	79.08	15.52	1.959	0.75(0.07)	0.10	42.7	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 414.00 = 2616.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	117.61	8.80	2.753	0.75(0.07)	0.10	43.9	300.00
2	117.79	8.86	2.741	0.75(0.07)	0.10	44.2	120.00
3	122.79	10.78	2.437	0.75(0.07)	0.10	52.6	210.00
4	123.17	10.99	2.409	0.75(0.07)	0.10	53.5	200.00
5	122.94	11.21	2.381	0.75(0.07)	0.10	54.1	220.00
6	122.42	11.52	2.342	0.75(0.07)	0.10	54.7	410.00
7	122.20	11.60	2.332	0.75(0.07)	0.10	54.9	320.00
8	115.67	13.79	2.103	0.75(0.07)	0.10	58.4	310.00
9	113.98	14.30	2.056	0.75(0.07)	0.10	59.1	110.00
10	110.35	15.52	1.959	0.75(0.07)	0.10	60.4	100.00
11	108.73	16.05	1.919	0.75(0.07)	0.10	60.9	400.00

TOTAL AREA(ACRES) = 60.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 123.17 Tc(MIN.) = 10.986
 EFFECTIVE AREA(ACRES) = 53.47 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 60.9
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 414.00 = 2616.00 FEET.

```

PR25A
FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 12
-----
>>>>CLEAR MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 414.00 TO NODE 423.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 630.20 DOWNSTREAM(FEET) = 627.66
FLOW LENGTH(FEET) = 634.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.40
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 123.17
PIPE TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 12.11
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 423.00 = 3250.00 FEET.
*****
FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.11
RAINFALL INTENSITY(INCH/HR) = 2.27
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 53.47
TOTAL STREAM AREA(ACRES) = 60.85
PEAK FLOW RATE(CFS) AT CONFLUENCE = 123.17
*****
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 820.00
ELEVATION DATA: UPSTREAM(FEET) = 647.00 DOWNSTREAM(FEET) = 638.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.152
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.388
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 4.25 0.75 0.100 56 11.15
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 8.85
TOTAL AREA(ACRES) = 4.25 PEAK FLOW RATE(CFS) = 8.85
*****
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.15
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.388
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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                                PR25A
COMMERCIAL          B          0.20      0.75      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.20      SUBAREA RUNOFF(CFS) = 0.42
EFFECTIVE AREA(ACRES) = 4.45      AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75      AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.4      PEAK FLOW RATE(CFS) = 9.26

*****
FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 91
-----
>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<
=====
UPSTREAM NODE ELEVATION(FEET) = 638.70
DOWNSTREAM NODE ELEVATION(FEET) = 637.52
CHANNEL LENGTH THRU SUBAREA(Feet) = 235.00
"V" GUTTER WIDTH(Feet) = 3.00      GUTTER HIKE(Feet) = 0.170
PAVEMENT LIP(Feet) = 0.031      MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
MAXIMUM DEPTH(Feet) = 1.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.197
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
  LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL              B          4.05      0.75      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 2.36
AVERAGE FLOW DEPTH(Feet) = 0.50      FLOOD WIDTH(Feet) = 32.41
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 1.66      Tc(MIN.) = 12.81
SUBAREA AREA(ACRES) = 4.05      SUBAREA RUNOFF(CFS) = 7.74
EFFECTIVE AREA(ACRES) = 8.50      AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75      AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 8.5      PEAK FLOW RATE(CFS) = 16.24

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(Feet) = 0.52      FLOOD WIDTH(Feet) = 35.37
FLOW VELOCITY(Feet/Sec.) = 2.48      DEPTH*VELOCITY(FT*FT/SEC) = 1.30
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 1055.00 FEET.

*****
FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.197
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      0.75      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.60      SUBAREA RUNOFF(CFS) = 1.15
EFFECTIVE AREA(ACRES) = 9.10      AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75      AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 9.1      PEAK FLOW RATE(CFS) = 17.38

*****
FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(Feet) = 633.52      DOWNSTREAM(Feet) = 629.17
FLOW LENGTH(Feet) = 85.00      MANNING'S N = 0.012

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PR25A

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.34
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 17.38
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 12.90
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1140.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 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.) = 12.90
 RAINFALL INTENSITY(INCH/HR) = 2.19
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 9.10
 TOTAL STREAM AREA(ACRES) = 9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.38

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	117.61	9.93	2.560	0.75(0.07)	0.10	43.9	300.00
1	117.79	9.99	2.550	0.75(0.07)	0.10	44.2	120.00
1	122.79	11.91	2.296	0.75(0.07)	0.10	52.6	210.00
1	123.17	12.11	2.273	0.75(0.07)	0.10	53.5	200.00
1	122.94	12.33	2.248	0.75(0.07)	0.10	54.1	220.00
1	122.42	12.64	2.215	0.75(0.07)	0.10	54.7	410.00
1	122.20	12.72	2.206	0.75(0.07)	0.10	54.9	320.00
1	115.67	14.92	2.005	0.75(0.07)	0.10	58.4	310.00
1	113.98	15.44	1.964	0.75(0.07)	0.10	59.1	110.00
1	110.35	16.68	1.875	0.75(0.07)	0.10	60.4	100.00
1	108.73	17.22	1.840	0.75(0.07)	0.10	60.9	400.00
2	17.38	12.90	2.188	0.75(0.07)	0.10	9.1	420.00

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	133.35	9.93	2.560	0.75(0.07)	0.10	50.9	300.00
2	133.56	9.99	2.550	0.75(0.07)	0.10	51.2	120.00
3	139.65	11.91	2.296	0.75(0.07)	0.10	61.0	210.00
4	140.14	12.11	2.273	0.75(0.07)	0.10	62.0	200.00
5	140.02	12.33	2.248	0.75(0.07)	0.10	62.8	220.00
6	139.67	12.64	2.215	0.75(0.07)	0.10	63.7	410.00
7	139.49	12.72	2.206	0.75(0.07)	0.10	63.9	320.00
8	139.05	12.90	2.188	0.75(0.07)	0.10	64.3	420.00
9	131.55	14.92	2.005	0.75(0.07)	0.10	67.5	310.00
10	129.53	15.44	1.964	0.75(0.07)	0.10	68.2	110.00
11	125.16	16.68	1.875	0.75(0.07)	0.10	69.5	100.00
12	123.25	17.22	1.840	0.75(0.07)	0.10	70.0	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 140.14 Tc(MIN.) = 12.11
 EFFECTIVE AREA(ACRES) = 62.01 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 70.0
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 423.00 = 3250.00 FEET.

PR25A

FLOW PROCESS FROM NODE 423.00 TO NODE 505.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 627.66 DOWNSTREAM(FEET) = 626.60
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.51
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 140.14
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.45
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 505.00 = 3462.00 FEET.

FLOW PROCESS FROM NODE 505.00 TO NODE 505.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.45
RAINFALL INTENSITY(INCH/HR) = 2.24
AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 62.01
TOTAL STREAM AREA(ACRES) = 69.95
PEAK FLOW RATE(CFS) AT CONFLUENCE = 140.14

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) = 690.00
ELEVATION DATA: UPSTREAM(FEET) = 644.50 DOWNSTREAM(FEET) = 639.08

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.949
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.414
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	4.30	0.75	0.100	56	10.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 9.05
TOTAL AREA(ACRES) = 4.30 PEAK FLOW RATE(CFS) = 9.05

FLOW PROCESS FROM NODE 501.00 TO NODE 502.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 635.08 DOWNSTREAM(FEET) = 634.28
FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.42
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.05
PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.44
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 502.00 = 850.00 FEET.

FLOW PROCESS FROM NODE 502.00 TO NODE 502.00 IS CODE = 81

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

```

=====
MAINLINE Tc(MIN.) = 11.44
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.351
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B        1.90    0.75    0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.90    SUBAREA RUNOFF(CFS) = 3.89
EFFECTIVE AREA(ACRES) = 6.20    AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 6.2    PEAK FLOW RATE(CFS) = 12.70
=====

```

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) = 634.28 DOWNSTREAM(FEET) = 633.50
FLOW LENGTH(FEET) = 155.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.92
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.70
PIPE TRAVEL TIME(MIN.) = 0.44    Tc(MIN.) = 11.88
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 503.00 = 1005.00 FEET.
=====

```

FLOW PROCESS FROM NODE 503.00 TO NODE 503.00 IS CODE = 81

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

```

=====
MAINLINE Tc(MIN.) = 11.88
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.299
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE              GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B        1.90    0.75    0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.90    SUBAREA RUNOFF(CFS) = 3.80
EFFECTIVE AREA(ACRES) = 8.10    AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 8.1    PEAK FLOW RATE(CFS) = 16.22
=====

```

FLOW PROCESS FROM NODE 503.00 TO NODE 504.00 IS CODE = 31

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

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 633.50 DOWNSTREAM(FEET) = 632.70
FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.13
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.22
PIPE TRAVEL TIME(MIN.) = 0.44    Tc(MIN.) = 12.31
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 504.00 = 1165.00 FEET.
=====

```

FLOW PROCESS FROM NODE 504.00 TO NODE 504.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.31
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.250
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.95	0.75	0.100	56
COMMERCIAL	B	0.60	0.75	0.100	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 3.55 SUBAREA RUNOFF(CFS) = 6.95
 EFFECTIVE AREA(ACRES) = 11.65 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 11.7 PEAK FLOW RATE(CFS) = 22.81

FLOW PROCESS FROM NODE 504.00 TO NODE 505.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 632.70 DOWNSTREAM(FEET) = 627.60
 FLOW LENGTH(FEET) = 260.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.7 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 11.11
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 22.81
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 12.70
 LONGEST FLOWPATH FROM NODE 500.00 TO NODE 505.00 = 1425.00 FEET.

FLOW PROCESS FROM NODE 505.00 TO NODE 505.00 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.) = 12.70
 RAINFALL INTENSITY(INCH/HR) = 2.21
 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 11.65
 TOTAL STREAM AREA(ACRES) = 11.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.81

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	133.35	10.27	2.509	0.75(0.07)	0.10	50.9	300.00
1	133.56	10.33	2.500	0.75(0.07)	0.10	51.2	120.00
1	139.65	12.24	2.258	0.75(0.07)	0.10	61.0	210.00
1	140.14	12.45	2.236	0.75(0.07)	0.10	62.0	200.00
1	140.02	12.67	2.212	0.75(0.07)	0.10	62.8	220.00
1	139.67	12.98	2.180	0.75(0.07)	0.10	63.7	410.00
1	139.49	13.06	2.172	0.75(0.07)	0.10	63.9	320.00
1	139.05	13.24	2.154	0.75(0.07)	0.10	64.3	420.00
1	131.55	15.26	1.978	0.75(0.07)	0.10	67.5	310.00
1	129.53	15.78	1.939	0.75(0.07)	0.10	68.2	110.00
1	125.16	17.03	1.852	0.75(0.07)	0.10	69.5	100.00
1	123.25	17.56	1.818	0.75(0.07)	0.10	70.0	400.00
2	22.81	12.70	2.208	0.75(0.07)	0.10	11.7	500.00

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	154.38	10.27	2.509	0.75(0.07)	0.10	60.3	300.00
2	154.65	10.33	2.500	0.75(0.07)	0.10	60.7	120.00
3	162.14	12.24	2.258	0.75(0.07)	0.10	72.3	210.00
4	162.77	12.45	2.236	0.75(0.07)	0.10	73.4	200.00
5	162.81	12.67	2.212	0.75(0.07)	0.10	74.4	220.00
6	162.79	12.70	2.208	0.75(0.07)	0.10	74.5	500.00
7	162.17	12.98	2.180	0.75(0.07)	0.10	75.3	410.00
8	161.91	13.06	2.172	0.75(0.07)	0.10	75.5	320.00
9	161.28	13.24	2.154	0.75(0.07)	0.10	75.9	420.00
10	151.90	15.26	1.978	0.75(0.07)	0.10	79.1	310.00
11	149.46	15.78	1.939	0.75(0.07)	0.10	79.9	110.00
12	144.16	17.03	1.852	0.75(0.07)	0.10	81.2	100.00
13	141.89	17.56	1.818	0.75(0.07)	0.10	81.6	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 162.81 Tc(MIN.) = 12.67
 EFFECTIVE AREA(ACRES) = 74.37 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 81.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 505.00 = 3462.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 81.6 TC(MIN.) = 12.67
 EFFECTIVE AREA(ACRES) = 74.37 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE(CFS) = 162.81

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	154.38	10.27	2.509	0.75(0.07)	0.10	60.3	300.00
2	154.65	10.33	2.500	0.75(0.07)	0.10	60.7	120.00
3	162.14	12.24	2.258	0.75(0.07)	0.10	72.3	210.00
4	162.77	12.45	2.236	0.75(0.07)	0.10	73.4	200.00
5	162.81	12.67	2.212	0.75(0.07)	0.10	74.4	220.00
6	162.79	12.70	2.208	0.75(0.07)	0.10	74.5	500.00
7	162.17	12.98	2.180	0.75(0.07)	0.10	75.3	410.00
8	161.91	13.06	2.172	0.75(0.07)	0.10	75.5	320.00
9	161.28	13.24	2.154	0.75(0.07)	0.10	75.9	420.00
10	151.90	15.26	1.978	0.75(0.07)	0.10	79.1	310.00
11	149.46	15.78	1.939	0.75(0.07)	0.10	79.9	110.00
12	144.16	17.03	1.852	0.75(0.07)	0.10	81.2	100.00
13	141.89	17.56	1.818	0.75(0.07)	0.10	81.6	400.00

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 25-YEAR *
 * SOUTHEAST LANDSCAPE FRONTING MERRILL AVE (NODES 600-601) *

FILE NAME: W:\3635\PR25B.DAT
 TIME/DATE OF STUDY: 18:17 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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)	MAN- HING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 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) = 35.00
 ELEVATION DATA: UPSTREAM(FEET) = 641.05 DOWNSTREAM(FEET) = 640.35

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 6.401$

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.332

SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
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PR25B

NATURAL FAIR COVER

"OPEN BRUSH" B 0.15 0.61 1.000 66 6.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.61

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF(CFS) = 0.37

TOTAL AREA(ACRES) = 0.15 PEAK FLOW RATE(CFS) = 0.37

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 6.40

EFFECTIVE AREA(ACRES) = 0.15 AREA-AVERAGED F_m (INCH/HR) = 0.61

AREA-AVERAGED F_p (INCH/HR) = 0.61 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE(CFS) = 0.37

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 25-YEAR *
 * SOUTHEAST LANDSCAPE FRONTING MERRILL AVE (NODES 610-611) *

FILE NAME: W:\3635\PR25C.DAT
 TIME/DATE OF STUDY: 18:26 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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 (FT)	LIP (FT)	HIKE (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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 610.00 TO NODE 611.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
 ELEVATION DATA: UPSTREAM(FEET) = 639.50 DOWNSTREAM(FEET) = 635.70

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 8.567$

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.797

SUBAREA T_c AND LOSS RATE DATA(AMC II):

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

PR25C

NATURAL FAIR COVER

"OPEN BRUSH" B 0.85 0.61 1.000 66 8.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.61

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF(CFS) = 1.67

TOTAL AREA(ACRES) = 0.85 PEAK FLOW RATE(CFS) = 1.67

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 8.57

EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED F_m (INCH/HR)= 0.61

AREA-AVERAGED F_p (INCH/HR) = 0.61 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE(CFS) = 1.67

=====

END OF RATIONAL METHOD ANALYSIS



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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 25-YEAR *
 * SOUTHWEST ENTRY DRIVEWAY FRONTING MERRILL AVE (NODES 620-621) *

FILE NAME: W:\3635\PR25D.DAT
 TIME/DATE OF STUDY: 18:33 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 620.00 TO NODE 621.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 225.00
 ELEVATION DATA: UPSTREAM(FEET) = 640.85 DOWNSTREAM(FEET) = 635.60

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.625

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.600

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.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

PR25D
COMMERCIAL B 0.35 0.75 0.100 56 5.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.75
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.11
TOTAL AREA(ACRES) = 0.35 PEAK FLOW RATE(CFS) = 1.11

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.63
EFFECTIVE AREA(ACRES) = 0.35 AREA-AVERAGED Fm(INCH/HR)= 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.75 AREA-AVERAGED Ap = 0.100
PEAK FLOW RATE(CFS) = 1.11

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 25-YEAR *
 * SOUTHWEST LANDSCAPE FRONTING MERRILL AVE (NODES 630-631) *

FILE NAME: W:\3635\PR25E.DAT
 TIME/DATE OF STUDY: 18:39 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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 (FT)	LIP (FT)	HIKE (FT)	MAN- NING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 630.00 TO NODE 631.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 40.00
 ELEVATION DATA: UPSTREAM(FEET) = 639.50 DOWNSTREAM(FEET) = 635.25

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 5.000$
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.864
 SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
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PR25E

NATURAL FAIR COVER

"OPEN BRUSH" B 0.30 0.61 1.000 66 5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.61$

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 1.000$

SUBAREA RUNOFF(CFS) = 0.88

TOTAL AREA(ACRES) = 0.30 PEAK FLOW RATE(CFS) = 0.88

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.30 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.61$

AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.61$ AREA-AVERAGED $A_p = 1.000$

PEAK FLOW RATE(CFS) = 0.88

=====

END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 25-YEAR *
 * SOUTHWEST LANDSCAPE FRONTING EUCLID AVE (NODES 640-641) *

FILE NAME: W:\3635\PR25F.DAT
 TIME/DATE OF STUDY: 18:47 06/18/2019

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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) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8700

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 WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 640.00 TO NODE 641.00 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) = 30.00
 ELEVATION DATA: UPSTREAM(FEET) = 640.40 DOWNSTREAM(FEET) = 636.50

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 5.000$

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

SUBAREA T_c AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
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PR25F

NATURAL FAIR COVER

"OPEN BRUSH" B 0.80 0.61 1.000 66 5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.61$

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 1.000$

SUBAREA RUNOFF(CFS) = 2.34

TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.34

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END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.8 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.61$

AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.61$ AREA-AVERAGED $A_p = 1.000$

PEAK FLOW RATE(CFS) = 2.34

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END OF RATIONAL METHOD ANALYSIS



**PROPOSED CONDITION
100-YEAR**

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
* PROPOSED CONDITION 100-YEAR *
* SITE AREAS TRIBUTARY TO MERRILL AVE STORM DRAIN (NODES 100-505) *

FILE NAME: W:\3635\PR100A.DAT
TIME/DATE OF STUDY: 09:13 06/18/2019

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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) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

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 GUTTER-GEOMETRIES: HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 750.00
ELEVATION DATA: UPSTREAM(FEET) = 666.70 DOWNSTREAM(FEET) = 661.15

$T_c = K * [(LENGTH^{**} 3.00) / (ELEVATION\ CHANGE)]^{**} 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.457

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.863

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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PR100A.RES

COMMERCIAL B 3.70 0.42 0.100 76 11.46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 9.39
 TOTAL AREA(ACRES) = 3.70 PEAK FLOW RATE(CFS) = 9.39

FLOW PROCESS FROM NODE 101.00 TO NODE 112.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 657.15 DOWNSTREAM(FEET) = 654.60
 FLOW LENGTH(FEET) = 510.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.46
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.39
 PIPE TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 13.01
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1260.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

>>>>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.) = 13.01
 RAINFALL INTENSITY(INCH/HR) = 2.65
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 3.70
 TOTAL STREAM AREA(ACRES) = 3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.39

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<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 835.00
 ELEVATION DATA: UPSTREAM(FEET) = 665.96 DOWNSTREAM(FEET) = 659.77

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.790
 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	4.50	0.42	0.100	76	11.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 11.13
 TOTAL AREA(ACRES) = 4.50 PEAK FLOW RATE(CFS) = 11.13

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 655.77 DOWNSTREAM(FEET) = 655.67
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES

PR100A.RES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.45
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 11.13
 PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 11.98
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 845.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

>>>>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.) = 11.98
 RAINFALL INTENSITY(INCH/HR) = 2.79
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 4.50
 TOTAL STREAM AREA(ACRES) = 4.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.13

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.39	13.01	2.652	0.42(0.04)	0.10	3.7	100.00
2	11.13	11.98	2.787	0.42(0.04)	0.10	4.5	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	20.22	11.98	2.787	0.42(0.04)	0.10	7.9	110.00
2	19.97	13.01	2.652	0.42(0.04)	0.10	8.2	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 20.22 Tc(MIN.) = 11.98
 EFFECTIVE AREA(ACRES) = 7.91 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 8.2
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 1260.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 122.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 654.60 DOWNSTREAM(FEET) = 652.41
 FLOW LENGTH(FEET) = 146.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.72
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 20.22
 PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 12.23
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 1406.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

PR100A.RES

TIME OF CONCENTRATION(MIN.) = 12.23
 RAINFALL INTENSITY(INCH/HR) = 2.75
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 7.91
 TOTAL STREAM AREA(ACRES) = 8.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 20.22

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) = 275.00
 ELEVATION DATA: UPSTREAM(FEET) = 664.40 DOWNSTREAM(FEET) = 657.89

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 6.078
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.187
 SUBAREA T_c AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	T_c (MIN.)
COMMERCIAL	B	1.55	0.42	0.100	76	6.08

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 5.78
 TOTAL AREA(ACRES) = 1.55 PEAK FLOW RATE(CFS) = 5.78

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) = 653.89 DOWNSTREAM(FEET) = 652.92
 FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.86
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 5.78
 PIPE TRAVEL TIME(MIN.) = 0.67 T_c (MIN.) = 6.74
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 469.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 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.) = 6.74
 RAINFALL INTENSITY(INCH/HR) = 3.93
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 1.55
 TOTAL STREAM AREA(ACRES) = 1.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.78

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	20.22	12.23	2.753	0.42(0.04)	0.10	7.9	110.00
1	19.97	13.26	2.622	0.42(0.04)	0.10	8.2	100.00

PR100A.RES

2 5.78 6.74 3.934 0.42(0.04) 0.10 1.5 120.00

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	21.80	6.74	3.934	0.42(0.04)	0.10	5.9	120.00
2	24.25	12.23	2.753	0.42(0.04)	0.10	9.5	110.00
3	23.80	13.26	2.622	0.42(0.04)	0.10	9.8	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 24.25 Tc(MIN.) = 12.23
EFFECTIVE AREA(ACRES) = 9.46 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 9.8
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 1406.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 206.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 652.41 DOWNSTREAM(FEET) = 643.80
FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.10
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.25
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 12.40
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 206.00 = 1576.00 FEET.

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 1

>>>>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.) = 12.40
RAINFALL INTENSITY(INCH/HR) = 2.73
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 9.46
TOTAL STREAM AREA(ACRES) = 9.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 24.25

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) = 450.00
ELEVATION DATA: UPSTREAM(FEET) = 663.60 DOWNSTREAM(FEET) = 651.58

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.225

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.775

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	3.70	0.42	0.100	76	7.22

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42

PR100A.RES

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 12.43
TOTAL AREA(ACRES) = 3.70 PEAK FLOW RATE(CFS) = 12.43

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) =	647.58	DOWNSTREAM(FEET) =	647.43
FLOW LENGTH(FEET) =	30.00	MANNING'S N =	0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS	15.3 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	5.88		
ESTIMATED PIPE DIAMETER(INCH) =	24.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	12.43		
PIPE TRAVEL TIME(MIN.) =	0.09	Tc(MIN.) =	7.31
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 =	480.00 FEET.		

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

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

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MAINLINE Tc(MIN.) =	7.31				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.748				
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	0.42	0.100	76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.42				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.100				
SUBAREA AREA(ACRES) =	1.00	SUBAREA RUNOFF(CFS) =	3.34		
EFFECTIVE AREA(ACRES) =	4.70	AREA-AVERAGED Fm(INCH/HR) =	0.04		
AREA-AVERAGED Fp(INCH/HR) =	0.42	AREA-AVERAGED Ap =	0.10		
TOTAL AREA(ACRES) =	4.7	PEAK FLOW RATE(CFS) =	15.68		

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) =	647.43	DOWNSTREAM(FEET) =	646.68
FLOW LENGTH(FEET) =	150.00	MANNING'S N =	0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS	18.3 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	6.11		
ESTIMATED PIPE DIAMETER(INCH) =	24.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	15.68		
PIPE TRAVEL TIME(MIN.) =	0.41	Tc(MIN.) =	7.72
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 =	630.00 FEET.		

FLOW PROCESS FROM NODE 203.00 TO NODE 203.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) =	7.72				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.628				
SUBAREA LOSS RATE DATA(AMC III):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	2.00	0.42	0.100	76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.42				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.100				
SUBAREA AREA(ACRES) =	2.00	SUBAREA RUNOFF(CFS) =	6.45		
EFFECTIVE AREA(ACRES) =	6.70	AREA-AVERAGED Fm(INCH/HR) =	0.04		


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                                PR100A.RES
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 21.62
*****
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) = 646.68 DOWNSTREAM(FEET) = 645.90
FLOW LENGTH(FEET) = 155.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.63
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.62
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 8.11
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 785.00 FEET.
*****
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.11
* 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 B 2.00 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 6.26
EFFECTIVE AREA(ACRES) = 8.70 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 8.7 PEAK FLOW RATE(CFS) = 27.25
*****
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) = 645.90 DOWNSTREAM(FEET) = 645.10
FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.05
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.25
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 8.49
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 945.00 FEET.
*****
FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.427
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 4.00 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 12.19
EFFECTIVE AREA(ACRES) = 12.70 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10

```

PR100A.RES
TOTAL AREA(ACRES) = 12.7 PEAK FLOW RATE(CFS) = 38.69

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) =	645.10	DOWNSTREAM(FEET) =	643.80
FLOW LENGTH(FEET) =	260.00	MANNING'S N =	0.012
DEPTH OF FLOW IN 33.0 INCH PIPE IS	26.4 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	7.58		
ESTIMATED PIPE DIAMETER(INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	38.69		
PIPE TRAVEL TIME(MIN.) =	0.57	Tc(MIN.) =	9.06
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 206.00 =	1205.00 FEET.		

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:	
TIME OF CONCENTRATION(MIN.) =	9.06
RAINFALL INTENSITY(INCH/HR) =	3.30
AREA-AVERAGED Fm(INCH/HR) =	0.04
AREA-AVERAGED Fp(INCH/HR) =	0.42
AREA-AVERAGED Ap =	0.10
EFFECTIVE STREAM AREA(ACRES) =	12.70
TOTAL STREAM AREA(ACRES) =	12.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =	38.69

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.80	6.92	3.873	0.42(0.04)	0.10	5.9	120.00
1	24.25	12.40	2.729	0.42(0.04)	0.10	9.5	110.00
1	23.80	13.44	2.601	0.42(0.04)	0.10	9.8	100.00
2	38.69	9.06	3.296	0.42(0.04)	0.10	12.7	200.00

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	56.61	6.92	3.873	0.42(0.04)	0.10	15.6	120.00
2	61.44	9.06	3.296	0.42(0.04)	0.10	20.0	200.00
3	56.20	12.40	2.729	0.42(0.04)	0.10	22.2	110.00
4	54.23	13.44	2.601	0.42(0.04)	0.10	22.5	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) =	61.44	Tc(MIN.) =	9.06
EFFECTIVE AREA(ACRES) =	19.99	AREA-AVERAGED Fm(INCH/HR) =	0.04
AREA-AVERAGED Fp(INCH/HR) =	0.42	AREA-AVERAGED Ap =	0.10
TOTAL AREA(ACRES) =	22.5		
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 206.00 =	1576.00 FEET.		

FLOW PROCESS FROM NODE 206.00 TO NODE 212.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	643.80	DOWNSTREAM(FEET) =	643.40
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PR100A.RES
FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.48
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 61.44
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 9.22
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 212.00 = 1656.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 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.) = 9.22
RAINFALL INTENSITY(INCH/HR) = 3.26
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 19.99
TOTAL STREAM AREA(ACRES) = 22.45
PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.44

*****
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) = 600.00
ELEVATION DATA: UPSTREAM(FEET) = 665.18 DOWNSTREAM(FEET) = 655.52

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.970
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.315
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 3.00 0.42 0.100 76 8.97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 8.84
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 8.84

*****
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 651.52 DOWNSTREAM(FEET) = 643.90
FLOW LENGTH(FEET) = 104.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 12.0 INCH PIPE IS 8.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.61
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.84
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 9.09
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 704.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2

```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 9.09
 RAINFALL INTENSITY(INCH/HR) = 3.29
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 3.00
 TOTAL STREAM AREA(ACRES) = 3.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.84

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	56.61	7.08	3.821	0.42(0.04)	0.10	15.6	120.00
1	61.44	9.22	3.262	0.42(0.04)	0.10	20.0	200.00
1	56.20	12.56	2.709	0.42(0.04)	0.10	22.2	110.00
1	54.23	13.60	2.583	0.42(0.04)	0.10	22.5	100.00
2	8.84	9.09	3.289	0.42(0.04)	0.10	3.0	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	64.62	7.08	3.821	0.42(0.04)	0.10	18.0	120.00
2	69.99	9.09	3.289	0.42(0.04)	0.10	22.7	210.00
3	70.21	9.22	3.262	0.42(0.04)	0.10	23.0	200.00
4	63.46	12.56	2.709	0.42(0.04)	0.10	25.2	110.00
5	61.15	13.60	2.583	0.42(0.04)	0.10	25.5	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 70.21 Tc(MIN.) = 9.22
 EFFECTIVE AREA(ACRES) = 22.99 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 25.5
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 212.00 = 1656.00 FEET.

 FLOW PROCESS FROM NODE 212.00 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) = 643.40 DOWNSTREAM(FEET) = 640.40
 FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.88
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 70.21
 PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 10.34
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 222.00 = 2256.00 FEET.

 FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 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.) = 10.34
 RAINFALL INTENSITY(INCH/HR) = 3.04
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 22.99
 TOTAL STREAM AREA(ACRES) = 25.45

PEAK FLOW RATE(CFS) AT CONFLUENCE = 70.21

FLOW PROCESS FROM NODE 220.00 TO NODE 221.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 705.00
ELEVATION DATA: UPSTREAM(FEET) = 655.42 DOWNSTREAM(FEET) = 648.58

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.587
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.001
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	B	4.55	0.42	0.100	76	10.59

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 12.12
TOTAL AREA(ACRES) = 4.55 PEAK FLOW RATE(CFS) = 12.12

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) = 644.58 DOWNSTREAM(FEET) = 641.18
FLOW LENGTH(FEET) = 85.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.56
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.12
PIPE TRAVEL TIME(MIN.) = 0.11 T_c (MIN.) = 10.70
LONGEST FLOWPATH FROM NODE 220.00 TO NODE 222.00 = 790.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 222.00 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.) = 10.70
RAINFALL INTENSITY(INCH/HR) = 2.98
AREA-AVERAGED F_m (INCH/HR) = 0.04
AREA-AVERAGED F_p (INCH/HR) = 0.42
AREA-AVERAGED A_p = 0.10
EFFECTIVE STREAM AREA(ACRES) = 4.55
TOTAL STREAM AREA(ACRES) = 4.55
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.12

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	64.62	8.22	3.494	0.42(0.04)	0.10	18.0	120.00
1	69.99	10.22	3.067	0.42(0.04)	0.10	22.7	210.00
1	70.21	10.34	3.044	0.42(0.04)	0.10	23.0	200.00
1	63.46	13.70	2.571	0.42(0.04)	0.10	25.2	110.00
1	61.15	14.78	2.457	0.42(0.04)	0.10	25.5	100.00
2	12.12	10.70	2.982	0.42(0.04)	0.10	4.6	220.00

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	75.55	8.22	3.494	0.42(0.04)	0.10	21.4	120.00
2	81.89	10.22	3.067	0.42(0.04)	0.10	27.1	210.00
3	82.16	10.34	3.044	0.42(0.04)	0.10	27.4	200.00
4	81.61	10.70	2.982	0.42(0.04)	0.10	27.8	220.00
5	73.88	13.70	2.571	0.42(0.04)	0.10	29.7	110.00
6	71.10	14.78	2.457	0.42(0.04)	0.10	30.0	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.16 Tc(MIN.) = 10.34
 EFFECTIVE AREA(ACRES) = 27.39 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 30.0
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 222.00 = 2256.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 308.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(Feet) = 640.40 DOWNSTREAM(Feet) = 639.65
 FLOW LENGTH(Feet) = 150.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.7 INCHES
 PIPE-FLOW VELOCITY(Feet/Sec.) = 9.27
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 82.16
 PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 10.61
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 308.00 = 2406.00 FEET.

FLOW PROCESS FROM NODE 308.00 TO NODE 308.00 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.) = 10.61
 RAINFALL INTENSITY(INCH/HR) = 3.00
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 27.39
 TOTAL STREAM AREA(ACRES) = 30.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 82.16

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) = 260.00
 ELEVATION DATA: UPSTREAM(Feet) = 652.57 DOWNSTREAM(Feet) = 649.07

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

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.653

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.966

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	2.40	0.42	0.100	76	6.65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

PR100A.RES

SUBAREA RUNOFF(CFS) = 8.48
 TOTAL AREA(ACRES) = 2.40 PEAK FLOW RATE(CFS) = 8.48

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 645.07 DOWNSTREAM(FEET) = 644.52
 FLOW LENGTH(FEET) = 110.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.35
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 8.48
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.00
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 370.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 302.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.848
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 4.11
 EFFECTIVE AREA(ACRES) = 3.60 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 3.6 PEAK FLOW RATE(CFS) = 12.33

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) = 644.52 DOWNSTREAM(FEET) = 644.07
 FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.87
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 12.33
 PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 7.25
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 460.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.25
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.767
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.80	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.68
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 14.75

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 644.07 DOWNSTREAM(FEET) = 643.62
FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.06
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.75
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 7.50
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 550.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.691
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.20 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.94
EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 18.39

FLOW PROCESS FROM NODE 304.00 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) = 643.62 DOWNSTREAM(FEET) = 643.17
FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.46
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.39
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 7.73
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 640.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.624
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.20 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.87
EFFECTIVE AREA(ACRES) = 6.80 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 6.8 PEAK FLOW RATE(CFS) = 21.92

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 FLOW PROCESS FROM NODE 305.00 TO NODE 306.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 643.17 DOWNSTREAM(FEET) = 642.72
 FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.62
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 21.92
 PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 7.96
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 306.00 = 730.00 FEET.

 FLOW PROCESS FROM NODE 306.00 TO NODE 306.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.96
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.562
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.80	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.53
 EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 24.08

 FLOW PROCESS FROM NODE 306.00 TO NODE 307.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.72 DOWNSTREAM(FEET) = 642.27
 FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.91
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 24.08
 PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 8.17
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 8.17
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.505
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.05	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 3.27
 EFFECTIVE AREA(ACRES) = 8.65 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 8.7 PEAK FLOW RATE(CFS) = 26.96

PR100A.RES

FLOW PROCESS FROM NODE 307.00 TO NODE 308.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 642.27 DOWNSTREAM(FEET) = 640.62
FLOW LENGTH(FEET) = 165.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.19
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 26.96
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 8.47
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 308.00 = 985.00 FEET.

FLOW PROCESS FROM NODE 308.00 TO NODE 308.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 8.47
RAINFALL INTENSITY(INCH/HR) = 3.43
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 8.65
TOTAL STREAM AREA(ACRES) = 8.65
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.96

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	75.55	8.49	3.426	0.42(0.04)	0.10	21.4	120.00
1	81.89	10.48	3.019	0.42(0.04)	0.10	27.1	210.00
1	82.16	10.61	2.997	0.42(0.04)	0.10	27.4	200.00
1	81.61	10.97	2.938	0.42(0.04)	0.10	27.8	220.00
1	73.88	13.98	2.540	0.42(0.04)	0.10	29.7	110.00
1	71.10	15.06	2.429	0.42(0.04)	0.10	30.0	100.00
2	26.96	8.47	3.430	0.42(0.04)	0.10	8.7	300.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	102.44	8.47	3.430	0.42(0.04)	0.10	30.1	300.00
2	102.47	8.49	3.426	0.42(0.04)	0.10	30.1	120.00
3	105.58	10.48	3.019	0.42(0.04)	0.10	35.7	210.00
4	105.68	10.61	2.997	0.42(0.04)	0.10	36.0	200.00
5	104.65	10.97	2.938	0.42(0.04)	0.10	36.4	220.00
6	93.76	13.98	2.540	0.42(0.04)	0.10	38.4	110.00
7	90.09	15.06	2.429	0.42(0.04)	0.10	38.7	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 105.68 Tc(MIN.) = 10.61
EFFECTIVE AREA(ACRES) = 36.04 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 38.7
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 308.00 = 2406.00 FEET.

FLOW PROCESS FROM NODE 308.00 TO NODE 324.00 IS CODE = 31

PR100A.RES

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

ELEVATION DATA: UPSTREAM(FEET) = 639.65 DOWNSTREAM(FEET) = 639.30
FLOW LENGTH(FEET) = 70.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.73
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 105.68
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.73
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 324.00 = 2476.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 530.00
ELEVATION DATA: UPSTREAM(FEET) = 664.10 DOWNSTREAM(FEET) = 658.86

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.221
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 1.00 0.42 0.100 76 9.41
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 2.86
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.86

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 654.86 DOWNSTREAM(FEET) = 654.58
FLOW LENGTH(FEET) = 55.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.12
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.86
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 9.63
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 585.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 312.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.177
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

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                                PR100A.RES
SUBAREA AREA(ACRES) =    0.10    SUBAREA RUNOFF(CFS) =    0.28
EFFECTIVE AREA(ACRES) =    1.10    AREA-AVERAGED Fm(INCH/HR) =    0.04
AREA-AVERAGED Fp(INCH/HR) =    0.42    AREA-AVERAGED Ap =    0.10
TOTAL AREA(ACRES) =    1.1    PEAK FLOW RATE(CFS) =    3.10

*****
FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =    31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    654.58    DOWNSTREAM(FEET) =    650.08
FLOW LENGTH(FEET) =    300.00    MANNING'S N =    0.012
DEPTH OF FLOW IN 12.0 INCH PIPE IS    7.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    6.30
ESTIMATED PIPE DIAMETER(INCH) =    12.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    3.10
PIPE TRAVEL TIME(MIN.) =    0.79    Tc(MIN.) =    10.43
LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =    885.00 FEET.

*****
FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =    81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) =    10.43
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =    3.029
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN
COMMERCIAL    B    0.85    0.42    0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =    0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =    0.100
SUBAREA AREA(ACRES) =    0.85    SUBAREA RUNOFF(CFS) =    2.28
EFFECTIVE AREA(ACRES) =    1.95    AREA-AVERAGED Fm(INCH/HR) =    0.04
AREA-AVERAGED Fp(INCH/HR) =    0.42    AREA-AVERAGED Ap =    0.10
TOTAL AREA(ACRES) =    2.0    PEAK FLOW RATE(CFS) =    5.24

*****
FLOW PROCESS FROM NODE    313.00 TO NODE    322.00 IS CODE =    31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    650.08    DOWNSTREAM(FEET) =    641.68
FLOW LENGTH(FEET) =    730.00    MANNING'S N =    0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS    9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    6.49
ESTIMATED PIPE DIAMETER(INCH) =    15.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    5.24
PIPE TRAVEL TIME(MIN.) =    1.88    Tc(MIN.) =    12.30
LONGEST FLOWPATH FROM NODE    310.00 TO NODE    322.00 =    1615.00 FEET.

*****
FLOW PROCESS FROM NODE    322.00 TO NODE    322.00 IS CODE =    1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS =    2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM    1 ARE:
TIME OF CONCENTRATION(MIN.) =    12.30
RAINFALL INTENSITY(INCH/HR) =    2.74
AREA-AVERAGED Fm(INCH/HR) =    0.04
AREA-AVERAGED Fp(INCH/HR) =    0.42
AREA-AVERAGED Ap =    0.10
EFFECTIVE STREAM AREA(ACRES) =    1.95
TOTAL STREAM AREA(ACRES) =    1.95

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PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.24

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) = 720.00

ELEVATION DATA: UPSTREAM(FEET) = 655.42 DOWNSTREAM(FEET) = 646.06

 $T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$ SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 10.070

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.093

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	B	1.45	0.42	0.100	76	10.07

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.42SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF(CFS) = 3.98

TOTAL AREA(ACRES) = 1.45 PEAK FLOW RATE(CFS) = 3.98

FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 642.06 DOWNSTREAM(FEET) = 641.81

FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.39

ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.98

PIPE TRAVEL TIME(MIN.) = 0.19 T_c (MIN.) = 10.26

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 770.00 FEET.

FLOW PROCESS FROM NODE 322.00 TO NODE 322.00 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.) = 10.26

RAINFALL INTENSITY(INCH/HR) = 3.06

AREA-AVERAGED F_m (INCH/HR) = 0.04AREA-AVERAGED F_p (INCH/HR) = 0.42AREA-AVERAGED A_p = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.45

TOTAL STREAM AREA(ACRES) = 1.45

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.98

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	5.24	12.30	2.743	0.42(0.04)	0.10	2.0	310.00
2	3.98	10.26	3.059	0.42(0.04)	0.10	1.5	320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	5.24	12.30	2.743	0.42(0.04)	0.10	2.0	310.00
2	3.98	10.26	3.059	0.42(0.04)	0.10	1.5	320.00

PR100A.RES
 1 8.86 10.26 3.059 0.42(0.04) 0.10 3.1 320.00
 2 8.81 12.30 2.743 0.42(0.04) 0.10 3.4 310.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 8.86 Tc(MIN.) = 10.26
 EFFECTIVE AREA(ACRES) = 3.08 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 3.4
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 322.00 = 1615.00 FEET.

 FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 641.68 DOWNSTREAM(FEET) = 640.50
 FLOW LENGTH(FEET) = 235.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.41
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 8.86
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 10.98
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 323.00 = 1850.00 FEET.

 FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 10.98
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.936
 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	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.56
 EFFECTIVE AREA(ACRES) = 3.68 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.57

 FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 640.50 DOWNSTREAM(FEET) = 639.80
 FLOW LENGTH(FEET) = 140.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.48
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.57
 PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 11.41
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 324.00 = 1990.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 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 (ACRES)	Ae (ACRES)	HEADWATER NODE
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Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.57	11.41	2.870	0.42(0.04)	0.10	3.7	320.00
2	9.39	13.45	2.599	0.42(0.04)	0.10	4.0	310.00

LONGEST FLOWPATH FROM NODE 310.00 TO NODE 324.00 = 1990.00 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	102.44	8.59	3.402	0.42(0.04)	0.10	30.1	300.00
2	102.47	8.61	3.398	0.42(0.04)	0.10	30.1	120.00
3	105.58	10.60	2.998	0.42(0.04)	0.10	35.7	210.00
4	105.68	10.73	2.977	0.42(0.04)	0.10	36.0	200.00
5	104.65	11.09	2.919	0.42(0.04)	0.10	36.4	220.00
6	93.76	14.11	2.527	0.42(0.04)	0.10	38.4	110.00
7	90.09	15.19	2.417	0.42(0.04)	0.10	38.7	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 324.00 = 2476.00 FEET.

** PEAK FLOW RATE TABLE **

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.01	8.59	3.402	0.42(0.04)	0.10	32.8	300.00
2	111.05	8.61	3.398	0.42(0.04)	0.10	32.9	120.00
3	114.88	10.60	2.998	0.42(0.04)	0.10	39.1	210.00
4	115.02	10.73	2.977	0.42(0.04)	0.10	39.5	200.00
5	114.12	11.09	2.919	0.42(0.04)	0.10	40.0	220.00
6	113.07	11.41	2.870	0.42(0.04)	0.10	40.3	320.00
7	105.50	13.45	2.599	0.42(0.04)	0.10	41.9	310.00
8	102.88	14.11	2.527	0.42(0.04)	0.10	42.4	110.00
9	98.81	15.19	2.417	0.42(0.04)	0.10	42.7	100.00

TOTAL AREA(ACRES) = 42.7

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 115.02 Tc(MIN.) = 10.731
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 42.7
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 324.00 = 2476.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 12

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

FLOW PROCESS FROM NODE 324.00 TO NODE 414.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 639.30 DOWNSTREAM(FEET) = 630.34
FLOW LENGTH(FEET) = 140.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.52
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 115.02
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 10.82
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 414.00 = 2616.00 FEET.

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 10

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

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) = 840.00
 ELEVATION DATA: UPSTREAM(FEET) = 658.50 DOWNSTREAM(FEET) = 650.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 11.260$
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.892
 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	B	2.10	0.42	0.100	76	11.26

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.42$
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA RUNOFF(CFS) = 5.39
 TOTAL AREA(ACRES) = 2.10 PEAK FLOW RATE(CFS) = 5.39

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) = 650.00 DOWNSTREAM ELEVATION(FEET) = 644.71
 STREET LENGTH(FEET) = 310.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.46
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.41
 HALFSTREET FLOOD WIDTH(FEET) = 13.87
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.38
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.39
 STREET FLOW TRAVEL TIME(MIN.) = 1.53 $T_c(MIN.) = 12.79$
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.680
 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	B	0.90	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.42$
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.14
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED $F_m(INCH/HR) = 0.04$
 AREA-AVERAGED $F_p(INCH/HR) = 0.42$ AREA-AVERAGED $A_p = 0.10$
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.12

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.49
 FLOW VELOCITY(FEET/SEC.) = 3.44 DEPTH*VELOCITY(FT*FT/SEC.) = 1.45
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 1150.00 FEET.

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

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


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                                PR100A.RES
ELEVATION DATA: UPSTREAM(FEET) = 641.21 DOWNSTREAM(FEET) = 637.54
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.09
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.12
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 12.82
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1180.00 FEET.

*****
FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.676
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap      SCS
LAND USE              GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL             B       0.35      0.42      0.100    76
COMMERCIAL             B       0.10      0.42      0.100    76
COMMERCIAL             B       0.25      0.42      0.100    76
COMMERCIAL             B       0.15      0.42      0.100    76
COMMERCIAL             B       0.15      0.42      0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.37
EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.48

*****
FLOW PROCESS FROM NODE 403.00 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) = 637.54 DOWNSTREAM(FEET) = 636.39
FLOW LENGTH(FEET) = 230.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.47
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.48
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 13.52
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 1410.00 FEET.

*****
FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81
-----
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 13.52
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.592
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap      SCS
LAND USE              GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL             B       0.25      0.42      0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.25 SUBAREA RUNOFF(CFS) = 0.57
EFFECTIVE AREA(ACRES) = 4.25 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 9.75

*****
FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 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) = 636.39 DOWNSTREAM(FEET) = 636.24
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.50
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.75
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 13.61
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 1440.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.85 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.85 SUBAREA RUNOFF(CFS) = 1.94
EFFECTIVE AREA(ACRES) = 5.10 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 11.65

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) = 636.24 DOWNSTREAM(FEET) = 634.14
FLOW LENGTH(FEET) = 210.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.52
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.65
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 14.08
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 1650.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.530
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 0.42 0.100 76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.61
EFFECTIVE AREA(ACRES) = 8.50 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 8.5 PEAK FLOW RATE(CFS) = 19.03

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)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 634.14 DOWNSTREAM(FEET) = 633.39
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.50
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.03
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 14.46
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 1800.00 FEET.

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*****
FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 14.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.489
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B      1.95    0.42    0.100  76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 4.29
EFFECTIVE AREA(ACRES) = 10.45 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 23.01

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*****
FLOW PROCESS FROM NODE 407.00 TO NODE 408.00 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) = 633.39 DOWNSTREAM(FEET) = 632.61
FLOW LENGTH(FEET) = 155.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.66
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 23.01
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 14.85
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 408.00 = 1955.00 FEET.

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*****
FLOW PROCESS FROM NODE 408.00 TO NODE 408.00 IS CODE = 81

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

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=====
MAINLINE Tc(MIN.) = 14.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B      1.95    0.42    0.100  76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 4.23
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 26.87

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*****
FLOW PROCESS FROM NODE 408.00 TO NODE 413.00 IS CODE = 31

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

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

PR100A.RES

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=====
ELEVATION DATA: UPSTREAM(FEET) = 632.61 DOWNSTREAM(FEET) = 631.81
FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.04
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 26.87
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 15.23
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 413.00 = 2115.00 FEET.

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*****
FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 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.) = 15.23
RAINFALL INTENSITY(INCH/HR) = 2.41
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 12.40
TOTAL STREAM AREA(ACRES) = 12.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.87

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*****
FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 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) = 835.00
ELEVATION DATA: UPSTREAM(FEET) = 655.62 DOWNSTREAM(FEET) = 640.07

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.944
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.117
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS      Tc
LAND USE              GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL            B      2.40     0.42     0.100    76     9.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 6.64
TOTAL AREA(ACRES) = 2.40 PEAK FLOW RATE(CFS) = 6.64

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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)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 636.35 DOWNSTREAM(FEET) = 635.00
FLOW LENGTH(FEET) = 270.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.98
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.64
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 1105.00 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<<<<
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PR100A.RES

MAINLINE Tc(MIN.) = 10.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958
 SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.40 0.42 0.100 76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 8.92
 EFFECTIVE AREA(ACRES) = 5.80 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 15.22

FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 634.90 DOWNSTREAM(FEET) = 632.10
 FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.50
 ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 15.22
 PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 10.89
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1145.00 FEET.

FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 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.) = 10.89
 RAINFALL INTENSITY(INCH/HR) = 2.95
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 5.80
 TOTAL STREAM AREA(ACRES) = 5.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 15.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	26.87	15.23	2.413	0.42(0.04)	0.10	12.4	400.00
2	15.22	10.89	2.952	0.42(0.04)	0.10	5.8	410.00

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	38.79	10.89	2.952	0.42(0.04)	0.10	14.7	410.00
2	39.28	15.23	2.413	0.42(0.04)	0.10	18.2	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 39.28 Tc(MIN.) = 15.23
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 18.2
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 413.00 = 2115.00 FEET.

PR100A.RES

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31

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

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

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ELEVATION DATA: UPSTREAM(FEET) = 631.81 DOWNSTREAM(FEET) = 630.51
FLOW LENGTH(FEET) = 260.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.58
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 39.28
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 15.80
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 414.00 = 2375.00 FEET.
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FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 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	38.79	11.46	2.862	0.42(0.04)	0.10	14.7	410.00
2	39.28	15.80	2.361	0.42(0.04)	0.10	18.2	400.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 414.00 = 2375.00 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	111.01	8.68	3.381	0.42(0.04)	0.10	32.8	300.00
2	111.05	8.70	3.377	0.42(0.04)	0.10	32.9	120.00
3	114.88	10.69	2.984	0.42(0.04)	0.10	39.1	210.00
4	115.02	10.82	2.963	0.42(0.04)	0.10	39.5	200.00
5	114.12	11.18	2.905	0.42(0.04)	0.10	40.0	220.00
6	113.07	11.50	2.856	0.42(0.04)	0.10	40.3	320.00
7	105.50	13.55	2.589	0.42(0.04)	0.10	41.9	310.00
8	102.88	14.20	2.517	0.42(0.04)	0.10	42.4	110.00
9	98.81	15.28	2.409	0.42(0.04)	0.10	42.7	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 414.00 = 2616.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.81	8.68	3.381	0.42(0.04)	0.10	43.9	300.00
2	145.87	8.70	3.377	0.42(0.04)	0.10	44.0	120.00
3	152.64	10.69	2.984	0.42(0.04)	0.10	52.8	210.00
4	152.95	10.82	2.963	0.42(0.04)	0.10	53.3	200.00
5	152.53	11.18	2.905	0.42(0.04)	0.10	54.3	220.00
6	151.99	11.46	2.862	0.42(0.04)	0.10	54.9	410.00
7	151.86	11.50	2.856	0.42(0.04)	0.10	55.0	320.00
8	144.52	13.55	2.589	0.42(0.04)	0.10	58.3	310.00
9	141.97	14.20	2.517	0.42(0.04)	0.10	59.3	110.00
10	138.03	15.28	2.409	0.42(0.04)	0.10	60.4	100.00
11	136.08	15.80	2.361	0.42(0.04)	0.10	60.9	400.00

TOTAL AREA(ACRES) = 60.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 152.95 Tc(MIN.) = 10.819

EFFECTIVE AREA(ACRES) = 53.34 AREA-AVERAGED Fm(INCH/HR) = 0.04

AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 60.9

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 414.00 = 2616.00 FEET.

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 12

PR100A.RES

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

FLOW PROCESS FROM NODE 414.00 TO NODE 423.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 630.20 DOWNSTREAM(FEET) = 627.66
FLOW LENGTH(FEET) = 634.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 60.0 INCH PIPE IS 43.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.01
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 152.95
PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 11.88
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 423.00 = 3250.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 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.) = 11.88
RAINFALL INTENSITY(INCH/HR) = 2.80
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 53.34
TOTAL STREAM AREA(ACRES) = 60.85
PEAK FLOW RATE(CFS) AT CONFLUENCE = 152.95

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 820.00
ELEVATION DATA: UPSTREAM(FEET) = 647.00 DOWNSTREAM(FEET) = 638.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.152
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.909
SUBAREA Tc AND LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 4.25 0.42 0.100 76 11.15
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 10.97
TOTAL AREA(ACRES) = 4.25 PEAK FLOW RATE(CFS) = 10.97

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.15
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.909
SUBAREA LOSS RATE DATA(AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.42 0.100 76

PR100A.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.42$
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.52
 EFFECTIVE AREA(ACRES) = 4.45 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.04$
 AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.42$ AREA-AVERAGED $A_p = 0.10$
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 11.48

FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 91

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

=====

UPSTREAM NODE ELEVATION(Feet) = 638.70
 DOWNSTREAM NODE ELEVATION(Feet) = 637.52
 CHANNEL LENGTH THRU SUBAREA(Feet) = 235.00
 "V" GUTTER WIDTH(Feet) = 3.00 GUTTER HIKE(Feet) = 0.170
 PAVEMENT LIP(Feet) = 0.031 MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(Feet) = 1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.685
 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	B	4.05	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.42$
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 2.46
 AVERAGE FLOW DEPTH(Feet) = 0.53 FLOOD WIDTH(Feet) = 35.53
 "V" GUTTER FLOW TRAVEL TIME(MIN.) = 1.59 $T_c(\text{MIN.}) = 12.74$
 SUBAREA AREA(ACRES) = 4.05 SUBAREA RUNOFF(CFS) = 9.63
 EFFECTIVE AREA(ACRES) = 8.50 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.04$
 AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.42$ AREA-AVERAGED $A_p = 0.10$
 TOTAL AREA(ACRES) = 8.5 PEAK FLOW RATE(CFS) = 20.22

END OF SUBAREA "V" GUTTER HYDRAULICS:

DEPTH(Feet) = 0.56 FLOOD WIDTH(Feet) = 38.80
 FLOW VELOCITY(Feet/Sec.) = 2.58 DEPTH*VELOCITY(Feet*Feet/Sec) = 1.44
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 1055.00 FEET.

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

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

=====

MAINLINE $T_c(\text{MIN.}) = 12.74$
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.685
 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	B	0.60	0.42	0.100	76

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.42$
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.43
 EFFECTIVE AREA(ACRES) = 9.10 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.04$
 AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.42$ AREA-AVERAGED $A_p = 0.10$
 TOTAL AREA(ACRES) = 9.1 PEAK FLOW RATE(CFS) = 21.65

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(Feet) = 633.52 DOWNSTREAM(Feet) = 629.17
 FLOW LENGTH(Feet) = 85.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.9 INCHES

PR100A.RES

PIPE-FLOW VELOCITY(Feet/Sec.) = 15.98
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 21.65
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 12.83
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1140.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 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.) = 12.83
 RAINFALL INTENSITY(INCH/HR) = 2.67
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 9.10
 TOTAL STREAM AREA(ACRES) = 9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.65

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.81	9.77	3.151	0.42(0.04)	0.10	43.9	300.00
1	145.87	9.78	3.147	0.42(0.04)	0.10	44.0	120.00
1	152.64	11.75	2.820	0.42(0.04)	0.10	52.8	210.00
1	152.95	11.88	2.802	0.42(0.04)	0.10	53.3	200.00
1	152.53	12.23	2.752	0.42(0.04)	0.10	54.3	220.00
1	151.99	12.52	2.715	0.42(0.04)	0.10	54.9	410.00
1	151.86	12.58	2.706	0.42(0.04)	0.10	55.0	320.00
1	144.52	14.63	2.472	0.42(0.04)	0.10	58.3	310.00
1	141.97	15.28	2.408	0.42(0.04)	0.10	59.3	110.00
1	138.03	16.37	2.311	0.42(0.04)	0.10	60.4	100.00
1	136.08	16.89	2.268	0.42(0.04)	0.10	60.9	400.00
2	21.65	12.83	2.674	0.42(0.04)	0.10	9.1	420.00

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	165.26	9.77	3.151	0.42(0.04)	0.10	50.9	300.00
2	165.34	9.78	3.147	0.42(0.04)	0.10	50.9	120.00
3	173.55	11.75	2.820	0.42(0.04)	0.10	61.2	210.00
4	173.96	11.88	2.802	0.42(0.04)	0.10	61.8	200.00
5	173.78	12.23	2.752	0.42(0.04)	0.10	63.0	220.00
6	173.42	12.52	2.715	0.42(0.04)	0.10	63.8	410.00
7	173.34	12.58	2.706	0.42(0.04)	0.10	63.9	320.00
8	172.60	12.83	2.674	0.42(0.04)	0.10	64.5	420.00
9	164.51	14.63	2.472	0.42(0.04)	0.10	67.4	310.00
10	161.43	15.28	2.408	0.42(0.04)	0.10	68.4	110.00
11	156.69	16.37	2.311	0.42(0.04)	0.10	69.5	100.00
12	154.39	16.89	2.268	0.42(0.04)	0.10	70.0	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 173.96 Tc(MIN.) = 11.88
 EFFECTIVE AREA(ACRES) = 61.77 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 70.0
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 423.00 = 3250.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 505.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 627.66 DOWNSTREAM(FEET) = 626.60
 FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.20
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 173.96
 PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.19
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 505.00 = 3462.00 FEET.

FLOW PROCESS FROM NODE 505.00 TO NODE 505.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 12.19
 RAINFALL INTENSITY(INCH/HR) = 2.76
 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA(ACRES) = 61.77
 TOTAL STREAM AREA(ACRES) = 69.95
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 173.96

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) = 690.00
 ELEVATION DATA: UPSTREAM(FEET) = 644.50 DOWNSTREAM(FEET) = 639.08

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.949
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.941
 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	4.30	0.42	0.100	76	10.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 11.22
 TOTAL AREA(ACRES) = 4.30 PEAK FLOW RATE(CFS) = 11.22

FLOW PROCESS FROM NODE 501.00 TO NODE 502.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 635.08 DOWNSTREAM(FEET) = 634.28
 FLOW LENGTH(FEET) = 160.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.60
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 11.22
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 11.43
 LONGEST FLOWPATH FROM NODE 500.00 TO NODE 502.00 = 850.00 FEET.

FLOW PROCESS FROM NODE 502.00 TO NODE 502.00 IS CODE = 81

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

```

=====
MAINLINE Tc(MIN.) = 11.43
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      1.90    0.42    0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.90    SUBAREA RUNOFF(CFS) = 4.83
EFFECTIVE AREA(ACRES) = 6.20    AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42    AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 6.2    PEAK FLOW RATE(CFS) = 15.76

```

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) = 634.28 DOWNSTREAM(Feet) = 633.50
FLOW LENGTH(Feet) = 155.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 6.13
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.76
PIPE TRAVEL TIME(MIN.) = 0.42    Tc(MIN.) = 11.85
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 503.00 = 1005.00 FEET.

```

FLOW PROCESS FROM NODE 503.00 TO NODE 503.00 IS CODE = 81

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

```

=====
MAINLINE Tc(MIN.) = 11.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.806
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL            B      1.90    0.42    0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.90    SUBAREA RUNOFF(CFS) = 4.73
EFFECTIVE AREA(ACRES) = 8.10    AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42    AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 8.1    PEAK FLOW RATE(CFS) = 20.15

```

FLOW PROCESS FROM NODE 503.00 TO NODE 504.00 IS CODE = 31

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

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

```

=====
ELEVATION DATA: UPSTREAM(Feet) = 633.50 DOWNSTREAM(Feet) = 632.70
FLOW LENGTH(Feet) = 160.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 6.56
ESTIMATED PIPE DIAMETER(INCH) = 27.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.15
PIPE TRAVEL TIME(MIN.) = 0.41    Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 504.00 = 1165.00 FEET.

```

FLOW PROCESS FROM NODE 504.00 TO NODE 504.00 IS CODE = 81

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

```

=====
MAINLINE Tc(MIN.) = 12.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.749
SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp      Ap      SCS
    LAND USE          GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL             B       2.95     0.42     0.100    76
COMMERCIAL             B       0.60     0.42     0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.42
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 3.55      SUBAREA RUNOFF(CFS) = 8.65
EFFECTIVE AREA(ACRES) = 11.65   AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 11.7      PEAK FLOW RATE(CFS) = 28.38

```

```

*****
FLOW PROCESS FROM NODE 504.00 TO NODE 505.00 IS CODE = 31
=====

```

```

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

```

```

ELEVATION DATA: UPSTREAM(FEET) = 632.70 DOWNSTREAM(FEET) = 627.60
FLOW LENGTH(FEET) = 260.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.96
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 28.38
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.62
LONGEST FLOWPATH FROM NODE 500.00 TO NODE 505.00 = 1425.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 505.00 TO NODE 505.00 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.) = 12.62
RAINFALL INTENSITY(INCH/HR) = 2.70
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.42
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 11.65
TOTAL STREAM AREA(ACRES) = 11.65
PEAK FLOW RATE(CFS) AT CONFLUENCE = 28.38

```

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	165.26	10.09	3.090	0.42(0.04)	0.10	50.9	300.00
1	165.34	10.11	3.086	0.42(0.04)	0.10	50.9	120.00
1	173.55	12.06	2.775	0.42(0.04)	0.10	61.2	210.00
1	173.96	12.19	2.758	0.42(0.04)	0.10	61.8	200.00
1	173.78	12.55	2.710	0.42(0.04)	0.10	63.0	220.00
1	173.42	12.83	2.674	0.42(0.04)	0.10	63.8	410.00
1	173.34	12.89	2.667	0.42(0.04)	0.10	63.9	320.00
1	172.60	13.15	2.636	0.42(0.04)	0.10	64.5	420.00
1	164.51	14.95	2.440	0.42(0.04)	0.10	67.4	310.00
1	161.43	15.61	2.378	0.42(0.04)	0.10	68.4	110.00
1	156.69	16.69	2.284	0.42(0.04)	0.10	69.5	100.00
1	154.39	17.22	2.242	0.42(0.04)	0.10	70.0	400.00
2	28.38	12.62	2.702	0.42(0.04)	0.10	11.7	500.00

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

PR100A.RES

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	191.27	10.09	3.090	0.42(0.04)	0.10	60.2	300.00
2	191.36	10.11	3.086	0.42(0.04)	0.10	60.3	120.00
3	201.45	12.06	2.775	0.42(0.04)	0.10	72.3	210.00
4	201.96	12.19	2.758	0.42(0.04)	0.10	73.0	200.00
5	202.11	12.55	2.710	0.42(0.04)	0.10	74.6	220.00
6	202.08	12.62	2.702	0.42(0.04)	0.10	74.8	500.00
7	201.52	12.83	2.674	0.42(0.04)	0.10	75.5	410.00
8	201.35	12.89	2.667	0.42(0.04)	0.10	75.6	320.00
9	200.28	13.15	2.636	0.42(0.04)	0.10	76.2	420.00
10	190.09	14.95	2.440	0.42(0.04)	0.10	79.1	310.00
11	186.36	15.61	2.378	0.42(0.04)	0.10	80.0	110.00
12	180.61	16.69	2.284	0.42(0.04)	0.10	81.2	100.00
13	177.87	17.22	2.242	0.42(0.04)	0.10	81.6	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 202.11 Tc(MIN.) = 12.55
 EFFECTIVE AREA(ACRES) = 74.57 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 81.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 505.00 = 3462.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 81.6 TC(MIN.) = 12.55
 EFFECTIVE AREA(ACRES) = 74.57 AREA-AVERAGED Fm(INCH/HR) = 0.04
 AREA-AVERAGED Fp(INCH/HR) = 0.42 AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE(CFS) = 202.11

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	191.27	10.09	3.090	0.42(0.04)	0.10	60.2	300.00
2	191.36	10.11	3.086	0.42(0.04)	0.10	60.3	120.00
3	201.45	12.06	2.775	0.42(0.04)	0.10	72.3	210.00
4	201.96	12.19	2.758	0.42(0.04)	0.10	73.0	200.00
5	202.11	12.55	2.710	0.42(0.04)	0.10	74.6	220.00
6	202.08	12.62	2.702	0.42(0.04)	0.10	74.8	500.00
7	201.52	12.83	2.674	0.42(0.04)	0.10	75.5	410.00
8	201.35	12.89	2.667	0.42(0.04)	0.10	75.6	320.00
9	200.28	13.15	2.636	0.42(0.04)	0.10	76.2	420.00
10	190.09	14.95	2.440	0.42(0.04)	0.10	79.1	310.00
11	186.36	15.61	2.378	0.42(0.04)	0.10	80.0	110.00
12	180.61	16.69	2.284	0.42(0.04)	0.10	81.2	100.00
13	177.87	17.22	2.242	0.42(0.04)	0.10	81.6	400.00

END OF RATIONAL METHOD ANALYSIS

▲

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
* PROPOSED CONDITION 100-YEAR *
* SOUTHEAST LANDSCAPE FRONTING MERRILL AVE (NODES 600-601) *

FILE NAME: W:\3635\PR100B.DAT
TIME/DATE OF STUDY: 18:14 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

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)	MAN- HING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 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) = 35.00
ELEVATION DATA: UPSTREAM(FEET) = 641.05 DOWNSTREAM(FEET) = 640.35

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 6.401$

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.059

SUBAREA T_c AND LOSS RATE DATA(AMC III):

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

PR100B

NATURAL FAIR COVER

"OPEN BRUSH" B 0.15 0.31 1.000 84 6.40

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.31$

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 1.000$

SUBAREA RUNOFF(CFS) = 0.51

TOTAL AREA(ACRES) = 0.15 PEAK FLOW RATE(CFS) = 0.51

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.2 TC(MIN.) = 6.40

EFFECTIVE AREA(ACRES) = 0.15 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.31$

AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.31$ AREA-AVERAGED $A_p = 1.000$

PEAK FLOW RATE(CFS) = 0.51

=====

END OF RATIONAL METHOD ANALYSIS

▲

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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 100-YEAR *
 * SOUTHEAST LANDSCAPE FRONTING MERRILL AVE (NODES 610-611) *

FILE NAME: W:\3635\PR100C.DAT
 TIME/DATE OF STUDY: 18:23 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

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)	MANING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 610.00 TO NODE 611.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
 ELEVATION DATA: UPSTREAM(FEET) = 639.50 DOWNSTREAM(FEET) = 635.70

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 8.567$

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.408

SUBAREA T_c AND LOSS RATE DATA(AMC III):

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

PR100C

NATURAL FAIR COVER

"OPEN BRUSH" 8 0.85 0.31 1.000 84 8.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.31

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 1.000

SUBAREA RUNOFF(CFS) = 2.37

TOTAL AREA(ACRES) = 0.85 PEAK FLOW RATE(CFS) = 2.37

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.9 TC(MIN.) = 8.57

EFFECTIVE AREA(ACRES) = 0.85 AREA-AVERAGED F_m (INCH/HR)= 0.31

AREA-AVERAGED F_p (INCH/HR) = 0.31 AREA-AVERAGED A_p = 1.000

PEAK FLOW RATE(CFS) = 2.37

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
* PROPOSED CONDITION 100-YEAR *
* SOUTHWEST ENTRY DRIVEWAY FRONTING MERRILL AVE (NODES 620-621) *

FILE NAME: W:\3635\PR100D.DAT
TIME/DATE OF STUDY: 18:31 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

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 GUTTER-GEOMETRIES: HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (FT)	MANING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 620.00 TO NODE 621.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 225.00
ELEVATION DATA: UPSTREAM(FEET) = 640.85 DOWNSTREAM(FEET) = 635.60

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

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.625

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.386

SUBAREA T_c AND LOSS RATE DATA(AMC III):

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

COMMERCIAL B 0.35 0.42 0.100 76 5.63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.42
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF(CFS) = 1.37
 TOTAL AREA(ACRES) = 0.35 PEAK FLOW RATE(CFS) = 1.37

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.63
 EFFECTIVE AREA(ACRES) = 0.35 AREA-AVERAGED F_m (INCH/HR)= 0.04
 AREA-AVERAGED F_p (INCH/HR) = 0.42 AREA-AVERAGED A_p = 0.100
 PEAK FLOW RATE(CFS) = 1.37

=====

END OF RATIONAL METHOD ANALYSIS



 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
 (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 100-YEAR *
 * SOUTHWEST LANDSCAPE FRONTING MERRILL AVE (NODES 630-631) *

FILE NAME: W:\3635\PR100E.DAT
 TIME/DATE OF STUDY: 18:37 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

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 GUTTER-GEOMETRIES: HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 FLOW PROCESS FROM NODE 630.00 TO NODE 631.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 40.00
 ELEVATION DATA: UPSTREAM(FEET) = 639.50 DOWNSTREAM(FEET) = 635.25

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

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.000

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.708

SUBAREA T_c AND LOSS RATE DATA(AMC III):

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

PR100E

NATURAL FAIR COVER

"OPEN BRUSH" B 0.30 0.31 1.000 84 5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.31$

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 1.000$

SUBAREA RUNOFF(CFS) = 1.19

TOTAL AREA(ACRES) = 0.30 PEAK FLOW RATE(CFS) = 1.19

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.30 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.31$

AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.31$ AREA-AVERAGED $A_p = 1.000$

PEAK FLOW RATE(CFS) = 1.19

=====

END OF RATIONAL METHOD ANALYSIS

 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
 * JOB #3635 EUCLID & EUCALYPTUS, ONTARIO *
 * PROPOSED CONDITION 100-YEAR *
 * SOUTHWEST LANDSCAPE FRONTING EUCLID AVE (NODES 640-641) *

FILE NAME: W:\3635\PR100F.DAT
 TIME/DATE OF STUDY: 18:45 06/18/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE($\log(I; \text{IN/HR})$ vs. $\log(T_c; \text{MIN})$) = 0.6000
 USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0600

ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

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

*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 640.00 TO NODE 641.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 30.00
 ELEVATION DATA: UPSTREAM(FEET) = 640.40 DOWNSTREAM(FEET) = 636.50

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

SUBAREA ANALYSIS USED MINIMUM $T_c(\text{MIN.}) = 5.000$

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.708

SUBAREA T_c AND LOSS RATE DATA(AMC III):

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

PR100F

NATURAL FAIR COVER

"OPEN BRUSH" B 0.80 0.31 1.000 84 5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.31$

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 1.000$

SUBAREA RUNOFF(CFS) = 3.17

TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.17

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.8 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.31$

AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.31$ AREA-AVERAGED $A_p = 1.000$

PEAK FLOW RATE(CFS) = 3.17

=====

END OF RATIONAL METHOD ANALYSIS

APPENDIX C

DETENTION ANALYSIS

 NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS
 =====

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Analysis prepared by:

THIENES ENGINEERING, INC.
 14349 FIRESTONE BLVD
 LA MIRADA, CA 90638

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 PROPOSED CONDITION 100-YEAR LOSS RATE & LOW LOSS FRACTION

 *** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
 AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 5.90 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	84.05	10.00	56.(AMC II)	0.423	0.920

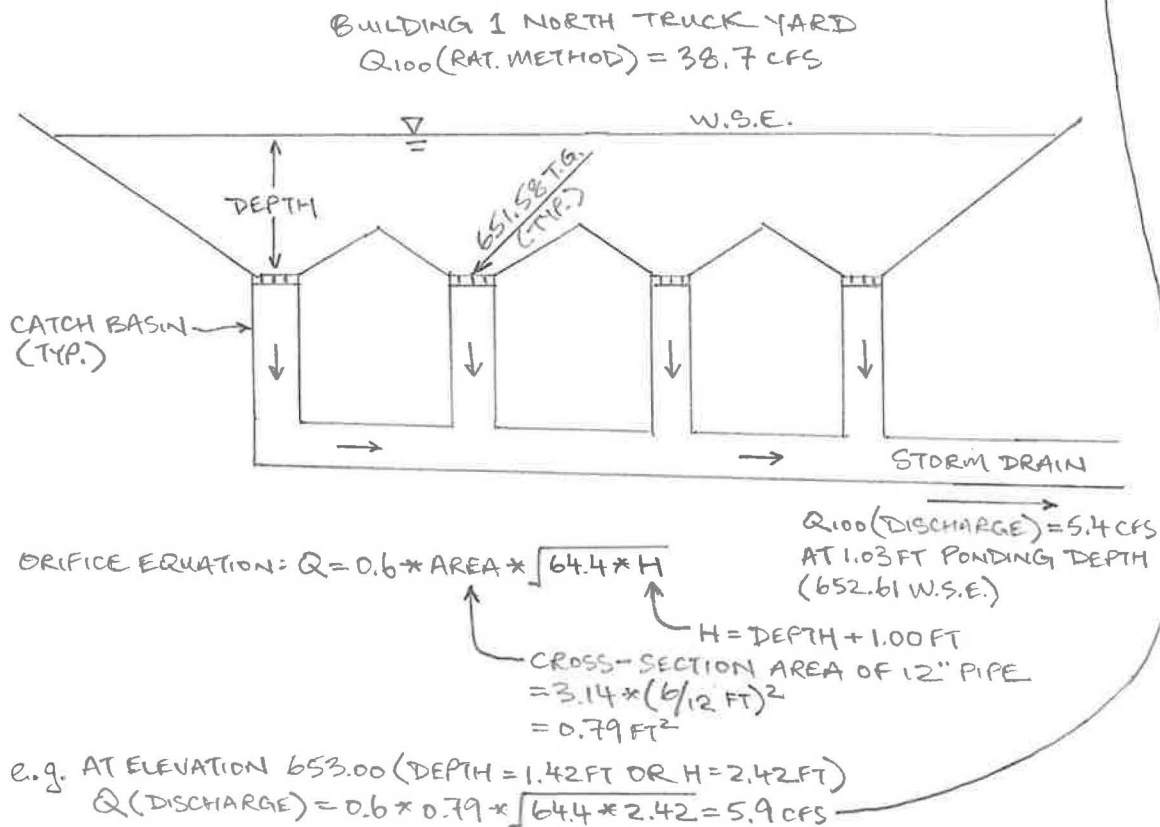
TOTAL AREA (Acres) = 84.05

AREA-AVERAGED LOSS RATE, \bar{F}_m (in./hr.) = 0.042

AREA-AVERAGED LOW LOSS FRACTION, \bar{Y} = 0.080
 =====

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUILDING 1 NORTH TRUCK YARD (NODE 205)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
651.58	0.00	0	418	418	0.01	4.2
651.80	0.22	3800	1975	2393	0.05	4.5
652.00	0.42	15950	4878	7271	0.17	4.8
652.20	0.62	32830	8243	15514	0.36	5.1
652.40	0.82	49600	11356	26870	0.62	5.4
652.60	1.02	63960	13547	40417	0.93	5.7
652.80	1.22	71510	15069	55486	1.27	5.9
653.00	1.42	79180	16630	72116	1.66	6.2
653.20	1.62	87120	18273	90389	2.08	6.4
653.40	1.82	95610	18010	108399	2.49	6.6
653.58	2.00	104500				



 SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 1 NORTH TRUCK YARD (NODES 205)

 RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 12.70
 SOIL-LOSS RATE, F_m , (INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 8.50
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 5.18
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 1.07

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	10.0	20.0	30.0	40.0
0.13	0.0078	1.33	.Q	.	.	.	.
0.28	0.0233	1.33	.Q	.	.	.	.
0.42	0.0389	1.34	.Q	.	.	.	.
0.56	0.0546	1.34	.Q	.	.	.	.
0.70	0.0704	1.35	.Q	.	.	.	.
0.84	0.0862	1.36	.Q	.	.	.	.
0.98	0.1021	1.36	.Q	.	.	.	.
1.12	0.1181	1.37	.Q	.	.	.	.
1.27	0.1341	1.37	.Q	.	.	.	.
1.41	0.1502	1.38	.Q	.	.	.	.
1.55	0.1664	1.39	.Q	.	.	.	.
1.69	0.1827	1.39	.Q	.	.	.	.
1.83	0.1990	1.40	.Q	.	.	.	.
1.98	0.2155	1.41	.Q	.	.	.	.
2.12	0.2320	1.41	.Q	.	.	.	.
2.26	0.2486	1.42	.Q	.	.	.	.
2.40	0.2652	1.43	.Q	.	.	.	.
2.54	0.2820	1.44	.Q	.	.	.	.
2.68	0.2988	1.44	.Q	.	.	.	.

BLDG1N

2.83	0.3158	1.45	.Q	.	.	.	.
2.97	0.3328	1.46	.Q	.	.	.	.
3.11	0.3499	1.47	.Q	.	.	.	.
3.25	0.3671	1.47	.Q	.	.	.	.
3.39	0.3844	1.48	.Q	.	.	.	.
3.53	0.4018	1.49	.Q	.	.	.	.
3.67	0.4192	1.50	.Q	.	.	.	.
3.82	0.4368	1.50	.Q	.	.	.	.
3.96	0.4545	1.52	.Q	.	.	.	.
4.10	0.4723	1.52	.Q	.	.	.	.
4.24	0.4902	1.53	.Q	.	.	.	.
4.38	0.5081	1.54	.Q	.	.	.	.
4.53	0.5262	1.55	.Q	.	.	.	.
4.67	0.5444	1.56	.Q	.	.	.	.
4.81	0.5627	1.57	.Q	.	.	.	.
4.95	0.5812	1.58	.Q	.	.	.	.
5.09	0.5997	1.59	.Q	.	.	.	.
5.23	0.6183	1.60	.Q	.	.	.	.
5.38	0.6371	1.61	.Q	.	.	.	.
5.52	0.6560	1.62	.Q	.	.	.	.
5.66	0.6750	1.63	.Q	.	.	.	.
5.80	0.6942	1.64	.Q	.	.	.	.
5.94	0.7134	1.65	.Q	.	.	.	.
6.08	0.7328	1.66	.Q	.	.	.	.
6.22	0.7524	1.68	.Q	.	.	.	.
6.37	0.7720	1.68	.Q	.	.	.	.
6.51	0.7919	1.70	.Q	.	.	.	.
6.65	0.8118	1.71	.Q	.	.	.	.
6.79	0.8319	1.73	.Q	.	.	.	.
6.93	0.8522	1.73	.Q	.	.	.	.
7.07	0.8726	1.75	.Q	.	.	.	.
7.22	0.8931	1.76	.Q	.	.	.	.
7.36	0.9139	1.78	.Q	.	.	.	.
7.50	0.9347	1.79	.Q	.	.	.	.
7.64	0.9558	1.81	.Q	.	.	.	.
7.78	0.9770	1.82	.Q	.	.	.	.
7.93	0.9984	1.84	.Q	.	.	.	.
8.07	1.0200	1.85	.Q	.	.	.	.
8.21	1.0418	1.87	.Q	.	.	.	.
8.35	1.0637	1.88	.Q	.	.	.	.
8.49	1.0859	1.90	.Q	.	.	.	.
8.63	1.1082	1.92	.Q	.	.	.	.
8.77	1.1308	1.94	.Q	.	.	.	.
8.92	1.1536	1.95	.Q	.	.	.	.
9.06	1.1766	1.98	.Q	.	.	.	.
9.20	1.1998	1.99	.Q	.	.	.	.
9.34	1.2233	2.02	.Q	.	.	.	.
9.48	1.2470	2.03	.Q	.	.	.	.
9.62	1.2709	2.06	.Q	.	.	.	.
9.77	1.2951	2.07	.Q	.	.	.	.
9.91	1.3196	2.11	.Q	.	.	.	.
10.05	1.3443	2.12	.Q	.	.	.	.
10.19	1.3694	2.15	.Q	.	.	.	.
10.33	1.3947	2.17	.Q	.	.	.	.
10.48	1.4203	2.21	.Q	.	.	.	.
10.62	1.4462	2.22	.Q	.	.	.	.
10.76	1.4725	2.26	.Q	.	.	.	.
10.90	1.4991	2.28	.Q	.	.	.	.
11.04	1.5261	2.32	.Q	.	.	.	.
11.18	1.5534	2.35	.Q	.	.	.	.
11.32	1.5811	2.39	.Q	.	.	.	.
11.47	1.6092	2.41	.Q	.	.	.	.
11.61	1.6378	2.46	.Q	.	.	.	.
11.75	1.6667	2.49	.Q	.	.	.	.
11.89	1.6962	2.54	.Q	.	.	.	.
12.03	1.7261	2.57	.Q	.	.	.	.
12.18	1.7584	2.94	.Q	.	.	.	.

BLDG1N

12.32	1.7929	2.97	. Q	.	.	.	.
12.46	1.8280	3.03	. Q	.	.	.	.
12.60	1.8637	3.07	. Q	.	.	.	.
12.74	1.9000	3.14	. Q	.	.	.	.
12.88	1.9370	3.18	. Q	.	.	.	.
13.02	1.9747	3.26	. Q	.	.	.	.
13.17	2.0131	3.30	. Q	.	.	.	.
13.31	2.0523	3.40	. Q	.	.	.	.
13.45	2.0924	3.45	. Q	.	.	.	.
13.59	2.1334	3.56	. Q	.	.	.	.
13.73	2.1753	3.62	. Q	.	.	.	.
13.88	2.2184	3.74	. Q	.	.	.	.
14.02	2.2627	3.81	. Q	.	.	.	.
14.16	2.3075	3.85	. Q	.	.	.	.
14.30	2.3531	3.93	. Q	.	.	.	.
14.44	2.4003	4.13	. Q	.	.	.	.
14.58	2.4492	4.24	. Q	.	.	.	.
14.73	2.5003	4.49	. Q	.	.	.	.
14.87	2.5538	4.63	. Q	.	.	.	.
15.01	2.6100	4.98	. Q	.	.	.	.
15.15	2.6695	5.18	. Q	.	.	.	.
15.29	2.7333	5.71	. Q	.	.	.	.
15.43	2.8017	5.97	. Q	.	.	.	.
15.57	2.8687	5.47	. Q	.	.	.	.
15.72	2.9369	6.19	. Q	.	.	.	.
15.86	3.0236	8.62	. Q	.	.	.	.
16.00	3.1442	11.98	. .Q	.	.	.	.
16.14	3.4345	37.60	.	.	.	. Q	.
16.28	3.6961	7.09	. Q	.	.	.	.
16.42	3.7667	4.96	. Q	.	.	.	.
16.57	3.8274	5.42	. Q	.	.	.	.
16.71	3.8872	4.80	. Q	.	.	.	.
16.85	3.9408	4.36	. Q	.	.	.	.
16.99	3.9899	4.03	. Q	.	.	.	.
17.13	4.0361	3.87	. Q	.	.	.	.
17.27	4.0803	3.68	. Q	.	.	.	.
17.42	4.1223	3.50	. Q	.	.	.	.
17.56	4.1624	3.35	. Q	.	.	.	.
17.70	4.2008	3.22	. Q	.	.	.	.
17.84	4.2378	3.10	. Q	.	.	.	.
17.98	4.2735	3.00	. Q	.	.	.	.
18.12	4.3069	2.71	. Q	.	.	.	.
18.27	4.3375	2.51	. Q	.	.	.	.
18.41	4.3665	2.44	. Q	.	.	.	.
18.55	4.3946	2.37	. Q	.	.	.	.
18.69	4.4220	2.30	. Q	.	.	.	.
18.83	4.4486	2.24	. Q	.	.	.	.
18.98	4.4745	2.19	. Q	.	.	.	.
19.12	4.4998	2.14	. Q	.	.	.	.
19.26	4.5246	2.09	. Q	.	.	.	.
19.40	4.5488	2.05	. Q	.	.	.	.
19.54	4.5725	2.00	. Q	.	.	.	.
19.68	4.5957	1.96	. Q	.	.	.	.
19.83	4.6185	1.93	. Q	.	.	.	.
19.97	4.6409	1.89	. Q	.	.	.	.
20.11	4.6628	1.86	. Q	.	.	.	.
20.25	4.6844	1.83	. Q	.	.	.	.
20.39	4.7056	1.80	. Q	.	.	.	.
20.53	4.7265	1.77	. Q	.	.	.	.
20.67	4.7471	1.74	. Q	.	.	.	.
20.82	4.7673	1.72	. Q	.	.	.	.
20.96	4.7873	1.69	. Q	.	.	.	.
21.10	4.8070	1.67	. Q	.	.	.	.
21.24	4.8264	1.65	. Q	.	.	.	.
21.38	4.8455	1.62	. Q	.	.	.	.
21.52	4.8644	1.60	. Q	.	.	.	.
21.67	4.8831	1.58	. Q	.	.	.	.

BLDG1N

21.81	4.9015	1.56	.Q	.	.	.	.
21.95	4.9197	1.55	.Q	.	.	.	.
22.09	4.9377	1.53	.Q	.	.	.	.
22.23	4.9554	1.51	.Q	.	.	.	.
22.38	4.9730	1.49	.Q	.	.	.	.
22.52	4.9904	1.48	.Q	.	.	.	.
22.66	5.0076	1.46	.Q	.	.	.	.
22.80	5.0246	1.45	.Q	.	.	.	.
22.94	5.0415	1.43	.Q	.	.	.	.
23.08	5.0581	1.42	.Q	.	.	.	.
23.23	5.0746	1.40	.Q	.	.	.	.
23.37	5.0910	1.39	.Q	.	.	.	.
23.51	5.1072	1.38	.Q	.	.	.	.
23.65	5.1232	1.36	.Q	.	.	.	.
23.79	5.1391	1.35	.Q	.	.	.	.
23.93	5.1549	1.34	.Q	.	.	.	.
24.08	5.1705	1.33	.Q	.	.	.	.
24.22	5.1783	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

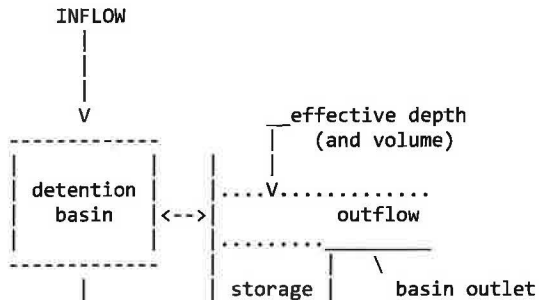
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1445.0
10%	195.5
20%	25.5
30%	17.0
40%	8.5
50%	8.5
60%	8.5
70%	8.5
80%	8.5
90%	8.5

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 1 NORTH TRUCK YARD (NODES 205)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 8.500
 DEAD STORAGE(AF) = 0.00
 SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
 ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



V
OUTFLOW

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 11

*BASIN-DEPTH	STORAGE	OUTFLOW	**BASIN-DEPTH	STORAGE	OUTFLOW	*
(FEET)	(ACRE-FEET)	(CFS)	(FEET)	(ACRE-FEET)	(CFS)	
* 0.000	0.000	0.000**	0.220	0.010	4.200*	
* 0.420	0.050	4.500**	0.620	0.170	4.800*	
* 0.820	0.360	5.100**	1.020	0.620	5.400*	
* 1.220	0.930	5.700**	1.420	1.270	5.900*	
* 1.620	1.660	6.200**	1.820	2.080	6.400*	
* 2.000	2.490	6.600**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.22	-0.01459	0.03459
3	0.42	0.02366	0.07634
4	0.62	0.14190	0.19810
5	0.82	0.33014	0.38986
6	1.02	0.58839	0.65161
7	1.22	0.89663	0.96337
8	1.42	1.23546	1.30454
9	1.62	1.62371	1.69629
10	1.82	2.04253	2.11747
11	2.00	2.45136	2.52864

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.133	0.000	1.33	0.10	0.94	0.004
0.275	0.000	1.33	0.10	1.89	0.005
0.417	0.000	1.34	0.10	1.90	0.005
0.558	0.000	1.34	0.10	1.90	0.005
0.700	0.000	1.35	0.10	1.91	0.005
0.842	0.000	1.36	0.10	1.92	0.005
0.983	0.000	1.36	0.10	1.93	0.005
1.125	0.000	1.37	0.10	1.94	0.005
1.267	0.000	1.37	0.10	1.95	0.005
1.408	0.000	1.38	0.10	1.96	0.005
1.550	0.000	1.39	0.10	1.97	0.005
1.692	0.000	1.39	0.10	1.98	0.005
1.833	0.000	1.40	0.10	1.99	0.005
1.975	0.000	1.41	0.10	1.99	0.005
2.117	0.000	1.41	0.11	2.00	0.005
2.258	0.000	1.42	0.11	2.01	0.005
2.400	0.000	1.43	0.11	2.02	0.005
2.542	0.000	1.44	0.11	2.03	0.005
2.683	0.000	1.44	0.11	2.05	0.005
2.825	0.000	1.45	0.11	2.06	0.005
2.967	0.000	1.46	0.11	2.07	0.005
3.108	0.000	1.47	0.11	2.08	0.005
3.250	0.000	1.47	0.11	2.09	0.005
3.392	0.000	1.48	0.11	2.10	0.005
3.533	0.000	1.49	0.11	2.11	0.005
3.675	0.000	1.50	0.11	2.12	0.005
3.817	0.000	1.50	0.11	2.13	0.005
3.958	0.000	1.52	0.11	2.15	0.005

				BLDG1N	
4.100	0.000	1.52	0.11	2.16	0.005
4.242	0.000	1.53	0.11	2.17	0.005
4.383	0.000	1.54	0.11	2.18	0.005
4.525	0.000	1.55	0.12	2.20	0.005
4.667	0.000	1.56	0.12	2.21	0.005
4.808	0.000	1.57	0.12	2.22	0.005
4.950	0.000	1.58	0.12	2.24	0.005
5.092	0.000	1.59	0.12	2.25	0.005
5.233	0.000	1.60	0.12	2.26	0.005
5.375	0.000	1.61	0.12	2.28	0.005
5.517	0.000	1.62	0.12	2.29	0.005
5.658	0.000	1.63	0.12	2.31	0.006
5.800	0.000	1.64	0.12	2.32	0.006
5.942	0.000	1.65	0.12	2.34	0.006
6.083	0.000	1.66	0.12	2.36	0.006
6.225	0.000	1.68	0.12	2.37	0.006
6.367	0.000	1.68	0.13	2.39	0.006
6.508	0.000	1.70	0.13	2.41	0.006
6.650	0.000	1.71	0.13	2.42	0.006
6.792	0.000	1.73	0.13	2.44	0.006
6.933	0.000	1.73	0.13	2.46	0.006
7.075	0.000	1.75	0.13	2.48	0.006
7.217	0.000	1.76	0.13	2.50	0.006
7.358	0.000	1.78	0.13	2.52	0.006
7.500	0.000	1.79	0.13	2.54	0.006
7.642	0.000	1.81	0.13	2.56	0.006
7.783	0.000	1.82	0.14	2.58	0.006
7.925	0.000	1.84	0.14	2.60	0.006
8.067	0.000	1.85	0.14	2.62	0.006
8.208	0.000	1.87	0.14	2.64	0.006
8.350	0.000	1.88	0.14	2.67	0.006
8.492	0.000	1.90	0.14	2.69	0.006
8.633	0.000	1.92	0.14	2.71	0.006
8.775	0.000	1.94	0.14	2.74	0.007
8.917	0.000	1.95	0.15	2.77	0.007
9.058	0.000	1.98	0.15	2.79	0.007
9.200	0.000	1.99	0.15	2.82	0.007
9.342	0.000	2.02	0.15	2.85	0.007
9.483	0.000	2.03	0.15	2.88	0.007
9.625	0.000	2.06	0.15	2.91	0.007
9.767	0.000	2.07	0.15	2.94	0.007
9.908	0.000	2.11	0.16	2.97	0.007
10.050	0.000	2.12	0.16	3.00	0.007
10.192	0.000	2.15	0.16	3.04	0.007
10.333	0.000	2.17	0.16	3.07	0.007
10.475	0.000	2.21	0.16	3.11	0.007
10.617	0.000	2.22	0.17	3.15	0.008
10.758	0.000	2.26	0.17	3.19	0.008
10.900	0.000	2.28	0.17	3.23	0.008
11.042	0.000	2.32	0.17	3.27	0.008
11.183	0.000	2.35	0.17	3.32	0.008
11.325	0.000	2.39	0.18	3.37	0.008
11.467	0.000	2.41	0.18	3.41	0.008
11.608	0.000	2.46	0.18	3.47	0.008
11.750	0.000	2.49	0.19	3.52	0.008
11.892	0.000	2.54	0.19	3.58	0.009
12.033	0.000	2.57	0.19	3.63	0.009
12.175	0.000	2.94	0.22	3.91	0.010
12.317	0.000	2.97	0.22	4.19	0.010
12.458	0.000	3.03	0.22	4.20	0.011
12.600	0.000	3.07	0.23	4.21	0.011
12.742	0.000	3.14	0.23	4.21	0.012
12.883	0.000	3.18	0.23	4.22	0.012
13.025	0.000	3.26	0.24	4.22	0.013
13.167	0.000	3.30	0.24	4.23	0.014
13.308	0.000	3.40	0.24	4.23	0.015
13.450	0.000	3.45	0.25	4.24	0.016

BLDG1N					
13.592	0.000	3.56	0.25	4.25	0.017
13.733	0.000	3.62	0.26	4.25	0.017
13.875	0.000	3.74	0.26	4.26	0.019
14.017	0.000	3.81	0.27	4.27	0.020
14.158	0.000	3.85	0.27	4.27	0.020
14.300	0.000	3.93	0.27	4.28	0.021
14.442	0.000	4.13	0.29	4.29	0.023
14.583	0.000	4.24	0.29	4.30	0.024
14.725	0.000	4.49	0.31	4.32	0.027
14.867	0.000	4.63	0.32	4.34	0.031
15.008	0.000	4.98	0.36	4.38	0.038
15.150	0.000	5.18	0.40	4.44	0.046
15.292	0.000	5.71	0.44	4.50	0.061
15.433	0.000	5.97	0.47	4.55	0.077
15.575	0.000	5.47	0.48	4.58	0.088
15.717	0.000	6.19	0.51	4.62	0.106
15.858	0.000	8.62	0.59	4.70	0.152
16.000	0.000	11.98	0.69	4.83	0.236
16.142	0.000	37.60	1.02	5.15	0.616
16.283	0.000	7.09	1.03	5.40	0.635
16.425	0.000	4.96	1.03	5.41	0.630
16.567	0.000	5.42	1.03	5.41	0.630
16.708	0.000	4.80	1.02	5.41	0.623
16.850	0.000	4.36	1.01	5.40	0.611
16.992	0.000	4.03	1.00	5.38	0.595
17.133	0.000	3.87	0.99	5.36	0.578
17.275	0.000	3.68	0.97	5.34	0.558
17.417	0.000	3.50	0.96	5.32	0.537
17.558	0.000	3.35	0.94	5.29	0.514
17.700	0.000	3.22	0.92	5.26	0.490
17.842	0.000	3.10	0.90	5.24	0.465
17.983	0.000	3.00	0.88	5.21	0.439
18.125	0.000	2.71	0.86	5.17	0.410
18.267	0.000	2.51	0.84	5.14	0.380
18.408	0.000	2.44	0.81	5.10	0.348
18.550	0.000	2.37	0.77	5.06	0.317
18.692	0.000	2.30	0.74	5.01	0.285
18.833	0.000	2.24	0.71	4.96	0.254
18.975	0.000	2.19	0.67	4.91	0.222
19.117	0.000	2.14	0.64	4.86	0.190
19.258	0.000	2.09	0.60	4.80	0.158
19.400	0.000	2.05	0.55	4.73	0.127
19.542	0.000	2.00	0.50	4.65	0.096
19.683	0.000	1.96	0.45	4.58	0.065
19.825	0.000	1.93	0.35	4.46	0.035
19.967	0.000	1.89	0.20	4.13	0.009
20.108	0.000	1.86	0.14	3.26	0.006
20.250	0.000	1.83	0.14	2.62	0.006
20.392	0.000	1.80	0.13	2.58	0.006
20.533	0.000	1.77	0.13	2.54	0.006
20.675	0.000	1.74	0.13	2.50	0.006
20.817	0.000	1.72	0.13	2.46	0.006
20.958	0.000	1.69	0.13	2.42	0.006
21.100	0.000	1.67	0.12	2.39	0.006
21.242	0.000	1.65	0.12	2.36	0.006
21.383	0.000	1.62	0.12	2.32	0.005
21.525	0.000	1.60	0.12	2.29	0.005
21.667	0.000	1.58	0.12	2.27	0.005
21.808	0.000	1.56	0.12	2.24	0.005
21.950	0.000	1.55	0.12	2.21	0.005
22.092	0.000	1.53	0.11	2.18	0.005
22.233	0.000	1.51	0.11	2.16	0.005
22.375	0.000	1.49	0.11	2.13	0.005
22.517	0.000	1.48	0.11	2.11	0.005
22.658	0.000	1.46	0.11	2.09	0.005
22.800	0.000	1.45	0.11	2.07	0.005
22.942	0.000	1.43	0.11	2.05	0.005

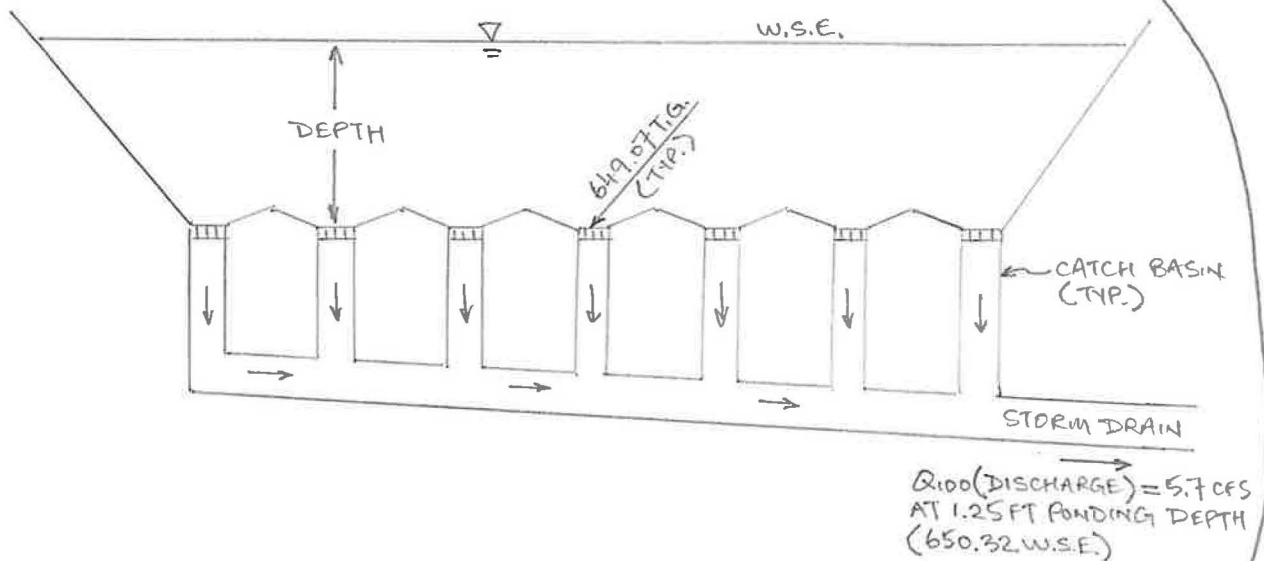
$Q_{100}(\text{DISCHARGE}) = 5.4 \text{ CFS}$
 $\text{DEPTH} = 1.03 \text{ FT}$
 $\text{VOLUME} = 0.635 \text{ AC-FT}$

				BLDG1N	
23.083	0.000	1.42	0.11	2.02	0.005
23.225	0.000	1.40	0.10	2.00	0.005
23.367	0.000	1.39	0.10	1.99	0.005
23.508	0.000	1.38	0.10	1.97	0.005
23.650	0.000	1.36	0.10	1.95	0.005
23.792	0.000	1.35	0.10	1.93	0.005
23.933	0.000	1.34	0.10	1.91	0.005
24.075	0.000	1.33	0.10	1.90	0.004
24.217	0.000	0.00	0.00	0.94	0.000
24.358	0.000	0.00	0.00	0.00	0.000

JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 1 SOUTH TRUCK YARD (NODE 307)

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
649.07	0.00	0				
			346	346	0.01	4.4
649.40	0.33	2100				
			881	1228	0.03	4.7
649.60	0.53	6710				
			1887	3115	0.07	5.0
649.80	0.73	12160				
			3016	6131	0.14	5.3
650.00	0.93	18000				
			4185	10316	0.24	5.6
650.20	1.13	23850				
			5410	15726	0.36	5.8
650.40	1.33	30250				
			6704	22430	0.51	6.0
650.60	1.53	36790				
			8067	30497	0.70	6.2
650.80	1.73	43880				

BUILDING 1 SOUTH TRUCK YARD
 $Q_{100}(\text{RAT. METHOD}) = 27.0 \text{ CFS}$



ORIFICE EQUATION: $Q = 0.6 * \text{AREA} * \sqrt{64.4 * H}$

$H = \text{DEPTH} + 1.00 \text{ FT}$

CROSS-SECTION AREA OF 12" DISCHARGE PIPE
 $= 3.14 * (6/12 \text{ FT})^2$
 $= 0.79 \text{ FT}^2$

e.g. AT ELEVATION 650.00 (DEPTH = 0.93 FT OR $H = 1.93 \text{ FT}$)

$Q(\text{DISCHARGE}) = 0.6 * 0.79 * \sqrt{64.4 * 1.93} = 5.3 \text{ CFS}$

 SMALL AREA UNIT HYDROGRAPH MODEL

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 1 SOUTH TRUCK YARD (NODE 307)

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 8.65
 SOIL-LOSS RATE, Fm, (INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 8.20
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 3.52
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.73

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	7.5	15.0	22.5	30.0
0.01	0.0000	0.00	Q	*	*	*	*
0.15	0.0051	0.90	.Q	*	*	*	*
0.28	0.0153	0.91	.Q	*	*	*	*
0.42	0.0256	0.91	.Q	*	*	*	*
0.56	0.0359	0.92	.Q	*	*	*	*
0.69	0.0462	0.92	.Q	*	*	*	*
0.83	0.0566	0.92	.Q	*	*	*	*
0.97	0.0671	0.93	.Q	*	*	*	*
1.10	0.0776	0.93	.Q	*	*	*	*
1.24	0.0881	0.93	.Q	*	*	*	*
1.38	0.0987	0.94	.Q	*	*	*	*
1.51	0.1093	0.94	.Q	*	*	*	*
1.65	0.1200	0.95	.Q	*	*	*	*
1.79	0.1307	0.95	.Q	*	*	*	*
1.92	0.1415	0.96	.Q	*	*	*	*
2.06	0.1523	0.96	.Q	*	*	*	*
2.20	0.1632	0.97	.Q	*	*	*	*
2.33	0.1741	0.97	.Q	*	*	*	*
2.47	0.1851	0.98	.Q	*	*	*	*

BLDG1S

2.61	0.1962	0.98	.Q	.	.	.	.
2.74	0.2073	0.99	.Q	.	.	.	.
2.88	0.2184	0.99	.Q	.	.	.	.
3.02	0.2296	1.00	.Q	.	.	.	.
3.15	0.2409	1.00	.Q	.	.	.	.
3.29	0.2522	1.01	.Q	.	.	.	.
3.43	0.2636	1.01	.Q	.	.	.	.
3.56	0.2750	1.02	.Q	.	.	.	.
3.70	0.2865	1.02	.Q	.	.	.	.
3.84	0.2981	1.03	.Q	.	.	.	.
3.97	0.3097	1.03	.Q	.	.	.	.
4.11	0.3214	1.04	.Q	.	.	.	.
4.25	0.3331	1.04	.Q	.	.	.	.
4.38	0.3450	1.05	.Q	.	.	.	.
4.52	0.3568	1.05	.Q	.	.	.	.
4.66	0.3688	1.06	.Q	.	.	.	.
4.79	0.3808	1.07	.Q	.	.	.	.
4.93	0.3929	1.08	.Q	.	.	.	.
5.07	0.4051	1.08	.Q	.	.	.	.
5.20	0.4173	1.09	.Q	.	.	.	.
5.34	0.4297	1.09	.Q	.	.	.	.
5.48	0.4420	1.10	.Q	.	.	.	.
5.61	0.4545	1.11	.Q	.	.	.	.
5.75	0.4671	1.12	.Q	.	.	.	.
5.89	0.4797	1.12	.Q	.	.	.	.
6.02	0.4924	1.13	.Q	.	.	.	.
6.16	0.5052	1.14	.Q	.	.	.	.
6.30	0.5181	1.15	.Q	.	.	.	.
6.43	0.5311	1.15	.Q	.	.	.	.
6.57	0.5441	1.16	.Q	.	.	.	.
6.71	0.5573	1.17	.Q	.	.	.	.
6.84	0.5705	1.18	.Q	.	.	.	.
6.98	0.5839	1.18	.Q	.	.	.	.
7.12	0.5973	1.20	.Q	.	.	.	.
7.25	0.6109	1.20	.Q	.	.	.	.
7.39	0.6245	1.21	.Q	.	.	.	.
7.53	0.6383	1.22	.Q	.	.	.	.
7.66	0.6521	1.23	.Q	.	.	.	.
7.80	0.6661	1.24	.Q	.	.	.	.
7.94	0.6802	1.25	.Q	.	.	.	.
8.07	0.6944	1.26	.Q	.	.	.	.
8.21	0.7087	1.27	.Q	.	.	.	.
8.35	0.7231	1.28	.Q	.	.	.	.
8.48	0.7377	1.30	.Q	.	.	.	.
8.62	0.7523	1.30	.Q	.	.	.	.
8.76	0.7672	1.32	.Q	.	.	.	.
8.89	0.7821	1.33	.Q	.	.	.	.
9.03	0.7972	1.34	.Q	.	.	.	.
9.17	0.8124	1.35	.Q	.	.	.	.
9.30	0.8278	1.37	.Q	.	.	.	.
9.44	0.8433	1.38	.Q	.	.	.	.
9.58	0.8590	1.40	.Q	.	.	.	.
9.71	0.8749	1.41	.Q	.	.	.	.
9.85	0.8909	1.43	.Q	.	.	.	.
9.99	0.9071	1.44	.Q	.	.	.	.
10.12	0.9234	1.46	.Q	.	.	.	.
10.26	0.9400	1.47	.Q	.	.	.	.
10.40	0.9567	1.49	.Q	.	.	.	.
10.53	0.9736	1.50	. Q	.	.	.	.
10.67	0.9908	1.53	. Q	.	.	.	.
10.81	1.0081	1.54	. Q	.	.	.	.
10.94	1.0257	1.57	. Q	.	.	.	.
11.08	1.0435	1.58	. Q	.	.	.	.
11.22	1.0615	1.61	. Q	.	.	.	.
11.35	1.0798	1.63	. Q	.	.	.	.
11.49	1.0983	1.66	. Q	.	.	.	.
11.63	1.1171	1.67	. Q	.	.	.	.

BLDG15

11.76	1.1362	1.71	. Q	.	.	.	.
11.90	1.1556	1.72	. Q	.	.	.	.
12.04	1.1753	1.76	. Q	.	.	.	.
12.17	1.1963	1.97	. Q	.	.	.	.
12.31	1.2189	2.03	. Q	.	.	.	.
12.45	1.2420	2.05	. Q	.	.	.	.
12.58	1.2654	2.10	. Q	.	.	.	.
12.72	1.2892	2.12	. Q	.	.	.	.
12.86	1.3134	2.17	. Q	.	.	.	.
12.99	1.3381	2.20	. Q	.	.	.	.
13.13	1.3632	2.25	. Q	.	.	.	.
13.27	1.3889	2.28	. Q	.	.	.	.
13.40	1.4150	2.35	. Q	.	.	.	.
13.54	1.4418	2.38	. Q	.	.	.	.
13.68	1.4691	2.46	. Q	.	.	.	.
13.81	1.4971	2.50	. Q	.	.	.	.
13.95	1.5259	2.59	. Q	.	.	.	.
14.09	1.5554	2.64	. Q	.	.	.	.
14.22	1.5853	2.66	. Q	.	.	.	.
14.36	1.6158	2.72	. Q	.	.	.	.
14.50	1.6473	2.86	. Q	.	.	.	.
14.63	1.6800	2.93	. Q	.	.	.	.
14.77	1.7141	3.11	. Q	.	.	.	.
14.91	1.7498	3.21	. Q	.	.	.	.
15.04	1.7873	3.45	. Q	.	.	.	.
15.18	1.8270	3.59	. Q	.	.	.	.
15.32	1.8696	3.96	. Q	.	.	.	.
15.45	1.9138	3.86	. Q	.	.	.	.
15.59	1.9571	3.80	. Q	.	.	.	.
15.73	2.0029	4.31	. Q	.	.	.	.
15.86	2.0612	6.01	. Q	.	.	.	.
16.00	2.1422	8.34	. .Q	.	.	.	.
16.14	2.3371	26.17	.	.	.	. Q	.
16.27	2.5127	4.91	. Q	.	.	.	.
16.41	2.5599	3.45	. Q	.	.	.	.
16.55	2.6006	3.75	. Q	.	.	.	.
16.68	2.6405	3.32	. Q	.	.	.	.
16.82	2.6763	3.02	. Q	.	.	.	.
16.96	2.7090	2.79	. Q	.	.	.	.
17.09	2.7395	2.61	. Q	.	.	.	.
17.23	2.7686	2.54	. Q	.	.	.	.
17.37	2.7967	2.42	. Q	.	.	.	.
17.50	2.8234	2.32	. Q	.	.	.	.
17.64	2.8491	2.23	. Q	.	.	.	.
17.78	2.8738	2.14	. Q	.	.	.	.
17.91	2.8976	2.07	. Q	.	.	.	.
18.05	2.9206	2.01	. Q	.	.	.	.
18.19	2.9418	1.74	. Q	.	.	.	.
18.32	2.9612	1.69	. Q	.	.	.	.
18.46	2.9800	1.64	. Q	.	.	.	.
18.60	2.9983	1.60	. Q	.	.	.	.
18.73	3.0161	1.55	. Q	.	.	.	.
18.87	3.0334	1.52	. Q	.	.	.	.
19.01	3.0504	1.48	. Q	.	.	.	.
19.14	3.0669	1.45	. Q	.	.	.	.
19.28	3.0831	1.42	. Q	.	.	.	.
19.42	3.0990	1.39	. Q	.	.	.	.
19.55	3.1145	1.36	. Q	.	.	.	.
19.69	3.1297	1.34	. Q	.	.	.	.
19.83	3.1447	1.31	. Q	.	.	.	.
19.96	3.1594	1.29	. Q	.	.	.	.
20.10	3.1738	1.27	. Q	.	.	.	.
20.24	3.1880	1.25	. Q	.	.	.	.
20.37	3.2020	1.23	. Q	.	.	.	.
20.51	3.2157	1.21	. Q	.	.	.	.
20.65	3.2292	1.19	. Q	.	.	.	.
20.78	3.2426	1.17	. Q	.	.	.	.

BLDG1S

20.92	3.2557	1.16	.Q	.	.	.	.
21.06	3.2687	1.14	.Q	.	.	.	.
21.19	3.2815	1.13	.Q	.	.	.	.
21.33	3.2942	1.11	.Q	.	.	.	.
21.47	3.3066	1.10	.Q	.	.	.	.
21.60	3.3189	1.08	.Q	.	.	.	.
21.74	3.3311	1.07	.Q	.	.	.	.
21.88	3.3431	1.06	.Q	.	.	.	.
22.01	3.3550	1.05	.Q	.	.	.	.
22.15	3.3668	1.03	.Q	.	.	.	.
22.29	3.3784	1.02	.Q	.	.	.	.
22.42	3.3899	1.01	.Q	.	.	.	.
22.56	3.4013	1.00	.Q	.	.	.	.
22.70	3.4126	0.99	.Q	.	.	.	.
22.83	3.4237	0.98	.Q	.	.	.	.
22.97	3.4347	0.97	.Q	.	.	.	.
23.11	3.4457	0.96	.Q	.	.	.	.
23.24	3.4565	0.95	.Q	.	.	.	.
23.38	3.4672	0.95	.Q	.	.	.	.
23.52	3.4779	0.94	.Q	.	.	.	.
23.65	3.4884	0.93	.Q	.	.	.	.
23.79	3.4988	0.92	.Q	.	.	.	.
23.93	3.5092	0.91	.Q	.	.	.	.
24.06	3.5194	0.90	.Q	.	.	.	.
24.20	3.5246	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1443.2
10%	180.4
20%	24.6
30%	16.4
40%	8.2
50%	8.2
60%	8.2
70%	8.2
80%	8.2
90%	8.2

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
100-YEAR DETENTION IN BUILDING 1 SOUTH TRUCK YARD (NODE 307)

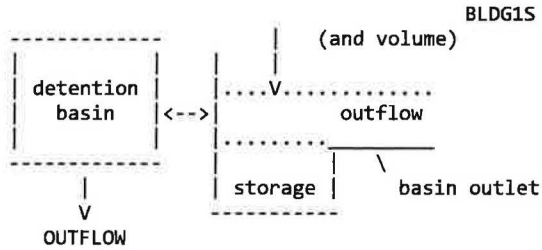
FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 8.200
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

INFLOW

|
|
|
V

__effective depth



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 9

*BASIN-DEPTH	STORAGE	OUTFLOW	**BASIN-DEPTH	STORAGE	OUTFLOW	*
(FEET)	(ACRE-FEET)	(CFS)	(FEET)	(ACRE-FEET)	(CFS)	*
* 0.000	0.000	0.000**	0.330	0.010	4.400*	
* 0.530	0.030	4.700**	0.730	0.070	5.000*	
* 0.930	0.140	5.300**	1.130	0.240	5.600*	
* 1.330	0.360	5.800**	1.530	0.510	6.000*	
* 1.730	0.700	6.200**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.33	-0.01485	0.03485
3	0.53	0.00346	0.05654
4	0.73	0.04176	0.09824
5	0.93	0.11007	0.16993
6	1.13	0.20837	0.27163
7	1.33	0.32725	0.39275
8	1.53	0.47612	0.54388
9	1.73	0.66499	0.73501

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.010	0.000	0.00	0.00	0.00	0.000
0.147	0.000	0.90	0.10	0.64	0.003
0.283	0.000	0.91	0.10	1.29	0.003
0.420	0.000	0.91	0.10	1.30	0.003
0.557	0.000	0.92	0.10	1.30	0.003
0.693	0.000	0.92	0.10	1.31	0.003
0.830	0.000	0.92	0.10	1.31	0.003
0.967	0.000	0.93	0.10	1.32	0.003
1.103	0.000	0.93	0.10	1.32	0.003
1.240	0.000	0.93	0.10	1.33	0.003
1.377	0.000	0.94	0.10	1.34	0.003
1.513	0.000	0.94	0.10	1.34	0.003
1.650	0.000	0.95	0.10	1.35	0.003
1.787	0.000	0.95	0.10	1.35	0.003
1.923	0.000	0.96	0.10	1.36	0.003
2.060	0.000	0.96	0.10	1.37	0.003
2.197	0.000	0.97	0.10	1.37	0.003
2.333	0.000	0.97	0.10	1.38	0.003
2.470	0.000	0.98	0.10	1.39	0.003
2.607	0.000	0.98	0.10	1.39	0.003
2.743	0.000	0.99	0.11	1.40	0.003
2.880	0.000	0.99	0.11	1.41	0.003
3.017	0.000	1.00	0.11	1.41	0.003
3.153	0.000	1.00	0.11	1.42	0.003

				BLDG1S	
3.290	0.000	1.01	0.11	1.43	0.003
3.427	0.000	1.01	0.11	1.44	0.003
3.563	0.000	1.02	0.11	1.44	0.003
3.700	0.000	1.02	0.11	1.45	0.003
3.837	0.000	1.03	0.11	1.46	0.003
3.973	0.000	1.03	0.11	1.47	0.003
4.110	0.000	1.04	0.11	1.48	0.003
4.247	0.000	1.04	0.11	1.48	0.003
4.383	0.000	1.05	0.11	1.49	0.003
4.520	0.000	1.05	0.11	1.50	0.003
4.657	0.000	1.06	0.11	1.51	0.003
4.793	0.000	1.07	0.11	1.52	0.003
4.930	0.000	1.08	0.12	1.53	0.003
5.067	0.000	1.08	0.12	1.54	0.003
5.203	0.000	1.09	0.12	1.55	0.004
5.340	0.000	1.09	0.12	1.56	0.004
5.477	0.000	1.10	0.12	1.56	0.004
5.613	0.000	1.11	0.12	1.57	0.004
5.750	0.000	1.12	0.12	1.58	0.004
5.887	0.000	1.12	0.12	1.59	0.004
6.023	0.000	1.13	0.12	1.61	0.004
6.160	0.000	1.14	0.12	1.62	0.004
6.297	0.000	1.15	0.12	1.63	0.004
6.433	0.000	1.15	0.12	1.64	0.004
6.570	0.000	1.16	0.12	1.65	0.004
6.707	0.000	1.17	0.12	1.66	0.004
6.843	0.000	1.18	0.13	1.67	0.004
6.980	0.000	1.18	0.13	1.68	0.004
7.117	0.000	1.20	0.13	1.70	0.004
7.253	0.000	1.20	0.13	1.71	0.004
7.390	0.000	1.21	0.13	1.72	0.004
7.527	0.000	1.22	0.13	1.74	0.004
7.663	0.000	1.23	0.13	1.75	0.004
7.800	0.000	1.24	0.13	1.76	0.004
7.937	0.000	1.25	0.13	1.78	0.004
8.073	0.000	1.26	0.13	1.79	0.004
8.210	0.000	1.27	0.14	1.81	0.004
8.347	0.000	1.28	0.14	1.82	0.004
8.483	0.000	1.30	0.14	1.84	0.004
8.620	0.000	1.30	0.14	1.85	0.004
8.757	0.000	1.32	0.14	1.87	0.004
8.893	0.000	1.33	0.14	1.89	0.004
9.030	0.000	1.34	0.14	1.91	0.004
9.167	0.000	1.35	0.14	1.92	0.004
9.303	0.000	1.37	0.15	1.94	0.004
9.440	0.000	1.38	0.15	1.96	0.004
9.577	0.000	1.40	0.15	1.98	0.005
9.713	0.000	1.41	0.15	2.00	0.005
9.850	0.000	1.43	0.15	2.02	0.005
9.987	0.000	1.44	0.15	2.04	0.005
10.123	0.000	1.46	0.16	2.07	0.005
10.260	0.000	1.47	0.16	2.09	0.005
10.397	0.000	1.49	0.16	2.11	0.005
10.533	0.000	1.50	0.16	2.14	0.005
10.670	0.000	1.53	0.16	2.16	0.005
10.807	0.000	1.54	0.16	2.19	0.005
10.943	0.000	1.57	0.17	2.22	0.005
11.080	0.000	1.58	0.17	2.25	0.005
11.217	0.000	1.61	0.17	2.28	0.005
11.353	0.000	1.63	0.17	2.31	0.005
11.490	0.000	1.66	0.18	2.34	0.005
11.627	0.000	1.67	0.18	2.37	0.005
11.763	0.000	1.71	0.18	2.41	0.006
11.900	0.000	1.72	0.18	2.45	0.006
12.037	0.000	1.76	0.19	2.49	0.006
12.173	0.000	1.97	0.21	2.66	0.006
12.310	0.000	2.03	0.22	2.85	0.007

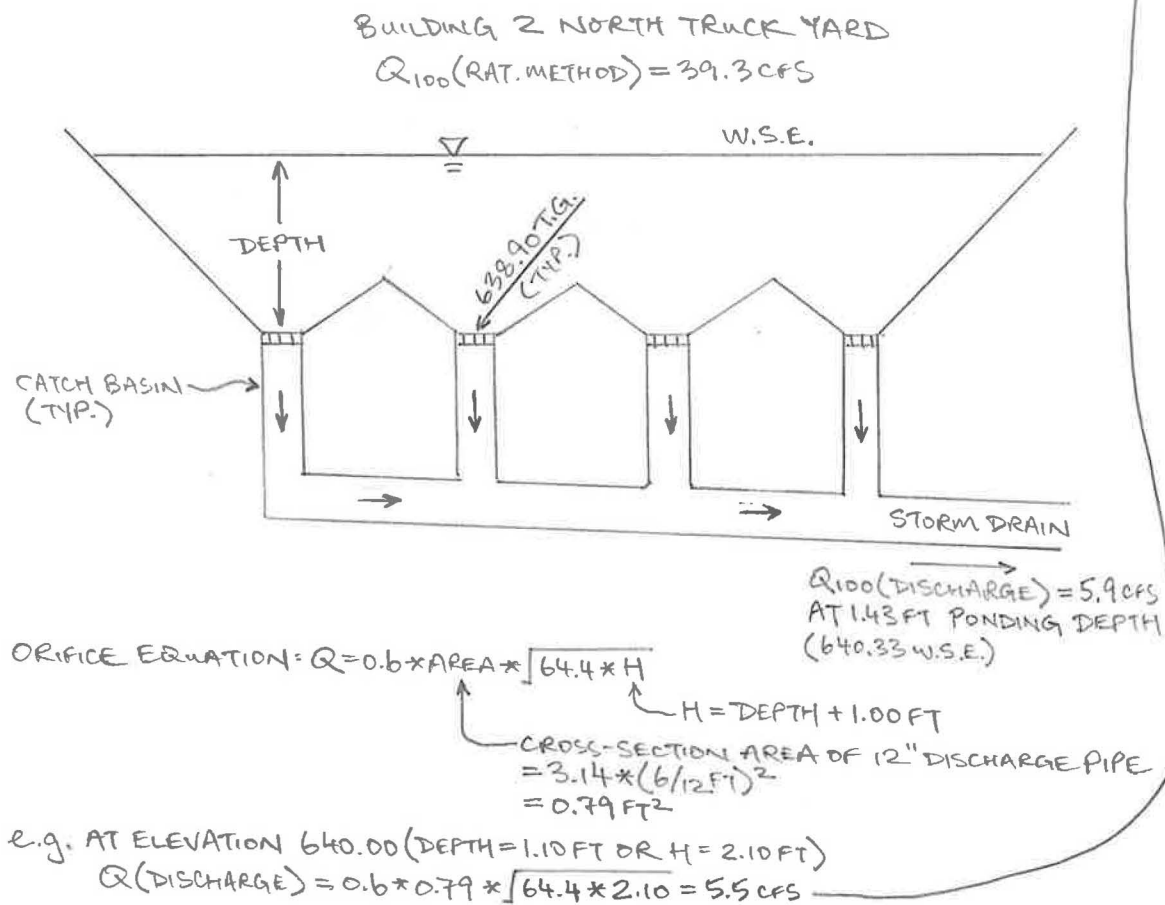
BLDG1S					
12.447	0.000	2.05	0.22	2.91	0.007
12.583	0.000	2.10	0.22	2.96	0.007
12.720	0.000	2.12	0.23	3.01	0.007
12.857	0.000	2.17	0.23	3.06	0.007
12.993	0.000	2.20	0.24	3.11	0.007
13.130	0.000	2.25	0.24	3.17	0.007
13.267	0.000	2.28	0.24	3.24	0.007
13.403	0.000	2.35	0.25	3.30	0.008
13.540	0.000	2.38	0.26	3.38	0.008
13.677	0.000	2.46	0.26	3.45	0.008
13.813	0.000	2.50	0.27	3.54	0.008
13.950	0.000	2.59	0.28	3.63	0.008
14.087	0.000	2.64	0.28	3.73	0.009
14.223	0.000	2.66	0.28	3.78	0.009
14.360	0.000	2.72	0.29	3.84	0.009
14.497	0.000	2.86	0.31	3.98	0.009
14.633	0.000	2.93	0.31	4.13	0.010
14.770	0.000	3.11	0.33	4.29	0.010
14.907	0.000	3.21	0.34	4.41	0.011
15.043	0.000	3.45	0.37	4.44	0.014
15.180	0.000	3.59	0.38	4.47	0.015
15.317	0.000	3.96	0.42	4.51	0.019
15.453	0.000	3.86	0.41	4.53	0.018
15.590	0.000	3.80	0.40	4.52	0.017
15.727	0.000	4.31	0.46	4.55	0.023
15.863	0.000	6.01	0.58	4.69	0.041
16.000	0.000	8.34	0.76	4.91	0.080
16.137	0.000	26.17	1.25	5.38	0.314
16.273	0.000	4.91	1.24	5.72	0.305
16.410	0.000	3.45	1.20	5.69	0.280
16.547	0.000	3.75	1.16	5.65	0.259
16.683	0.000	3.32	1.12	5.60	0.233
16.820	0.000	3.02	1.06	5.54	0.204
16.957	0.000	2.79	1.00	5.45	0.174
17.093	0.000	2.61	0.94	5.36	0.143
17.230	0.000	2.54	0.85	5.25	0.113
17.367	0.000	2.42	0.77	5.12	0.082
17.503	0.000	2.32	0.64	4.96	0.052
17.640	0.000	2.23	0.47	4.74	0.024
17.777	0.000	2.14	0.23	3.83	0.007
17.913	0.000	2.07	0.22	3.01	0.007
18.050	0.000	2.01	0.21	2.91	0.007
18.187	0.000	1.74	0.19	2.68	0.006
18.323	0.000	1.69	0.18	2.45	0.005
18.460	0.000	1.64	0.18	2.37	0.005
18.597	0.000	1.60	0.17	2.31	0.005
18.733	0.000	1.55	0.17	2.25	0.005
18.870	0.000	1.52	0.16	2.19	0.005
19.007	0.000	1.48	0.16	2.14	0.005
19.143	0.000	1.45	0.15	2.09	0.005
19.280	0.000	1.42	0.15	2.04	0.005
19.417	0.000	1.39	0.15	2.00	0.005
19.553	0.000	1.36	0.15	1.96	0.004
19.690	0.000	1.34	0.14	1.92	0.004
19.827	0.000	1.31	0.14	1.89	0.004
19.963	0.000	1.29	0.14	1.85	0.004
20.100	0.000	1.27	0.14	1.82	0.004
20.237	0.000	1.25	0.13	1.79	0.004
20.373	0.000	1.23	0.13	1.76	0.004
20.510	0.000	1.21	0.13	1.74	0.004
20.647	0.000	1.19	0.13	1.71	0.004
20.783	0.000	1.17	0.13	1.68	0.004
20.920	0.000	1.16	0.12	1.66	0.004
21.057	0.000	1.14	0.12	1.64	0.004
21.193	0.000	1.13	0.12	1.62	0.004
21.330	0.000	1.11	0.12	1.60	0.004
21.467	0.000	1.10	0.12	1.57	0.004

← $Q_{100}(\text{DISCHARGE}) = 5.7 \text{ CFS}$
 $\text{DEPTH} = 1.25 \text{ FT}$
 $\text{VOLUME} = 0.314 \text{ AC} \cdot \text{FT}$

				BLDG1S	
21.603	0.000	1.08	0.12	1.56	0.004
21.740	0.000	1.07	0.11	1.54	0.003
21.877	0.000	1.06	0.11	1.52	0.003
22.013	0.000	1.05	0.11	1.50	0.003
22.150	0.000	1.03	0.11	1.48	0.003
22.287	0.000	1.02	0.11	1.47	0.003
22.423	0.000	1.01	0.11	1.45	0.003
22.560	0.000	1.00	0.11	1.44	0.003
22.697	0.000	0.99	0.11	1.42	0.003
22.833	0.000	0.98	0.11	1.41	0.003
22.970	0.000	0.97	0.10	1.39	0.003
23.107	0.000	0.96	0.10	1.38	0.003
23.243	0.000	0.95	0.10	1.37	0.003
23.380	0.000	0.95	0.10	1.35	0.003
23.517	0.000	0.94	0.10	1.34	0.003
23.653	0.000	0.93	0.10	1.33	0.003
23.790	0.000	0.92	0.10	1.32	0.003
23.927	0.000	0.91	0.10	1.31	0.003
24.063	0.000	0.90	0.10	1.30	0.003
24.200	0.000	0.00	0.00	0.65	0.000
24.337	0.000	0.00	0.00	0.00	0.000

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 2 NORTH TRUCK YARD (NODE 413)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
638.90	0.00	0				
			35	35	0.00	4.0
639.00	0.10	700				
			803	838	0.02	4.3
639.20	0.30	7330				
			2938	3776	0.09	4.6
639.40	0.50	22050				
			6114	9890	0.23	4.9
639.60	0.70	39090				
			9450	19340	0.44	5.2
639.80	0.90	55410				
			12248	31588	0.73	5.5
640.00	1.10	67070				
			14212	45800	1.05	5.8
640.20	1.30	75050				
			15794	61594	1.41	6.0
640.40	1.50	82890				
			17370	78964	1.81	6.3
640.60	1.70	90810				



 SMALL AREA UNIT HYDROGRAPH MODEL

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Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 2 NORTH TRUCK YARD (NODE 413)

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 18.20
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 15.20
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 7.42
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 1.53

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	10.0	20.0	30.0	40.0
0.04	0.0000	0.00	Q	.	.	.	.
0.29	0.0199	1.90	.Q	.	.	.	.
0.55	0.0599	1.92	.Q	.	.	.	.
0.80	0.1002	1.93	.Q	.	.	.	.
1.05	0.1409	1.95	.Q	.	.	.	.
1.31	0.1818	1.96	.Q	.	.	.	.
1.56	0.2231	1.98	.Q	.	.	.	.
1.81	0.2648	2.00	.Q	.	.	.	.
2.07	0.3068	2.02	. Q	.	.	.	.
2.32	0.3492	2.03	. Q	.	.	.	.
2.57	0.3920	2.05	. Q	.	.	.	.
2.83	0.4351	2.07	. Q	.	.	.	.
3.08	0.4787	2.09	. Q	.	.	.	.
3.33	0.5226	2.11	. Q	.	.	.	.
3.59	0.5670	2.13	. Q	.	.	.	.
3.84	0.6119	2.15	. Q	.	.	.	.
4.09	0.6571	2.18	. Q	.	.	.	.
4.35	0.7029	2.19	. Q	.	.	.	.
4.60	0.7491	2.22	. Q	.	.	.	.

BLDG2N

4.85	0.7958	2.24	. Q	.	.	.	.
5.11	0.8430	2.27	. Q	.	.	.	.
5.36	0.8908	2.29	. Q	.	.	.	.
5.61	0.9391	2.32	. Q	.	.	.	.
5.87	0.9880	2.34	. Q	.	.	.	.
6.12	1.0374	2.38	. Q	.	.	.	.
6.37	1.0875	2.40	. Q	.	.	.	.
6.63	1.1382	2.44	. Q	.	.	.	.
6.88	1.1895	2.46	. Q	.	.	.	.
7.13	1.2416	2.51	. Q	.	.	.	.
7.39	1.2943	2.53	. Q	.	.	.	.
7.64	1.3478	2.58	. Q	.	.	.	.
7.89	1.4021	2.60	. Q	.	.	.	.
8.15	1.4572	2.66	. Q	.	.	.	.
8.40	1.5131	2.69	. Q	.	.	.	.
8.65	1.5700	2.74	. Q	.	.	.	.
8.91	1.6277	2.77	. Q	.	.	.	.
9.16	1.6865	2.84	. Q	.	.	.	.
9.41	1.7463	2.87	. Q	.	.	.	.
9.67	1.8072	2.94	. Q	.	.	.	.
9.92	1.8692	2.98	. Q	.	.	.	.
10.17	1.9325	3.06	. Q	.	.	.	.
10.43	1.9971	3.11	. Q	.	.	.	.
10.68	2.0631	3.20	. Q	.	.	.	.
10.93	2.1305	3.25	. Q	.	.	.	.
11.19	2.1996	3.35	. Q	.	.	.	.
11.44	2.2704	3.41	. Q	.	.	.	.
11.69	2.3431	3.53	. Q	.	.	.	.
11.95	2.4178	3.60	. Q	.	.	.	.
12.20	2.4978	4.05	. Q	.	.	.	.
12.45	2.5848	4.26	. Q	.	.	.	.
12.71	2.6759	4.44	. Q	.	.	.	.
12.96	2.7697	4.53	. Q	.	.	.	.
13.21	2.8669	4.75	. Q	.	.	.	.
13.47	2.9675	4.87	. Q	.	.	.	.
13.72	3.0723	5.14	. Q	.	.	.	.
13.97	3.1817	5.30	. Q	.	.	.	.
14.23	3.2952	5.53	. Q	.	.	.	.
14.48	3.4131	5.74	. Q	.	.	.	.
14.73	3.5392	6.30	. Q	.	.	.	.
14.99	3.6749	6.66	. Q	.	.	.	.
15.24	3.8247	7.65	. Q	.	.	.	.
15.49	3.9929	8.41	. Q	.	.	.	.
15.75	4.1747	8.95	. Q	.	.	.	.
16.00	4.3939	11.99	. Q	.	.	.	.
16.25	4.9172	38.01	.	.	.	Q	.
16.51	5.3924	7.39	. Q	.	.	.	.
16.76	5.5442	7.10	. Q	.	.	.	.
17.01	5.6813	6.00	. Q	.	.	.	.
17.27	5.8015	5.48	. Q	.	.	.	.
17.52	5.9112	5.00	. Q	.	.	.	.
17.77	6.0121	4.64	. Q	.	.	.	.
18.03	6.1061	4.35	. Q	.	.	.	.
18.28	6.1900	3.67	. Q	.	.	.	.
18.53	6.2648	3.47	. Q	.	.	.	.
18.79	6.3356	3.30	. Q	.	.	.	.
19.04	6.4031	3.15	. Q	.	.	.	.
19.29	6.4678	3.02	. Q	.	.	.	.
19.55	6.5298	2.91	. Q	.	.	.	.
19.80	6.5896	2.81	. Q	.	.	.	.
20.05	6.6474	2.71	. Q	.	.	.	.
20.31	6.7034	2.63	. Q	.	.	.	.
20.56	6.7577	2.56	. Q	.	.	.	.
20.81	6.8104	2.49	. Q	.	.	.	.
21.07	6.8618	2.42	. Q	.	.	.	.
21.32	6.9119	2.36	. Q	.	.	.	.
21.57	6.9607	2.31	. Q	.	.	.	.

BLDG2N

21.83	7.0085	2.26	. Q	.	.	.	.
22.08	7.0552	2.21	. Q	.	.	.	.
22.33	7.1010	2.16	. Q	.	.	.	.
22.59	7.1458	2.12	. Q	.	.	.	.
22.84	7.1898	2.08	. Q	.	.	.	.
23.09	7.2329	2.04	. Q	.	.	.	.
23.35	7.2753	2.01	. Q	.	.	.	.
23.60	7.3170	1.97	.Q	.	.	.	.
23.85	7.3580	1.94	.Q	.	.	.	.
24.11	7.3983	1.91	.Q	.	.	.	.
24.36	7.4183	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

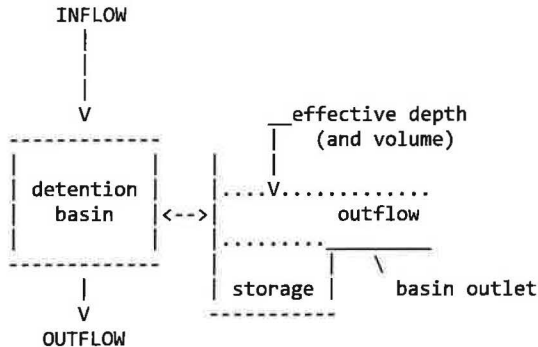
Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1444.0
10%	364.8
20%	76.0
30%	30.4
40%	15.2
50%	15.2
60%	15.2
70%	15.2
80%	15.2
90%	15.2

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
100-YEAR DETENTION IN BUILDING 2 NORTH TRUCK YARD (NODE 413)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 15.200
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 10

*BASIN-DEPTH STORAGE OUTFLOW **BASIN-DEPTH STORAGE OUTFLOW *

BLDG2N								
*	(FEET)	(ACRE-FEET)	(CFS)	**	(FEET)	(ACRE-FEET)	(CFS)	*
*	0.000	0.000	0.000**		0.100	0.010	4.000*	
*	0.300	0.020	4.300**		0.500	0.090	4.600*	
*	0.700	0.230	4.900**		0.900	0.440	5.200*	
*	1.100	0.730	5.500**		1.300	1.050	5.800*	
*	1.500	1.410	6.000**		1.700	1.810	6.300*	

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.10	-0.03187	0.05187
3	0.30	-0.02501	0.06501
4	0.50	0.04185	0.13815
5	0.70	0.17871	0.28129
6	0.90	0.38556	0.49444
7	1.10	0.67242	0.78758
8	1.30	0.98928	1.11072
9	1.50	1.34719	1.47281
10	1.70	1.74405	1.87595

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

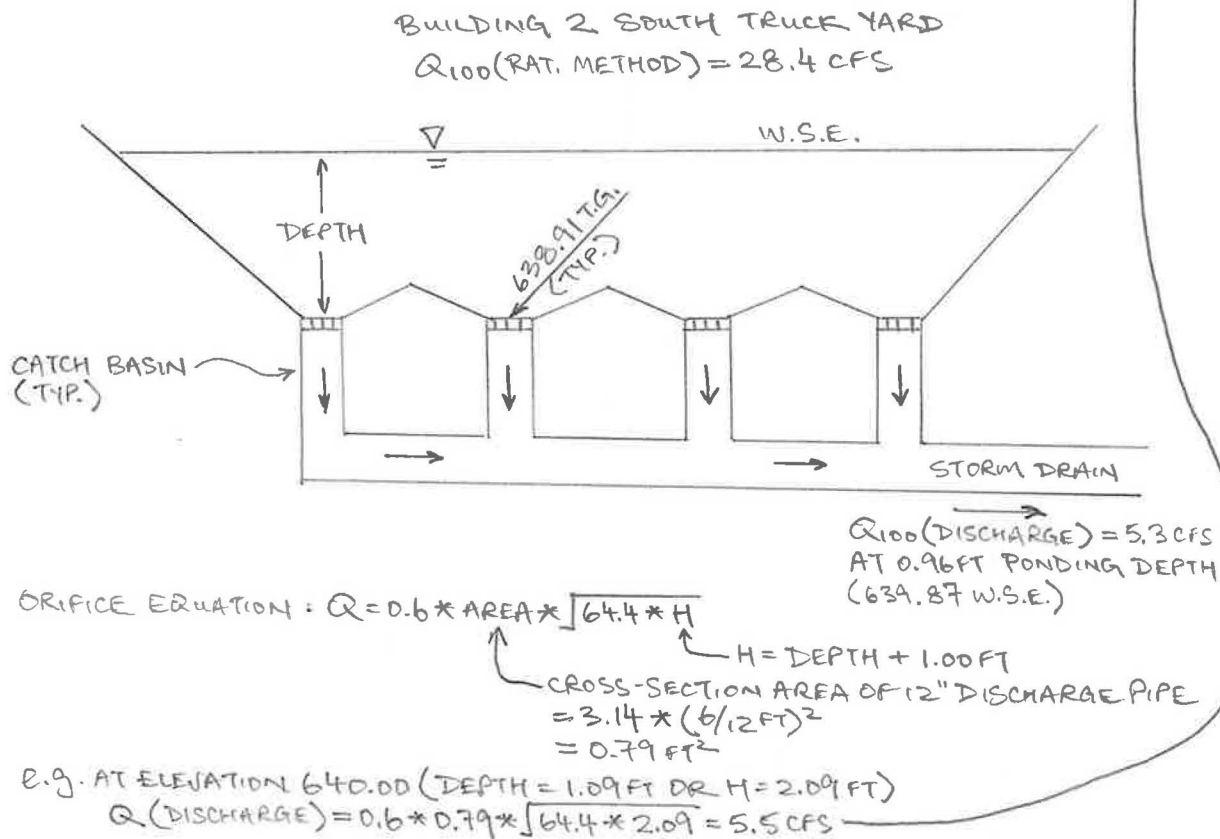
TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.040	0.000	0.00	0.00	0.00	0.000
0.293	0.000	1.90	0.08	1.54	0.008
0.547	0.000	1.92	0.08	3.09	0.008
0.800	0.000	1.93	0.08	3.11	0.008
1.053	0.000	1.95	0.08	3.13	0.008
1.307	0.000	1.96	0.08	3.16	0.008
1.560	0.000	1.98	0.08	3.19	0.008
1.813	0.000	2.00	0.08	3.21	0.008
2.067	0.000	2.02	0.08	3.24	0.008
2.320	0.000	2.03	0.08	3.27	0.008
2.573	0.000	2.05	0.08	3.30	0.008
2.827	0.000	2.07	0.08	3.33	0.008
3.080	0.000	2.09	0.08	3.36	0.008
3.333	0.000	2.11	0.09	3.39	0.009
3.587	0.000	2.13	0.09	3.42	0.009
3.840	0.000	2.15	0.09	3.46	0.009
4.093	0.000	2.18	0.09	3.49	0.009
4.347	0.000	2.19	0.09	3.53	0.009
4.600	0.000	2.22	0.09	3.56	0.009
4.853	0.000	2.24	0.09	3.60	0.009
5.107	0.000	2.27	0.09	3.64	0.009
5.360	0.000	2.29	0.09	3.68	0.009
5.613	0.000	2.32	0.09	3.72	0.009
5.867	0.000	2.34	0.09	3.77	0.009
6.120	0.000	2.38	0.10	3.81	0.010
6.373	0.000	2.40	0.10	3.86	0.010
6.627	0.000	2.44	0.10	3.91	0.010
6.880	0.000	2.46	0.10	3.96	0.010
7.133	0.000	2.51	0.11	4.00	0.010
7.387	0.000	2.53	0.12	4.02	0.011
7.640	0.000	2.58	0.13	4.04	0.012
7.893	0.000	2.60	0.14	4.05	0.012
8.147	0.000	2.66	0.16	4.07	0.013
8.400	0.000	2.69	0.17	4.09	0.013
8.653	0.000	2.74	0.18	4.11	0.014
8.907	0.000	2.77	0.19	4.13	0.015
9.160	0.000	2.84	0.22	4.16	0.016

BLDG2N					
9.413	0.000	2.87	0.23	4.18	0.016
9.667	0.000	2.94	0.25	4.21	0.017
9.920	0.000	2.98	0.26	4.23	0.018
10.173	0.000	3.06	0.29	4.26	0.019
10.427	0.000	3.11	0.30	4.29	0.020
10.680	0.000	3.20	0.31	4.30	0.022
10.933	0.000	3.25	0.31	4.31	0.023
11.187	0.000	3.35	0.31	4.32	0.025
11.440	0.000	3.41	0.32	4.32	0.026
11.693	0.000	3.53	0.32	4.33	0.029
11.947	0.000	3.60	0.33	4.34	0.030
12.200	0.000	4.05	0.35	4.36	0.039
12.453	0.000	4.26	0.37	4.39	0.043
12.707	0.000	4.44	0.38	4.41	0.047
12.960	0.000	4.53	0.38	4.42	0.049
13.213	0.000	4.75	0.40	4.44	0.055
13.467	0.000	4.87	0.43	4.47	0.064
13.720	0.000	5.14	0.46	4.52	0.077
13.973	0.000	5.30	0.50	4.57	0.092
14.227	0.000	5.53	0.53	4.63	0.111
14.480	0.000	5.74	0.56	4.67	0.134
14.733	0.000	6.30	0.61	4.73	0.167
14.987	0.000	6.66	0.66	4.81	0.205
15.240	0.000	7.65	0.73	4.90	0.263
15.493	0.000	8.41	0.80	5.00	0.335
15.747	0.000	8.95	0.88	5.11	0.415
16.000	0.000	11.99	0.98	5.24	0.556
16.253	0.000	38.01	1.40	5.61	1.234
16.507	0.000	7.39	1.42	5.91	1.266
16.760	0.000	7.10	1.43	5.93	1.290
17.013	0.000	6.00	1.43	5.93	1.291
17.267	0.000	5.48	1.43	5.93	1.282
17.520	0.000	5.00	1.42	5.92	1.263
17.773	0.000	4.64	1.40	5.91	1.236
18.027	0.000	4.35	1.39	5.89	1.204
18.280	0.000	3.67	1.36	5.87	1.157
18.533	0.000	3.47	1.33	5.85	1.108
18.787	0.000	3.30	1.30	5.82	1.055
19.040	0.000	3.15	1.27	5.78	1.000
19.293	0.000	3.02	1.23	5.73	0.943
19.547	0.000	2.91	1.20	5.67	0.886
19.800	0.000	2.81	1.16	5.62	0.827
20.053	0.000	2.71	1.12	5.56	0.767
20.307	0.000	2.63	1.08	5.51	0.707
20.560	0.000	2.56	1.04	5.44	0.646
20.813	0.000	2.49	1.00	5.38	0.586
21.067	0.000	2.42	0.96	5.32	0.525
21.320	0.000	2.36	0.92	5.26	0.464
21.573	0.000	2.31	0.87	5.19	0.404
21.827	0.000	2.26	0.81	5.11	0.344
22.080	0.000	2.21	0.75	5.02	0.285
22.333	0.000	2.16	0.70	4.94	0.227
22.587	0.000	2.12	0.62	4.83	0.171
22.840	0.000	2.08	0.54	4.71	0.115
23.093	0.000	2.04	0.42	4.57	0.063
23.347	0.000	2.01	0.19	4.31	0.014
23.600	0.000	1.97	0.08	3.66	0.008
23.853	0.000	1.94	0.08	3.16	0.008
24.107	0.000	1.91	0.08	3.11	0.008
24.360	0.000	0.00	0.00	1.54	0.000
24.613	0.000	0.00	0.00	0.00	0.000

$Q_{100}(\text{DISCHARGE}) = 5.9 \text{ CFS}$
 $\text{DEPTH} = 1.43 \text{ FT}$
 $\text{VOLUME} = 1.291 \text{ AC-FT}$

JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 2 SOUTH TRUCK YARD (NODE 504)

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
638.91	0.00	0				
			30	30	0.00	4.0
639.00	0.09	670	798	828	0.02	4.3
639.20	0.29	7310	2977	3805	0.09	4.6
639.40	0.49	22460	6217	10022	0.23	4.9
639.60	0.69	39710	9592	19614	0.45	5.2
639.80	0.89	56210	12414	32028	0.74	5.5
640.00	1.09	67930	14429	46457	1.07	5.8
640.20	1.29	76360	16156	62613	1.44	6.0
640.40	1.49	85200	18005	80618	1.85	6.2
640.60	1.69	94850	13779	94398	2.17	6.4
640.74	1.83	102000				



 SMALL AREA UNIT HYDROGRAPH MODEL

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

Problem Descriptions:

JOB #3635 EUDLIC & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 2 SOUTH TRUCK YARD (NODE 504)

 RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 11.65
 SOIL-LOSS RATE, F_m (INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 12.30
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 4.76
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.97

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	7.5	15.0	22.5	30.0
0.01	0.0000	0.00	Q	*	*	*	*
0.21	0.0103	1.22	.Q	*	*	*	*
0.42	0.0310	1.22	.Q	*	*	*	*
0.62	0.0518	1.23	.Q	*	*	*	*
0.83	0.0727	1.24	.Q	*	*	*	*
1.03	0.0938	1.25	.Q	*	*	*	*
1.24	0.1150	1.26	.Q	*	*	*	*
1.44	0.1364	1.27	.Q	*	*	*	*
1.65	0.1579	1.27	.Q	*	*	*	*
1.85	0.1796	1.28	.Q	*	*	*	*
2.06	0.2014	1.29	.Q	*	*	*	*
2.26	0.2233	1.30	.Q	*	*	*	*
2.47	0.2455	1.31	.Q	*	*	*	*
2.67	0.2677	1.32	.Q	*	*	*	*
2.88	0.2902	1.33	.Q	*	*	*	*
3.08	0.3128	1.34	.Q	*	*	*	*
3.29	0.3356	1.35	.Q	*	*	*	*
3.49	0.3586	1.36	.Q	*	*	*	*
3.70	0.3817	1.37	.Q	*	*	*	*

BLDG25

3.90	0.4051	1.38	.Q	.	.	.	.
4.11	0.4286	1.39	.Q	.	.	.	.
4.32	0.4523	1.41	.Q	.	.	.	.
4.52	0.4762	1.42	.Q	.	.	.	.
4.72	0.5004	1.43	.Q	.	.	.	.
4.93	0.5247	1.44	.Q	.	.	.	.
5.13	0.5493	1.46	.Q	.	.	.	.
5.34	0.5741	1.47	.Q	.	.	.	.
5.54	0.5991	1.49	.Q	.	.	.	.
5.75	0.6243	1.50	.Q	.	.	.	.
5.95	0.6498	1.51	. Q	.	.	.	.
6.16	0.6756	1.52	. Q	.	.	.	.
6.36	0.7016	1.55	. Q	.	.	.	.
6.57	0.7278	1.56	. Q	.	.	.	.
6.78	0.7544	1.58	. Q	.	.	.	.
6.98	0.7812	1.59	. Q	.	.	.	.
7.18	0.8083	1.61	. Q	.	.	.	.
7.39	0.8358	1.62	. Q	.	.	.	.
7.59	0.8635	1.65	. Q	.	.	.	.
7.80	0.8916	1.66	. Q	.	.	.	.
8.01	0.9200	1.69	. Q	.	.	.	.
8.21	0.9487	1.70	. Q	.	.	.	.
8.41	0.9778	1.73	. Q	.	.	.	.
8.62	1.0073	1.75	. Q	.	.	.	.
8.82	1.0372	1.78	. Q	.	.	.	.
9.03	1.0675	1.80	. Q	.	.	.	.
9.23	1.0982	1.83	. Q	.	.	.	.
9.44	1.1294	1.85	. Q	.	.	.	.
9.65	1.1610	1.89	. Q	.	.	.	.
9.85	1.1932	1.91	. Q	.	.	.	.
10.05	1.2258	1.95	. Q	.	.	.	.
10.26	1.2590	1.97	. Q	.	.	.	.
10.47	1.2927	2.01	. Q	.	.	.	.
10.67	1.3271	2.04	. Q	.	.	.	.
10.88	1.3620	2.09	. Q	.	.	.	.
11.08	1.3977	2.12	. Q	.	.	.	.
11.28	1.4340	2.17	. Q	.	.	.	.
11.49	1.4711	2.20	. Q	.	.	.	.
11.70	1.5090	2.27	. Q	.	.	.	.
11.90	1.5478	2.30	. Q	.	.	.	.
12.10	1.5881	2.45	. Q	.	.	.	.
12.31	1.6318	2.70	. Q	.	.	.	.
12.52	1.6782	2.79	. Q	.	.	.	.
12.72	1.7258	2.83	. Q	.	.	.	.
12.93	1.7746	2.93	. Q	.	.	.	.
13.13	1.8248	2.99	. Q	.	.	.	.
13.34	1.8764	3.11	. Q	.	.	.	.
13.54	1.9297	3.18	. Q	.	.	.	.
13.74	1.9847	3.33	. Q	.	.	.	.
13.95	2.0418	3.41	. Q	.	.	.	.
14.15	2.1006	3.53	. Q	.	.	.	.
14.36	2.1611	3.61	. Q	.	.	.	.
14.57	2.2245	3.87	. Q	.	.	.	.
14.77	2.2915	4.03	. Q	.	.	.	.
14.98	2.3632	4.43	. Q	.	.	.	.
15.18	2.4404	4.69	. Q	.	.	.	.
15.38	2.5260	5.41	. Q	.	.	.	.
15.59	2.6118	4.71	. Q	.	.	.	.
15.80	2.7060	6.41	. Q	.	.	.	.
16.00	2.8345	8.75	. Q	.	.	.	.
16.20	3.1426	27.63	.	.	.	Q	.
16.41	3.4215	5.28	. Q	.	.	.	.
16.61	3.5085	5.00	. Q	.	.	.	.
16.82	3.5866	4.22	. Q	.	.	.	.
17.02	3.6539	3.73	. Q	.	.	.	.
17.23	3.7152	3.50	. Q	.	.	.	.
17.43	3.7724	3.25	. Q	.	.	.	.

BLDG2S

17.64	3.8257	3.05	. Q	.	.	.	.
17.84	3.8759	2.88	. Q	.	.	.	.
18.05	3.9236	2.74	. Q	.	.	.	.
18.26	3.9666	2.34	. Q	.	.	.	.
18.46	4.0054	2.24	. Q	.	.	.	.
18.67	4.0425	2.14	. Q	.	.	.	.
18.87	4.0782	2.06	. Q	.	.	.	.
19.08	4.1125	1.99	. Q	.	.	.	.
19.28	4.1457	1.93	. Q	.	.	.	.
19.48	4.1779	1.87	. Q	.	.	.	.
19.69	4.2090	1.81	. Q	.	.	.	.
19.89	4.2393	1.76	. Q	.	.	.	.
20.10	4.2688	1.72	. Q	.	.	.	.
20.31	4.2976	1.68	. Q	.	.	.	.
20.51	4.3257	1.64	. Q	.	.	.	.
20.72	4.3531	1.60	. Q	.	.	.	.
20.92	4.3799	1.57	. Q	.	.	.	.
21.12	4.4062	1.53	. Q	.	.	.	.
21.33	4.4319	1.50	. Q	.	.	.	.
21.53	4.4572	1.48	. Q	.	.	.	.
21.74	4.4820	1.45	. Q	.	.	.	.
21.94	4.5063	1.42	. Q	.	.	.	.
22.15	4.5303	1.40	. Q	.	.	.	.
22.36	4.5538	1.38	. Q	.	.	.	.
22.56	4.5769	1.36	. Q	.	.	.	.
22.77	4.5997	1.33	. Q	.	.	.	.
22.97	4.6222	1.32	. Q	.	.	.	.
23.17	4.6443	1.30	. Q	.	.	.	.
23.38	4.6661	1.28	. Q	.	.	.	.
23.58	4.6876	1.26	. Q	.	.	.	.
23.79	4.7088	1.24	. Q	.	.	.	.
23.99	4.7298	1.23	. Q	.	.	.	.
24.20	4.7505	1.22	. Q	.	.	.	.
24.41	4.7608	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1451.4
10%	332.1
20%	36.9
30%	24.6
40%	12.3
50%	12.3
60%	12.3
70%	12.3
80%	12.3
90%	12.3

Problem Descriptions:
 JOB #3635 EUDLIC & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 2 SOUTH TRUCK YARD (NODE 504)

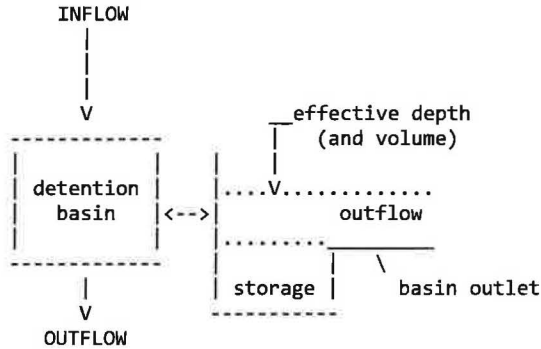
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FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 12.300
 DEAD STORAGE(AF) = 0.00

BLDG25

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
 ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 11

*BASIN-DEPTH	STORAGE	OUTFLOW	**BASIN-DEPTH	STORAGE	OUTFLOW	*
(FEET)	(ACRE-FEET)	(CFS)	(FEET)	(ACRE-FEET)	(CFS)	*
* 0.000	0.000	0.000**	0.090	0.010	4.000*	
* 0.290	0.020	4.300**	0.490	0.090	4.600*	
* 0.690	0.230	4.900**	0.890	0.450	5.200*	
* 1.090	0.740	5.500**	1.290	1.070	5.800*	
* 1.490	1.440	6.000**	1.690	1.850	6.200*	
* 1.830	2.170	6.400**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.09	-0.02388	0.04388
3	0.29	-0.01643	0.05643
4	0.49	0.05103	0.12897
5	0.69	0.18849	0.27151
6	0.89	0.40595	0.49405
7	1.09	0.69341	0.78659
8	1.29	1.02087	1.11913
9	1.49	1.38917	1.49083
10	1.69	1.79748	1.90252
11	1.83	2.11579	2.22422

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.010	0.000	0.00	0.00	0.00	0.000
0.215	0.000	1.22	0.04	0.94	0.005
0.420	0.000	1.22	0.04	1.88	0.005
0.625	0.000	1.23	0.04	1.90	0.005
0.830	0.000	1.24	0.04	1.91	0.005
1.035	0.000	1.25	0.04	1.92	0.005
1.240	0.000	1.26	0.04	1.93	0.005
1.445	0.000	1.27	0.04	1.95	0.005
1.650	0.000	1.27	0.04	1.96	0.005
1.855	0.000	1.28	0.04	1.97	0.005
2.060	0.000	1.29	0.04	1.99	0.005
2.265	0.000	1.30	0.05	2.00	0.005

BLDG2S					
2.470	0.000	1.31	0.05	2.02	0.005
2.675	0.000	1.32	0.05	2.03	0.005
2.880	0.000	1.33	0.05	2.05	0.005
3.085	0.000	1.34	0.05	2.06	0.005
3.290	0.000	1.35	0.05	2.08	0.005
3.495	0.000	1.36	0.05	2.09	0.005
3.700	0.000	1.37	0.05	2.11	0.005
3.905	0.000	1.38	0.05	2.13	0.005
4.110	0.000	1.39	0.05	2.14	0.005
4.315	0.000	1.41	0.05	2.16	0.005
4.520	0.000	1.42	0.05	2.18	0.005
4.725	0.000	1.43	0.05	2.20	0.006
4.930	0.000	1.44	0.05	2.22	0.006
5.135	0.000	1.46	0.05	2.24	0.006
5.340	0.000	1.47	0.05	2.26	0.006
5.545	0.000	1.49	0.05	2.28	0.006
5.750	0.000	1.50	0.05	2.30	0.006
5.955	0.000	1.51	0.05	2.32	0.006
6.160	0.000	1.52	0.05	2.35	0.006
6.365	0.000	1.55	0.05	2.37	0.006
6.570	0.000	1.56	0.05	2.39	0.006
6.775	0.000	1.58	0.05	2.42	0.006
6.980	0.000	1.59	0.06	2.45	0.006
7.185	0.000	1.61	0.06	2.47	0.006
7.390	0.000	1.62	0.06	2.50	0.006
7.595	0.000	1.65	0.06	2.53	0.006
7.800	0.000	1.66	0.06	2.56	0.006
8.005	0.000	1.69	0.06	2.59	0.007
8.210	0.000	1.70	0.06	2.62	0.007
8.415	0.000	1.73	0.06	2.65	0.007
8.620	0.000	1.75	0.06	2.69	0.007
8.825	0.000	1.78	0.06	2.72	0.007
9.030	0.000	1.80	0.06	2.76	0.007
9.235	0.000	1.83	0.06	2.80	0.007
9.440	0.000	1.85	0.06	2.84	0.007
9.645	0.000	1.89	0.07	2.88	0.007
9.850	0.000	1.91	0.07	2.93	0.007
10.055	0.000	1.95	0.07	2.98	0.008
10.260	0.000	1.97	0.07	3.02	0.008
10.465	0.000	2.01	0.07	3.08	0.008
10.670	0.000	2.04	0.07	3.13	0.008
10.875	0.000	2.09	0.07	3.19	0.008
11.080	0.000	2.12	0.07	3.25	0.008
11.285	0.000	2.17	0.08	3.31	0.008
11.490	0.000	2.20	0.08	3.38	0.009
11.695	0.000	2.27	0.08	3.45	0.009
11.900	0.000	2.30	0.08	3.53	0.009
12.105	0.000	2.45	0.09	3.67	0.009
12.310	0.000	2.70	0.12	3.92	0.011
12.515	0.000	2.79	0.14	4.06	0.013
12.720	0.000	2.83	0.16	4.09	0.013
12.925	0.000	2.93	0.18	4.12	0.015
13.130	0.000	2.99	0.20	4.15	0.015
13.335	0.000	3.11	0.23	4.19	0.017
13.540	0.000	3.18	0.25	4.22	0.018
13.745	0.000	3.33	0.29	4.27	0.020
13.950	0.000	3.41	0.29	4.30	0.021
14.155	0.000	3.53	0.30	4.31	0.023
14.360	0.000	3.61	0.30	4.32	0.025
14.565	0.000	3.87	0.32	4.33	0.029
14.770	0.000	4.03	0.32	4.34	0.032
14.975	0.000	4.43	0.34	4.36	0.038
15.180	0.000	4.69	0.36	4.39	0.043
15.385	0.000	5.41	0.40	4.43	0.060
15.590	0.000	4.71	0.41	4.48	0.064
15.795	0.000	6.41	0.50	4.55	0.095
16.000	0.000	8.75	0.60	4.68	0.164

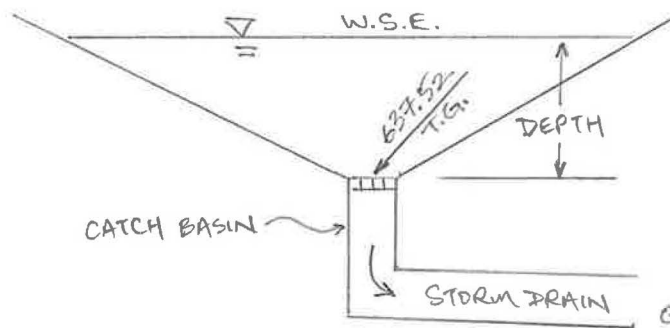
BLDG2S					
16.205	0.000	27.63	0.96	5.03	0.547
16.410	0.000	5.28	0.96	5.30	0.547
16.615	0.000	5.00	0.95	5.30	0.542
16.820	0.000	4.22	0.94	5.29	0.524
17.025	0.000	3.73	0.92	5.26	0.498
17.230	0.000	3.50	0.90	5.23	0.468
17.435	0.000	3.25	0.88	5.20	0.435
17.640	0.000	3.05	0.84	5.16	0.399
17.845	0.000	2.88	0.81	5.11	0.362
18.050	0.000	2.74	0.77	5.05	0.323
18.255	0.000	2.34	0.73	5.00	0.278
18.460	0.000	2.24	0.69	4.93	0.232
18.665	0.000	2.14	0.63	4.85	0.186
18.870	0.000	2.06	0.56	4.76	0.140
19.075	0.000	1.99	0.50	4.66	0.095
19.280	0.000	1.93	0.38	4.52	0.051
19.485	0.000	1.87	0.11	4.23	0.011
19.690	0.000	1.81	0.06	3.42	0.007
19.895	0.000	1.76	0.06	2.76	0.007
20.100	0.000	1.72	0.06	2.69	0.007
20.305	0.000	1.68	0.06	2.62	0.006
20.510	0.000	1.64	0.06	2.56	0.006
20.715	0.000	1.60	0.06	2.50	0.006
20.920	0.000	1.57	0.05	2.45	0.006
21.125	0.000	1.53	0.05	2.39	0.006
21.330	0.000	1.50	0.05	2.35	0.006
21.535	0.000	1.48	0.05	2.30	0.006
21.740	0.000	1.45	0.05	2.26	0.006
21.945	0.000	1.42	0.05	2.22	0.005
22.150	0.000	1.40	0.05	2.18	0.005
22.355	0.000	1.38	0.05	2.14	0.005
22.560	0.000	1.36	0.05	2.11	0.005
22.765	0.000	1.33	0.05	2.08	0.005
22.970	0.000	1.32	0.05	2.05	0.005
23.175	0.000	1.30	0.05	2.02	0.005
23.380	0.000	1.28	0.04	1.99	0.005
23.585	0.000	1.26	0.04	1.96	0.005
23.790	0.000	1.24	0.04	1.93	0.005
23.995	0.000	1.23	0.04	1.91	0.005
24.200	0.000	1.22	0.04	1.89	0.005
24.405	0.000	0.00	0.00	0.94	0.000
24.610	0.000	0.00	0.00	0.00	0.000

← $Q_{100}(\text{DISCHARGE}) = 5.3 \text{ cfs}$
 $\text{DEPTH} = 0.96 \text{ FT}$
 $\text{VOLUME} = 0.547 \text{ AC-FT}$

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 3 TRUCK YARD (NODE 422)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
637.52	0.00	0	238	238	0.01	4.3
637.80	0.28	1700	626	864	0.02	4.6
638.00	0.48	4560	1285	2149	0.05	4.9
638.20	0.68	8290	2071	4220	0.10	5.2
638.40	0.88	12420	2958	7178	0.16	5.5
638.60	1.08	17160	3980	11158	0.26	5.8
638.80	1.28	22640	5151	16309	0.37	6.0
639.00	1.48	28870	3688	19997	0.46	6.1
639.12	1.60	32600				

BUILDING 3 TRUCK YARD
 $Q_{100}(\text{RAT. METHOD}) = 21.7 \text{ CFS}$



$Q_{100}(\text{DISCHARGE}) = 5.9 \text{ CFS}$
 AT 1.44 FT PONDING DEPTH
 (638.96 W.S.E.)

ORIFICE EQUATION: $Q = 0.6 * \text{AREA} * \sqrt{64.4 * H}$

$H = \text{DEPTH} + 1.00 \text{ FT}$

CROSS-SECTION AREA OF 12" DISCHARGE PIPE
 $= 3.14 * (6/12 \text{ FT})^2$
 $= 0.79 \text{ FT}^2$

e.g. AT ELEVATION 639.00 (DEPTH = 1.48 FT OR $H = 2.48 \text{ FT}$)

$Q(\text{DISCHARGE}) = 0.6 * 0.79 * \sqrt{64.4 * 2.48} = 6.0 \text{ CFS}$

 SMALL AREA UNIT HYDROGRAPH MODEL
 =====

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUIDLING 3 TRUCK YARD (NODE 422)

 RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 9.10
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 12.70
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 3.71
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.76

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	7.5	15.0	22.5	30.0
0.13	0.0049	0.95	.Q	.	.	.	.
0.34	0.0215	0.95	.Q	.	.	.	.
0.55	0.0383	0.96	.Q	.	.	.	.
0.76	0.0551	0.97	.Q	.	.	.	.
0.97	0.0721	0.97	.Q	.	.	.	.
1.18	0.0892	0.98	.Q	.	.	.	.
1.40	0.1064	0.99	.Q	.	.	.	.
1.61	0.1237	0.99	.Q	.	.	.	.
1.82	0.1411	1.00	.Q	.	.	.	.
2.03	0.1587	1.01	.Q	.	.	.	.
2.24	0.1764	1.02	.Q	.	.	.	.
2.45	0.1942	1.02	.Q	.	.	.	.
2.67	0.2122	1.03	.Q	.	.	.	.
2.88	0.2303	1.04	.Q	.	.	.	.
3.09	0.2485	1.05	.Q	.	.	.	.
3.30	0.2669	1.05	.Q	.	.	.	.
3.51	0.2854	1.07	.Q	.	.	.	.
3.72	0.3041	1.07	.Q	.	.	.	.
3.94	0.3229	1.08	.Q	.	.	.	.

BLDG3

4.15	0.3419	1.09	.Q	.	.	.	.
4.36	0.3611	1.10	.Q	.	.	.	.
4.57	0.3804	1.11	.Q	.	.	.	.
4.78	0.3999	1.12	.Q	.	.	.	.
4.99	0.4196	1.13	.Q	.	.	.	.
5.21	0.4395	1.14	.Q	.	.	.	.
5.42	0.4595	1.15	.Q	.	.	.	.
5.63	0.4798	1.16	.Q	.	.	.	.
5.84	0.5002	1.17	.Q	.	.	.	.
6.05	0.5208	1.19	.Q	.	.	.	.
6.26	0.5417	1.20	.Q	.	.	.	.
6.47	0.5628	1.21	.Q	.	.	.	.
6.69	0.5841	1.22	.Q	.	.	.	.
6.90	0.6056	1.24	.Q	.	.	.	.
7.11	0.6274	1.25	.Q	.	.	.	.
7.32	0.6494	1.27	.Q	.	.	.	.
7.53	0.6717	1.28	.Q	.	.	.	.
7.75	0.6943	1.30	.Q	.	.	.	.
7.96	0.7171	1.31	.Q	.	.	.	.
8.17	0.7402	1.33	.Q	.	.	.	.
8.38	0.7636	1.34	.Q	.	.	.	.
8.59	0.7874	1.37	.Q	.	.	.	.
8.80	0.8114	1.38	.Q	.	.	.	.
9.02	0.8358	1.41	.Q	.	.	.	.
9.23	0.8606	1.42	.Q	.	.	.	.
9.44	0.8857	1.45	.Q	.	.	.	.
9.65	0.9112	1.47	.Q	.	.	.	.
9.86	0.9371	1.50	.Q	.	.	.	.
10.07	0.9635	1.51	. Q	.	.	.	.
10.28	0.9903	1.55	. Q	.	.	.	.
10.50	1.0175	1.57	. Q	.	.	.	.
10.71	1.0453	1.61	. Q	.	.	.	.
10.92	1.0736	1.63	. Q	.	.	.	.
11.13	1.1024	1.67	. Q	.	.	.	.
11.34	1.1319	1.70	. Q	.	.	.	.
11.55	1.1620	1.75	. Q	.	.	.	.
11.77	1.1928	1.77	. Q	.	.	.	.
11.98	1.2243	1.83	. Q	.	.	.	.
12.19	1.2572	1.94	. Q	.	.	.	.
12.40	1.2929	2.15	. Q	.	.	.	.
12.61	1.3308	2.18	. Q	.	.	.	.
12.82	1.3696	2.26	. Q	.	.	.	.
13.04	1.4095	2.30	. Q	.	.	.	.
13.25	1.4506	2.40	. Q	.	.	.	.
13.46	1.4930	2.45	. Q	.	.	.	.
13.67	1.5368	2.56	. Q	.	.	.	.
13.88	1.5822	2.63	. Q	.	.	.	.
14.10	1.6293	2.76	. Q	.	.	.	.
14.31	1.6778	2.78	. Q	.	.	.	.
14.52	1.7282	2.98	. Q	.	.	.	.
14.73	1.7814	3.11	. Q	.	.	.	.
14.94	1.8384	3.41	. Q	.	.	.	.
15.15	1.8999	3.61	. Q	.	.	.	.
15.37	1.9678	4.16	. Q	.	.	.	.
15.58	2.0373	3.78	. Q	.	.	.	.
15.79	2.1134	4.93	. Q	.	.	.	.
16.00	2.2151	6.70	. Q	.	.	.	.
16.21	2.4589	21.17	.	.	.	Q	.
16.42	2.6794	4.05	. Q	.	.	.	.
16.64	2.7485	3.85	. Q	.	.	.	.
16.85	2.8105	3.25	. Q	.	.	.	.
17.06	2.8641	2.87	. Q	.	.	.	.
17.27	2.9128	2.70	. Q	.	.	.	.
17.48	2.9583	2.50	. Q	.	.	.	.
17.69	3.0007	2.35	. Q	.	.	.	.
17.91	3.0407	2.22	. Q	.	.	.	.
18.12	3.0786	2.11	. Q	.	.	.	.

BLDG3

18.33	3.1128	1.80	. Q	.	.	.	.
18.54	3.1436	1.72	. Q	.	.	.	.
18.75	3.1731	1.65	. Q	.	.	.	.
18.96	3.2014	1.59	. Q	.	.	.	.
19.17	3.2286	1.53	. Q	.	.	.	.
19.39	3.2550	1.48	.Q	.	.	.	.
19.60	3.2805	1.44	.Q	.	.	.	.
19.81	3.3053	1.39	.Q	.	.	.	.
20.02	3.3293	1.36	.Q	.	.	.	.
20.23	3.3528	1.32	.Q	.	.	.	.
20.44	3.3756	1.29	.Q	.	.	.	.
20.66	3.3979	1.26	.Q	.	.	.	.
20.87	3.4197	1.23	.Q	.	.	.	.
21.08	3.4410	1.20	.Q	.	.	.	.
21.29	3.4618	1.18	.Q	.	.	.	.
21.50	3.4823	1.16	.Q	.	.	.	.
21.72	3.5023	1.14	.Q	.	.	.	.
21.93	3.5220	1.11	.Q	.	.	.	.
22.14	3.5413	1.10	.Q	.	.	.	.
22.35	3.5603	1.08	.Q	.	.	.	.
22.56	3.5790	1.06	.Q	.	.	.	.
22.77	3.5974	1.04	.Q	.	.	.	.
22.98	3.6155	1.03	.Q	.	.	.	.
23.20	3.6333	1.01	.Q	.	.	.	.
23.41	3.6509	1.00	.Q	.	.	.	.
23.62	3.6682	0.98	.Q	.	.	.	.
23.83	3.6853	0.97	.Q	.	.	.	.
24.04	3.7021	0.96	.Q	.	.	.	.
24.25	3.7105	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1447.8
10%	342.9
20%	38.1
30%	25.4
40%	12.7
50%	12.7
60%	12.7
70%	12.7
80%	12.7
90%	12.7

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
100-YEAR DETENTION IN BUIDLING 3 TRUCK YARD (NODE 422)

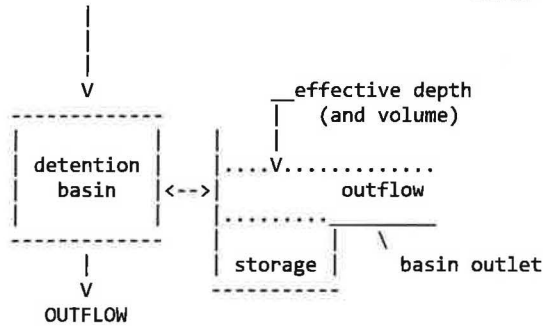
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FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 12.700
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

INFLOW

BLDG3



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 9

* (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	** (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
* 0.000	0.000	0.000**	0.280	0.010	4.300*	
* 0.480	0.020	4.600**	0.680	0.050	4.900*	
* 0.880	0.100	5.200**	1.080	0.160	5.500*	
* 1.280	0.260	5.800**	1.480	0.370	6.000*	
* 1.600	0.460	6.100**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.28	-0.02761	0.04761
3	0.48	-0.02023	0.06023
4	0.68	0.00714	0.09286
5	0.88	0.05452	0.14548
6	1.08	0.11189	0.20811
7	1.28	0.20927	0.31073
8	1.48	0.31752	0.42248
9	1.60	0.40665	0.51335

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.125	0.000	0.95	0.10	0.75	0.003
0.337	0.000	0.95	0.10	1.50	0.004
0.548	0.000	0.96	0.10	1.51	0.004
0.760	0.000	0.97	0.10	1.52	0.004
0.972	0.000	0.97	0.10	1.53	0.004
1.183	0.000	0.98	0.10	1.54	0.004
1.395	0.000	0.99	0.10	1.55	0.004
1.607	0.000	0.99	0.10	1.56	0.004
1.818	0.000	1.00	0.10	1.58	0.004
2.030	0.000	1.01	0.10	1.59	0.004
2.242	0.000	1.02	0.10	1.60	0.004
2.453	0.000	1.02	0.11	1.61	0.004
2.665	0.000	1.03	0.11	1.62	0.004
2.877	0.000	1.04	0.11	1.63	0.004
3.088	0.000	1.05	0.11	1.65	0.004
3.300	0.000	1.05	0.11	1.66	0.004
3.512	0.000	1.07	0.11	1.67	0.004
3.723	0.000	1.07	0.11	1.69	0.004
3.935	0.000	1.08	0.11	1.70	0.004
4.147	0.000	1.09	0.11	1.72	0.004

BLDG3					
4.358	0.000	1.10	0.11	1.73	0.004
4.570	0.000	1.11	0.11	1.75	0.004
4.782	0.000	1.12	0.12	1.76	0.004
4.993	0.000	1.13	0.12	1.78	0.004
5.205	0.000	1.14	0.12	1.79	0.004
5.417	0.000	1.15	0.12	1.81	0.004
5.628	0.000	1.16	0.12	1.83	0.004
5.840	0.000	1.17	0.12	1.85	0.004
6.052	0.000	1.19	0.12	1.86	0.004
6.263	0.000	1.20	0.12	1.88	0.004
6.475	0.000	1.21	0.12	1.90	0.004
6.687	0.000	1.22	0.13	1.92	0.004
6.898	0.000	1.24	0.13	1.95	0.005
7.110	0.000	1.25	0.13	1.97	0.005
7.322	0.000	1.27	0.13	1.99	0.005
7.533	0.000	1.28	0.13	2.01	0.005
7.745	0.000	1.30	0.13	2.04	0.005
7.957	0.000	1.31	0.13	2.06	0.005
8.168	0.000	1.33	0.14	2.09	0.005
8.380	0.000	1.34	0.14	2.12	0.005
8.592	0.000	1.37	0.14	2.14	0.005
8.803	0.000	1.38	0.14	2.17	0.005
9.015	0.000	1.41	0.14	2.20	0.005
9.227	0.000	1.42	0.15	2.24	0.005
9.438	0.000	1.45	0.15	2.27	0.005
9.650	0.000	1.47	0.15	2.30	0.005
9.862	0.000	1.50	0.15	2.34	0.006
10.073	0.000	1.51	0.16	2.38	0.006
10.285	0.000	1.55	0.16	2.42	0.006
10.497	0.000	1.57	0.16	2.46	0.006
10.708	0.000	1.61	0.17	2.51	0.006
10.920	0.000	1.63	0.17	2.56	0.006
11.132	0.000	1.67	0.17	2.61	0.006
11.343	0.000	1.70	0.17	2.66	0.006
11.555	0.000	1.75	0.18	2.72	0.006
11.767	0.000	1.77	0.18	2.78	0.007
11.978	0.000	1.83	0.19	2.85	0.007
12.190	0.000	1.94	0.20	2.98	0.007
12.402	0.000	2.15	0.22	3.23	0.008
12.613	0.000	2.18	0.22	3.42	0.008
12.825	0.000	2.26	0.23	3.51	0.008
13.037	0.000	2.30	0.24	3.60	0.008
13.248	0.000	2.40	0.25	3.71	0.009
13.460	0.000	2.45	0.25	3.83	0.009
13.672	0.000	2.56	0.26	3.96	0.009
13.883	0.000	2.63	0.27	4.10	0.010
14.095	0.000	2.76	0.29	4.23	0.011
14.307	0.000	2.78	0.30	4.32	0.011
14.518	0.000	2.98	0.35	4.37	0.014
14.730	0.000	3.11	0.39	4.43	0.015
14.942	0.000	3.41	0.47	4.52	0.020
15.153	0.000	3.61	0.50	4.61	0.023
15.365	0.000	4.16	0.56	4.67	0.032
15.577	0.000	3.78	0.52	4.68	0.025
15.788	0.000	4.93	0.64	4.75	0.044
16.000	0.000	6.70	0.78	4.94	0.075
16.212	0.000	21.17	1.44	5.50	0.349
16.423	0.000	4.05	1.38	5.93	0.316
16.635	0.000	3.85	1.32	5.87	0.280
16.847	0.000	3.25	1.23	5.78	0.236
17.058	0.000	2.87	1.13	5.65	0.187
17.270	0.000	2.70	1.01	5.49	0.139
17.482	0.000	2.50	0.84	5.27	0.090
17.693	0.000	2.35	0.64	4.99	0.044
17.905	0.000	2.22	0.24	4.25	0.008
18.117	0.000	2.11	0.22	3.50	0.008
18.328	0.000	1.80	0.19	3.09	0.007

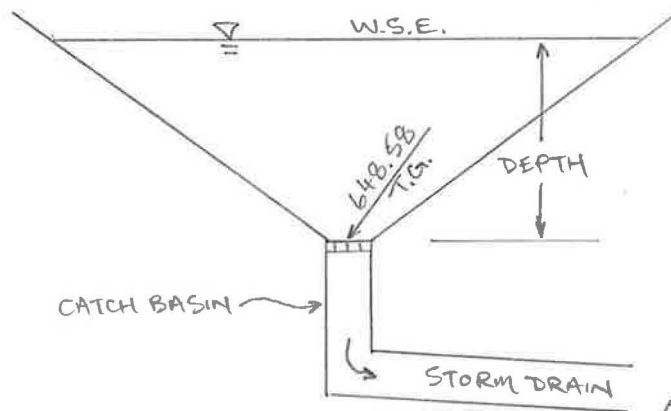
← $Q_{100}(\text{DISCHARGE}) = 5.9 \text{ CFS}$
 DEPTH = 1.44 FT
 VOLUME = 0.349 AC-FT

				BLDG3	
18.540	0.000	1.72	0.18	2.78	0.006
18.752	0.000	1.65	0.17	2.66	0.006
18.963	0.000	1.59	0.16	2.56	0.006
19.175	0.000	1.53	0.16	2.46	0.006
19.387	0.000	1.48	0.15	2.38	0.005
19.598	0.000	1.44	0.15	2.30	0.005
19.810	0.000	1.39	0.14	2.24	0.005
20.022	0.000	1.36	0.14	2.17	0.005
20.233	0.000	1.32	0.14	2.12	0.005
20.445	0.000	1.29	0.13	2.06	0.005
20.657	0.000	1.26	0.13	2.01	0.005
20.868	0.000	1.23	0.13	1.97	0.005
21.080	0.000	1.20	0.12	1.92	0.004
21.292	0.000	1.18	0.12	1.88	0.004
21.503	0.000	1.16	0.12	1.85	0.004
21.715	0.000	1.14	0.12	1.81	0.004
21.927	0.000	1.11	0.11	1.78	0.004
22.138	0.000	1.10	0.11	1.75	0.004
22.350	0.000	1.08	0.11	1.72	0.004
22.562	0.000	1.06	0.11	1.69	0.004
22.773	0.000	1.04	0.11	1.66	0.004
22.985	0.000	1.03	0.11	1.63	0.004
23.197	0.000	1.01	0.10	1.61	0.004
23.408	0.000	1.00	0.10	1.59	0.004
23.620	0.000	0.98	0.10	1.56	0.004
23.832	0.000	0.97	0.10	1.54	0.004
24.043	0.000	0.96	0.10	1.52	0.004
24.255	0.000	0.00	0.00	0.76	0.000
24.467	0.000	0.00	0.00	0.00	0.000

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 4 TRUCK YARD (NODE 221)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
648.58	0.00	0				
			161	161	0.00	4.2
648.80	0.22	1460				
			583	744	0.02	4.5
649.00	0.42	4370				
			1239	1983	0.05	4.8
649.20	0.62	8020				
			2018	4001	0.09	5.1
649.40	0.82	12160				
			2893	6894	0.16	5.4
649.60	1.02	16770				

BUILDING 4 TRUCK YARD
Q₁₀₀(RAT. METHOD) = 12.1 CFS



Q₁₀₀(DISCHARGE) = 5.2 CFS
AT 0.94 FT PONDING DEPTH
(649.52 W.S.E.)

ORIFICE EQUATION: $Q = 0.6 * \text{AREA} * \sqrt{64.4 * H}$

$H = \text{DEPTH} + 1.00 \text{ FT}$

CROSS-SECTION AREA OF 12" DISCHARGE PIPE
 $= 3.14 * (6/12 \text{ FT})^2$
 $= 0.79 \text{ FT}^2$

e.g. AT ELEVATION 649.00 (DEPTH = 0.42 FT OR H = 1.42 FT)

$Q(\text{DISCHARGE}) = 0.6 * 0.79 * \sqrt{64.4 * H} = 4.5 \text{ CFS}$

 SMALL AREA UNIT HYDROGRAPH MODEL
 =====

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 4 TRUCK YARD (NODE 221)

 RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 4.55
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 10.60
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.85
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.38

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
0.10	0.0000	0.00	Q	*	*	*	*
0.28	0.0035	0.48	Q	*	*	*	*
0.45	0.0105	0.48	Q	*	*	*	*
0.63	0.0175	0.48	Q	*	*	*	*
0.81	0.0245	0.48	Q	*	*	*	*
0.98	0.0316	0.49	Q	*	*	*	*
1.16	0.0387	0.49	Q	*	*	*	*
1.34	0.0459	0.49	Q	*	*	*	*
1.51	0.0531	0.50	Q	*	*	*	*
1.69	0.0604	0.50	Q	*	*	*	*
1.87	0.0677	0.50	.Q	*	*	*	*
2.04	0.0750	0.51	.Q	*	*	*	*
2.22	0.0824	0.51	.Q	*	*	*	*
2.40	0.0899	0.51	.Q	*	*	*	*
2.57	0.0973	0.51	.Q	*	*	*	*
2.75	0.1049	0.52	.Q	*	*	*	*
2.93	0.1125	0.52	.Q	*	*	*	*
3.10	0.1201	0.52	.Q	*	*	*	*
3.28	0.1278	0.53	.Q	*	*	*	*

BLDG4

3.46	0.1355	0.53	.Q	.	.	.	.
3.63	0.1433	0.53	.Q	.	.	.	.
3.81	0.1511	0.54	.Q	.	.	.	.
3.99	0.1590	0.54	.Q	.	.	.	.
4.16	0.1670	0.55	.Q	.	.	.	.
4.34	0.1750	0.55	.Q	.	.	.	.
4.52	0.1830	0.56	.Q	.	.	.	.
4.69	0.1911	0.56	.Q	.	.	.	.
4.87	0.1993	0.56	.Q	.	.	.	.
5.05	0.2076	0.57	.Q	.	.	.	.
5.22	0.2159	0.57	.Q	.	.	.	.
5.40	0.2243	0.58	.Q	.	.	.	.
5.58	0.2327	0.58	.Q	.	.	.	.
5.75	0.2412	0.58	.Q	.	.	.	.
5.93	0.2498	0.59	.Q	.	.	.	.
6.11	0.2585	0.59	.Q	.	.	.	.
6.28	0.2672	0.60	.Q	.	.	.	.
6.46	0.2760	0.61	.Q	.	.	.	.
6.64	0.2849	0.61	.Q	.	.	.	.
6.81	0.2939	0.62	.Q	.	.	.	.
6.99	0.3029	0.62	.Q	.	.	.	.
7.17	0.3121	0.63	.Q	.	.	.	.
7.34	0.3213	0.64	.Q	.	.	.	.
7.52	0.3306	0.64	.Q	.	.	.	.
7.70	0.3400	0.65	.Q	.	.	.	.
7.87	0.3495	0.65	.Q	.	.	.	.
8.05	0.3591	0.66	.Q	.	.	.	.
8.23	0.3688	0.67	.Q	.	.	.	.
8.40	0.3787	0.68	.Q	.	.	.	.
8.58	0.3886	0.68	.Q	.	.	.	.
8.76	0.3986	0.69	.Q	.	.	.	.
8.93	0.4088	0.70	.Q	.	.	.	.
9.11	0.4191	0.71	.Q	.	.	.	.
9.29	0.4295	0.72	.Q	.	.	.	.
9.46	0.4400	0.73	.Q	.	.	.	.
9.64	0.4507	0.73	.Q	.	.	.	.
9.82	0.4615	0.75	.Q	.	.	.	.
9.99	0.4725	0.75	.Q	.	.	.	.
10.17	0.4836	0.77	.Q	.	.	.	.
10.35	0.4949	0.78	.Q	.	.	.	.
10.52	0.5063	0.79	.Q	.	.	.	.
10.70	0.5179	0.80	.Q	.	.	.	.
10.88	0.5297	0.82	.Q	.	.	.	.
11.05	0.5418	0.83	.Q	.	.	.	.
11.23	0.5540	0.85	.Q	.	.	.	.
11.41	0.5664	0.86	.Q	.	.	.	.
11.58	0.5791	0.88	.Q	.	.	.	.
11.76	0.5919	0.89	.Q	.	.	.	.
11.94	0.6051	0.91	.Q	.	.	.	.
12.11	0.6185	0.93	.Q	.	.	.	.
12.29	0.6330	1.06	. Q	.	.	.	.
12.47	0.6487	1.08	. Q	.	.	.	.
12.64	0.6646	1.11	. Q	.	.	.	.
12.82	0.6809	1.12	. Q	.	.	.	.
13.00	0.6976	1.16	. Q	.	.	.	.
13.17	0.7146	1.18	. Q	.	.	.	.
13.35	0.7321	1.22	. Q	.	.	.	.
13.53	0.7501	1.24	. Q	.	.	.	.
13.70	0.7686	1.29	. Q	.	.	.	.
13.88	0.7877	1.32	. Q	.	.	.	.
14.06	0.8075	1.38	. Q	.	.	.	.
14.23	0.8277	1.38	. Q	.	.	.	.
14.41	0.8483	1.46	. Q	.	.	.	.
14.59	0.8700	1.51	. Q	.	.	.	.
14.76	0.8928	1.62	. Q	.	.	.	.
14.94	0.9169	1.68	. Q	.	.	.	.
15.12	0.9426	1.85	. Q	.	.	.	.

BLDG4									
15.29	0.9704	1.96	.	Q	.	.	.	.	.
15.47	0.9986	1.90	.	Q	.	.	.	.	.
15.65	1.0266	1.94	.	Q	.	.	.	.	.
15.82	1.0605	2.71	.	Q	.	.	.	.	.
16.00	1.1076	3.75	.	Q	.	.	.	.	.
16.18	1.2211	11.80	.	.	.	Q	.	.	.
16.35	1.3238	2.26	.	Q	.	.	.	.	.
16.53	1.3556	2.09	.	Q	.	.	.	.	.
16.71	1.3837	1.76	.	Q	.	.	.	.	.
16.88	1.4080	1.56	.	Q	.	.	.	.	.
17.06	1.4297	1.42	.	Q	.	.	.	.	.
17.24	1.4499	1.35	.	Q	.	.	.	.	.
17.41	1.4690	1.27	.	Q	.	.	.	.	.
17.59	1.4870	1.20	.	Q	.	.	.	.	.
17.77	1.5041	1.14	.	Q	.	.	.	.	.
17.94	1.5204	1.09	.	Q	.	.	.	.	.
18.12	1.5360	1.04	.	Q	.	.	.	.	.
18.30	1.5502	0.90	.	Q	.	.	.	.	.
18.47	1.5631	0.87	.	Q	.	.	.	.	.
18.65	1.5755	0.84	.	Q	.	.	.	.	.
18.83	1.5875	0.81	.	Q	.	.	.	.	.
19.00	1.5991	0.78	.	Q	.	.	.	.	.
19.18	1.6104	0.76	.	Q	.	.	.	.	.
19.36	1.6214	0.74	.	Q	.	.	.	.	.
19.53	1.6321	0.72	.	Q	.	.	.	.	.
19.71	1.6425	0.70	.	Q	.	.	.	.	.
19.89	1.6526	0.69	.	Q	.	.	.	.	.
20.06	1.6626	0.67	.	Q	.	.	.	.	.
20.24	1.6723	0.66	.	Q	.	.	.	.	.
20.42	1.6818	0.64	.	Q	.	.	.	.	.
20.59	1.6911	0.63	.	Q	.	.	.	.	.
20.77	1.7002	0.62	.	Q	.	.	.	.	.
20.95	1.7092	0.61	.	Q	.	.	.	.	.
21.12	1.7180	0.60	.	Q	.	.	.	.	.
21.30	1.7267	0.59	.	Q	.	.	.	.	.
21.48	1.7352	0.58	.	Q	.	.	.	.	.
21.65	1.7436	0.57	.	Q	.	.	.	.	.
21.83	1.7518	0.56	.	Q	.	.	.	.	.
22.01	1.7599	0.55	.	Q	.	.	.	.	.
22.18	1.7679	0.54	.	Q	.	.	.	.	.
22.36	1.7758	0.54	.	Q	.	.	.	.	.
22.54	1.7836	0.53	.	Q	.	.	.	.	.
22.71	1.7913	0.52	.	Q	.	.	.	.	.
22.89	1.7989	0.52	.	Q	.	.	.	.	.
23.07	1.8064	0.51	.	Q	.	.	.	.	.
23.24	1.8138	0.50	.	Q	.	.	.	.	.
23.42	1.8211	0.50	.	Q	.	.	.	.	.
23.60	1.8283	0.49	.	Q	.	.	.	.	.
23.77	1.8354	0.49	.	Q	.	.	.	.	.
23.95	1.8425	0.48	.	Q	.	.	.	.	.
24.13	1.8494	0.48	.	Q	.	.	.	.	.
24.30	1.8529	0.00	.	Q	.	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1441.6
10%	265.0
20%	31.8
30%	21.2
40%	10.6
50%	10.6

60%	10.6
70%	10.6
80%	10.6
90%	10.6

BLDG4

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO

100-YEAR DETENTION IN BUILDING 4 TRUCK YARD (NODE 221)

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FLOW-THROUGH DETENTION BASIN MODEL

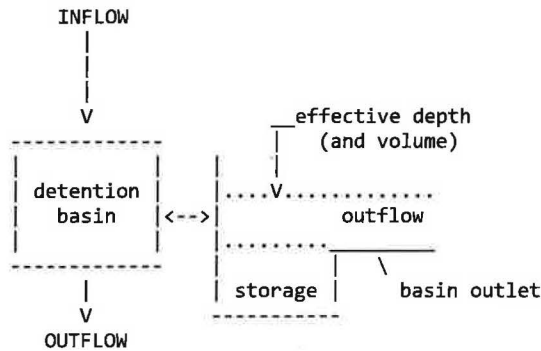
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 10.600

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 6

* (FEET)	STORAGE (ACRE-Feet)	OUTFLOW (CFS)	** (FEET)	STORAGE (ACRE-Feet)	OUTFLOW (CFS)
0.000	0.000	0.000**	0.220	0.010	4.200*
0.420	0.020	4.500**	0.620	0.050	4.800*
0.820	0.090	5.100**	1.020	0.160	5.400*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-Feet)	{S+O*DT/2} (ACRE-Feet)
1	0.00	0.00000	0.00000
2	0.22	-0.02066	0.04066
3	0.42	-0.01285	0.05285
4	0.62	0.01496	0.08504
5	0.82	0.05277	0.12723
6	1.02	0.12058	0.19942

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.100	0.000	0.00	0.00	0.00	0.000
0.277	0.000	0.48	0.04	0.36	0.002

BLDG4

0.453	0.000	0.48	0.04	0.72	0.002
0.630	0.000	0.48	0.04	0.72	0.002
0.807	0.000	0.48	0.04	0.73	0.002
0.983	0.000	0.49	0.04	0.73	0.002
1.160	0.000	0.49	0.04	0.74	0.002
1.337	0.000	0.49	0.04	0.74	0.002
1.513	0.000	0.50	0.04	0.75	0.002
1.690	0.000	0.50	0.04	0.75	0.002
1.867	0.000	0.50	0.04	0.75	0.002
2.043	0.000	0.51	0.04	0.76	0.002
2.220	0.000	0.51	0.04	0.76	0.002
2.397	0.000	0.51	0.04	0.77	0.002
2.573	0.000	0.51	0.04	0.77	0.002
2.750	0.000	0.52	0.04	0.78	0.002
2.927	0.000	0.52	0.04	0.78	0.002
3.103	0.000	0.52	0.04	0.79	0.002
3.280	0.000	0.53	0.04	0.79	0.002
3.457	0.000	0.53	0.04	0.80	0.002
3.633	0.000	0.53	0.04	0.80	0.002
3.810	0.000	0.54	0.04	0.81	0.002
3.987	0.000	0.54	0.04	0.82	0.002
4.163	0.000	0.55	0.04	0.82	0.002
4.340	0.000	0.55	0.04	0.83	0.002
4.517	0.000	0.56	0.04	0.83	0.002
4.693	0.000	0.56	0.04	0.84	0.002
4.870	0.000	0.56	0.04	0.85	0.002
5.047	0.000	0.57	0.04	0.85	0.002
5.223	0.000	0.57	0.05	0.86	0.002
5.400	0.000	0.58	0.05	0.87	0.002
5.577	0.000	0.58	0.05	0.87	0.002
5.753	0.000	0.58	0.05	0.88	0.002
5.930	0.000	0.59	0.05	0.89	0.002
6.107	0.000	0.59	0.05	0.89	0.002
6.283	0.000	0.60	0.05	0.90	0.002
6.460	0.000	0.61	0.05	0.91	0.002
6.637	0.000	0.61	0.05	0.92	0.002
6.813	0.000	0.62	0.05	0.93	0.002
6.990	0.000	0.62	0.05	0.94	0.002
7.167	0.000	0.63	0.05	0.94	0.002
7.343	0.000	0.64	0.05	0.95	0.002
7.520	0.000	0.64	0.05	0.96	0.002
7.697	0.000	0.65	0.05	0.97	0.002
7.873	0.000	0.65	0.05	0.98	0.002
8.050	0.000	0.66	0.05	0.99	0.002
8.227	0.000	0.67	0.05	1.00	0.002
8.403	0.000	0.68	0.05	1.01	0.002
8.580	0.000	0.68	0.05	1.03	0.002
8.757	0.000	0.69	0.05	1.04	0.002
8.933	0.000	0.70	0.06	1.05	0.003
9.110	0.000	0.71	0.06	1.06	0.003
9.287	0.000	0.72	0.06	1.07	0.003
9.463	0.000	0.73	0.06	1.09	0.003
9.640	0.000	0.73	0.06	1.10	0.003
9.817	0.000	0.75	0.06	1.12	0.003
9.993	0.000	0.75	0.06	1.13	0.003
10.170	0.000	0.77	0.06	1.15	0.003
10.347	0.000	0.78	0.06	1.17	0.003
10.523	0.000	0.79	0.06	1.18	0.003
10.700	0.000	0.80	0.06	1.20	0.003
10.877	0.000	0.82	0.06	1.22	0.003
11.053	0.000	0.83	0.07	1.24	0.003
11.230	0.000	0.85	0.07	1.26	0.003
11.407	0.000	0.86	0.07	1.28	0.003
11.583	0.000	0.88	0.07	1.31	0.003
11.760	0.000	0.89	0.07	1.33	0.003
11.937	0.000	0.91	0.07	1.36	0.003
12.113	0.000	0.93	0.07	1.39	0.003

BLDG4

12.290	0.000	1.06	0.08	1.50	0.004
12.467	0.000	1.08	0.09	1.61	0.004
12.643	0.000	1.11	0.09	1.65	0.004
12.820	0.000	1.12	0.09	1.68	0.004
12.997	0.000	1.16	0.09	1.72	0.004
13.173	0.000	1.18	0.09	1.76	0.004
13.350	0.000	1.22	0.10	1.81	0.004
13.527	0.000	1.24	0.10	1.86	0.004
13.703	0.000	1.29	0.10	1.91	0.005
13.880	0.000	1.32	0.10	1.97	0.005
14.057	0.000	1.38	0.11	2.04	0.005
14.233	0.000	1.38	0.11	2.08	0.005
14.410	0.000	1.46	0.12	2.14	0.005
14.587	0.000	1.51	0.12	2.23	0.005
14.763	0.000	1.62	0.13	2.35	0.006
14.940	0.000	1.68	0.13	2.49	0.006
15.117	0.000	1.85	0.15	2.66	0.007
15.293	0.000	1.96	0.15	2.87	0.007
15.470	0.000	1.90	0.15	2.91	0.007
15.647	0.000	1.94	0.15	2.89	0.007
15.823	0.000	2.71	0.21	3.50	0.010
16.000	0.000	3.75	0.43	4.30	0.022
16.177	0.000	11.80	0.94	4.90	0.134
16.353	0.000	2.26	0.82	5.20	0.091
16.530	0.000	2.09	0.61	4.95	0.049
16.707	0.000	1.76	0.22	4.46	0.010
16.883	0.000	1.56	0.12	3.24	0.006
17.060	0.000	1.42	0.11	2.24	0.005
17.237	0.000	1.35	0.11	2.09	0.005
17.413	0.000	1.27	0.10	1.98	0.005
17.590	0.000	1.20	0.09	1.86	0.004
17.767	0.000	1.14	0.09	1.76	0.004
17.943	0.000	1.09	0.09	1.68	0.004
18.120	0.000	1.04	0.08	1.61	0.004
18.297	0.000	0.90	0.07	1.47	0.003
18.473	0.000	0.87	0.07	1.33	0.003
18.650	0.000	0.84	0.07	1.28	0.003
18.827	0.000	0.81	0.06	1.24	0.003
19.003	0.000	0.78	0.06	1.20	0.003
19.180	0.000	0.76	0.06	1.17	0.003
19.357	0.000	0.74	0.06	1.13	0.003
19.533	0.000	0.72	0.06	1.10	0.003
19.710	0.000	0.70	0.06	1.08	0.003
19.887	0.000	0.69	0.05	1.05	0.002
20.063	0.000	0.67	0.05	1.03	0.002
20.240	0.000	0.66	0.05	1.00	0.002
20.417	0.000	0.64	0.05	0.98	0.002
20.593	0.000	0.63	0.05	0.96	0.002
20.770	0.000	0.62	0.05	0.94	0.002
20.947	0.000	0.61	0.05	0.93	0.002
21.123	0.000	0.60	0.05	0.91	0.002
21.300	0.000	0.59	0.05	0.89	0.002
21.477	0.000	0.58	0.05	0.88	0.002
21.653	0.000	0.57	0.04	0.87	0.002
21.830	0.000	0.56	0.04	0.85	0.002
22.007	0.000	0.55	0.04	0.84	0.002
22.183	0.000	0.54	0.04	0.83	0.002
22.360	0.000	0.54	0.04	0.82	0.002
22.537	0.000	0.53	0.04	0.80	0.002
22.713	0.000	0.52	0.04	0.79	0.002
22.890	0.000	0.52	0.04	0.78	0.002
23.067	0.000	0.51	0.04	0.77	0.002
23.243	0.000	0.50	0.04	0.76	0.002
23.420	0.000	0.50	0.04	0.75	0.002
23.597	0.000	0.49	0.04	0.75	0.002
23.773	0.000	0.49	0.04	0.74	0.002
23.950	0.000	0.48	0.04	0.73	0.002

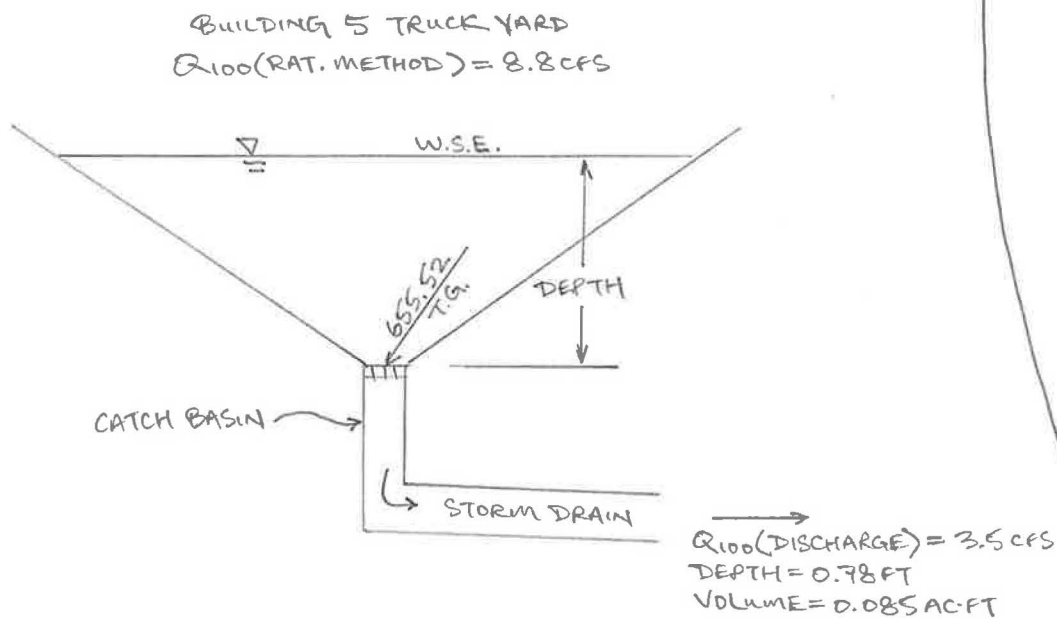
← $Q_{100}(\text{DISCHARGE}) = 5.2 \text{ CFS}$
 DEPTH = 0.94 FT
 VOLUME = 0.134 AC-FT

BLDG4

24.127	0.000	0.48	0.04	0.72	0.002
24.303	0.000	0.00	0.00	0.36	0.000
24.480	0.000	0.00	0.00	0.00	0.000

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 5 TRUCK YARD (NODE 211)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
655.52	0.00	0				
			300	300	0.01	3.0
655.80	0.28	2140				
			746	1046	0.02	3.2
656.00	0.48	5320				
			1441	2487	0.06	3.4
656.20	0.68	9090				
			2187	4674	0.11	3.6
656.40	0.88	12780				
			2875	7549	0.17	3.8
656.60	1.08	15970				



ORIFICE EQUATION: $Q = 0.6 * \text{AREA} * \sqrt{64.4 * H}$

\uparrow CROSS-SECTION AREA OF 10" DISCHARGE PIPE
 $= 3.14 * (5/12 \text{ FT})^2$
 $= 0.55 \text{ FT}^2$

\uparrow $H = \text{DEPTH} + 1.00 \text{ FT}$

e.g. AT ELEVATION 656.00 (DEPTH = 0.48 FT OR $H = 1.48 \text{ FT}$)

$Q(\text{DISCHARGE}) = 0.6 * 0.55 * \sqrt{64.4 * 1.48} = 3.2 \text{ CFS}$

 SMALL AREA UNIT HYDROGRAPH MODEL

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 5 TRUCK YARD (NODE 211)

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 3.00
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 9.00
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.22
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.25

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.10	0.0000	0.00	Q	.	.	.	.
0.25	0.0019	0.31	.Q	.	.	.	.
0.40	0.0059	0.32	.Q	.	.	.	.
0.55	0.0098	0.32	.Q	.	.	.	.
0.70	0.0137	0.32	.Q	.	.	.	.
0.85	0.0177	0.32	.Q	.	.	.	.
1.00	0.0216	0.32	.Q	.	.	.	.
1.15	0.0256	0.32	.Q	.	.	.	.
1.30	0.0297	0.32	.Q	.	.	.	.
1.45	0.0337	0.33	.Q	.	.	.	.
1.60	0.0377	0.33	.Q	.	.	.	.
1.75	0.0418	0.33	.Q	.	.	.	.
1.90	0.0459	0.33	.Q	.	.	.	.
2.05	0.0500	0.33	.Q	.	.	.	.
2.20	0.0542	0.33	.Q	.	.	.	.
2.35	0.0583	0.34	.Q	.	.	.	.
2.50	0.0625	0.34	.Q	.	.	.	.
2.65	0.0667	0.34	.Q	.	.	.	.
2.80	0.0710	0.34	.Q	.	.	.	.

BLDG5

2.95	0.0752	0.34	.Q	.	.	.	.
3.10	0.0795	0.35	.Q	.	.	.	.
3.25	0.0838	0.35	.Q	.	.	.	.
3.40	0.0881	0.35	.Q	.	.	.	.
3.55	0.0925	0.35	.Q	.	.	.	.
3.70	0.0968	0.35	.Q	.	.	.	.
3.85	0.1012	0.36	.Q	.	.	.	.
4.00	0.1057	0.36	.Q	.	.	.	.
4.15	0.1101	0.36	.Q	.	.	.	.
4.30	0.1146	0.36	.Q	.	.	.	.
4.45	0.1191	0.37	.Q	.	.	.	.
4.60	0.1236	0.37	.Q	.	.	.	.
4.75	0.1282	0.37	.Q	.	.	.	.
4.90	0.1328	0.37	.Q	.	.	.	.
5.05	0.1374	0.37	.Q	.	.	.	.
5.20	0.1421	0.38	.Q	.	.	.	.
5.35	0.1468	0.38	.Q	.	.	.	.
5.50	0.1515	0.38	.Q	.	.	.	.
5.65	0.1562	0.39	.Q	.	.	.	.
5.80	0.1610	0.39	.Q	.	.	.	.
5.95	0.1658	0.39	.Q	.	.	.	.
6.10	0.1707	0.39	.Q	.	.	.	.
6.25	0.1756	0.40	.Q	.	.	.	.
6.40	0.1805	0.40	.Q	.	.	.	.
6.55	0.1855	0.40	.Q	.	.	.	.
6.70	0.1905	0.40	.Q	.	.	.	.
6.85	0.1955	0.41	.Q	.	.	.	.
7.00	0.2006	0.41	.Q	.	.	.	.
7.15	0.2057	0.42	.Q	.	.	.	.
7.30	0.2109	0.42	.Q	.	.	.	.
7.45	0.2161	0.42	.Q	.	.	.	.
7.60	0.2213	0.42	.Q	.	.	.	.
7.75	0.2266	0.43	.Q	.	.	.	.
7.90	0.2320	0.43	.Q	.	.	.	.
8.05	0.2374	0.44	.Q	.	.	.	.
8.20	0.2428	0.44	.Q	.	.	.	.
8.35	0.2483	0.45	.Q	.	.	.	.
8.50	0.2538	0.45	.Q	.	.	.	.
8.65	0.2594	0.45	.Q	.	.	.	.
8.80	0.2651	0.46	.Q	.	.	.	.
8.95	0.2708	0.46	.Q	.	.	.	.
9.10	0.2765	0.47	.Q	.	.	.	.
9.25	0.2824	0.47	.Q	.	.	.	.
9.40	0.2883	0.48	.Q	.	.	.	.
9.55	0.2942	0.48	.Q	.	.	.	.
9.70	0.3002	0.49	.Q	.	.	.	.
9.85	0.3063	0.49	.Q	.	.	.	.
10.00	0.3125	0.50	.Q	.	.	.	.
10.15	0.3187	0.51	. Q	.	.	.	.
10.30	0.3250	0.51	. Q	.	.	.	.
10.45	0.3314	0.52	. Q	.	.	.	.
10.60	0.3379	0.52	. Q	.	.	.	.
10.75	0.3444	0.53	. Q	.	.	.	.
10.90	0.3511	0.54	. Q	.	.	.	.
11.05	0.3578	0.55	. Q	.	.	.	.
11.20	0.3647	0.55	. Q	.	.	.	.
11.35	0.3716	0.57	. Q	.	.	.	.
11.50	0.3787	0.57	. Q	.	.	.	.
11.65	0.3858	0.58	. Q	.	.	.	.
11.80	0.3931	0.59	. Q	.	.	.	.
11.95	0.4005	0.60	. Q	.	.	.	.
12.10	0.4080	0.61	. Q	.	.	.	.
12.25	0.4162	0.70	. Q	.	.	.	.
12.40	0.4249	0.71	. Q	.	.	.	.
12.55	0.4337	0.72	. Q	.	.	.	.
12.70	0.4428	0.73	. Q	.	.	.	.
12.85	0.4519	0.75	. Q	.	.	.	.

BLDG5

13.00	0.4613	0.76	.	Q	.	.	.	.
13.15	0.4709	0.78	.	Q	.	.	.	.
13.30	0.4807	0.79	.	Q	.	.	.	.
13.45	0.4907	0.82	.	Q	.	.	.	.
13.60	0.5009	0.83	.	Q	.	.	.	.
13.75	0.5114	0.86	.	Q	.	.	.	.
13.90	0.5222	0.88	.	Q	.	.	.	.
14.05	0.5334	0.91	.	Q	.	.	.	.
14.20	0.5446	0.91	.	Q	.	.	.	.
14.35	0.5562	0.95	.	Q	.	.	.	.
14.50	0.5681	0.98	.	Q	.	.	.	.
14.65	0.5806	1.03	.	Q	.	.	.	.
14.80	0.5936	1.07	.	Q	.	.	.	.
14.95	0.6073	1.15	.	Q	.	.	.	.
15.10	0.6218	1.19	.	Q	.	.	.	.
15.25	0.6373	1.31	.	Q	.	.	.	.
15.40	0.6541	1.39	.	Q	.	.	.	.
15.55	0.6705	1.25	.	Q	.	.	.	.
15.70	0.6870	1.41	.	Q	.	.	.	.
15.85	0.7079	1.97	.	Q	.	.	.	.
16.00	0.7370	2.73	.	Q	.	.	.	.
16.15	0.8072	8.58	.	.	.	.	Q	.
16.30	0.8705	1.63	.	Q	.	.	.	.
16.45	0.8883	1.25	.	Q	.	.	.	.
16.60	0.9038	1.25	.	Q	.	.	.	.
16.75	0.9184	1.10	.	Q	.	.	.	.
16.90	0.9314	1.00	.	Q	.	.	.	.
17.05	0.9434	0.93	.	Q	.	.	.	.
17.20	0.9547	0.90	.	Q	.	.	.	.
17.35	0.9655	0.85	.	Q	.	.	.	.
17.50	0.9758	0.81	.	Q	.	.	.	.
17.65	0.9856	0.77	.	Q	.	.	.	.
17.80	0.9950	0.74	.	Q	.	.	.	.
17.95	1.0040	0.71	.	Q	.	.	.	.
18.10	1.0127	0.69	.	Q	.	.	.	.
18.25	1.0207	0.60	.	Q	.	.	.	.
18.40	1.0280	0.58	.	Q	.	.	.	.
18.55	1.0350	0.56	.	Q	.	.	.	.
18.70	1.0419	0.54	.	Q	.	.	.	.
18.85	1.0485	0.53	.	Q	.	.	.	.
19.00	1.0550	0.52	.	Q	.	.	.	.
19.15	1.0613	0.50	.	Q	.	.	.	.
19.30	1.0674	0.49	.	Q	.	.	.	.
19.45	1.0735	0.48	.	Q	.	.	.	.
19.60	1.0794	0.47	.	Q	.	.	.	.
19.75	1.0851	0.46	.	Q	.	.	.	.
19.90	1.0908	0.45	.	Q	.	.	.	.
20.05	1.0963	0.44	.	Q	.	.	.	.
20.20	1.1017	0.43	.	Q	.	.	.	.
20.35	1.1071	0.43	.	Q	.	.	.	.
20.50	1.1123	0.42	.	Q	.	.	.	.
20.65	1.1175	0.41	.	Q	.	.	.	.
20.80	1.1226	0.41	.	Q	.	.	.	.
20.95	1.1276	0.40	.	Q	.	.	.	.
21.10	1.1325	0.39	.	Q	.	.	.	.
21.25	1.1374	0.39	.	Q	.	.	.	.
21.40	1.1422	0.38	.	Q	.	.	.	.
21.55	1.1469	0.38	.	Q	.	.	.	.
21.70	1.1515	0.37	.	Q	.	.	.	.
21.85	1.1561	0.37	.	Q	.	.	.	.
22.00	1.1607	0.36	.	Q	.	.	.	.
22.15	1.1651	0.36	.	Q	.	.	.	.
22.30	1.1696	0.35	.	Q	.	.	.	.
22.45	1.1739	0.35	.	Q	.	.	.	.
22.60	1.1783	0.35	.	Q	.	.	.	.
22.75	1.1825	0.34	.	Q	.	.	.	.
22.90	1.1868	0.34	.	Q	.	.	.	.

BLDG5					
23.05	1.1910	0.34	.Q	.	.
23.20	1.1951	0.33	.Q	.	.
23.35	1.1992	0.33	.Q	.	.
23.50	1.2032	0.33	.Q	.	.
23.65	1.2073	0.32	.Q	.	.
23.80	1.2112	0.32	.Q	.	.
23.95	1.2152	0.32	.Q	.	.
24.10	1.2191	0.31	.Q	.	.
24.25	1.2210	0.00	Q	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

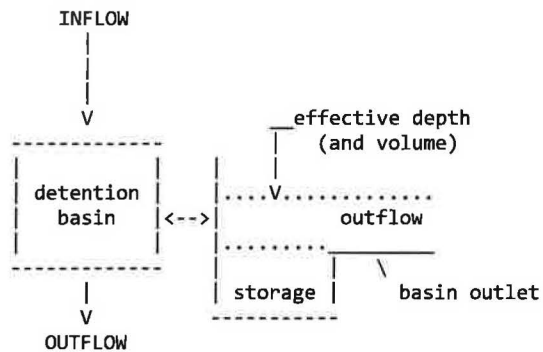
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.0
10%	216.0
20%	27.0
30%	18.0
40%	9.0
50%	9.0
60%	9.0
70%	9.0
80%	9.0
90%	9.0

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 5 TRUCK YARD (NODE 211)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 9.000
 DEAD STORAGE(AF) = 0.00
 SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
 ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 6

*BASIN-DEPTH	STORAGE	OUTFLOW	**BASIN-DEPTH	STORAGE	OUTFLOW
*(FEET)	(ACRE-FEET)	(CFS)	*(FEET)	(ACRE-FEET)	(CFS)
* 0.000	0.000	0.000	** 0.280	0.010	3.000

				BLDG5		
*	0.480	0.020	3.200**	0.680	0.060	3.400*
*	0.880	0.110	3.600**	1.080	0.170	3.800*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.28	-0.00860	0.02860
3	0.48	0.00017	0.03983
4	0.68	0.03893	0.08107
5	0.88	0.08769	0.13231
6	1.08	0.14645	0.19355

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.100	0.000	0.00	0.00	0.00	0.000
0.250	0.000	0.31	0.04	0.20	0.001
0.400	0.000	0.32	0.04	0.41	0.001
0.550	0.000	0.32	0.04	0.41	0.001
0.700	0.000	0.32	0.04	0.41	0.001
0.850	0.000	0.32	0.04	0.42	0.001
1.000	0.000	0.32	0.04	0.42	0.001
1.150	0.000	0.32	0.04	0.42	0.001
1.300	0.000	0.32	0.04	0.42	0.001
1.450	0.000	0.33	0.04	0.42	0.001
1.600	0.000	0.33	0.04	0.43	0.001
1.750	0.000	0.33	0.04	0.43	0.001
1.900	0.000	0.33	0.04	0.43	0.001
2.050	0.000	0.33	0.04	0.43	0.001
2.200	0.000	0.33	0.04	0.43	0.001
2.350	0.000	0.34	0.04	0.44	0.001
2.500	0.000	0.34	0.04	0.44	0.001
2.650	0.000	0.34	0.04	0.44	0.001
2.800	0.000	0.34	0.04	0.44	0.001
2.950	0.000	0.34	0.04	0.45	0.001
3.100	0.000	0.35	0.04	0.45	0.001
3.250	0.000	0.35	0.04	0.45	0.002
3.400	0.000	0.35	0.04	0.45	0.002
3.550	0.000	0.35	0.04	0.46	0.002
3.700	0.000	0.35	0.04	0.46	0.002
3.850	0.000	0.36	0.04	0.46	0.002
4.000	0.000	0.36	0.04	0.46	0.002
4.150	0.000	0.36	0.04	0.47	0.002
4.300	0.000	0.36	0.04	0.47	0.002
4.450	0.000	0.37	0.04	0.47	0.002
4.600	0.000	0.37	0.04	0.48	0.002
4.750	0.000	0.37	0.04	0.48	0.002
4.900	0.000	0.37	0.05	0.48	0.002
5.050	0.000	0.37	0.05	0.49	0.002
5.200	0.000	0.38	0.05	0.49	0.002
5.350	0.000	0.38	0.05	0.49	0.002
5.500	0.000	0.38	0.05	0.50	0.002
5.650	0.000	0.39	0.05	0.50	0.002
5.800	0.000	0.39	0.05	0.50	0.002
5.950	0.000	0.39	0.05	0.51	0.002
6.100	0.000	0.39	0.05	0.51	0.002
6.250	0.000	0.40	0.05	0.51	0.002
6.400	0.000	0.40	0.05	0.52	0.002
6.550	0.000	0.40	0.05	0.52	0.002
6.700	0.000	0.40	0.05	0.52	0.002

BLDG5					
6.850	0.000	0.41	0.05	0.53	0.002
7.000	0.000	0.41	0.05	0.53	0.002
7.150	0.000	0.42	0.05	0.54	0.002
7.300	0.000	0.42	0.05	0.54	0.002
7.450	0.000	0.42	0.05	0.55	0.002
7.600	0.000	0.42	0.05	0.55	0.002
7.750	0.000	0.43	0.05	0.56	0.002
7.900	0.000	0.43	0.05	0.56	0.002
8.050	0.000	0.44	0.05	0.57	0.002
8.200	0.000	0.44	0.05	0.57	0.002
8.350	0.000	0.45	0.05	0.58	0.002
8.500	0.000	0.45	0.05	0.58	0.002
8.650	0.000	0.45	0.06	0.59	0.002
8.800	0.000	0.46	0.06	0.59	0.002
8.950	0.000	0.46	0.06	0.60	0.002
9.100	0.000	0.47	0.06	0.60	0.002
9.250	0.000	0.47	0.06	0.61	0.002
9.400	0.000	0.48	0.06	0.62	0.002
9.550	0.000	0.48	0.06	0.62	0.002
9.700	0.000	0.49	0.06	0.63	0.002
9.850	0.000	0.49	0.06	0.64	0.002
10.000	0.000	0.50	0.06	0.65	0.002
10.150	0.000	0.51	0.06	0.65	0.002
10.300	0.000	0.51	0.06	0.66	0.002
10.450	0.000	0.52	0.06	0.67	0.002
10.600	0.000	0.52	0.06	0.68	0.002
10.750	0.000	0.53	0.06	0.69	0.002
10.900	0.000	0.54	0.07	0.70	0.002
11.050	0.000	0.55	0.07	0.71	0.002
11.200	0.000	0.55	0.07	0.72	0.002
11.350	0.000	0.57	0.07	0.73	0.002
11.500	0.000	0.57	0.07	0.74	0.002
11.650	0.000	0.58	0.07	0.75	0.003
11.800	0.000	0.59	0.07	0.76	0.003
11.950	0.000	0.60	0.07	0.78	0.003
12.100	0.000	0.61	0.07	0.79	0.003
12.250	0.000	0.70	0.08	0.85	0.003
12.400	0.000	0.71	0.09	0.91	0.003
12.550	0.000	0.72	0.09	0.93	0.003
12.700	0.000	0.73	0.09	0.95	0.003
12.850	0.000	0.75	0.09	0.96	0.003
13.000	0.000	0.76	0.09	0.98	0.003
13.150	0.000	0.78	0.10	1.00	0.003
13.300	0.000	0.79	0.10	1.03	0.003
13.450	0.000	0.82	0.10	1.05	0.004
13.600	0.000	0.83	0.10	1.07	0.004
13.750	0.000	0.86	0.10	1.10	0.004
13.900	0.000	0.88	0.11	1.13	0.004
14.050	0.000	0.91	0.11	1.17	0.004
14.200	0.000	0.91	0.11	1.18	0.004
14.350	0.000	0.95	0.12	1.21	0.004
14.500	0.000	0.98	0.12	1.25	0.004
14.650	0.000	1.03	0.13	1.31	0.004
14.800	0.000	1.07	0.13	1.37	0.005
14.950	0.000	1.15	0.14	1.44	0.005
15.100	0.000	1.19	0.14	1.52	0.005
15.250	0.000	1.31	0.16	1.63	0.006
15.400	0.000	1.39	0.17	1.76	0.006
15.550	0.000	1.25	0.15	1.72	0.005
15.700	0.000	1.41	0.17	1.73	0.006
15.850	0.000	1.97	0.24	2.20	0.009
16.000	0.000	2.73	0.37	2.83	0.015
16.150	0.000	8.58	0.78	3.30	0.085
16.300	0.000	1.63	0.69	3.45	0.062
16.450	0.000	1.25	0.56	3.34	0.036
16.600	0.000	1.25	0.33	3.16	0.012
16.750	0.000	1.10	0.13	2.24	0.005

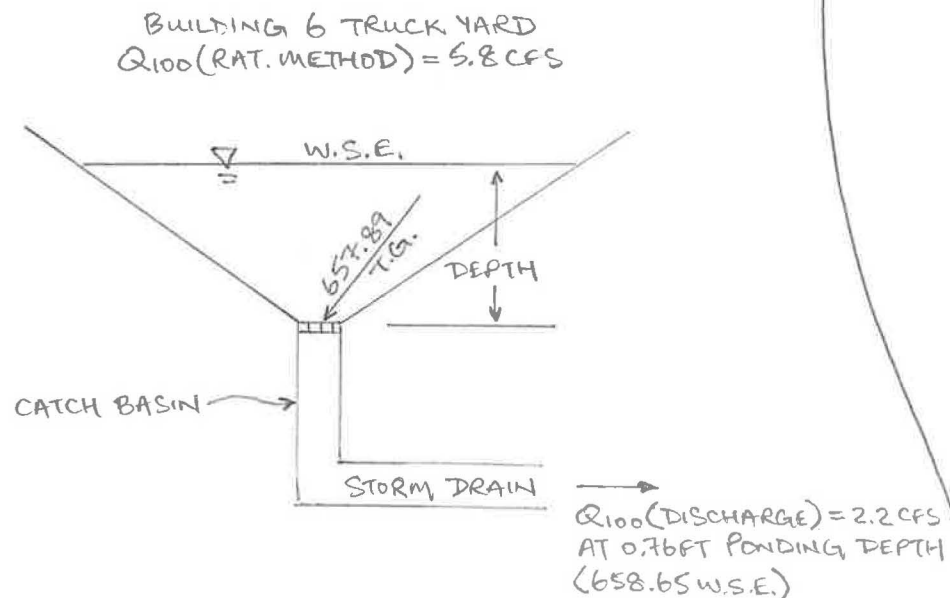
← Q₁₀₀(DISCHARGE) = 3.5 CFS
 DEPTH = 0.78 FT
 VOLUME = 0.085 AC-FT

BLDG5

16.900	0.000	1.00	0.12	1.37	0.004
17.050	0.000	0.93	0.11	1.26	0.004
17.200	0.000	0.90	0.11	1.19	0.004
17.350	0.000	0.85	0.10	1.13	0.004
17.500	0.000	0.81	0.10	1.08	0.003
17.650	0.000	0.77	0.09	1.03	0.003
17.800	0.000	0.74	0.09	0.98	0.003
17.950	0.000	0.71	0.09	0.95	0.003
18.100	0.000	0.69	0.08	0.91	0.003
18.250	0.000	0.60	0.07	0.84	0.003
18.400	0.000	0.58	0.07	0.76	0.003
18.550	0.000	0.56	0.07	0.74	0.002
18.700	0.000	0.54	0.07	0.72	0.002
18.850	0.000	0.53	0.06	0.70	0.002
19.000	0.000	0.52	0.06	0.68	0.002
19.150	0.000	0.50	0.06	0.66	0.002
19.300	0.000	0.49	0.06	0.65	0.002
19.450	0.000	0.48	0.06	0.63	0.002
19.600	0.000	0.47	0.06	0.62	0.002
19.750	0.000	0.46	0.06	0.60	0.002
19.900	0.000	0.45	0.05	0.59	0.002
20.050	0.000	0.44	0.05	0.58	0.002
20.200	0.000	0.43	0.05	0.57	0.002
20.350	0.000	0.43	0.05	0.56	0.002
20.500	0.000	0.42	0.05	0.55	0.002
20.650	0.000	0.41	0.05	0.54	0.002
20.800	0.000	0.41	0.05	0.53	0.002
20.950	0.000	0.40	0.05	0.52	0.002
21.100	0.000	0.39	0.05	0.52	0.002
21.250	0.000	0.39	0.05	0.51	0.002
21.400	0.000	0.38	0.05	0.50	0.002
21.550	0.000	0.38	0.05	0.50	0.002
21.700	0.000	0.37	0.05	0.49	0.002
21.850	0.000	0.37	0.04	0.48	0.002
22.000	0.000	0.36	0.04	0.48	0.002
22.150	0.000	0.36	0.04	0.47	0.002
22.300	0.000	0.35	0.04	0.46	0.002
22.450	0.000	0.35	0.04	0.46	0.002
22.600	0.000	0.35	0.04	0.45	0.002
22.750	0.000	0.34	0.04	0.45	0.001
22.900	0.000	0.34	0.04	0.44	0.001
23.050	0.000	0.34	0.04	0.44	0.001
23.200	0.000	0.33	0.04	0.43	0.001
23.350	0.000	0.33	0.04	0.43	0.001
23.500	0.000	0.33	0.04	0.43	0.001
23.650	0.000	0.32	0.04	0.42	0.001
23.800	0.000	0.32	0.04	0.42	0.001
23.950	0.000	0.32	0.04	0.41	0.001
24.100	0.000	0.31	0.04	0.41	0.001
24.250	0.000	0.00	0.00	0.20	0.000
24.400	0.000	0.00	0.00	0.00	0.000

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 6 TRUCK YARD (NODE 121)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
657.89	0.00	0				
			110	110	0.00	1.9
658.20	0.31	710				
			346	456	0.01	2.1
658.40	0.51	2750				
			829	1285	0.03	2.2
658.60	0.71	5540				
			1429	2714	0.06	2.3
658.80	0.91	8750				
			2055	4769	0.11	2.5
659.00	1.11	11800				
			2595	7364	0.17	2.6
659.20	1.31	14150				
			2928	10292	0.24	2.7
659.40	1.51	15130				
			3101	13393	0.31	2.8
659.60	1.71	15880				



ORIFICE EQUATION: $Q = 0.6 * \text{AREA} * \sqrt{64.4 * H}$

\uparrow CROSS-SECTION AREA OF 8" DISCHARGE PIPE
 $= 3.14 * (\frac{4}{12} \text{ FT})^2$
 $= 0.35 \text{ FT}^2$

\uparrow $H = \text{DEPTH} + 1.00 \text{ FT}$

e.g. AT ELEVATION 659.00 (DEPTH = 1.11 FT OR $H = 2.11 \text{ FT}$)

$Q(\text{DISCHARGE}) = 0.6 * 0.35 * \sqrt{64.4 * 2.11} = 2.5 \text{ CFS}$

 SMALL AREA UNIT HYDROGRAPH MODEL
 =====

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 6 TRUCK YARD (NODE 121)

 RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 1.55
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 6.10
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.63
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.13

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.04	0.0003	0.16	Q	.	.	.	.
0.14	0.0016	0.16	Q	.	.	.	.
0.24	0.0030	0.16	Q	.	.	.	.
0.34	0.0043	0.16	Q	.	.	.	.
0.45	0.0057	0.16	Q	.	.	.	.
0.55	0.0071	0.16	Q	.	.	.	.
0.65	0.0085	0.16	Q	.	.	.	.
0.75	0.0099	0.16	Q	.	.	.	.
0.85	0.0112	0.17	Q	.	.	.	.
0.95	0.0126	0.17	Q	.	.	.	.
1.06	0.0140	0.17	Q	.	.	.	.
1.16	0.0154	0.17	Q	.	.	.	.
1.26	0.0168	0.17	Q	.	.	.	.
1.36	0.0183	0.17	Q	.	.	.	.
1.46	0.0197	0.17	Q	.	.	.	.
1.56	0.0211	0.17	Q	.	.	.	.
1.67	0.0225	0.17	Q	.	.	.	.
1.77	0.0240	0.17	Q	.	.	.	.
1.87	0.0254	0.17	Q	.	.	.	.

BLDG6

1.97	0.0268	0.17	Q	.	.	.	.
2.07	0.0283	0.17	Q	.	.	.	.
2.17	0.0297	0.17	Q	.	.	.	.
2.28	0.0312	0.17	Q	.	.	.	.
2.38	0.0326	0.17	Q	.	.	.	.
2.48	0.0341	0.18	Q	.	.	.	.
2.58	0.0356	0.18	Q	.	.	.	.
2.68	0.0371	0.18	Q	.	.	.	.
2.78	0.0385	0.18	Q	.	.	.	.
2.88	0.0400	0.18	Q	.	.	.	.
2.99	0.0415	0.18	Q	.	.	.	.
3.09	0.0430	0.18	Q	.	.	.	.
3.19	0.0445	0.18	Q	.	.	.	.
3.29	0.0461	0.18	Q	.	.	.	.
3.39	0.0476	0.18	Q	.	.	.	.
3.50	0.0491	0.18	Q	.	.	.	.
3.60	0.0506	0.18	Q	.	.	.	.
3.70	0.0522	0.18	Q	.	.	.	.
3.80	0.0537	0.18	Q	.	.	.	.
3.90	0.0552	0.18	Q	.	.	.	.
4.00	0.0568	0.19	Q	.	.	.	.
4.11	0.0584	0.19	Q	.	.	.	.
4.21	0.0599	0.19	Q	.	.	.	.
4.31	0.0615	0.19	Q	.	.	.	.
4.41	0.0631	0.19	Q	.	.	.	.
4.51	0.0647	0.19	Q	.	.	.	.
4.61	0.0663	0.19	Q	.	.	.	.
4.72	0.0679	0.19	Q	.	.	.	.
4.82	0.0695	0.19	Q	.	.	.	.
4.92	0.0711	0.19	Q	.	.	.	.
5.02	0.0727	0.19	Q	.	.	.	.
5.12	0.0743	0.19	Q	.	.	.	.
5.22	0.0760	0.20	Q	.	.	.	.
5.32	0.0776	0.20	Q	.	.	.	.
5.43	0.0793	0.20	Q	.	.	.	.
5.53	0.0809	0.20	Q	.	.	.	.
5.63	0.0826	0.20	Q	.	.	.	.
5.73	0.0843	0.20	Q	.	.	.	.
5.83	0.0860	0.20	Q	.	.	.	.
5.93	0.0877	0.20	Q	.	.	.	.
6.04	0.0894	0.20	Q	.	.	.	.
6.14	0.0911	0.20	Q	.	.	.	.
6.24	0.0928	0.20	Q	.	.	.	.
6.34	0.0945	0.21	Q	.	.	.	.
6.44	0.0962	0.21	Q	.	.	.	.
6.55	0.0980	0.21	Q	.	.	.	.
6.65	0.0997	0.21	Q	.	.	.	.
6.75	0.1015	0.21	Q	.	.	.	.
6.85	0.1033	0.21	Q	.	.	.	.
6.95	0.1050	0.21	Q	.	.	.	.
7.05	0.1068	0.21	Q	.	.	.	.
7.16	0.1086	0.22	Q	.	.	.	.
7.26	0.1104	0.22	Q	.	.	.	.
7.36	0.1123	0.22	Q	.	.	.	.
7.46	0.1141	0.22	Q	.	.	.	.
7.56	0.1159	0.22	Q	.	.	.	.
7.66	0.1178	0.22	Q	.	.	.	.
7.76	0.1197	0.22	Q	.	.	.	.
7.87	0.1215	0.22	Q	.	.	.	.
7.97	0.1234	0.23	Q	.	.	.	.
8.07	0.1253	0.23	Q	.	.	.	.
8.17	0.1272	0.23	Q	.	.	.	.
8.27	0.1291	0.23	Q	.	.	.	.
8.38	0.1311	0.23	Q	.	.	.	.
8.48	0.1330	0.23	Q	.	.	.	.
8.58	0.1350	0.23	Q	.	.	.	.
8.68	0.1369	0.24	Q	.	.	.	.

BLDG6

8.78	0.1389	0.24	Q	.	.	.	.
8.88	0.1409	0.24	Q	.	.	.	.
8.99	0.1429	0.24	Q	.	.	.	.
9.09	0.1450	0.24	Q	.	.	.	.
9.19	0.1470	0.24	Q	.	.	.	.
9.29	0.1491	0.25	Q	.	.	.	.
9.39	0.1511	0.25	Q	.	.	.	.
9.49	0.1532	0.25	Q	.	.	.	.
9.60	0.1553	0.25	.Q	.	.	.	.
9.70	0.1574	0.25	.Q	.	.	.	.
9.80	0.1596	0.26	.Q	.	.	.	.
9.90	0.1617	0.26	.Q	.	.	.	.
10.00	0.1639	0.26	.Q	.	.	.	.
10.10	0.1661	0.26	.Q	.	.	.	.
10.20	0.1683	0.26	.Q	.	.	.	.
10.31	0.1705	0.27	.Q	.	.	.	.
10.41	0.1727	0.27	.Q	.	.	.	.
10.51	0.1750	0.27	.Q	.	.	.	.
10.61	0.1773	0.27	.Q	.	.	.	.
10.71	0.1796	0.27	.Q	.	.	.	.
10.82	0.1819	0.28	.Q	.	.	.	.
10.92	0.1842	0.28	.Q	.	.	.	.
11.02	0.1866	0.28	.Q	.	.	.	.
11.12	0.1890	0.29	.Q	.	.	.	.
11.22	0.1914	0.29	.Q	.	.	.	.
11.32	0.1939	0.29	.Q	.	.	.	.
11.43	0.1963	0.30	.Q	.	.	.	.
11.53	0.1988	0.30	.Q	.	.	.	.
11.63	0.2013	0.30	.Q	.	.	.	.
11.73	0.2039	0.30	.Q	.	.	.	.
11.83	0.2065	0.31	.Q	.	.	.	.
11.93	0.2091	0.31	.Q	.	.	.	.
12.03	0.2117	0.32	.Q	.	.	.	.
12.14	0.2145	0.36	.Q	.	.	.	.
12.24	0.2176	0.36	.Q	.	.	.	.
12.34	0.2206	0.36	.Q	.	.	.	.
12.44	0.2237	0.37	.Q	.	.	.	.
12.54	0.2268	0.37	.Q	.	.	.	.
12.65	0.2300	0.38	.Q	.	.	.	.
12.75	0.2332	0.38	.Q	.	.	.	.
12.85	0.2364	0.39	.Q	.	.	.	.
12.95	0.2397	0.39	.Q	.	.	.	.
13.05	0.2431	0.40	.Q	.	.	.	.
13.15	0.2464	0.40	.Q	.	.	.	.
13.26	0.2499	0.41	.Q	.	.	.	.
13.36	0.2534	0.42	.Q	.	.	.	.
13.46	0.2569	0.43	.Q	.	.	.	.
13.56	0.2605	0.43	.Q	.	.	.	.
13.66	0.2642	0.44	.Q	.	.	.	.
13.76	0.2679	0.45	.Q	.	.	.	.
13.87	0.2717	0.46	.Q	.	.	.	.
13.97	0.2756	0.46	.Q	.	.	.	.
14.07	0.2795	0.47	.Q	.	.	.	.
14.17	0.2835	0.47	.Q	.	.	.	.
14.27	0.2875	0.49	.Q	.	.	.	.
14.37	0.2916	0.49	.Q	.	.	.	.
14.48	0.2958	0.51	. Q	.	.	.	.
14.58	0.3002	0.52	. Q	.	.	.	.
14.68	0.3047	0.54	. Q	.	.	.	.
14.78	0.3093	0.56	. Q	.	.	.	.
14.88	0.3141	0.58	. Q	.	.	.	.
14.98	0.3190	0.60	. Q	.	.	.	.
15.09	0.3242	0.64	. Q	.	.	.	.
15.19	0.3297	0.66	. Q	.	.	.	.
15.29	0.3354	0.71	. Q	.	.	.	.
15.39	0.3415	0.74	. Q	.	.	.	.
15.49	0.3472	0.63	. Q	.	.	.	.

BLDG6						
15.59	0.3527	0.68	. Q	.	.	.
15.70	0.3589	0.82	. Q	.	.	.
15.80	0.3661	0.89	. Q	.	.	.
15.90	0.3753	1.29	. Q	.	.	.
16.00	0.3883	1.79	. Q	.	.	.
16.10	0.4193	5.60	.	. Q	.	.
16.20	0.4472	1.05	. Q	.	.	.
16.31	0.4547	0.74	. Q	.	.	.
16.41	0.4604	0.62	. Q	.	.	.
16.51	0.4659	0.68	. Q	.	.	.
16.61	0.4713	0.62	. Q	.	.	.
16.71	0.4763	0.57	. Q	.	.	.
16.81	0.4809	0.53	. Q	.	.	.
16.92	0.4853	0.50	. Q	.	.	.
17.02	0.4894	0.48	.Q	.	.	.
17.12	0.4934	0.47	.Q	.	.	.
17.22	0.4973	0.45	.Q	.	.	.
17.32	0.5010	0.44	.Q	.	.	.
17.42	0.5046	0.42	.Q	.	.	.
17.52	0.5081	0.41	.Q	.	.	.
17.63	0.5115	0.40	.Q	.	.	.
17.73	0.5148	0.39	.Q	.	.	.
17.83	0.5180	0.38	.Q	.	.	.
17.93	0.5211	0.37	.Q	.	.	.
18.03	0.5242	0.36	.Q	.	.	.
18.14	0.5270	0.31	.Q	.	.	.
18.24	0.5296	0.31	.Q	.	.	.
18.34	0.5322	0.30	.Q	.	.	.
18.44	0.5346	0.29	.Q	.	.	.
18.54	0.5371	0.29	.Q	.	.	.
18.64	0.5395	0.28	.Q	.	.	.
18.74	0.5418	0.28	.Q	.	.	.
18.85	0.5441	0.27	.Q	.	.	.
18.95	0.5464	0.27	.Q	.	.	.
19.05	0.5486	0.26	.Q	.	.	.
19.15	0.5508	0.26	.Q	.	.	.
19.25	0.5529	0.25	.Q	.	.	.
19.36	0.5551	0.25	.Q	.	.	.
19.46	0.5571	0.25	Q	.	.	.
19.56	0.5592	0.24	Q	.	.	.
19.66	0.5612	0.24	Q	.	.	.
19.76	0.5632	0.24	Q	.	.	.
19.86	0.5652	0.23	Q	.	.	.
19.97	0.5671	0.23	Q	.	.	.
20.07	0.5691	0.23	Q	.	.	.
20.17	0.5710	0.22	Q	.	.	.
20.27	0.5728	0.22	Q	.	.	.
20.37	0.5747	0.22	Q	.	.	.
20.47	0.5765	0.22	Q	.	.	.
20.58	0.5783	0.21	Q	.	.	.
20.68	0.5801	0.21	Q	.	.	.
20.78	0.5819	0.21	Q	.	.	.
20.88	0.5836	0.21	Q	.	.	.
20.98	0.5854	0.21	Q	.	.	.
21.08	0.5871	0.20	Q	.	.	.
21.18	0.5888	0.20	Q	.	.	.
21.29	0.5905	0.20	Q	.	.	.
21.39	0.5921	0.20	Q	.	.	.
21.49	0.5938	0.20	Q	.	.	.
21.59	0.5954	0.19	Q	.	.	.
21.69	0.5971	0.19	Q	.	.	.
21.80	0.5987	0.19	Q	.	.	.
21.90	0.6003	0.19	Q	.	.	.
22.00	0.6018	0.19	Q	.	.	.
22.10	0.6034	0.19	Q	.	.	.
22.20	0.6050	0.18	Q	.	.	.
22.30	0.6065	0.18	Q	.	.	.

BLDG6

22.41	0.6080	0.18	Q	.	.	.	.
22.51	0.6095	0.18	Q	.	.	.	.
22.61	0.6111	0.18	Q	.	.	.	.
22.71	0.6125	0.18	Q	.	.	.	.
22.81	0.6140	0.18	Q	.	.	.	.
22.91	0.6155	0.17	Q	.	.	.	.
23.02	0.6170	0.17	Q	.	.	.	.
23.12	0.6184	0.17	Q	.	.	.	.
23.22	0.6199	0.17	Q	.	.	.	.
23.32	0.6213	0.17	Q	.	.	.	.
23.42	0.6227	0.17	Q	.	.	.	.
23.52	0.6241	0.17	Q	.	.	.	.
23.62	0.6255	0.17	Q	.	.	.	.
23.73	0.6269	0.17	Q	.	.	.	.
23.83	0.6283	0.16	Q	.	.	.	.
23.93	0.6297	0.16	Q	.	.	.	.
24.03	0.6310	0.16	Q	.	.	.	.
24.13	0.6317	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

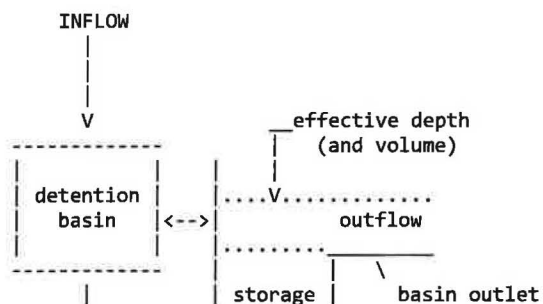
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1445.7
10%	115.9
20%	18.3
30%	12.2
40%	6.1
50%	6.1
60%	6.1
70%	6.1
80%	6.1
90%	6.1

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 6 TRUCK YARD (NODE 121)

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
 CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 6.100
 DEAD STORAGE(AF) = 0.00
 SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
 ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



V

OUTFLOW

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 9

*BASIN-DEPTH	STORAGE	OUTFLOW	**BASIN-DEPTH	STORAGE	OUTFLOW	*
(FEET)	(ACRE-FEET)	(CFS)	(FEET)	(ACRE-FEET)	(CFS)	
* 0.000	0.000	0.000**	0.310	0.003	1.900*	
* 0.510	0.010	2.100**	0.710	0.030	2.200*	
* 0.910	0.060	2.300**	1.110	0.110	2.500*	
* 1.310	0.170	2.600**	1.510	0.240	2.700*	
* 1.710	0.310	2.800**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.31	-0.00498	0.01098
3	0.51	0.00118	0.01882
4	0.71	0.02076	0.03924
5	0.91	0.05034	0.06966
6	1.11	0.09950	0.12050
7	1.31	0.15908	0.18092
8	1.51	0.22866	0.25134
9	1.71	0.29824	0.32176

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.038	0.000	0.16	0.04	0.12	0.000
0.140	0.000	0.16	0.04	0.24	0.000
0.242	0.000	0.16	0.04	0.24	0.000
0.343	0.000	0.16	0.04	0.24	0.000
0.445	0.000	0.16	0.04	0.24	0.000
0.547	0.000	0.16	0.04	0.24	0.000
0.648	0.000	0.16	0.04	0.24	0.000
0.750	0.000	0.16	0.04	0.24	0.000
0.852	0.000	0.17	0.04	0.24	0.000
0.953	0.000	0.17	0.04	0.24	0.000
1.055	0.000	0.17	0.04	0.24	0.000
1.157	0.000	0.17	0.04	0.24	0.000
1.258	0.000	0.17	0.04	0.24	0.000
1.360	0.000	0.17	0.04	0.24	0.000
1.462	0.000	0.17	0.04	0.25	0.000
1.563	0.000	0.17	0.04	0.25	0.000
1.665	0.000	0.17	0.04	0.25	0.000
1.767	0.000	0.17	0.04	0.25	0.000
1.868	0.000	0.17	0.04	0.25	0.000
1.970	0.000	0.17	0.04	0.25	0.000
2.072	0.000	0.17	0.04	0.25	0.000
2.173	0.000	0.17	0.04	0.25	0.000
2.275	0.000	0.17	0.04	0.25	0.000
2.377	0.000	0.17	0.04	0.25	0.000
2.478	0.000	0.18	0.04	0.25	0.000
2.580	0.000	0.18	0.04	0.25	0.000
2.682	0.000	0.18	0.04	0.26	0.000
2.783	0.000	0.18	0.04	0.26	0.000
2.885	0.000	0.18	0.04	0.26	0.000
2.987	0.000	0.18	0.04	0.26	0.000
3.088	0.000	0.18	0.04	0.26	0.000

				BLDG6	
3.190	0.000	0.18	0.04	0.26	0.000
3.292	0.000	0.18	0.04	0.26	0.000
3.393	0.000	0.18	0.04	0.26	0.000
3.495	0.000	0.18	0.04	0.26	0.000
3.597	0.000	0.18	0.04	0.26	0.000
3.698	0.000	0.18	0.04	0.27	0.000
3.800	0.000	0.18	0.04	0.27	0.000
3.902	0.000	0.18	0.04	0.27	0.000
4.003	0.000	0.19	0.04	0.27	0.000
4.105	0.000	0.19	0.04	0.27	0.000
4.207	0.000	0.19	0.04	0.27	0.000
4.308	0.000	0.19	0.04	0.27	0.000
4.410	0.000	0.19	0.04	0.27	0.000
4.512	0.000	0.19	0.04	0.27	0.000
4.613	0.000	0.19	0.05	0.28	0.000
4.715	0.000	0.19	0.05	0.28	0.000
4.817	0.000	0.19	0.05	0.28	0.000
4.918	0.000	0.19	0.05	0.28	0.000
5.020	0.000	0.19	0.05	0.28	0.000
5.122	0.000	0.19	0.05	0.28	0.000
5.223	0.000	0.20	0.05	0.28	0.000
5.325	0.000	0.20	0.05	0.28	0.000
5.427	0.000	0.20	0.05	0.29	0.000
5.528	0.000	0.20	0.05	0.29	0.000
5.630	0.000	0.20	0.05	0.29	0.000
5.732	0.000	0.20	0.05	0.29	0.000
5.833	0.000	0.20	0.05	0.29	0.000
5.935	0.000	0.20	0.05	0.29	0.000
6.037	0.000	0.20	0.05	0.29	0.000
6.138	0.000	0.20	0.05	0.30	0.000
6.240	0.000	0.20	0.05	0.30	0.000
6.342	0.000	0.21	0.05	0.30	0.000
6.443	0.000	0.21	0.05	0.30	0.000
6.545	0.000	0.21	0.05	0.30	0.000
6.647	0.000	0.21	0.05	0.30	0.000
6.748	0.000	0.21	0.05	0.30	0.000
6.850	0.000	0.21	0.05	0.31	0.000
6.952	0.000	0.21	0.05	0.31	0.000
7.053	0.000	0.21	0.05	0.31	0.000
7.155	0.000	0.22	0.05	0.31	0.000
7.257	0.000	0.22	0.05	0.31	0.000
7.358	0.000	0.22	0.05	0.31	0.000
7.460	0.000	0.22	0.05	0.32	0.001
7.562	0.000	0.22	0.05	0.32	0.001
7.663	0.000	0.22	0.05	0.32	0.001
7.765	0.000	0.22	0.05	0.32	0.001
7.867	0.000	0.22	0.05	0.32	0.001
7.968	0.000	0.23	0.05	0.33	0.001
8.070	0.000	0.23	0.05	0.33	0.001
8.172	0.000	0.23	0.05	0.33	0.001
8.273	0.000	0.23	0.05	0.33	0.001
8.375	0.000	0.23	0.05	0.33	0.001
8.477	0.000	0.23	0.06	0.34	0.001
8.578	0.000	0.23	0.06	0.34	0.001
8.680	0.000	0.24	0.06	0.34	0.001
8.782	0.000	0.24	0.06	0.34	0.001
8.883	0.000	0.24	0.06	0.35	0.001
8.985	0.000	0.24	0.06	0.35	0.001
9.087	0.000	0.24	0.06	0.35	0.001
9.188	0.000	0.24	0.06	0.35	0.001
9.290	0.000	0.25	0.06	0.36	0.001
9.392	0.000	0.25	0.06	0.36	0.001
9.493	0.000	0.25	0.06	0.36	0.001
9.595	0.000	0.25	0.06	0.36	0.001
9.697	0.000	0.25	0.06	0.37	0.001
9.798	0.000	0.26	0.06	0.37	0.001
9.900	0.000	0.26	0.06	0.37	0.001

				BLDG6	
10.002	0.000	0.26	0.06	0.38	0.001
10.103	0.000	0.26	0.06	0.38	0.001
10.205	0.000	0.26	0.06	0.38	0.001
10.307	0.000	0.27	0.06	0.38	0.001
10.408	0.000	0.27	0.06	0.39	0.001
10.510	0.000	0.27	0.06	0.39	0.001
10.612	0.000	0.27	0.06	0.39	0.001
10.713	0.000	0.27	0.07	0.40	0.001
10.815	0.000	0.28	0.07	0.40	0.001
10.917	0.000	0.28	0.07	0.41	0.001
11.018	0.000	0.28	0.07	0.41	0.001
11.120	0.000	0.29	0.07	0.41	0.001
11.222	0.000	0.29	0.07	0.42	0.001
11.323	0.000	0.29	0.07	0.42	0.001
11.425	0.000	0.30	0.07	0.43	0.001
11.527	0.000	0.30	0.07	0.43	0.001
11.628	0.000	0.30	0.07	0.44	0.001
11.730	0.000	0.30	0.07	0.44	0.001
11.832	0.000	0.31	0.07	0.45	0.001
11.933	0.000	0.31	0.07	0.45	0.001
12.035	0.000	0.32	0.08	0.46	0.001
12.137	0.000	0.36	0.08	0.49	0.001
12.238	0.000	0.36	0.09	0.52	0.001
12.340	0.000	0.36	0.09	0.53	0.001
12.442	0.000	0.37	0.09	0.53	0.001
12.543	0.000	0.37	0.09	0.54	0.001
12.645	0.000	0.38	0.09	0.55	0.001
12.747	0.000	0.38	0.09	0.55	0.001
12.848	0.000	0.39	0.09	0.56	0.001
12.950	0.000	0.39	0.09	0.57	0.001
13.052	0.000	0.40	0.10	0.58	0.001
13.153	0.000	0.40	0.10	0.59	0.001
13.255	0.000	0.41	0.10	0.59	0.001
13.357	0.000	0.42	0.10	0.60	0.001
13.458	0.000	0.43	0.10	0.61	0.001
13.560	0.000	0.43	0.10	0.62	0.001
13.662	0.000	0.44	0.10	0.63	0.001
13.763	0.000	0.45	0.11	0.65	0.001
13.865	0.000	0.46	0.11	0.66	0.001
13.967	0.000	0.46	0.11	0.67	0.001
14.068	0.000	0.47	0.11	0.68	0.001
14.170	0.000	0.47	0.11	0.68	0.001
14.272	0.000	0.49	0.12	0.69	0.001
14.373	0.000	0.49	0.12	0.71	0.001
14.475	0.000	0.51	0.12	0.73	0.001
14.577	0.000	0.52	0.12	0.75	0.001
14.678	0.000	0.54	0.13	0.78	0.001
14.780	0.000	0.56	0.13	0.80	0.001
14.882	0.000	0.58	0.14	0.83	0.001
14.983	0.000	0.60	0.14	0.86	0.001
15.085	0.000	0.64	0.15	0.90	0.001
15.187	0.000	0.66	0.16	0.94	0.002
15.288	0.000	0.71	0.17	0.99	0.002
15.390	0.000	0.74	0.18	1.05	0.002
15.492	0.000	0.63	0.15	0.99	0.001
15.593	0.000	0.68	0.16	0.95	0.002
15.695	0.000	0.82	0.19	1.09	0.002
15.797	0.000	0.89	0.21	1.25	0.002
15.898	0.000	1.29	0.31	1.59	0.003
16.000	0.000	1.79	0.41	1.94	0.007
16.102	0.000	5.60	0.76	2.11	0.038
16.203	0.000	1.05	0.69	2.21	0.028
16.305	0.000	0.74	0.57	2.16	0.016
16.407	0.000	0.62	0.34	2.03	0.004
16.508	0.000	0.68	0.16	1.46	0.002
16.610	0.000	0.62	0.15	0.94	0.001
16.712	0.000	0.57	0.14	0.86	0.001

$Q_{100}(\text{DISCHARGE}) = 2.2 \text{ CFS}$
 DEPTH = 0.76 FT
 VOLUME = 0.038 AC-FT

				BLDG6	
16.813	0.000	0.53	0.13	0.80	0.001
16.915	0.000	0.50	0.12	0.75	0.001
17.017	0.000	0.48	0.11	0.71	0.001
17.118	0.000	0.47	0.11	0.69	0.001
17.220	0.000	0.45	0.11	0.67	0.001
17.322	0.000	0.44	0.10	0.65	0.001
17.423	0.000	0.42	0.10	0.62	0.001
17.525	0.000	0.41	0.10	0.60	0.001
17.627	0.000	0.40	0.09	0.59	0.001
17.728	0.000	0.39	0.09	0.57	0.001
17.830	0.000	0.38	0.09	0.55	0.001
17.932	0.000	0.37	0.09	0.54	0.001
18.033	0.000	0.36	0.09	0.53	0.001
18.135	0.000	0.31	0.07	0.49	0.001
18.237	0.000	0.31	0.07	0.45	0.001
18.338	0.000	0.30	0.07	0.44	0.001
18.440	0.000	0.29	0.07	0.43	0.001
18.542	0.000	0.29	0.07	0.42	0.001
18.643	0.000	0.28	0.07	0.41	0.001
18.745	0.000	0.28	0.07	0.41	0.001
18.847	0.000	0.27	0.06	0.40	0.001
18.948	0.000	0.27	0.06	0.39	0.001
19.050	0.000	0.26	0.06	0.38	0.001
19.152	0.000	0.26	0.06	0.38	0.001
19.253	0.000	0.25	0.06	0.37	0.001
19.355	0.000	0.25	0.06	0.37	0.001
19.457	0.000	0.25	0.06	0.36	0.001
19.558	0.000	0.24	0.06	0.36	0.001
19.660	0.000	0.24	0.06	0.35	0.001
19.762	0.000	0.24	0.06	0.35	0.001
19.863	0.000	0.23	0.06	0.34	0.001
19.965	0.000	0.23	0.05	0.34	0.001
20.067	0.000	0.23	0.05	0.33	0.001
20.168	0.000	0.22	0.05	0.33	0.001
20.270	0.000	0.22	0.05	0.32	0.001
20.372	0.000	0.22	0.05	0.32	0.001
20.473	0.000	0.22	0.05	0.32	0.000
20.575	0.000	0.21	0.05	0.31	0.000
20.677	0.000	0.21	0.05	0.31	0.000
20.778	0.000	0.21	0.05	0.31	0.000
20.880	0.000	0.21	0.05	0.30	0.000
20.982	0.000	0.21	0.05	0.30	0.000
21.083	0.000	0.20	0.05	0.30	0.000
21.185	0.000	0.20	0.05	0.29	0.000
21.287	0.000	0.20	0.05	0.29	0.000
21.388	0.000	0.20	0.05	0.29	0.000
21.490	0.000	0.20	0.05	0.29	0.000
21.592	0.000	0.19	0.05	0.28	0.000
21.693	0.000	0.19	0.05	0.28	0.000
21.795	0.000	0.19	0.05	0.28	0.000
21.897	0.000	0.19	0.04	0.28	0.000
21.998	0.000	0.19	0.04	0.27	0.000
22.100	0.000	0.19	0.04	0.27	0.000
22.202	0.000	0.18	0.04	0.27	0.000
22.303	0.000	0.18	0.04	0.27	0.000
22.405	0.000	0.18	0.04	0.26	0.000
22.507	0.000	0.18	0.04	0.26	0.000
22.608	0.000	0.18	0.04	0.26	0.000
22.710	0.000	0.18	0.04	0.26	0.000
22.812	0.000	0.18	0.04	0.26	0.000
22.913	0.000	0.17	0.04	0.25	0.000
23.015	0.000	0.17	0.04	0.25	0.000
23.117	0.000	0.17	0.04	0.25	0.000
23.218	0.000	0.17	0.04	0.25	0.000
23.320	0.000	0.17	0.04	0.25	0.000
23.422	0.000	0.17	0.04	0.25	0.000
23.523	0.000	0.17	0.04	0.24	0.000

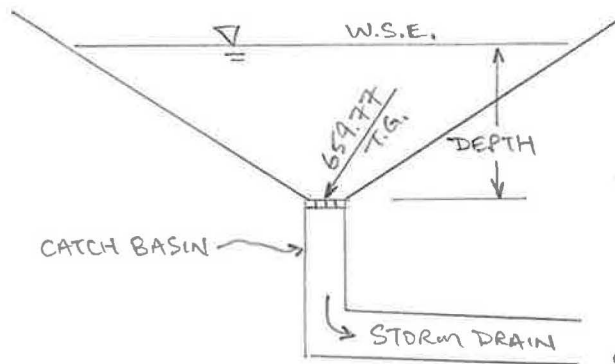
BLDG6

23.625	0.000	0.17	0.04	0.24	0.000
23.727	0.000	0.17	0.04	0.24	0.000
23.828	0.000	0.16	0.04	0.24	0.000
23.930	0.000	0.16	0.04	0.24	0.000
24.032	0.000	0.16	0.04	0.24	0.000
24.133	0.000	0.00	0.00	0.12	0.000
24.235	0.000	0.00	0.00	0.00	0.000

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUILDING 7 TRUCK YARD (NODE 111)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
659.77	0.00	0				
			17	17	0.00	2.9
660.00	0.23	150				
			126	143	0.00	3.2
660.20	0.43	1110				
			402	545	0.01	3.4
660.40	0.63	2910				
			775	1320	0.03	3.6
660.60	0.83	4840				
			1259	2579	0.06	3.8
660.80	1.03	7750				
			1944	4523	0.10	3.9
661.00	1.23	11690				
			2868	7391	0.17	4.1
661.20	1.43	16990				
			3934	11325	0.26	4.3
661.40	1.63	22350				

BUILDING 7 TRUCK YARD
 $Q_{100}(\text{RAT. METHOD}) = 11.1 \text{ cfs}$



$Q_{100}(\text{DISCHARGE}) = 4.0 \text{ cfs}$
 DEPTH = 1.36 FT
 (661.13 W.S.E.)

ORIFICE EQUATION: $Q = 0.6 * \text{AREA} * \sqrt{64.4 * H}$
 $H = \text{DEPTH} + 1.00 \text{ FT}$
 CROSS-SECTION AREA OF 10" DISCHARGE PIPE
 $= 3.14 * (5/12 \text{ FT})^2$
 $= 0.55 \text{ FT}^2$

e.g. AT ELEVATION 661.00 (DEPTH = 1.23 FT OR $H = 2.23 \text{ FT}$)
 $Q(\text{DISCHARGE}) = 0.6 * \text{AREA} * \sqrt{64.4 * 2.23} = 3.9 \text{ cfs}$

 SMALL AREA UNIT HYDROGRAPH MODEL

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 7 TRUCK YARD (NODE 111)

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 4.50
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 12.00
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.83
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.38

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	5.0	10.0	15.0	20.0
0.20	0.0039	0.47	Q	.	.	.	.
0.40	0.0117	0.47	Q	.	.	.	.
0.60	0.0195	0.48	Q	.	.	.	.
0.80	0.0274	0.48	Q	.	.	.	.
1.00	0.0353	0.48	Q	.	.	.	.
1.20	0.0433	0.48	Q	.	.	.	.
1.40	0.0514	0.49	Q	.	.	.	.
1.60	0.0595	0.49	Q	.	.	.	.
1.80	0.0676	0.50	Q	.	.	.	.
2.00	0.0758	0.50	Q	.	.	.	.
2.20	0.0841	0.50	.Q	.	.	.	.
2.40	0.0924	0.50	.Q	.	.	.	.
2.60	0.1008	0.51	.Q	.	.	.	.
2.80	0.1092	0.51	.Q	.	.	.	.
3.00	0.1177	0.52	.Q	.	.	.	.
3.20	0.1263	0.52	.Q	.	.	.	.
3.40	0.1349	0.52	.Q	.	.	.	.
3.60	0.1436	0.53	.Q	.	.	.	.
3.80	0.1523	0.53	.Q	.	.	.	.

BLDG7

4.00	0.1612	0.54	.Q	.	.	.	.
4.20	0.1701	0.54	.Q	.	.	.	.
4.40	0.1790	0.54	.Q	.	.	.	.
4.60	0.1881	0.55	.Q	.	.	.	.
4.80	0.1972	0.55	.Q	.	.	.	.
5.00	0.2064	0.56	.Q	.	.	.	.
5.20	0.2157	0.56	.Q	.	.	.	.
5.40	0.2251	0.57	.Q	.	.	.	.
5.60	0.2345	0.57	.Q	.	.	.	.
5.80	0.2441	0.58	.Q	.	.	.	.
6.00	0.2537	0.58	.Q	.	.	.	.
6.20	0.2634	0.59	.Q	.	.	.	.
6.40	0.2732	0.60	.Q	.	.	.	.
6.60	0.2832	0.60	.Q	.	.	.	.
6.80	0.2932	0.61	.Q	.	.	.	.
7.00	0.3033	0.62	.Q	.	.	.	.
7.20	0.3135	0.62	.Q	.	.	.	.
7.40	0.3239	0.63	.Q	.	.	.	.
7.60	0.3343	0.64	.Q	.	.	.	.
7.80	0.3449	0.65	.Q	.	.	.	.
8.00	0.3556	0.65	.Q	.	.	.	.
8.20	0.3665	0.66	.Q	.	.	.	.
8.40	0.3774	0.67	.Q	.	.	.	.
8.60	0.3885	0.68	.Q	.	.	.	.
8.80	0.3998	0.68	.Q	.	.	.	.
9.00	0.4112	0.70	.Q	.	.	.	.
9.20	0.4227	0.70	.Q	.	.	.	.
9.40	0.4345	0.72	.Q	.	.	.	.
9.60	0.4463	0.72	.Q	.	.	.	.
9.80	0.4584	0.74	.Q	.	.	.	.
10.00	0.4707	0.75	.Q	.	.	.	.
10.20	0.4831	0.76	.Q	.	.	.	.
10.40	0.4958	0.77	.Q	.	.	.	.
10.60	0.5086	0.79	.Q	.	.	.	.
10.80	0.5217	0.80	.Q	.	.	.	.
11.00	0.5351	0.82	.Q	.	.	.	.
11.20	0.5487	0.83	.Q	.	.	.	.
11.40	0.5625	0.85	.Q	.	.	.	.
11.60	0.5767	0.86	.Q	.	.	.	.
11.80	0.5911	0.89	.Q	.	.	.	.
12.00	0.6059	0.90	.Q	.	.	.	.
12.20	0.6219	1.04	. Q	.	.	.	.
12.40	0.6392	1.05	. Q	.	.	.	.
12.60	0.6569	1.09	. Q	.	.	.	.
12.80	0.6751	1.11	. Q	.	.	.	.
13.00	0.6937	1.14	. Q	.	.	.	.
13.20	0.7128	1.17	. Q	.	.	.	.
13.40	0.7324	1.21	. Q	.	.	.	.
13.60	0.7527	1.24	. Q	.	.	.	.
13.80	0.7737	1.30	. Q	.	.	.	.
14.00	0.7954	1.33	. Q	.	.	.	.
14.20	0.8177	1.36	. Q	.	.	.	.
14.40	0.8406	1.41	. Q	.	.	.	.
14.60	0.8647	1.51	. Q	.	.	.	.
14.80	0.8903	1.58	. Q	.	.	.	.
15.00	0.9176	1.73	. Q	.	.	.	.
15.20	0.9470	1.83	. Q	.	.	.	.
15.40	0.9796	2.11	. Q	.	.	.	.
15.60	1.0118	1.78	. Q	.	.	.	.
15.80	1.0473	2.51	. Q	.	.	.	.
16.00	1.0964	3.43	. Q	.	.	.	.
16.20	1.2143	10.83	. Q	.	.Q	.	.
16.40	1.3210	2.07	. Q	.	.	.	.
16.60	1.3542	1.95	. Q	.	.	.	.
16.80	1.3840	1.65	. Q	.	.	.	.
17.00	1.4096	1.46	. Q	.	.	.	.
17.20	1.4330	1.37	. Q	.	.	.	.

BLDG7

17.40	1.4547	1.27	.Q	.	.	.	.
17.60	1.4750	1.19	.Q	.	.	.	.
17.80	1.4942	1.12	.Q	.	.	.	.
18.00	1.5123	1.07	.Q	.	.	.	.
18.20	1.5287	0.92	.Q	.	.	.	.
18.40	1.5435	0.87	.Q	.	.	.	.
18.60	1.5577	0.84	.Q	.	.	.	.
18.80	1.5713	0.81	.Q	.	.	.	.
19.00	1.5844	0.78	.Q	.	.	.	.
19.20	1.5970	0.75	.Q	.	.	.	.
19.40	1.6093	0.73	.Q	.	.	.	.
19.60	1.6212	0.71	.Q	.	.	.	.
19.80	1.6327	0.69	.Q	.	.	.	.
20.00	1.6440	0.67	.Q	.	.	.	.
20.20	1.6549	0.66	.Q	.	.	.	.
20.40	1.6657	0.64	.Q	.	.	.	.
20.60	1.6761	0.63	.Q	.	.	.	.
20.80	1.6863	0.61	.Q	.	.	.	.
21.00	1.6964	0.60	.Q	.	.	.	.
21.20	1.7062	0.59	.Q	.	.	.	.
21.40	1.7158	0.58	.Q	.	.	.	.
21.60	1.7253	0.57	.Q	.	.	.	.
21.80	1.7346	0.56	.Q	.	.	.	.
22.00	1.7437	0.55	.Q	.	.	.	.
22.20	1.7527	0.54	.Q	.	.	.	.
22.40	1.7615	0.53	.Q	.	.	.	.
22.60	1.7702	0.52	.Q	.	.	.	.
22.80	1.7787	0.51	.Q	.	.	.	.
23.00	1.7872	0.51	.Q	.	.	.	.
23.20	1.7955	0.50	Q	.	.	.	.
23.40	1.8037	0.49	Q	.	.	.	.
23.60	1.8118	0.49	Q	.	.	.	.
23.80	1.8198	0.48	Q	.	.	.	.
24.00	1.8277	0.47	Q	.	.	.	.
24.20	1.8316	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1440.0
10%	324.0
20%	36.0
30%	24.0
40%	12.0
50%	12.0
60%	12.0
70%	12.0
80%	12.0
90%	12.0

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
100-YEAR DETENTION IN BUILDING 7 TRUCK YARD (NODE 111)

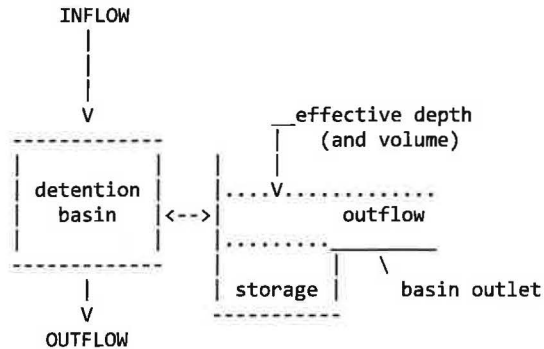
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FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 12.000

BLDG7

DEAD STORAGE(AF) = 0.00
 SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
 ASSUMED INITIAL DEPTH(Feet) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 9

* (FEET)	STORAGE (ACRE-Feet)	OUTFLOW (CFS)	** (FEET)	**STORAGE (ACRE-Feet)	OUTFLOW (CFS)	*
0.000	0.000	0.000**	0.230	0.001	2.900*	
0.430	0.003	3.200**	0.630	0.010	3.400*	
0.830	0.030	3.600**	1.030	0.060	3.800*	
1.230	0.100	3.900**	1.430	0.170	4.100*	
1.630	0.260	4.300**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-Feet)	{S+O*DT/2} (ACRE-Feet)
1	0.00	0.00000	0.00000
2	0.23	-0.02297	0.02497
3	0.43	-0.02345	0.02945
4	0.63	-0.01810	0.03810
5	0.83	0.00025	0.05975
6	1.03	0.02860	0.09140
7	1.23	0.06777	0.13223
8	1.43	0.13612	0.20388
9	1.63	0.22446	0.29554

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.200	0.000	0.47	0.07	0.45	0.000
0.400	0.000	0.47	0.07	0.90	0.000
0.600	0.000	0.48	0.07	0.91	0.000
0.800	0.000	0.48	0.07	0.92	0.000
1.000	0.000	0.48	0.07	0.92	0.000
1.200	0.000	0.48	0.07	0.93	0.000
1.400	0.000	0.49	0.07	0.93	0.000
1.600	0.000	0.49	0.07	0.94	0.000
1.800	0.000	0.50	0.08	0.95	0.000
2.000	0.000	0.50	0.08	0.95	0.000
2.200	0.000	0.50	0.08	0.96	0.000
2.400	0.000	0.50	0.08	0.97	0.000
2.600	0.000	0.51	0.08	0.97	0.000
2.800	0.000	0.51	0.08	0.98	0.000

BLDG7

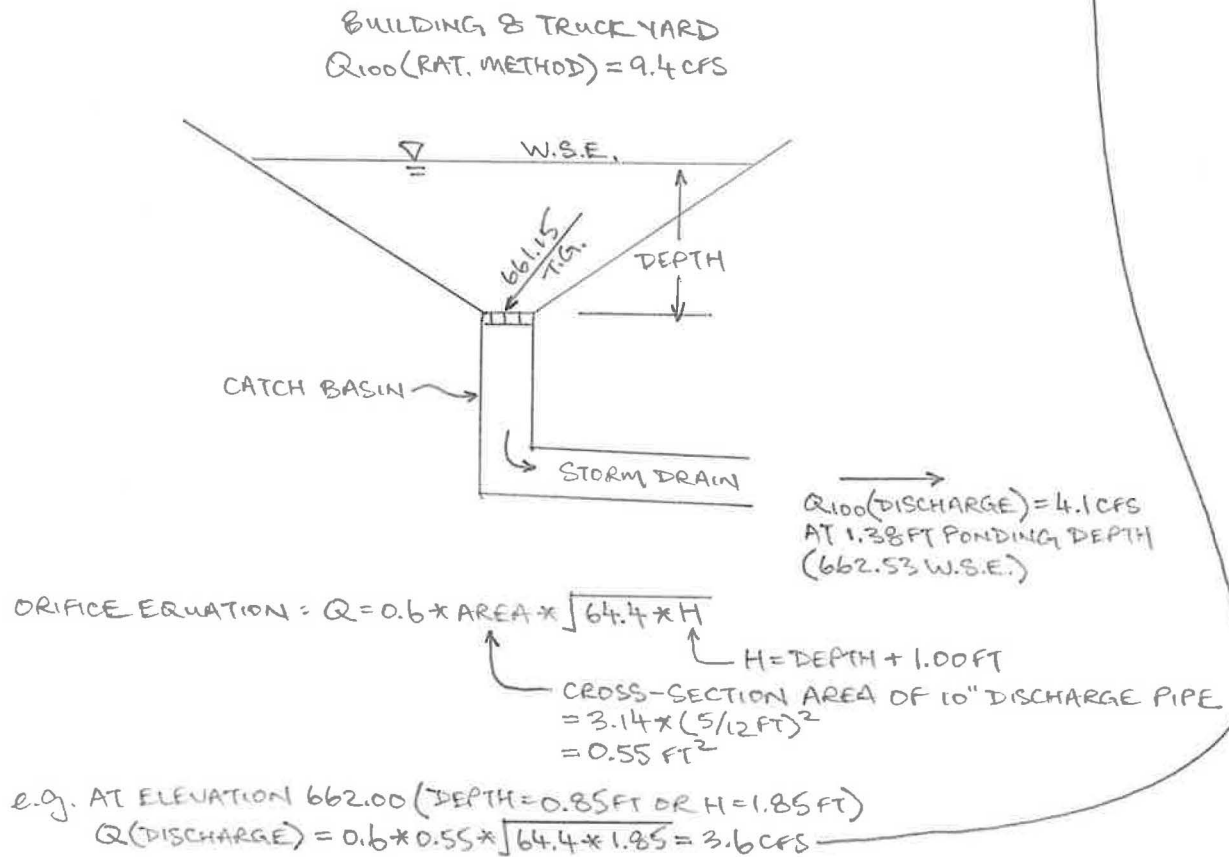
3.000	0.000	0.52	0.08	0.99	0.000
3.200	0.000	0.52	0.08	0.99	0.000
3.400	0.000	0.52	0.08	1.00	0.000
3.600	0.000	0.53	0.08	1.01	0.000
3.800	0.000	0.53	0.08	1.02	0.000
4.000	0.000	0.54	0.08	1.03	0.000
4.200	0.000	0.54	0.08	1.03	0.000
4.400	0.000	0.54	0.08	1.04	0.000
4.600	0.000	0.55	0.08	1.05	0.000
4.800	0.000	0.55	0.08	1.06	0.000
5.000	0.000	0.56	0.09	1.07	0.000
5.200	0.000	0.56	0.09	1.08	0.000
5.400	0.000	0.57	0.09	1.09	0.000
5.600	0.000	0.57	0.09	1.10	0.000
5.800	0.000	0.58	0.09	1.11	0.000
6.000	0.000	0.58	0.09	1.12	0.000
6.200	0.000	0.59	0.09	1.13	0.000
6.400	0.000	0.60	0.09	1.14	0.000
6.600	0.000	0.60	0.09	1.15	0.000
6.800	0.000	0.61	0.09	1.16	0.000
7.000	0.000	0.62	0.09	1.18	0.000
7.200	0.000	0.62	0.09	1.19	0.000
7.400	0.000	0.63	0.10	1.20	0.000
7.600	0.000	0.64	0.10	1.22	0.000
7.800	0.000	0.65	0.10	1.23	0.000
8.000	0.000	0.65	0.10	1.24	0.000
8.200	0.000	0.66	0.10	1.26	0.000
8.400	0.000	0.67	0.10	1.27	0.000
8.600	0.000	0.68	0.10	1.29	0.000
8.800	0.000	0.68	0.10	1.31	0.000
9.000	0.000	0.70	0.11	1.32	0.000
9.200	0.000	0.70	0.11	1.34	0.000
9.400	0.000	0.72	0.11	1.36	0.000
9.600	0.000	0.72	0.11	1.38	0.000
9.800	0.000	0.74	0.11	1.40	0.000
10.000	0.000	0.75	0.11	1.42	0.000
10.200	0.000	0.76	0.12	1.45	0.001
10.400	0.000	0.77	0.12	1.47	0.001
10.600	0.000	0.79	0.12	1.50	0.001
10.800	0.000	0.80	0.12	1.52	0.001
11.000	0.000	0.82	0.12	1.55	0.001
11.200	0.000	0.83	0.13	1.58	0.001
11.400	0.000	0.85	0.13	1.61	0.001
11.600	0.000	0.86	0.13	1.64	0.001
11.800	0.000	0.89	0.14	1.68	0.001
12.000	0.000	0.90	0.14	1.72	0.001
12.200	0.000	1.04	0.16	1.86	0.001
12.400	0.000	1.05	0.16	2.01	0.001
12.600	0.000	1.09	0.17	2.06	0.001
12.800	0.000	1.11	0.17	2.10	0.001
13.000	0.000	1.14	0.17	2.16	0.001
13.200	0.000	1.17	0.18	2.22	0.001
13.400	0.000	1.21	0.18	2.28	0.001
13.600	0.000	1.24	0.19	2.35	0.001
13.800	0.000	1.30	0.20	2.44	0.001
14.000	0.000	1.33	0.20	2.52	0.001
14.200	0.000	1.36	0.21	2.59	0.001
14.400	0.000	1.41	0.21	2.66	0.001
14.600	0.000	1.51	0.23	2.80	0.001
14.800	0.000	1.58	0.28	2.94	0.001
15.000	0.000	1.73	0.39	3.06	0.003
15.200	0.000	1.83	0.45	3.18	0.004
15.400	0.000	2.11	0.56	3.27	0.007
15.600	0.000	1.78	0.43	3.26	0.003
15.800	0.000	2.51	0.66	3.32	0.013
16.000	0.000	3.43	0.80	3.50	0.027
16.200	0.000	10.83	1.36	3.80	0.146

← $Q_{100}(\text{DISCHARGE}) = 4.0 \text{ CFS}$
 DEPTH = 1.36 FT
 VOLUME = 0.146 AC·FT

				BLDG7	
16.400	0.000	2.07	1.27	3.99	0.114
16.600	0.000	1.95	1.14	3.90	0.082
16.800	0.000	1.65	0.94	3.78	0.047
17.000	0.000	1.46	0.65	3.56	0.012
17.200	0.000	1.37	0.21	3.02	0.001
17.400	0.000	1.27	0.19	2.53	0.001
17.600	0.000	1.19	0.18	2.36	0.001
17.800	0.000	1.12	0.17	2.22	0.001
18.000	0.000	1.07	0.16	2.11	0.001
18.200	0.000	0.92	0.14	1.91	0.001
18.400	0.000	0.87	0.13	1.72	0.001
18.600	0.000	0.84	0.13	1.64	0.001
18.800	0.000	0.81	0.12	1.58	0.001
19.000	0.000	0.78	0.12	1.52	0.001
19.200	0.000	0.75	0.11	1.47	0.000
19.400	0.000	0.73	0.11	1.42	0.000
19.600	0.000	0.71	0.11	1.38	0.000
19.800	0.000	0.69	0.11	1.34	0.000
20.000	0.000	0.67	0.10	1.31	0.000
20.200	0.000	0.66	0.10	1.27	0.000
20.400	0.000	0.64	0.10	1.24	0.000
20.600	0.000	0.63	0.10	1.22	0.000
20.800	0.000	0.61	0.09	1.19	0.000
21.000	0.000	0.60	0.09	1.16	0.000
21.200	0.000	0.59	0.09	1.14	0.000
21.400	0.000	0.58	0.09	1.12	0.000
21.600	0.000	0.57	0.09	1.10	0.000
21.800	0.000	0.56	0.08	1.08	0.000
22.000	0.000	0.55	0.08	1.06	0.000
22.200	0.000	0.54	0.08	1.04	0.000
22.400	0.000	0.53	0.08	1.03	0.000
22.600	0.000	0.52	0.08	1.01	0.000
22.800	0.000	0.51	0.08	0.99	0.000
23.000	0.000	0.51	0.08	0.98	0.000
23.200	0.000	0.50	0.08	0.97	0.000
23.400	0.000	0.49	0.08	0.95	0.000
23.600	0.000	0.49	0.07	0.94	0.000
23.800	0.000	0.48	0.07	0.93	0.000
24.000	0.000	0.47	0.07	0.92	0.000
24.200	0.000	0.00	0.00	0.46	0.000
24.400	0.000	0.00	0.00	0.00	0.000

**JOB #3635 - S.E. CORNER OF EUCLID AVE & EUCALYPTUS AVE, ONTARIO
DETENTION IN BUIDLING 8 TRUCK YARD (NODE 101)**

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Q Discharge (cfs)
661.15	0.00	0				
			16	16	0.00	3.0
661.40	0.25	130				
			90	106	0.00	3.2
661.60	0.45	770				
			271	377	0.01	3.4
661.80	0.65	1940				
			562	939	0.02	3.6
662.00	0.85	3680				
			1048	1987	0.05	3.8
662.20	1.05	6800				
			1518	3505	0.08	4.0
662.40	1.25	8380				
			1999	5504	0.13	4.2
662.60	1.45	11610				
			1921	7425	0.17	4.3
662.75	1.60	14000				



 SMALL AREA UNIT HYDROGRAPH MODEL
 =====

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 Ver. 23.0 Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

 Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 8 TRUCK YARD (NODE 101)

 RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
 TOTAL CATCHMENT AREA(ACRES) = 3.70
 SOIL-LOSS RATE, Fm,(INCH/HR) = 0.042
 LOW LOSS FRACTION = 0.080
 TIME OF CONCENTRATION(MIN.) = 11.50
 SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
 USER SPECIFIED RAINFALL VALUES ARE USED
 RETURN FREQUENCY(YEARS) = 100
 5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.38
 30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.79
 1-HOUR POINT RAINFALL VALUE(INCHES) = 1.06
 3-HOUR POINT RAINFALL VALUE(INCHES) = 1.95
 6-HOUR POINT RAINFALL VALUE(INCHES) = 2.90
 24-HOUR POINT RAINFALL VALUE(INCHES) = 5.90

 TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 1.51
 TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.31

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.09	0.0015	0.39	.Q	*	*	*	*
0.28	0.0076	0.39	.Q	*	*	*	*
0.47	0.0137	0.39	.Q	*	*	*	*
0.67	0.0199	0.39	.Q	*	*	*	*
0.86	0.0262	0.39	.Q	*	*	*	*
1.05	0.0324	0.40	.Q	*	*	*	*
1.24	0.0387	0.40	.Q	*	*	*	*
1.43	0.0451	0.40	.Q	*	*	*	*
1.62	0.0515	0.40	.Q	*	*	*	*
1.82	0.0579	0.41	.Q	*	*	*	*
2.01	0.0643	0.41	.Q	*	*	*	*
2.20	0.0709	0.41	.Q	*	*	*	*
2.39	0.0774	0.42	.Q	*	*	*	*
2.58	0.0840	0.42	.Q	*	*	*	*
2.78	0.0907	0.42	.Q	*	*	*	*
2.97	0.0973	0.42	.Q	*	*	*	*
3.16	0.1041	0.43	.Q	*	*	*	*
3.35	0.1109	0.43	.Q	*	*	*	*
3.54	0.1177	0.43	.Q	*	*	*	*

BLDG8

3.73	0.1246	0.44	.Q	.	.	.	.
3.92	0.1315	0.44	.Q	.	.	.	.
4.12	0.1385	0.44	.Q	.	.	.	.
4.31	0.1456	0.45	.Q	.	.	.	.
4.50	0.1527	0.45	.Q	.	.	.	.
4.69	0.1598	0.45	.Q	.	.	.	.
4.88	0.1671	0.46	.Q	.	.	.	.
5.07	0.1743	0.46	.Q	.	.	.	.
5.27	0.1817	0.46	.Q	.	.	.	.
5.46	0.1891	0.47	.Q	.	.	.	.
5.65	0.1966	0.47	.Q	.	.	.	.
5.84	0.2041	0.48	.Q	.	.	.	.
6.03	0.2117	0.48	.Q	.	.	.	.
6.22	0.2194	0.49	.Q	.	.	.	.
6.42	0.2271	0.49	.Q	.	.	.	.
6.61	0.2349	0.50	.Q	.	.	.	.
6.80	0.2428	0.50	.Q	.	.	.	.
6.99	0.2508	0.51	.Q	.	.	.	.
7.18	0.2589	0.51	.Q	.	.	.	.
7.38	0.2670	0.52	.Q	.	.	.	.
7.57	0.2753	0.52	.Q	.	.	.	.
7.76	0.2836	0.53	.Q	.	.	.	.
7.95	0.2920	0.53	.Q	.	.	.	.
8.14	0.3005	0.54	.Q	.	.	.	.
8.33	0.3091	0.55	.Q	.	.	.	.
8.52	0.3178	0.55	.Q	.	.	.	.
8.72	0.3267	0.56	.Q	.	.	.	.
8.91	0.3356	0.57	.Q	.	.	.	.
9.10	0.3446	0.57	.Q	.	.	.	.
9.29	0.3538	0.58	.Q	.	.	.	.
9.48	0.3631	0.59	.Q	.	.	.	.
9.68	0.3725	0.60	.Q	.	.	.	.
9.87	0.3821	0.61	.Q	.	.	.	.
10.06	0.3918	0.62	.Q	.	.	.	.
10.25	0.4017	0.63	.Q	.	.	.	.
10.44	0.4117	0.64	.Q	.	.	.	.
10.63	0.4219	0.65	.Q	.	.	.	.
10.82	0.4322	0.66	.Q	.	.	.	.
11.02	0.4428	0.67	.Q	.	.	.	.
11.21	0.4535	0.69	.Q	.	.	.	.
11.40	0.4644	0.69	.Q	.	.	.	.
11.59	0.4756	0.71	.Q	.	.	.	.
11.78	0.4870	0.72	.Q	.	.	.	.
11.98	0.4986	0.74	.Q	.	.	.	.
12.17	0.5107	0.78	.Q	.	.	.	.
12.36	0.5238	0.87	.Q	.	.	.	.
12.55	0.5377	0.88	.Q	.	.	.	.
12.74	0.5519	0.91	.Q	.	.	.	.
12.93	0.5664	0.93	.Q	.	.	.	.
13.12	0.5813	0.96	.Q	.	.	.	.
13.32	0.5967	0.98	.Q	.	.	.	.
13.51	0.6124	1.02	.Q	.	.	.	.
13.70	0.6287	1.04	.Q	.	.	.	.
13.89	0.6455	1.09	.Q	.	.	.	.
14.08	0.6630	1.11	.Q	.	.	.	.
14.27	0.6809	1.14	.Q	.	.	.	.
14.47	0.6993	1.18	.Q	.	.	.	.
14.66	0.7186	1.27	.Q	.	.	.	.
14.85	0.7391	1.32	.Q	.	.	.	.
15.04	0.7611	1.45	.Q	.	.	.	.
15.23	0.7847	1.53	.Q	.	.	.	.
15.43	0.8101	1.67	.Q	.	.	.	.
15.62	0.8353	1.50	.Q	.	.	.	.
15.81	0.8639	2.11	.Q	.	.	.	.
16.00	0.9036	2.90	.Q	.	.	.	.
16.19	0.9989	9.14	.	.	.	Q	.
16.38	1.0851	1.75	.Q	.	.	.	.

BLDG8									
16.58	1.1119	1.64	.	Q	.	.	.	.	.
16.77	1.1358	1.38	.	Q	.	.	.	.	.
16.96	1.1564	1.22	.	Q	.	.	.	.	.
17.15	1.1750	1.12	.	Q	.	.	.	.	.
17.34	1.1923	1.06	.	Q	.	.	.	.	.
17.53	1.2086	1.00	.	Q	.	.	.	.	.
17.73	1.2239	0.94	.	Q	.	.	.	.	.
17.92	1.2385	0.90	.	Q	.	.	.	.	.
18.11	1.2524	0.86	.	Q	.	.	.	.	.
18.30	1.2650	0.73	.	Q	.	.	.	.	.
18.49	1.2764	0.70	.	Q	.	.	.	.	.
18.68	1.2873	0.68	.	Q	.	.	.	.	.
18.88	1.2978	0.65	.	Q	.	.	.	.	.
19.07	1.3080	0.63	.	Q	.	.	.	.	.
19.26	1.3179	0.61	.	Q	.	.	.	.	.
19.45	1.3275	0.60	.	Q	.	.	.	.	.
19.64	1.3368	0.58	.	Q	.	.	.	.	.
19.83	1.3458	0.56	.	Q	.	.	.	.	.
20.02	1.3546	0.55	.	Q	.	.	.	.	.
20.22	1.3632	0.54	.	Q	.	.	.	.	.
20.41	1.3717	0.53	.	Q	.	.	.	.	.
20.60	1.3799	0.51	.	Q	.	.	.	.	.
20.79	1.3880	0.50	.	Q	.	.	.	.	.
20.98	1.3959	0.49	.	Q	.	.	.	.	.
21.17	1.4036	0.48	.	Q	.	.	.	.	.
21.37	1.4112	0.48	.	Q	.	.	.	.	.
21.56	1.4187	0.47	.	Q	.	.	.	.	.
21.75	1.4260	0.46	.	Q	.	.	.	.	.
21.94	1.4332	0.45	.	Q	.	.	.	.	.
22.13	1.4403	0.44	.	Q	.	.	.	.	.
22.33	1.4473	0.44	.	Q	.	.	.	.	.
22.52	1.4542	0.43	.	Q	.	.	.	.	.
22.71	1.4610	0.43	.	Q	.	.	.	.	.
22.90	1.4677	0.42	.	Q	.	.	.	.	.
23.09	1.4743	0.41	.	Q	.	.	.	.	.
23.28	1.4808	0.41	.	Q	.	.	.	.	.
23.48	1.4872	0.40	.	Q	.	.	.	.	.
23.67	1.4936	0.40	.	Q	.	.	.	.	.
23.86	1.4999	0.39	.	Q	.	.	.	.	.
24.05	1.5060	0.39	.	Q	.	.	.	.	.
24.24	1.5091	0.00	Q	.	.	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
 (Note: 100% of Peak Flow Rate estimate assumed to have
 an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
=====	=====
0%	1449.0
10%	299.0
20%	34.5
30%	23.0
40%	11.5
50%	11.5
60%	11.5
70%	11.5
80%	11.5
90%	11.5

Problem Descriptions:

JOB #3635 EUCLID & EUCALYPTUS, ONTARIO
 100-YEAR DETENTION IN BUILDING 8 TRUCK YARD (NODE 101)

=====

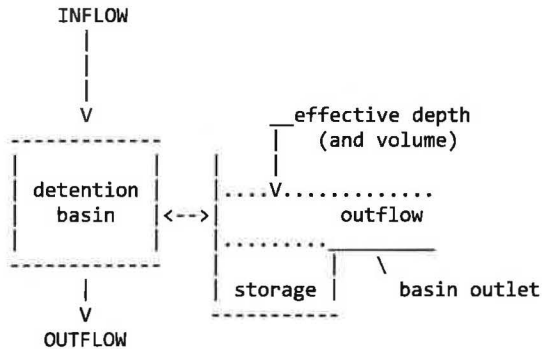
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:

CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 11.500

DEAD STORAGE(AF) = 0.00

SPECIFIED DEAD STORAGE(AF) FILLED = 0.00

ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:

TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 9

*BASIN-DEPTH	STORAGE	OUTFLOW	**BASIN-DEPTH	STORAGE	OUTFLOW	*
(FEET)	(ACRE-FEET)	(CFS)	(FEET)	(ACRE-FEET)	(CFS)	
* 0.000	0.000	0.000**	0.250	0.001	3.000*	
* 0.450	0.003	3.200**	0.650	0.010	3.400*	
* 0.850	0.020	3.600**	1.050	0.050	3.800*	
* 1.250	0.080	4.000**	1.450	0.130	4.200*	
* 1.600	0.170	4.300**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL	DEPTH	{S-O*DT/2}	{S+O*DT/2}
NUMBER	(FEET)	(ACRE-FEET)	(ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.25	-0.02276	0.02476
3	0.45	-0.02234	0.02834
4	0.65	-0.01693	0.03693
5	0.85	-0.00851	0.04851
6	1.05	0.01990	0.08010
7	1.25	0.04832	0.11168
8	1.45	0.09674	0.16326
9	1.60	0.13594	0.20406

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME	DEAD-STORAGE	INFLOW	EFFECTIVE	OUTFLOW	EFFECTIVE
(HRS)	FILLED(AF)	(CFS)	DEPTH(FT)	(CFS)	VOLUME(AF)
0.092	0.000	0.39	0.06	0.37	0.000
0.283	0.000	0.39	0.06	0.74	0.000
0.475	0.000	0.39	0.06	0.75	0.000
0.667	0.000	0.39	0.06	0.75	0.000
0.858	0.000	0.39	0.06	0.75	0.000
1.050	0.000	0.40	0.06	0.76	0.000
1.242	0.000	0.40	0.06	0.76	0.000
1.433	0.000	0.40	0.06	0.77	0.000

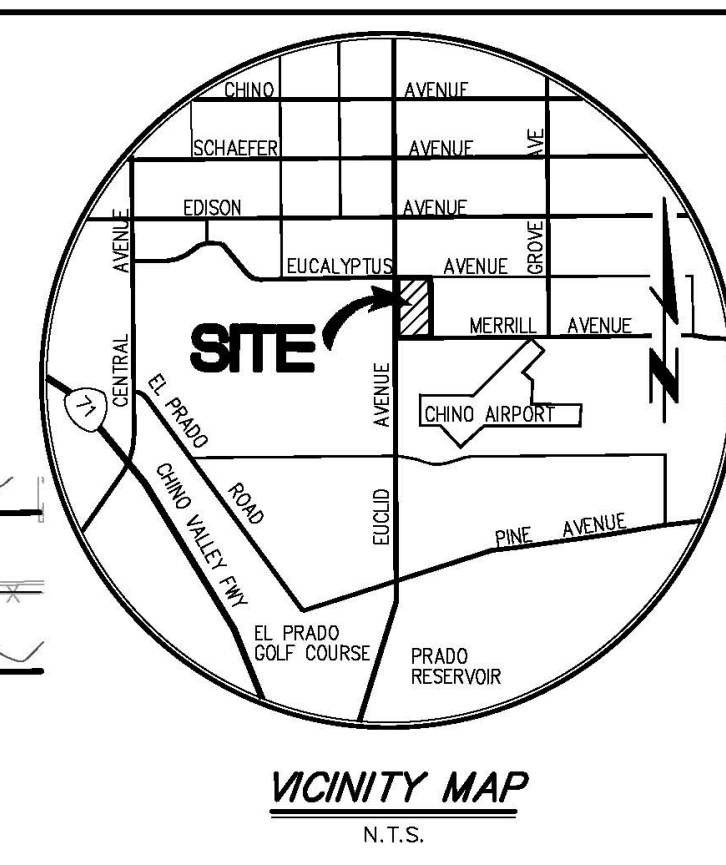
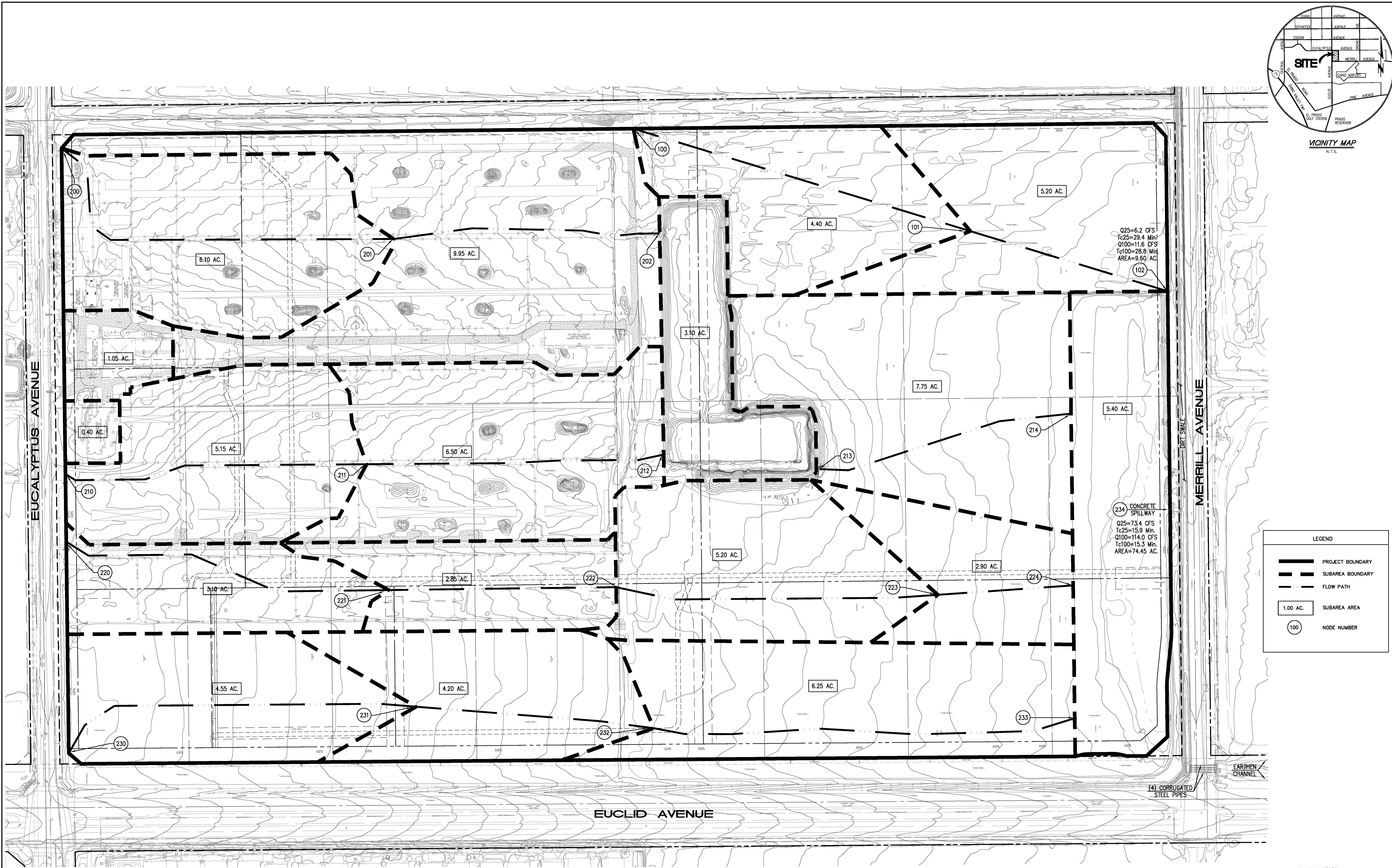
				BLDG8	
1.625	0.000	0.40	0.06	0.77	0.000
1.817	0.000	0.41	0.07	0.78	0.000
2.008	0.000	0.41	0.07	0.78	0.000
2.200	0.000	0.41	0.07	0.79	0.000
2.392	0.000	0.42	0.07	0.79	0.000
2.583	0.000	0.42	0.07	0.80	0.000
2.775	0.000	0.42	0.07	0.81	0.000
2.967	0.000	0.42	0.07	0.81	0.000
3.158	0.000	0.43	0.07	0.82	0.000
3.350	0.000	0.43	0.07	0.82	0.000
3.542	0.000	0.43	0.07	0.83	0.000
3.733	0.000	0.44	0.07	0.83	0.000
3.925	0.000	0.44	0.07	0.84	0.000
4.117	0.000	0.44	0.07	0.85	0.000
4.308	0.000	0.45	0.07	0.85	0.000
4.500	0.000	0.45	0.07	0.86	0.000
4.692	0.000	0.45	0.07	0.87	0.000
4.883	0.000	0.46	0.07	0.87	0.000
5.075	0.000	0.46	0.07	0.88	0.000
5.267	0.000	0.46	0.07	0.89	0.000
5.458	0.000	0.47	0.08	0.90	0.000
5.650	0.000	0.47	0.08	0.90	0.000
5.842	0.000	0.48	0.08	0.91	0.000
6.033	0.000	0.48	0.08	0.92	0.000
6.225	0.000	0.49	0.08	0.93	0.000
6.417	0.000	0.49	0.08	0.94	0.000
6.608	0.000	0.50	0.08	0.95	0.000
6.800	0.000	0.50	0.08	0.96	0.000
6.992	0.000	0.51	0.08	0.97	0.000
7.183	0.000	0.51	0.08	0.98	0.000
7.375	0.000	0.52	0.08	0.99	0.000
7.567	0.000	0.52	0.08	1.00	0.000
7.758	0.000	0.53	0.08	1.01	0.000
7.950	0.000	0.53	0.09	1.02	0.000
8.142	0.000	0.54	0.09	1.03	0.000
8.333	0.000	0.55	0.09	1.04	0.000
8.525	0.000	0.55	0.09	1.06	0.000
8.717	0.000	0.56	0.09	1.07	0.000
8.908	0.000	0.57	0.09	1.08	0.000
9.100	0.000	0.57	0.09	1.10	0.000
9.292	0.000	0.58	0.09	1.11	0.000
9.483	0.000	0.59	0.09	1.13	0.000
9.675	0.000	0.60	0.10	1.14	0.000
9.867	0.000	0.61	0.10	1.16	0.000
10.058	0.000	0.62	0.10	1.18	0.000
10.250	0.000	0.63	0.10	1.19	0.000
10.442	0.000	0.64	0.10	1.21	0.000
10.633	0.000	0.65	0.10	1.23	0.000
10.825	0.000	0.66	0.11	1.25	0.000
11.017	0.000	0.67	0.11	1.28	0.000
11.208	0.000	0.69	0.11	1.30	0.000
11.400	0.000	0.69	0.11	1.32	0.000
11.592	0.000	0.71	0.11	1.35	0.000
11.783	0.000	0.72	0.12	1.38	0.000
11.975	0.000	0.74	0.12	1.41	0.000
12.167	0.000	0.78	0.13	1.47	0.001
12.358	0.000	0.87	0.14	1.59	0.001
12.550	0.000	0.88	0.14	1.68	0.001
12.742	0.000	0.91	0.15	1.72	0.001
12.933	0.000	0.93	0.15	1.76	0.001
13.125	0.000	0.96	0.15	1.81	0.001
13.317	0.000	0.98	0.16	1.86	0.001
13.508	0.000	1.02	0.16	1.91	0.001
13.700	0.000	1.04	0.17	1.97	0.001
13.892	0.000	1.09	0.17	2.04	0.001
14.083	0.000	1.11	0.18	2.11	0.001
14.275	0.000	1.14	0.18	2.17	0.001

BLDG8					
14.467	0.000	1.18	0.19	2.23	0.001
14.658	0.000	1.27	0.20	2.35	0.001
14.850	0.000	1.32	0.21	2.48	0.001
15.042	0.000	1.45	0.23	2.66	0.001
15.233	0.000	1.53	0.25	2.86	0.001
15.425	0.000	1.67	0.35	3.02	0.002
15.617	0.000	1.50	0.24	2.99	0.001
15.808	0.000	2.11	0.57	3.10	0.007
16.000	0.000	2.90	0.80	3.44	0.018
16.192	0.000	9.14	1.38	3.84	0.112
16.383	0.000	1.75	1.22	4.05	0.076
16.575	0.000	1.64	0.99	3.85	0.041
16.767	0.000	1.38	0.55	3.52	0.007
16.958	0.000	1.22	0.20	2.82	0.001
17.150	0.000	1.12	0.18	2.25	0.001
17.342	0.000	1.06	0.17	2.10	0.001
17.533	0.000	1.00	0.16	1.97	0.001
17.725	0.000	0.94	0.15	1.86	0.001
17.917	0.000	0.90	0.14	1.76	0.001
18.108	0.000	0.86	0.14	1.68	0.001
18.300	0.000	0.73	0.12	1.53	0.000
18.492	0.000	0.70	0.11	1.38	0.000
18.683	0.000	0.68	0.11	1.33	0.000
18.875	0.000	0.65	0.10	1.28	0.000
19.067	0.000	0.63	0.10	1.23	0.000
19.258	0.000	0.61	0.10	1.19	0.000
19.450	0.000	0.60	0.10	1.16	0.000
19.642	0.000	0.58	0.09	1.13	0.000
19.833	0.000	0.56	0.09	1.10	0.000
20.025	0.000	0.55	0.09	1.07	0.000
20.217	0.000	0.54	0.09	1.04	0.000
20.408	0.000	0.53	0.08	1.02	0.000
20.600	0.000	0.51	0.08	1.00	0.000
20.792	0.000	0.50	0.08	0.98	0.000
20.983	0.000	0.49	0.08	0.96	0.000
21.175	0.000	0.48	0.08	0.94	0.000
21.367	0.000	0.48	0.08	0.92	0.000
21.558	0.000	0.47	0.07	0.91	0.000
21.750	0.000	0.46	0.07	0.89	0.000
21.942	0.000	0.45	0.07	0.87	0.000
22.133	0.000	0.44	0.07	0.86	0.000
22.325	0.000	0.44	0.07	0.85	0.000
22.517	0.000	0.43	0.07	0.83	0.000
22.708	0.000	0.43	0.07	0.82	0.000
22.900	0.000	0.42	0.07	0.81	0.000
23.092	0.000	0.41	0.07	0.80	0.000
23.283	0.000	0.41	0.07	0.79	0.000
23.475	0.000	0.40	0.06	0.78	0.000
23.667	0.000	0.40	0.06	0.77	0.000
23.858	0.000	0.39	0.06	0.76	0.000
24.050	0.000	0.39	0.06	0.75	0.000
24.242	0.000	0.00	0.00	0.37	0.000
24.433	0.000	0.00	0.00	0.00	0.000

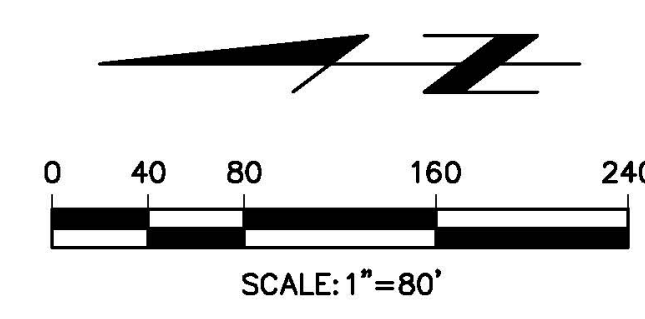
$Q_{100}(\text{DISCHARGE}) = 4.1 \text{ cfs}$
 $\text{DEPTH} = 1.38 \text{ FT}$
 $\text{VOLUME} = 0.112 \text{ AC-FT}$

APPENDIX D

HYDROLOGY MAP



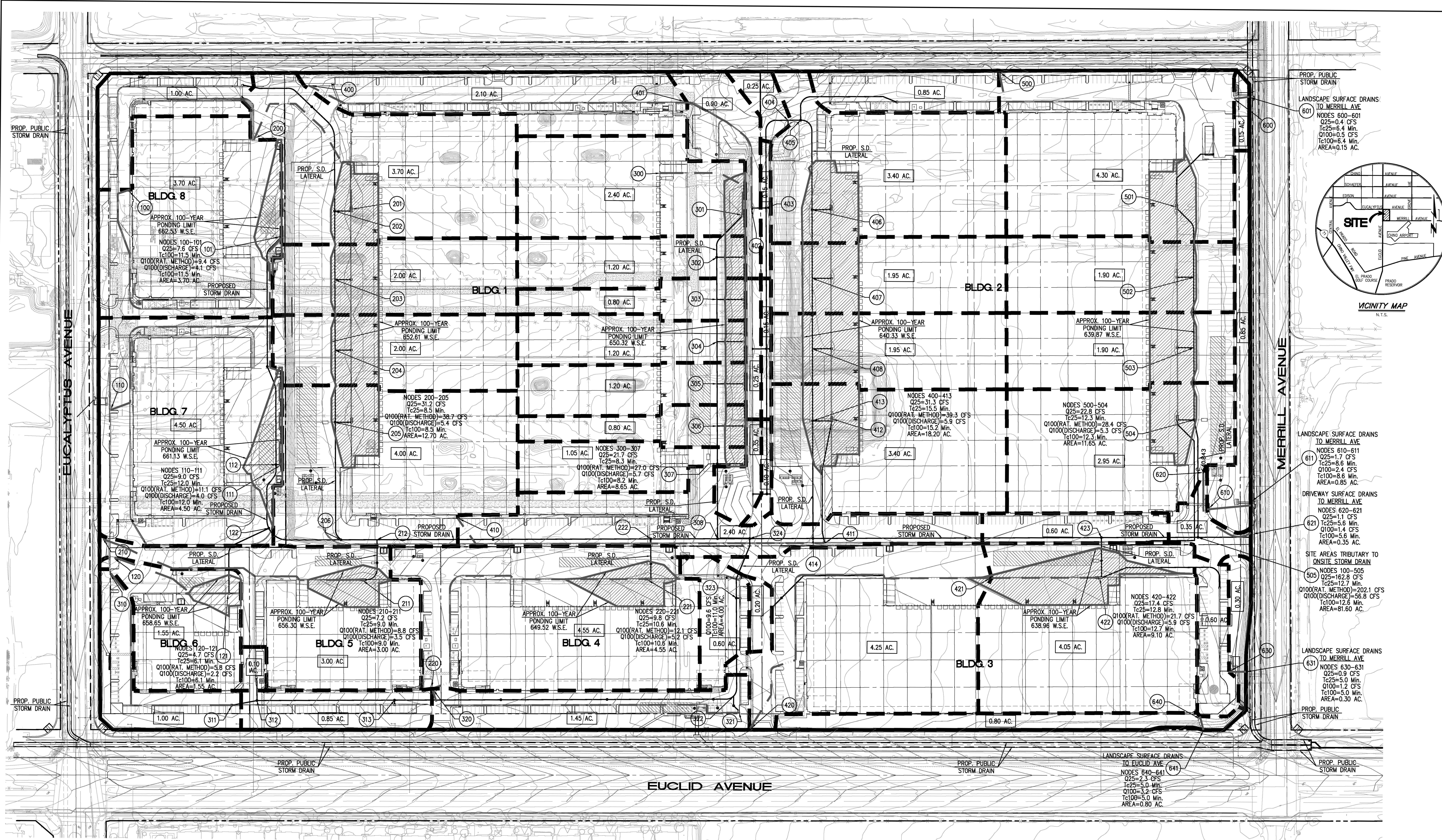
LEGEND	
	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
	SUBAREA AREA
	NODE NUMBER



CITY OF ONTARIO PUBLIC WORKS DEPARTMENT	
EXISTING CONDITION HYDROLOGY MAP	
ONTARIO RANCH BUSINESS PARK SEC EUCLID AVENUE AND EUCALYPTUS AVENUE	
Designed by _____ Checked by _____ Date _____	Approved by _____ Date _____
Designed by _____ Checked by _____ Date _____	Public Works Director _____ R.C.E. XXXXX
Sheet 1 of 1 Sheets	

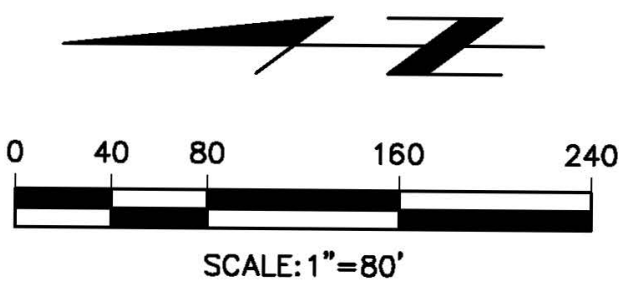
PREPARED FOR:
EUCLID LAND VENTURE, LLC
4450 MAGNATHUR BLVD., SUITE 100
NEWPORT BEACH, CA 92660
PHONE: (949) 216-7300

T.E.I. Thienes Engineering, Inc.
CIVIL ENGINEERING - LAND SURVEYING
14140 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH: (714) 521-4811 FAX: (714) 521-4733



LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 1.00 AC. SUBAREA AREA
- 100 NODE NUMBER
- APPROXIMATE 100-YEAR PONDING LIMIT



PREPARED FOR:
EUCUD LAND VENTURE, LLC
4450 MACARTHUR BLVD., SUITE 100
NEWPORT BEACH, CA 92660
PHONE: (949) 216-7300

Thienes Engineering, Inc.
CIVIL ENGINEERING & LAND SURVEYING
14348 FIRESTONE BOULEVARD
LA HABRA, CALIFORNIA 90630
PUL7414321-611 FAX7414321-412

CITY OF ONTARIO
PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP
ONTARIO RANCH BUSINESS PARK
SEC EUCLID AVENUE AND EUCALYPTUS AVENUE

Designed by	Date	Approved by	Date
Checked by	Date	Public Works Director	R.C.E. XXXXX
Designed by	Date		
Checked by	Date		

Sheet **1** of **1** Sheets

3635/ 1 OF 1 SHEET