Drainage Study for Arroyo Vista (Preliminary Engineering)

RICK Job No. 19427
December 29, 2022
Revised: May 8, 2024

RICK

DRAINAGE STUDY

FOR

ARROYO VISTA

(PRELIMINARY ENGINEERING)

Job Number 19427

Brendan Hastie, P.E.
R.C.E. #65809, Exp. 09/25

Prepared for:

TTLC Riverside Chicago, LLC
a California limited liability company
2942 Century Place, Suite 121
Costa Mesa, California 92626
Telephone: 949-645-5370

Prepared by:

RICK
Water Resources Division
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

December 29, 2022
Revised: May 8, 2024

DRAINAGE STUDY
FOR
TTLC CHICAGO AVENUE

REVISION PAGE

May 8, 2024

This report presents revisions to the December 29, 2022 report pursuant to redline comments received as part of the 1st plan check review by Riverside County on the WQMP. Comments received from Riverside County Flood Control and Water Conservation District on the Hydraulic Analysis Report for Goldenstar Creek have also been incorporated into this report.

1. The project site is located within a Special Flood Hazards Area (SFHA) as shown on the Public Flood Hazard Determination Interactive Map found at http://rcflood.org. Per TTM 38510, grading is being proposed within the floodplain and in accordance with Ordinance No. 458, any proposed grading, encroachment, or other modification of this 100-year floodplain requires the applicant to submit a detailed hydrologic/hydraulic analysis to determine potential impacts of the development to the DWR floodplain and revise the effective floodplain limits. Additionally, per Ordinance No. 458, Section 8.a.5, all subdivision proposals and other proposed new development, including manufactured home parks or subdivisions greater than fifty (50) lots or five (5) acres, whichever is less, shall be required to identify the base flood elevation and be reviewed to determine whether such proposals will be reasonably safe from flooding. To provide appropriate future administration of County Ordinance No. 458, the following items shall be submitted to the District for review and approval a. A floodplain analysis consisting of HEC-RAS calculations, cross sections, maps, reports, and other data prepared to the satisfaction of the District for the purpose of revising the effective SFHA limits. Environmental mitigation areas with restricted maintenance that are proposed within the natural conveyance area shall be modeled as ineffective flow. b. Identification of the base flood elevation. c. Exhibits showing the pre-development and post-development SFHA limits. If adversely affecting adjacent properties with an increase in water surface elevations or velocities, offsite permissions will be required.

   1a. The “Flood & Drainage Comment Responses (12-29-2022)” response letter submitted states that a hydraulic analysis report for Goldenstar Creek was prepared by Rick Engineering to address the floodplain analysis correction. However, this report was not included in the submittal for review. Please include the floodplain analysis for review in the next submittal.

   A detailed hydraulic analysis in the form of a report titled “Hydraulic Analysis Report for Goldenstar Creek”, dated May 8, 2024 (or subsequent versions thereof) has been prepared by Rick Engineering Company to provide the requested information and submitted separately.

2. Please ensure that the proposed basin outlets and emergency escape for each water quality basin, and its path through the tract, are shown on the exhibit. To prevent flood damage to the proposed structures, all proposed structures along the emergency escape path shall be protected from flooding by either properly elevating the finished floor in relation to the flow path, or by making sure the structures are setback to provide adequate flow through area in the event the emergency escape of the stormwater runoff is necessary.

   This comment is noted. Overland escape of water from the basins away from proposed structures is already part of the project design.

3. Future exhibits shall depict floodplain limits and all proposed flood control and drainage facilities including watercourses, retention basins, channels, storm drains, culverts, grades, and easement or right-of-way widths clearly shown. Centerline curve radii and typical sections shall be shown for all open channel facilities. The exhibit shall depict all points of concentration where offsite runoff enters the site and points of discharge from the site, including the drainage area in acres and the one-percent annual chance (100-year) discharge at each point.

   This comment is noted.

4. Please revise the preliminary drainage report to include a routing analysis for each of the basins, to verify that each basin is adequately sized to mitigate the increased runoff. Basins should be designed per Appendix C – Basin Guidelines of Design Handbook for Low Impact Development Best Management Practices. a. For example, both Lot C and Lot D Water Quality Basin's cross sections show a 6-foot bench instead of the required width for an access road along the perimeter. This is not acceptable. We recommend reconsidering the design of Lot D Water Quality Basin due to its similar invert elevation and proximity to the adjacent watercourse curving around the proposed basin. Once the floodplain analysis is provided, additional corrections may be provided.

   Noted. Routing analysis has been included for all basins. And the 6-foot bench has been included.

5. Per previous correspondence with the District for PAR 210156, 2:1 side slopes will be acceptable if the side slopes are armored with riprap. There is no indication in the submittals that the 2:1 slopes will be armored therefore, please ensure that this information is included in the next submittal; otherwise 4:1 slopes are recommended for earthen/natural channel banks.

   Side slopes have nee revised to 4:1.

6. Please provide information regarding the operation and maintenance of any proposed flood control facilities. If proposing to armor the watercourse or channel banks, they shall be publicly maintained.

   Language referencing the maintenance of flood control facilities has been included in the Drainage Study and Hydraulic Analysis.

TABLE OF CONTENTS

Figures

Tables

Appendices

1.0 INTRODUCTION

1.1 Project Description

This drainage study presents preliminary hydrologic and hydraulic analyses for the Arroyo Vista project (herein referred to as "the project"). The approximately 148-acre Specific Plan site is located on the North of Iris Avenue, West of Chicago Avenue, in unincorporated Riverside County, California. The project site is bounded by vacant land use and residential uses to the north, Iris Avenue to the south, vacant land uses to the east, and Chicago Avenue and residential uses to the West. Refer to Figure 1.0 for a Vicinity Map of the project.

1.2 Project Features

The proposed project includes 230 single-family detached residences, with incorporated open spaces. The project site includes one existing water course. In order to comply with the County of Riverside's drainage, stormwater quality, and hydromodification management requirements, the project also includes construction of three (3) stormwater BMPs. Separately, a Preliminary Water Quality Management Plan (WQMP) for the project was prepared and titled, "Project Specific Water Quality Management Plan for the Arroyo Vista Project" and dated May 8, 2024 (and any revisions thereafter) by Rick Engineering Company (Job Number 19427).

1.3 Drainage Characteristics

The project site is subject to off-site area stormwater run-on from the south along Iris Avenue, and from the east along Chicago Avenue. The project site contains one natural watercourse, Goldenstar Creek, as designated by the Santa Ana Regional Water Quality Control Board, running southeast to northwest through the center of the site. The site generally drains from southeasterly to northwesterly.

In the existing condition the site consists of open, undeveloped space with native vegetation and numerous rocky outcroppings. There are no existing drainage structures on the site.

In the post-project condition, the drainage characteristics will remain similar as compared to the pre-project condition. The slope of the site will continue to drain from southeasterly to northwesterly, with three separate drainage basins each being conveyed by separate storm drain backbone systems to their respective treatment BMPs, before discharging to Goldenstar Creek. One drainage basin is draining to a central point of confluence south of Goldenstar Creek (Basin 100), one drains to a central point of confluence north of Goldenstar Creek (Basin 200), and one drains to a northwest point of confluence (Basin 300). A hydraulic analysis of Goldenstar Creek and the proposed project is provided as a separate report titled, "Hydraulic Analysis Report for Goldenstar Creek," dated May 8, 2024 (and any subsequent versions thereafter) prepared by Rick Engineering Company (Job Number 19427).

Offsite bypass is to be collected at one point along Iris Avenue and at one point along Chicago Avenue and conveyed to Goldenstar Creek via separate storm drains, maintaining similar drainage patterns to the existing condition. Offsite bypass at a second location along Chicago Avenue is to be collected and bypassed to the existing drainage course north of the project site, maintaining similar drainage patterns to the existing condition.

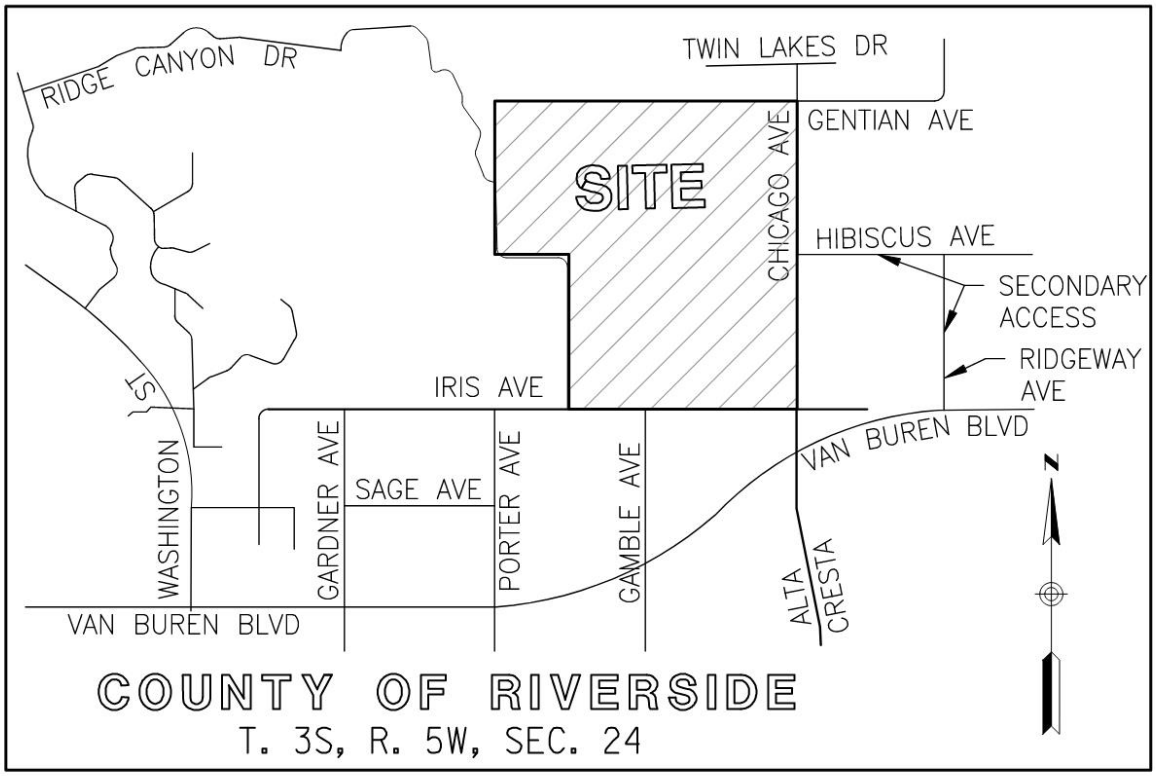
1.4 FEMA Flood Hazard Zone Information

The water courses around the project have been identified by the Federal Emergency Management Agency (FEMA) as zone D. This is an area of 'Unidentified Flood Risk." The project is shown on the FEMA Flood Insurance Rate Map (FIRM) number 06065C0740G, effective August 28, 2008, included with Appendix A for reference. No FEMA submittals are anticipated to be required for this project.

1.5 Water Quality and Hydromodification Management

As part of the preliminary engineering process, a Preliminary Water Quality Management Plan (WQMP) has been prepared for the project. The report is titled, "Preliminary Water Quality Management Plan for Arroyo Vista," dated May 8, 2024 (and any subsequent versions thereafter) prepared by Rick Engineering Company (Job Number 19427). The WQMP documents how the project addresses the requirements regarding permanent stormwater quality and hydromodification management, in accordance with the stormwater guidance document titled, "Water Quality Management Plan, A Guidance Document for the Santa Ana Region of Riverside County."

Figure 1: Vicinity Map



Vicinity Map

Not to scale

2.0 HYDROLOGY

Hydrologic calculations were computed in accordance with the Riverside County Flood Control and Water Conservation District - Hydrology Manual, dated April 1978 (manual). The Advanced Engineering Software (AES) 2014 Rational Method Analysis (Version 21.0) program was used to perform the hydrologic analysis in this study.

The AES hydrologic model is developed by creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points. The program has the capability to perform calculations for 15 hydrologic processes. These processes are assigned code numbers that appear in the results. The code numbers and their significance are as follows:

Subarea Hydrologic Processes (Codes)

Code 1: Confluence analysis at a node
Code 2: Initial subarea analysis
Code 3: Pipe flow travel time (computer-estimated pipe sizes)
Code 4: Pipe flow travel time (user-specified pipe size)
Code 5: Trapezoidal channel travel time
Code 6: Street flow analysis through a subarea
Code 7: User-specified information at a node
Code 8: Addition of the subarea runoff to mainline
Code 9: V-Gutter flow through a subarea
Code 10: Copy main-stream data onto a memory bank
Code 11: Confluence a memory bank with the main-stream memory
Code 12: Clear a memory bank
Code 13: Clear the main-stream memory
Code 14: Copy a memory bank onto the main-stream memory
Code 15: Hydrologic data bank storage functions

In order to perform the hydrologic analysis, base information for the study area is required. This information includes the drainage facility locations and sizes, land uses, flow patterns, drainage basin boundaries, and topographic elevations. Compiled Hydrologic backup is included as Appendix A to this report.

Area

Watersheds were delineated to distinguish areas with similar flow characteristics and hydrologic properties as well as to determine peak flows at confluence points, existing and proposed storm drain facilities, and to facilitate hydraulic analyses. Drainage basin boundaries, flow patterns, and topographic elevations are shown on the hydrologic workmap for the site, included in Appendix B.

Time of Concentration/Intensity

The time of concentration was calculated using AES to determine the intensity for the 10- and 100-year storm events. The rainfall intensity was calculated in AES using the 10 and 60-minute intensity values for the approximate project site location of the unincorporated area of Riverside County (Woodcrest) values from NOAA Atlas 14, Volume 6, Version 2. An annotated chart has been included in Appendix A.

Runoff Coefficient

The runoff coefficients used for each minor basin were calculated by the AES software based on the user-entered information of the hydrologic soil group and the land use for each basin. A tabulation of parameters assigned to AES calculations and additional supporting information is included in Appendix A of this report.

Hydrologic soil group data is available for the site through the Natural Resource Conservation Service (NRCS) Web Soil Survey, showing the site consisting of type “B”, “C”, and “D” soils. Individual soil types were used consistently to assign roughness coefficients for the existing condition. The proposed condition analysis assumes type “D” soil within the area of development for the conservatism of the calculations.

Topography

The onsite project specific topography consists of 1-foot contours on the NGVD29 vertical datum compiled by photogrammetric methods from aerial photography.

2.1 Hydrologic Results

The hydrologic results for the pre-project and post-project conditions can be found in Table 2.1. These results show the project peak flow rates for the storm event before they are detained as discussed by Section 4.0.

Table 2.1 – 100-Year Peak Flow Rates

Storm Event	Basin ID	Pre-Project[1,3]			Post-Project[1]		
		Time of Concentration (min)	Total Area (ac)	Peak Flow Rate (cfs)[2]	Time of Concentration (min)	Total Area (ac)	Peak Flow Rate (cfs)[2]
100-year	100	36.0	38.2	41.1	13.5	28.6	65.8
	200	30.8	22.2	22.8	24.0	19.9	37.7
	300	33.5	41.7	47.9	20.6	56.6	109.0

Note:
1: Refer to Appendix A for supporting information.
2: cfs= cubic feet per second.
3: The pre-project conditions presented include offsite run-on. The basins presented in this table are composed of drainage areas corresponding roughly to the post-project basin delineation areas.

.

3.0 HYDRAULICS

3.1 Hydraulic Methodology and Criteria

The 100-year proposed peak flow rates determined using the Modified Rational Method were used to determine preliminary sizes for the on-site storm drain system.

3.2 Curb Inlet Sizing

Inlet design calculations will be completed using a computer program based on the flow rates calculated by modified rational method for the 100-year storm event. Preliminary inlet locations have been identified. Detailed inlet design calculations are to be provided in the final engineering drainage report.

3.3 Storm Drain Sizing

Preliminary storm drain backbone pipe sizes were designed using AES rational method output and a 30% sizing factor to account for losses. A summary of conceptual storm drain sizes is provided in Appendix C.

3.4 Energy Dissipater Design

Offsite stormwater run-on is to be bypassed through the site and discharged into Goldenstar Creek. Preliminary discharge locations have been identified. Energy dissipater design at these locations will be included in the final engineering drainage report.

4.0 DETENTION REQUIREMENTS

As described in the introduction of this report, the project proposes three separate BMPs within the project site boundary. In order to mitigate for anticipated increased runoff due to the proposed development, 24-hour storm event for the 2-year and 10-year frequencies have been analyzed for preliminary detention sizing. The preliminary detention analysis has been conducted in accordance with the County of Riverside requirements utilizing the Hydrologic Modeling System (HEC-HMS) software and the guidance supplied by the Riverside County Flood Control (RCFC), in anticipation of the requirement to document compliance with Riverside County's Interim Criteria for Increased Runoff Detention with final engineering drainage report. A summary of the flood control detention analyses is included in Appendix D.

The required cumulative storage volume was calculated for each basin. The HEC-HMS software (version 4.10) modeled three basins for preliminary detention sizing requirements. Based on the preliminary detention analysis, it is anticipated adequate detention volume has been provided and that the post-project un-detained peak flow rates will be mitigated to the pre-project peak flow rate level (equal or less) for the applicable design storms. A summary of the pre-project and post-project flow rates and pre-project and post-project peak storages is provided in Table 4.1 below. A summary of the required peak storage is summarized in Table 4.2.

Table 4.1 - Detention Summary for the 10-Year and 2-year 24 Hour Storm Events

		Pre-Project Flow Rate (cfs)	Post-Project Flow Rate (Undetained) (cfs)	Post-Project Flow Rate (Detained) (cfs)	Post-Project Peak Storage (acre-feet)
Basin 100	2YR	0.6	2.6	0.5	0.29
	10 YR	4.2	6.5	4.0	0.99
Basin 200	2 YR	0.4	1.7	0.4	0.15
	10 YR	2.8	4.3	2.8	0.57
Basin 300	2 YR	1.1	4.4	0.9	0.61
	10 YR	7.7	11.4	7.0	1.83

Notes:
1. Peak Storages obtained from HEC-HMS. Outputs and RCFC Preprocessor inputs provided in Appendix D.

A summary of the proposed basin storage is summarized in Table 4.2 below.

Table 4.2 - Proposed Basin Summary

	Tributary Area (acre)	Minimum volume from 2-year, 24-hour storm event (Acre-feet)	Minimum volume from 10-year, 24-hour storm event (Acre-feet)	Provided Detention Volume (acre-feet)[1]
Basin 100	28.6	0.40	0.98	2.13
Basin 200	19.9	0.27	0.66	1.34
Basin 300	56.6	0.74	1.82	3.69

Notes:
1. Provided Detention Volume is calculated reserving 1 foot of freeboard depth within the proposed basin footprint.

5.0 CONCLUSION

This drainage study presents preliminary engineering hydrologic analyses for the proposed Arroyo Vista residential project. Hydrologic calculations were computed in accordance with the Riverside County Flood Control and Water Conservation District - Hydrology Manual, dated April 1978 (manual). The Advanced Engineering Software (AES) 2014 Rational Method Analysis (Version 21.0) program was used for the rational method modeling in this study. The discharges for the 100-year storm events have been calculated for the project site for the proposed conditions and preliminary storm flow routing has been determined.

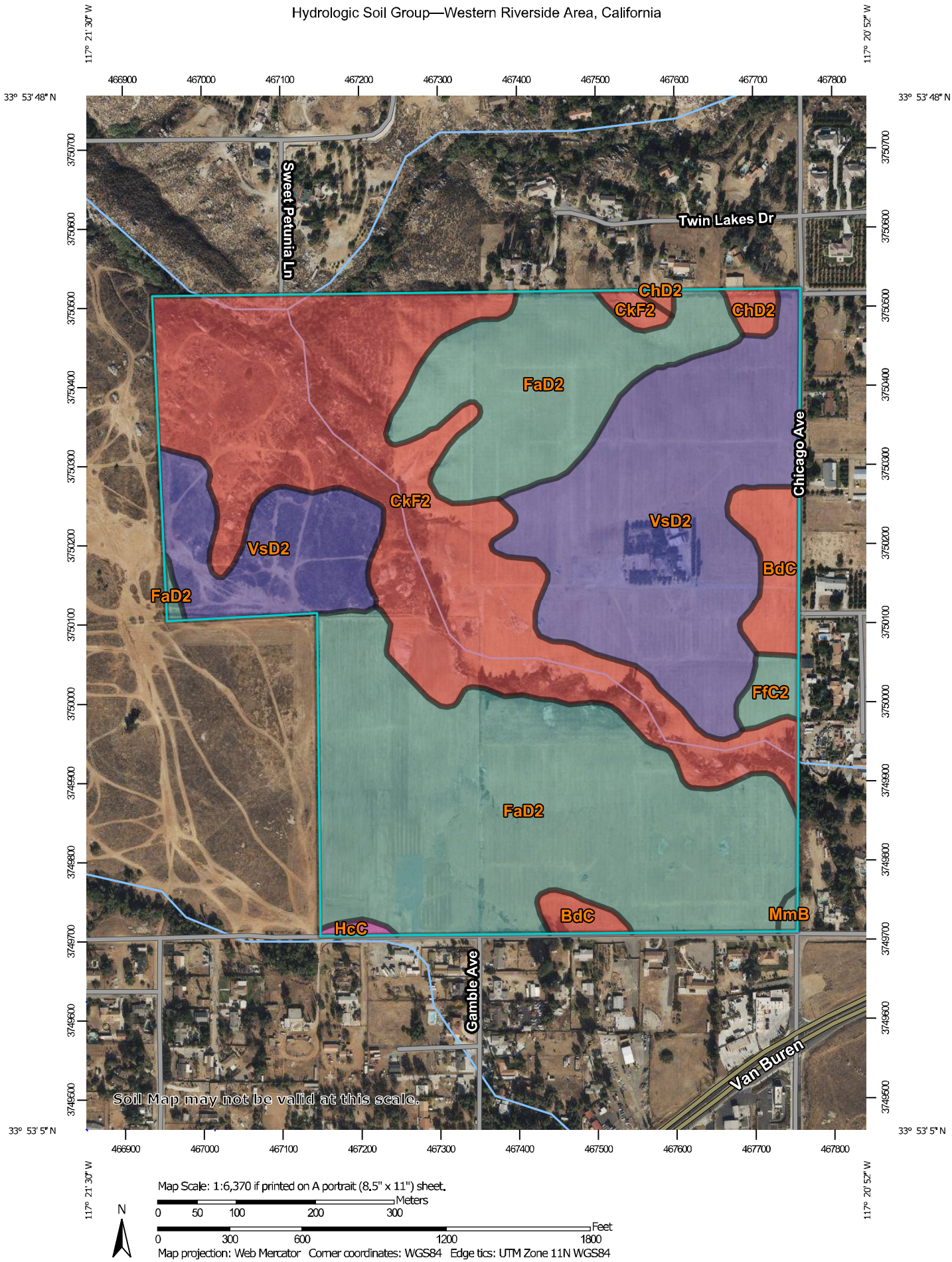
In order to determine the detention volume required to reduce the post-project peak discharge rate back to the pre-project peak discharge rates at the discharge points, a preliminary detention analysis has been included with this drainage study for the 24-hour 2-year and 10-year design storms.

Appendix A

Hydrologic Backup Information

Includes:

1. Soil Map
2. NOAA Atlas 14 Vol. 6 Precipitation Data
3. FEMA Flood Risk Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 15, 2020—Feb 6, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BdC	Bonsall fine sandy loam, 2 to 8 percent slopes	D	4.5	3.2%
ChD2	Cieneba sandy loam, 8 to 15 percent slopes, eroded	D	1.0	0.7%
CkF2	Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded	D	40.5	28.3%
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded	C	56.7	39.7%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	C	1.4	1.0%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	A	0.4	0.2%
MmB	Monserate sandy loam, 0 to 5 percent slopes	C	0.3	0.2%
VsD2	Vista coarse sandy loam, 8 to 15 percent slopes, eroded	B	38.2	26.7%
Totals for Area of Interest			**143.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOAA Atlas 14, Volume 6, Version 2
Location name: Woodcrest, California, USA*
Latitude: 33.8902°, Longitude: -117.3523°
Elevation: 1502.55 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.02** (0.852-1.22)	**1.36** (1.13-1.64)	**1.84** (1.54-2.23)	**2.27** (1.87-2.77)	**2.89** (2.30-3.66)	**3.41** (2.65-4.42)	**3.97** (3.01-5.28)	**4.60** (3.38-6.29)	**5.51** (3.89-7.87)	**6.26** (4.27-9.29)
10-min	**0.726** (0.606-0.882)	**0.972** (0.810-1.18)	**1.32** (1.10-1.60)	**1.63** (1.34-1.99)	**2.07** (1.65-2.63)	**2.44** (1.90-3.17)	**2.84** (2.16-3.79)	**3.29** (2.43-4.51)	**3.94** (2.78-5.64)	**4.49** (3.06-6.65)
15-min	**0.588** (0.492-0.712)	**0.784** (0.656-0.948)	**1.06** (0.884-1.29)	**1.31** (1.08-1.60)	**1.67** (1.33-2.12)	**1.97** (1.54-2.55)	**2.30** (1.74-3.05)	**2.66** (1.96-3.63)	**3.18** (2.25-4.55)	**3.62** (2.47-5.37)
30-min	**0.442** (0.368-0.534)	**0.590** (0.492-0.712)	**0.800** (0.664-0.970)	**0.982** (0.810-1.20)	**1.25** (0.998-1.59)	**1.48** (1.15-1.92)	**1.72** (1.31-2.29)	**1.99** (1.47-2.73)	**2.39** (1.69-3.41)	**2.72** (1.85-4.03)
60-min	**0.316** (0.264-0.382)	**0.422** (0.352-0.511)	**0.573** (0.477-0.695)	**0.704** (0.581-0.862)	**0.898** (0.716-1.14)	**1.06** (0.826-1.37)	**1.24** (0.938-1.64)	**1.43** (1.05-1.96)	**1.71** (1.21-2.45)	**1.95** (1.33-2.89)
2-hr	**0.230** (0.192-0.278)	**0.300** (0.250-0.363)	**0.394** (0.328-0.479)	**0.474** (0.392-0.581)	**0.588** (0.468-0.746)	**0.678** (0.528-0.879)	**0.773** (0.588-1.03)	**0.874** (0.645-1.20)	**1.02** (0.718-1.45)	**1.13** (0.771-1.68)
3-hr	**0.186** (0.156-0.225)	**0.240** (0.200-0.291)	**0.313** (0.260-0.380)	**0.373** (0.308-0.457)	**0.457** (0.364-0.579)	**0.523** (0.408-0.678)	**0.591** (0.449-0.786)	**0.663** (0.489-0.907)	**0.762** (0.538-1.09)	**0.841** (0.573-1.25)
6-hr	**0.127** (0.106-0.153)	**0.163** (0.136-0.197)	**0.210** (0.175-0.255)	**0.248** (0.205-0.304)	**0.301** (0.240-0.381)	**0.342** (0.266-0.443)	**0.383** (0.291-0.509)	**0.426** (0.314-0.583)	**0.484** (0.342-0.693)	**0.530** (0.361-0.786)
12-hr	**0.081** (0.068-0.098)	**0.104** (0.087-0.126)	**0.135** (0.112-0.164)	**0.160** (0.132-0.195)	**0.193** (0.154-0.245)	**0.219** (0.171-0.284)	**0.246** (0.187-0.327)	**0.273** (0.202-0.374)	**0.311** (0.219-0.444)	**0.340** (0.231-0.503)
24-hr	**0.054** (0.048-0.063)	**0.071** (0.062-0.082)	**0.092** (0.081-0.107)	**0.110** (0.096-0.128)	**0.134** (0.113-0.161)	**0.153** (0.127-0.188)	**0.172** (0.139-0.217)	**0.192** (0.151-0.248)	**0.219** (0.166-0.296)	**0.241** (0.176-0.336)
2-day	**0.033** (0.029-0.038)	**0.043** (0.038-0.050)	**0.057** (0.051-0.067)	**0.069** (0.060-0.081)	**0.085** (0.072-0.103)	**0.098** (0.081-0.120)	**0.111** (0.090-0.139)	**0.124** (0.098-0.161)	**0.143** (0.108-0.192)	**0.157** (0.115-0.220)
3-day	**0.023** (0.021-0.027)	**0.031** (0.028-0.036)	**0.042** (0.037-0.049)	**0.051** (0.045-0.060)	**0.063** (0.054-0.076)	**0.073** (0.061-0.090)	**0.083** (0.067-0.105)	**0.093** (0.074-0.121)	**0.108** (0.082-0.145)	**0.119** (0.087-0.166)
4-day	**0.019** (0.017-0.022)	**0.026** (0.023-0.030)	**0.035** (0.031-0.040)	**0.042** (0.037-0.050)	**0.053** (0.045-0.064)	**0.061** (0.051-0.075)	**0.070** (0.057-0.088)	**0.079** (0.062-0.102)	**0.091** (0.069-0.123)	**0.101** (0.074-0.141)
7-day	**0.012** (0.011-0.014)	**0.017** (0.015-0.020)	**0.023** (0.021-0.027)	**0.029** (0.025-0.034)	**0.036** (0.031-0.044)	**0.042** (0.035-0.052)	**0.049** (0.039-0.061)	**0.055** (0.044-0.072)	**0.064** (0.049-0.087)	**0.072** (0.053-0.100)
10-day	**0.009** (0.008-0.011)	**0.013** (0.012-0.015)	**0.018** (0.016-0.021)	**0.022** (0.020-0.026)	**0.028** (0.024-0.034)	**0.033** (0.028-0.041)	**0.038** (0.031-0.048)	**0.044** (0.034-0.057)	**0.051** (0.039-0.069)	**0.057** (0.042-0.080)
20-day	**0.006** (0.005-0.006)	**0.008** (0.007-0.009)	**0.011** (0.010-0.013)	**0.014** (0.012-0.016)	**0.018** (0.015-0.021)	**0.021** (0.017-0.026)	**0.024** (0.020-0.031)	**0.028** (0.022-0.036)	**0.033** (0.025-0.045)	**0.037** (0.027-0.052)
30-day	**0.004** (0.004-0.005)	**0.006** (0.006-0.007)	**0.009** (0.008-0.010)	**0.011** (0.010-0.013)	**0.014** (0.012-0.017)	**0.017** (0.014-0.021)	**0.020** (0.016-0.025)	**0.023** (0.018-0.029)	**0.027** (0.020-0.036)	**0.031** (0.022-0.043)
45-day	**0.004** (0.003-0.004)	**0.005** (0.004-0.006)	**0.007** (0.006-0.008)	**0.009** (0.008-0.010)	**0.011** (0.009-0.013)	**0.013** (0.011-0.016)	**0.015** (0.013-0.019)	**0.018** (0.014-0.023)	**0.021** (0.016-0.029)	**0.024** (0.018-0.034)
60-day	**0.003** (0.003-0.004)	**0.004** (0.004-0.005)	**0.006** (0.005-0.007)	**0.007** (0.006-0.009)	**0.009** (0.008-0.011)	**0.011** (0.009-0.014)	**0.013** (0.011-0.016)	**0.015** (0.012-0.020)	**0.018** (0.014-0.025)	**0.021** (0.015-0.029)

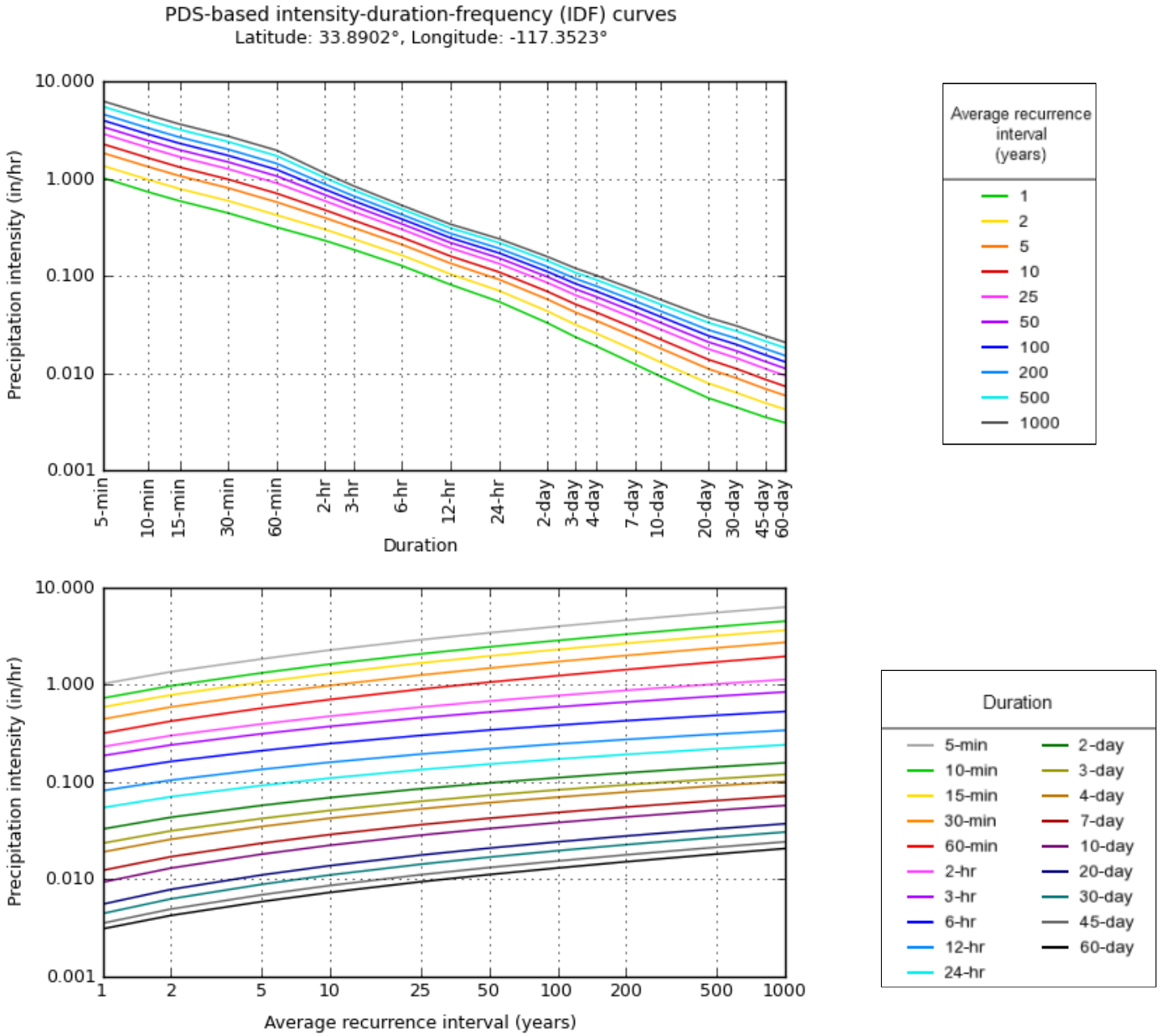
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



NOAA Atlas 14, Volume 6, Version 2

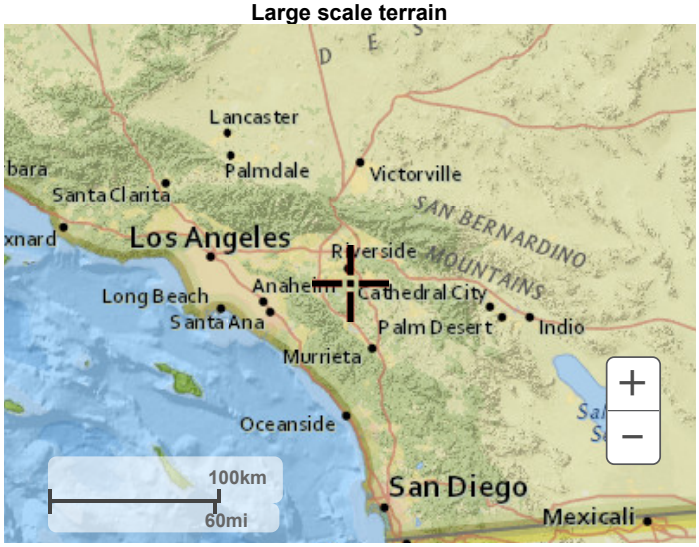
Created (GMT): Wed Feb 16 19:19:09 2022

Back to Top

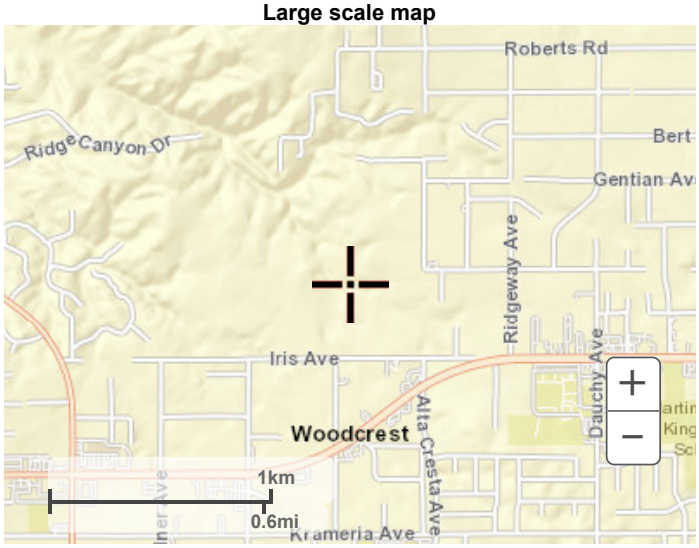
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map



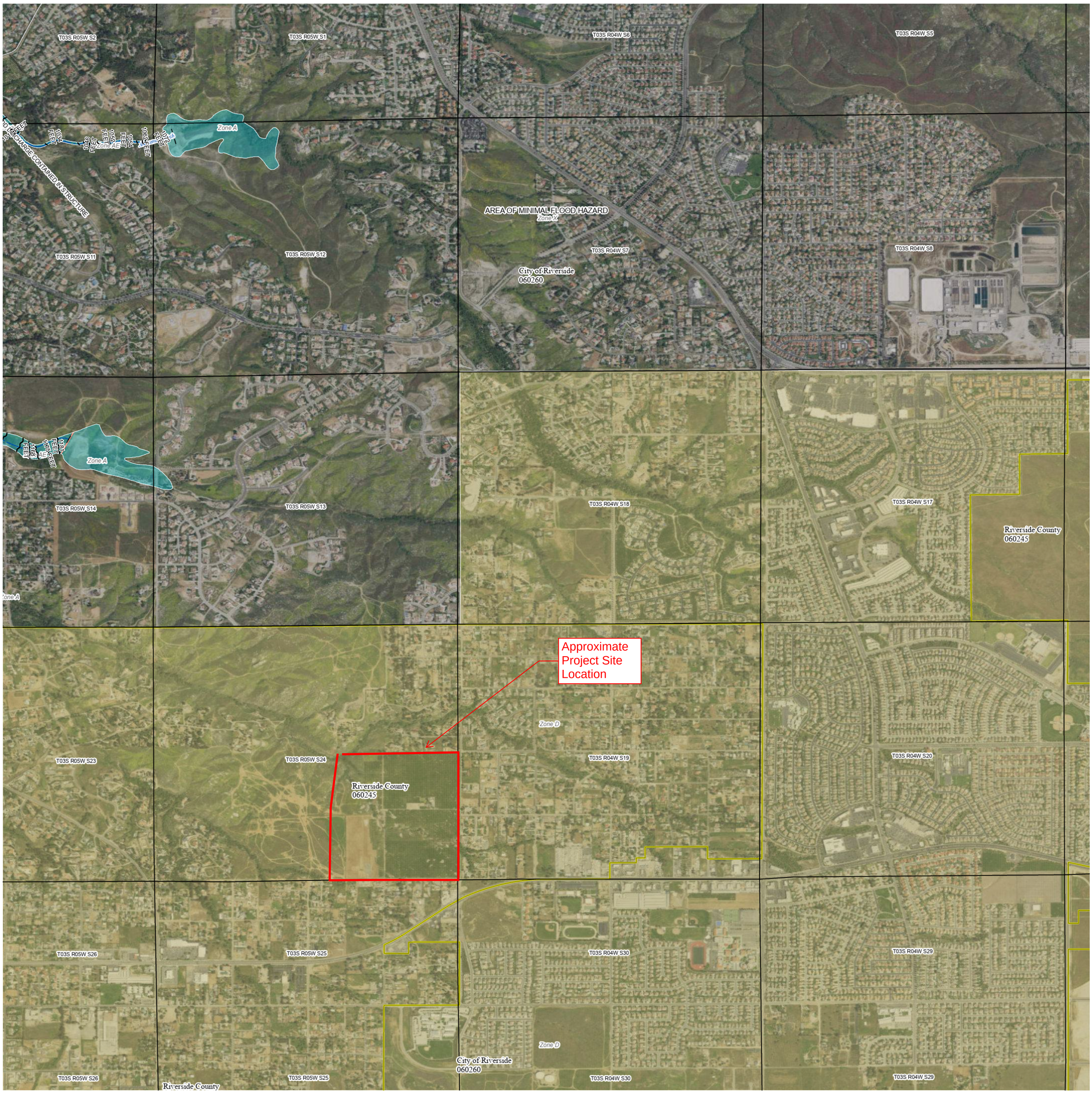
Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

117°22'30.9"W 33°56'28.2"N



117°18'44.19"W 33°52'16.84"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP
FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **6/29/2022 11:29 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

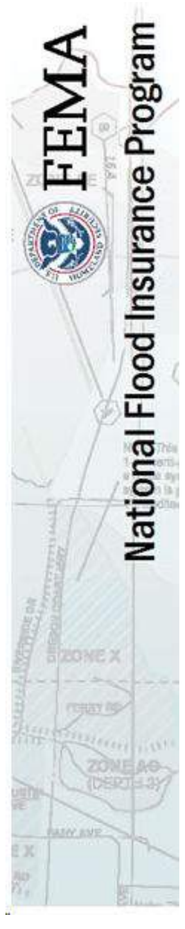
Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 3,000 4,000 Feet

0 105 210 420 630 840 Meters



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

PANEL **740** OF **3805**

Panel Contains:

COMMUNITY	NUMBER	PANEL
CITY OF RIVERSIDE	060260	0740
RIVERSIDE COUNTY	060245	0740

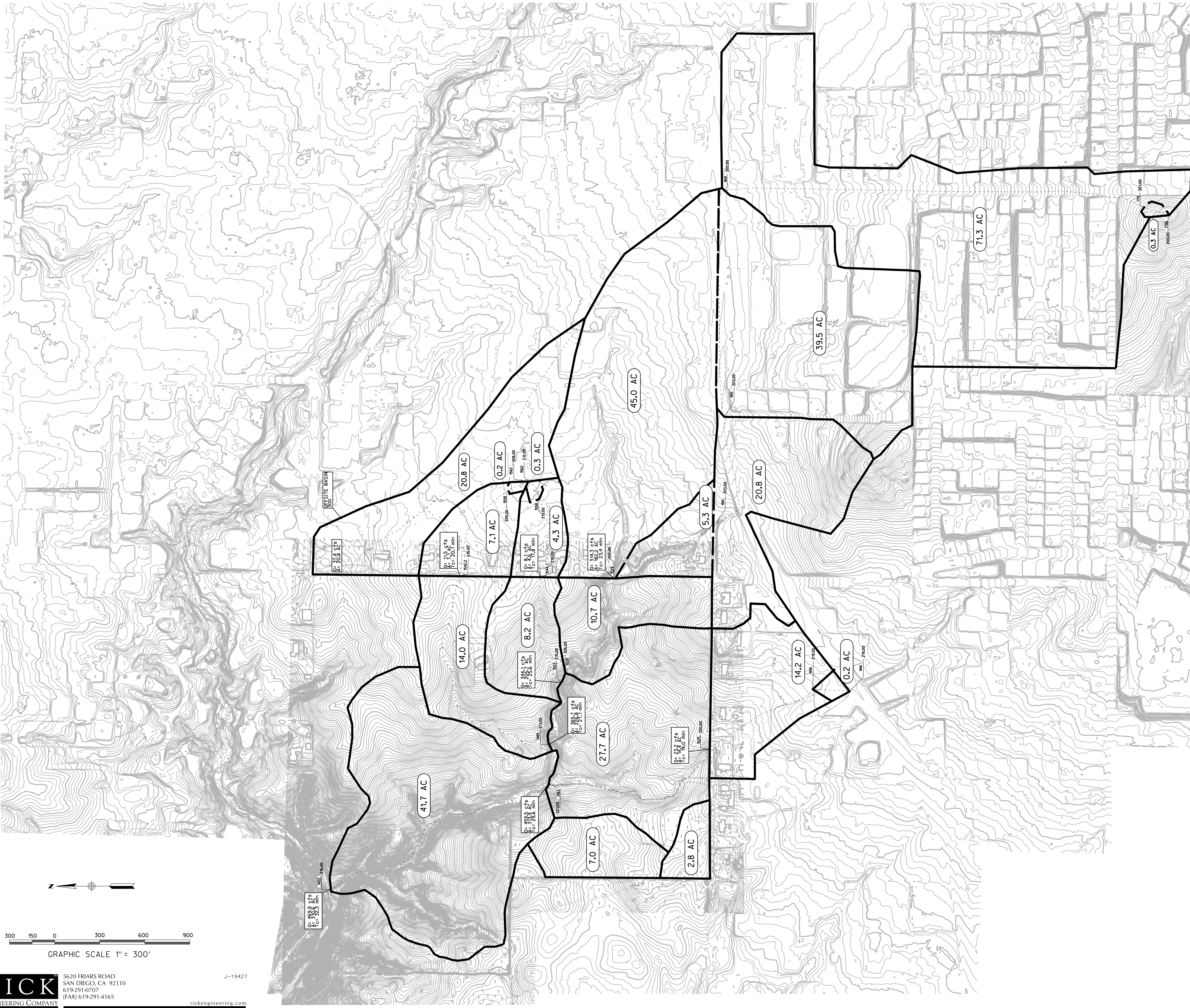
MAP NUMBER
06065C0740G
EFFECTIVE DATE
August 28, 2008

Appendix B

Rational Method Calculations

Includes:

1. Pre-Development Drainage Exhibit
2. 100-Year Pre-Development Rational Method Outputs
3. Post-Development Drainage Exhibit
4. 100-Year Post Development Rational Method Outputs



LEGEND:

———	SUB BASIN BOUNDARY
— —	SUB BASIN BOUNDARY
(0.14 AC.)	SUB BASIN AREA
[102]	NODE NUMBER

NOTES

1. BASIN 300 OFFSITE WAS ASSUMED TO HAVE EQUIVALENT RUNOFF PER ACRE AS THE DRAINAGE AREA FROM NODE 212 - 214 DUE TO THE SIMILAR LAND COVER.

DRAINAGE STUDY MAP FOR CHICAGO AVENUE

OFFSITE DRAINAGE EXHIBIT

(PRE--PROJECT)

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

J-19427

DATE: APRIL 5, 2022
REVISED: May 8, 2024

J-19427

NOT FOR CONSTRUCTION - EXHIBIT FOR DRAINAGE STUDY REPORT ONLY

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
                    (Rational Tabling Version 21.0)
                Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                          San Diego, California 92110
                        619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* CHICAGO AVENUE                                                        *
* EXISTING CONDITION RATIONAL METHOD FOR 100 YEAR EVENT                 *
* FN: CA200E00.RAT      J#19427      3/18/2024                          *
 ************************************************************************

  FILE NAME: CA200E00.RAT
  TIME/DATE OF STUDY: 14:47 03/18/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.630
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.704
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.840
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.240
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4685655
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4625021
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.240
  SLOPE OF INTENSITY DURATION CURVE = 0.4625
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   25.0     18.5    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
```

```
  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 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.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   178.00
  UPSTREAM ELEVATION(FEET) =   1786.00
  DOWNSTREAM ELEVATION(FEET) =   1770.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  TC = 0.533*[(  178.00**3)/(    16.00)]**.2 =    6.852
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.383
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7955
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.81
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.81

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1770.00  DOWNSTREAM ELEVATION(FEET) = 1602.00
  STREET LENGTH(FEET) =  2869.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 25.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  18.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      73.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.55
    HALFSTREET FLOOD WIDTH(FEET) =   24.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.21
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.97
  STREET FLOW TRAVEL TIME(MIN.) =   6.63   Tc(MIN.) =   13.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.473
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8177
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =   71.30      SUBAREA RUNOFF(CFS) =  144.20
  TOTAL AREA(ACRES) =       71.6        PEAK FLOW RATE(CFS) =     145.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.66   HALFSTREET FLOOD WIDTH(FEET) =  33.15
  FLOW VELOCITY(FEET/SEC.) =  8.58   DEPTH*VELOCITY(FT*FT/SEC.) =   5.69
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 2869.0 FT WITH ELEVATION-DROP = 168.0 FT, IS  124.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    202.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    3047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1602.00  DOWNSTREAM ELEVATION(FEET) = 1593.00
  STREET LENGTH(FEET) =  1499.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 25.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  18.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     176.75
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.99
    HALFSTREET FLOOD WIDTH(FEET) =   49.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.98
  STREET FLOW TRAVEL TIME(MIN.) =   6.21   Tc(MIN.) =   19.70
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.076
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7730
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =   39.50      SUBAREA RUNOFF(CFS) =   63.38
  TOTAL AREA(ACRES) =      111.1        PEAK FLOW RATE(CFS) =     208.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 1.05   HALFSTREET FLOOD WIDTH(FEET) =  52.31
  FLOW VELOCITY(FEET/SEC.) =  4.20   DEPTH*VELOCITY(FT*FT/SEC.) =   4.39
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1499.0 FT WITH ELEVATION-DROP =   9.0 FT, IS   56.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    203.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    4546.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1593.00  DOWNSTREAM ELEVATION(FEET) = 1565.00
  STREET LENGTH(FEET) =   824.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

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

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     224.45
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.81
    HALFSTREET FLOOD WIDTH(FEET) =   37.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    7.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   21.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.007
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7695
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =   20.80      SUBAREA RUNOFF(CFS) =   32.12
  TOTAL AREA(ACRES) =      131.9        PEAK FLOW RATE(CFS) =     240.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.83   HALFSTREET FLOOD WIDTH(FEET) =  38.02
  FLOW VELOCITY(FEET/SEC.) =  9.44   DEPTH*VELOCITY(FT*FT/SEC.) =   7.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.50 =    5370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.50 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1565.00  DOWNSTREAM(FEET) =   1529.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   756.00   CHANNEL SLOPE =  0.0476
  CHANNEL BASE(FEET) =    8.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.075   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.918
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7645
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     244.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.74
  AVERAGE FLOW DEPTH(FEET) =   2.41   TRAVEL TIME(MIN.) =   2.20
  Tc(MIN.) =   23.38
  SUBAREA AREA(ACRES) =     5.30       SUBAREA RUNOFF(CFS) =    7.77
  TOTAL AREA(ACRES) =      137.2         PEAK FLOW RATE(CFS) =     248.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.43   FLOW VELOCITY(FEET/SEC.) =   5.76
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    6126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.918
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7645
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =   45.00   SUBAREA RUNOFF(CFS) =   65.97
  TOTAL AREA(ACRES) =      182.2   TOTAL RUNOFF(CFS) =     314.25
  TC(MIN.) =   23.38

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1529.00  DOWNSTREAM(FEET) =   1509.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   892.00   CHANNEL SLOPE =  0.0224
  CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   4.300
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.845
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6794
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     320.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.34
  AVERAGE FLOW DEPTH(FEET) =   2.48   TRAVEL TIME(MIN.) =   2.02
  Tc(MIN.) =   25.40
  SUBAREA AREA(ACRES) =    10.70       SUBAREA RUNOFF(CFS) =   13.41
  TOTAL AREA(ACRES) =      192.9         PEAK FLOW RATE(CFS) =     327.67
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.50   FLOW VELOCITY(FEET/SEC.) =   7.39
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    7018.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1509.00  DOWNSTREAM(FEET) =   1503.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    71.00   CHANNEL SLOPE =  0.0845
  CHANNEL BASE(FEET) =    4.50   "Z" FACTOR =   5.400
  MANNING'S FACTOR = 0.075   MAXIMUM DEPTH(FEET) =  10.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     327.67
  FLOW VELOCITY(FEET/SEC.) =   7.24   FLOW DEPTH(FEET) =   2.51
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   25.57
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    7089.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.57
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =   192.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    327.67

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  UPSTREAM ELEVATION(FEET) =   1562.00
  DOWNSTREAM ELEVATION(FEET) =   1558.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.469*[(  125.00**3)/(     4.00)]**.2 =    6.444
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.480
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .8185
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.85
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1558.00  DOWNSTREAM(FEET) =   1544.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   596.00   CHANNEL SLOPE =  0.0223
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  56.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.180
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7781
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.88
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =  11.27
  Tc(MIN.) =   17.72
  SUBAREA AREA(ACRES) =     4.30       SUBAREA RUNOFF(CFS) =    7.29
  TOTAL AREA(ACRES) =        4.6         PEAK FLOW RATE(CFS) =       8.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE    212.00 TO NODE    214.00 =     721.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1545.00  DOWNSTREAM(FEET) =   1503.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   737.00   CHANNEL SLOPE =  0.0570
  CHANNEL BASE(FEET) =    8.40   "Z" FACTOR =  11.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.004
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5910
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.48
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   3.53
  Tc(MIN.) =   21.25
  SUBAREA AREA(ACRES) =     8.20       SUBAREA RUNOFF(CFS) =    9.71
  TOTAL AREA(ACRES) =       12.8         PEAK FLOW RATE(CFS) =      17.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.78
  LONGEST FLOWPATH FROM NODE    212.00 TO NODE    215.00 =    1458.00 FEET.

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

```
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 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.) =   21.25
  RAINFALL INTENSITY(INCH/HR) =   2.00
  TOTAL STREAM AREA(ACRES) =    12.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.86

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      327.67    25.57        1.840        192.90
      2       17.86    21.25        2.004         12.80

 ********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      290.19    21.25       2.004
      2      344.06    25.57       1.840

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     344.06   Tc(MIN.) =   25.57
  TOTAL AREA(ACRES) =      205.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    7089.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    211.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1503.00  DOWNSTREAM(FEET) =   1489.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   469.00   CHANNEL SLOPE =  0.0299
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   4.200
  MANNING'S FACTOR = 0.075   MAXIMUM DEPTH(FEET) =  10.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     344.06
  FLOW VELOCITY(FEET/SEC.) =   5.25   FLOW DEPTH(FEET) =   3.30
```

```
  TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   27.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    211.00 =    7558.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.05
  RAINFALL INTENSITY(INCH/HR) =   1.79
  TOTAL STREAM AREA(ACRES) =   205.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    344.06

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.00
  UPSTREAM ELEVATION(FEET) =   1562.00
  DOWNSTREAM ELEVATION(FEET) =   1558.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.469*[(  142.00**3)/(     4.00)]**.2 =    6.957
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.359
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .8159
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1558.00  DOWNSTREAM(FEET) =   1542.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   699.00   CHANNEL SLOPE =  0.0229
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  49.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.057
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7721
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.89
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =  13.12
```

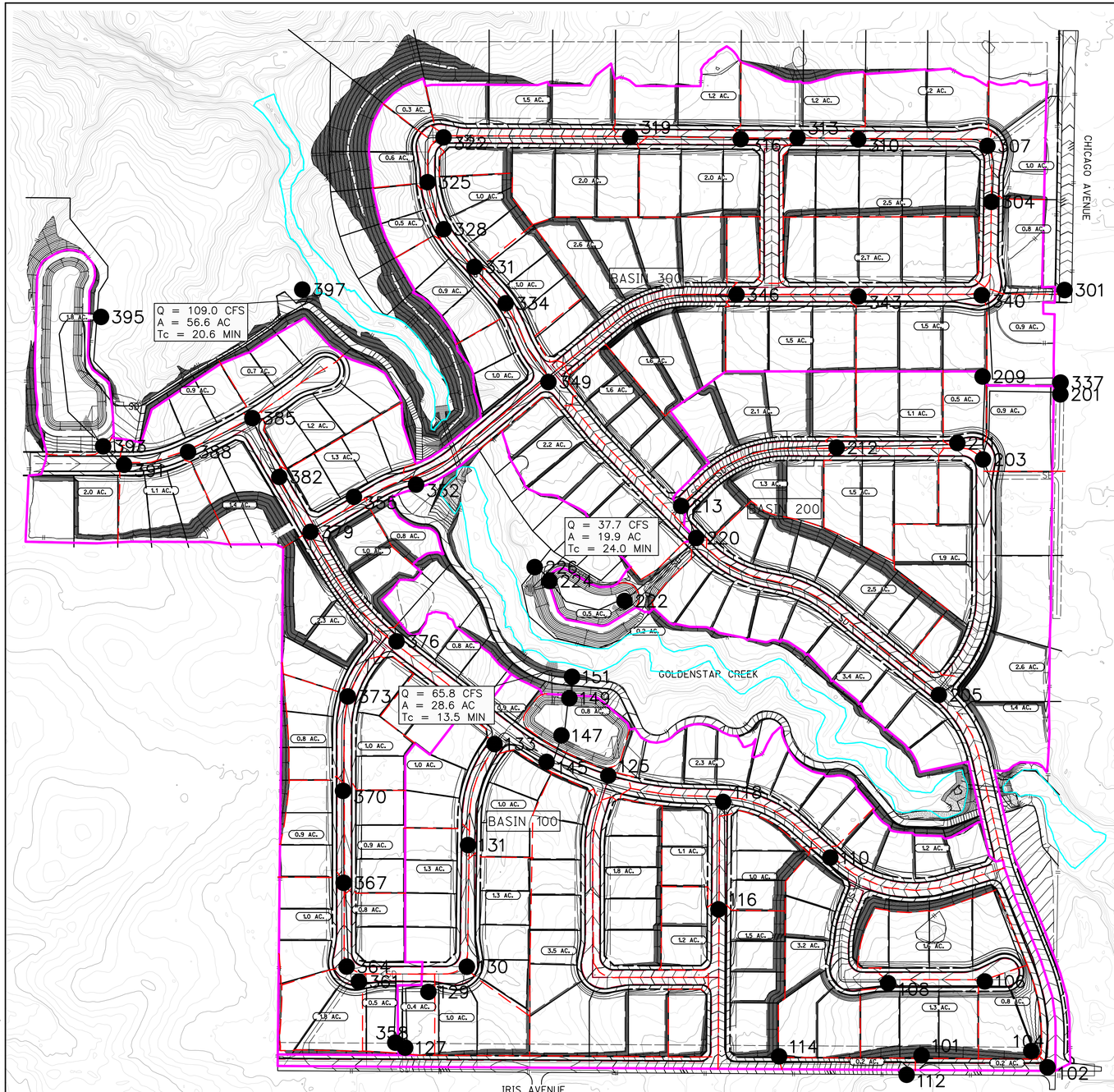
```
  Tc(MIN.) =   20.08
  SUBAREA AREA(ACRES) =     6.90       SUBAREA RUNOFF(CFS) =   10.96
  TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =      11.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     841.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1542.00  DOWNSTREAM(FEET) =   1489.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1639.00   CHANNEL SLOPE =  0.0323
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   8.300
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.689
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5555
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.56
  AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =  10.69
  Tc(MIN.) =   30.76
  SUBAREA AREA(ACRES) =    14.00       SUBAREA RUNOFF(CFS) =   13.13
  TOTAL AREA(ACRES) =       21.1         PEAK FLOW RATE(CFS) =      24.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   2.88
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    211.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    211.00 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.) =   30.76
  RAINFALL INTENSITY(INCH/HR) =   1.69
  TOTAL STREAM AREA(ACRES) =    21.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      344.06    27.05        1.792        205.70
      2       24.64    30.76        1.689         21.10
```

```
 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      365.74    27.05       1.792
      2      348.86    30.76       1.689

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     365.74   Tc(MIN.) =   27.05
  TOTAL AREA(ACRES) =      226.8
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    211.00 =    7558.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    221.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1489.00  DOWNSTREAM(FEET) =   1483.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   322.00   CHANNEL SLOPE =  0.0186
  CHANNEL BASE(FEET) =    3.20   "Z" FACTOR =   5.300
  MANNING'S FACTOR = 0.075   MAXIMUM DEPTH(FEET) =  10.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     365.74
  FLOW VELOCITY(FEET/SEC.) =   4.26   FLOW DEPTH(FEET) =   3.74
  TRAVEL TIME(MIN.) =   1.26   Tc(MIN.) =   28.32
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    7880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.32
  RAINFALL INTENSITY(INCH/HR) =   1.75
  TOTAL STREAM AREA(ACRES) =   226.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    365.74

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.50 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   226.00
  UPSTREAM ELEVATION(FEET) =   1566.00
  DOWNSTREAM ELEVATION(FEET) =   1558.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  TC = 0.393*[(  226.00**3)/(     8.00)]**.2 =    6.696
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.419
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8482
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    219.50 TO NODE    220.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1558.00  DOWNSTREAM(FEET) =   1525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   795.00   CHANNEL SLOPE =  0.0415
  CHANNEL BASE(FEET) =   72.00   "Z" FACTOR =  51.000
  MANNING'S FACTOR = 0.075   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.112
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7748
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.08
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =  12.28
  Tc(MIN.) =   18.98
  SUBAREA AREA(ACRES) =    14.20       SUBAREA RUNOFF(CFS) =   23.23
  TOTAL AREA(ACRES) =       14.4         PEAK FLOW RATE(CFS) =      23.81

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE    219.00 TO NODE    220.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1525.00  DOWNSTREAM(FEET) =   1483.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1294.00   CHANNEL SLOPE =  0.0325
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   9.200
```

```
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.890
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6834
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.78
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
 AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   5.14
 Tc(MIN.) =   24.12
 SUBAREA AREA(ACRES) =    27.70       SUBAREA RUNOFF(CFS) =   35.78
 TOTAL AREA(ACRES) =       42.1         PEAK FLOW RATE(CFS) =      59.59

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   4.62
 LONGEST FLOWPATH FROM NODE    219.00 TO NODE    221.00 =    2315.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   24.12
 RAINFALL INTENSITY(INCH/HR) =   1.89
 TOTAL STREAM AREA(ACRES) =    42.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     59.59

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      365.74    28.32        1.755        226.80
     2       59.59    24.12        1.890         42.10

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      371.17    24.12       1.890
     2      421.07    28.32       1.755

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     421.07   Tc(MIN.) =   28.32
  TOTAL AREA(ACRES) =      268.9
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    7880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    216.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1483.00  DOWNSTREAM(FEET) =   1402.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1719.00   CHANNEL SLOPE =  0.0471
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   2.800
  MANNING'S FACTOR = 0.075   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.652
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7092
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     445.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.23
  AVERAGE FLOW DEPTH(FEET) =   3.74   TRAVEL TIME(MIN.) =   3.96
  Tc(MIN.) =   32.28
  SUBAREA AREA(ACRES) =    41.70       SUBAREA RUNOFF(CFS) =   48.85
  TOTAL AREA(ACRES) =      310.6         PEAK FLOW RATE(CFS) =     469.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.83   FLOW VELOCITY(FEET/SEC.) =   7.33
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    216.00 =    9599.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      310.6  TC(MIN.) =     32.28
  PEAK FLOW RATE(CFS)   =     469.91
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- FLOWPATH
- ACREAGE — 2.5 AC.
- NODE
- DRAINAGE NODE ID — 301
- BASIN ID — BASIN 300
- PROPOSED 100-YEAR WSE OF GOLDENSTAR CREEK

150 75 0 150 300 450

GRAPHIC SCALE: 1"=150'

RICK ENGINEERING COMPANY
1770 IOWA AVE, SUITE 100
RIVERSIDE, CA 92507
951.782.0707
rickengineering.com

DRAINAGE STUDY MAP FOR
ARROYO VISTA
TTM 38510
PRELIMINARY ENGINEERING
POST-PROJECT

SHEET 1 OF 1
J-19427 REVISED: 05/08/2024

NOT FOR CONSTRUCTION – EXHIBIT FOR DRAINAGE STUDY REPORT ONLY

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
                    (Rational Tabling Version 21.0)
                Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                           San Diego, California 92110
                         619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* CHICAGO AVE (J-19427)                                                  *
* 100-YEAR, 1-HOUR PEAK FLOW RATE                                        *
* PROPOSED CONDITIONS (BASIN 100)                                        *
 **************************************************************************

  FILE NAME: CA100P00.RAT
  TIME/DATE OF STUDY: 14:46 12/20/2022
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.630
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.704
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.840
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.240
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4685655
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4625021
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.240
  SLOPE OF INTENSITY DURATION CURVE = 0.4625
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  7.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   326.00
  UPSTREAM ELEVATION(FEET) =   1566.90
  DOWNSTREAM ELEVATION(FEET) =   1559.60
  ELEVATION DIFFERENCE(FEET) =      7.30
  TC = 0.303*[(  326.00**3)/(     7.30)]**.2 =    6.559
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.452
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    110.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1559.60  DOWNSTREAM ELEVATION(FEET) = 1527.40
  STREET LENGTH(FEET) =   947.80   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    6.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   4.35   Tc(MIN.) =   10.91
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.728
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8370
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    7.31
  TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =       7.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   8.84
  FLOW VELOCITY(FEET/SEC.) =  4.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =    1273.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 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.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.73
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.92

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.40
  UPSTREAM ELEVATION(FEET) =   1552.00
  DOWNSTREAM ELEVATION(FEET) =   1547.40
  ELEVATION DIFFERENCE(FEET) =      4.60
  TC = 0.422*[(  250.40**3)/(     4.60)]**.2 =    8.552
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.053
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8314
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1547.40  DOWNSTREAM ELEVATION(FEET) = 1544.50
```

```
  STREET LENGTH(FEET) =   240.10   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =    9.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =   10.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.821
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8388
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    6.86
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       8.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    108.00 =     490.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    110.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1541.50  DOWNSTREAM(FEET) =  1524.40
  FLOW LENGTH(FEET) =   482.30   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.89
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   10.89
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    110.00 =     972.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.730
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8244
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    2.70
  TOTAL AREA(ACRES) =        4.9   TOTAL RUNOFF(CFS) =      11.59
  TC(MIN.) =   10.89

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 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) =   2.73
  TOTAL STREAM AREA(ACRES) =     4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.59

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.92    10.91        2.728          3.40
      2       11.59    10.89        2.730          4.90

 ********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       19.50    10.89       2.730
      2       19.51    10.91       2.728

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.50   Tc(MIN.) =   10.89
  TOTAL AREA(ACRES) =        8.3
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =    1273.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    118.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1524.40  DOWNSTREAM(FEET) =  1514.00
  FLOW LENGTH(FEET) =   317.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.50
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   11.32
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =    1591.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 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.) =   11.32
  RAINFALL INTENSITY(INCH/HR) =   2.68
  TOTAL STREAM AREA(ACRES) =     8.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.50

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   333.20
  UPSTREAM ELEVATION(FEET) =   1566.80
  DOWNSTREAM ELEVATION(FEET) =   1543.40
  ELEVATION DIFFERENCE(FEET) =     23.40
  TC = 0.303*[(  333.20**3)/(    23.40)]**.2 =    5.265
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.821
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8906
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) = 1543.40  DOWNSTREAM ELEVATION(FEET) = 1519.10
```

```
  STREET LENGTH(FEET) =   209.60   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    4.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.56
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =    5.81
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.650
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8414
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    8.29
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       8.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   6.84
  FLOW VELOCITY(FEET/SEC.) =  6.82   DEPTH*VELOCITY(FT*FT/SEC.) =   2.01
  LONGEST FLOWPATH FROM NODE    112.00 TO NODE    116.00 =     542.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    118.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1516.10  DOWNSTREAM(FEET) =  1514.00
  FLOW LENGTH(FEET) =   273.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.97
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    6.60
  LONGEST FLOWPATH FROM NODE    112.00 TO NODE    118.00 =     816.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.442
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8485
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.92
 TOTAL AREA(ACRES) =        3.9   TOTAL RUNOFF(CFS) =      11.89
 TC(MIN.) =    6.60

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 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.) =    6.60
 RAINFALL INTENSITY(INCH/HR) =   3.44
 TOTAL STREAM AREA(ACRES) =     3.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.89

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.50    11.32        2.682          8.30
     2       11.89     6.60        3.442          3.90

 ********************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       23.27     6.60       3.442
     2       28.77    11.32       2.682

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      28.77   Tc(MIN.) =   11.32
 TOTAL AREA(ACRES) =       12.2
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =    1591.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1514.00  DOWNSTREAM(FEET) =  1506.10
  FLOW LENGTH(FEET) =   306.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.77
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   11.72
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    125.00 =    1897.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.639
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8351
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    8.70   SUBAREA RUNOFF(CFS) =   19.17
  TOTAL AREA(ACRES) =       20.9   TOTAL RUNOFF(CFS) =      47.94
  TC(MIN.) =   11.72

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1506.10  DOWNSTREAM(FEET) =  1504.70
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.40
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.94
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    145.00 =    2021.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =   11.92
  RAINFALL INTENSITY(INCH/HR) =   2.62
  TOTAL STREAM AREA(ACRES) =    20.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.94
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    129.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   221.70
  UPSTREAM ELEVATION(FEET) =   1519.00
  DOWNSTREAM ELEVATION(FEET) =   1513.60
  ELEVATION DIFFERENCE(FEET) =      5.40
  TC = 0.393*[(  221.70**3)/(     5.40)]**.2 =    7.160
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.314
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8468
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1513.60  DOWNSTREAM ELEVATION(FEET) = 1512.80
  STREET LENGTH(FEET) =   114.40   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    8.13
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.126
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8328
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.73
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.38
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    130.00 =     336.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1509.80  DOWNSTREAM(FEET) =  1507.40
  FLOW LENGTH(FEET) =   332.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.73
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    9.30
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     668.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.938
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8409
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.60   SUBAREA RUNOFF(CFS) =    6.42
  TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      10.15
  TC(MIN.) =    9.30

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1507.40  DOWNSTREAM(FEET) =  1505.70
  FLOW LENGTH(FEET) =   264.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.15
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   10.06
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    133.00 =     932.60 FEET.

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

```
 FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8390
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    2.00   SUBAREA RUNOFF(CFS) =    4.75
 TOTAL AREA(ACRES) =        6.0   TOTAL RUNOFF(CFS) =      14.90
 TC(MIN.) =   10.06

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1505.70  DOWNSTREAM(FEET) =  1504.70
 FLOW LENGTH(FEET) =   157.60   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.90
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.48
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    145.00 =    1090.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.779
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8876
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.22
 TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      17.12
 TC(MIN.) =   10.48

****************************************************************************
 FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =   10.48
 RAINFALL INTENSITY(INCH/HR) =   2.78
 TOTAL STREAM AREA(ACRES) =     6.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.12
```

```
 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       47.94    11.92        2.618         20.90
     2       17.12    10.48        2.779          6.90

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       59.27    10.48       2.779
     2       64.07    11.92       2.618

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      64.07   Tc(MIN.) =   11.92
 TOTAL AREA(ACRES) =       27.8
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    145.00 =    2021.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    145.00 TO NODE    147.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1504.70  DOWNSTREAM(FEET) =  1503.00
 FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.20
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.07
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   12.00
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    147.00 =    2089.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    147.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1503.00  DOWNSTREAM(FEET) =   1502.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   100.80   CHANNEL SLOPE =  0.0050
```

```
  CHANNEL BASE(FEET) =  325.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.471
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8863
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      64.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.11
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   1.52
  Tc(MIN.) =   13.51
  SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    1.75
  TOTAL AREA(ACRES) =       28.6         PEAK FLOW RATE(CFS) =      65.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    149.00 =    2190.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    151.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1502.50  DOWNSTREAM(FEET) =  1498.50
  FLOW LENGTH(FEET) =    43.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.23
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.82
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.54
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    151.00 =    2234.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       28.6  TC(MIN.) =     13.54
  PEAK FLOW RATE(CFS)   =      65.82
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
                    (Rational Tabling Version 21.0)
                Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                           San Diego, California 92110
                         619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* CHICAGO AVE (J-19427)                                                  *
* 100-YEAR, 1-HOUR PEAK FLOW RATE                                        *
* PROPOSED CONDITIONS (BASIN 200)                                        *
 **************************************************************************

  FILE NAME: CA200P00.RAT
  TIME/DATE OF STUDY: 13:40 05/06/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.630
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.704
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.840
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.240
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4685655
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4625021
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.240
  SLOPE OF INTENSITY DURATION CURVE = 0.4625
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  7.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   348.50
  UPSTREAM ELEVATION(FEET) =   1545.50
  DOWNSTREAM ELEVATION(FEET) =   1541.40
  ELEVATION DIFFERENCE(FEET) =      4.10
  TC = 0.469*[(  348.50**3)/(     4.10)]**.2 =   11.864
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.624
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7957
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    205.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1541.40  DOWNSTREAM ELEVATION(FEET) = 1527.20
  STREET LENGTH(FEET) =   633.30   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    8.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   3.20   Tc(MIN.) =   15.07
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.349
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8141
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    8.61
  TOTAL AREA(ACRES) =        5.4        PEAK FLOW RATE(CFS) =      10.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  11.13
  FLOW VELOCITY(FEET/SEC.) =  3.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =     981.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.349
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8141
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.68
  TOTAL AREA(ACRES) =        6.8   TOTAL RUNOFF(CFS) =      13.16
  TC(MIN.) =   15.07

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1524.20  DOWNSTREAM(FEET) =  1500.10
  FLOW LENGTH(FEET) =   743.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.16
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   16.16
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    220.00 =    1724.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.275
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8117
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    5.90   SUBAREA RUNOFF(CFS) =   10.89
  TOTAL AREA(ACRES) =       12.7   TOTAL RUNOFF(CFS) =      24.06
  TC(MIN.) =   16.16
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.16
  RAINFALL INTENSITY(INCH/HR) =   2.27
  TOTAL STREAM AREA(ACRES) =    12.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.06

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   227.70
  UPSTREAM ELEVATION(FEET) =   1544.00
  DOWNSTREAM ELEVATION(FEET) =   1541.40
  ELEVATION DIFFERENCE(FEET) =      2.60
  TC = 0.422*[(  227.70**3)/(     2.60)]**.2 =    9.054
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.974
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8298
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.23
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.23

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1541.40  DOWNSTREAM ELEVATION(FEET) = 1536.20
  STREET LENGTH(FEET) =   290.60   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    7.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.79
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.742
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8247
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    5.88
  TOTAL AREA(ACRES) =        3.1        PEAK FLOW RATE(CFS) =       7.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =   9.78
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE    209.00 TO NODE    212.00 =     518.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1533.20  DOWNSTREAM(FEET) =  1501.10
  FLOW LENGTH(FEET) =   421.80   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.11
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   11.32
  LONGEST FLOWPATH FROM NODE    209.00 TO NODE    213.00 =     940.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.682
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8232
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.10   SUBAREA RUNOFF(CFS) =    4.64
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      11.75
  TC(MIN.) =   11.32

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1501.10  DOWNSTREAM(FEET) =  1500.10
  FLOW LENGTH(FEET) =    86.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.75
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.51
  LONGEST FLOWPATH FROM NODE    209.00 TO NODE    220.00 =    1026.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.661
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8356
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    2.89
  TOTAL AREA(ACRES) =        6.5   TOTAL RUNOFF(CFS) =      14.64
  TC(MIN.) =   11.51

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    200.00 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.) =   11.51
  RAINFALL INTENSITY(INCH/HR) =   2.66
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.06    16.16        2.275         12.70
      2       14.64    11.51        2.661          6.50

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       31.78    11.51       2.661
      2       36.57    16.16       2.275

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.57   Tc(MIN.) =   16.16
  TOTAL AREA(ACRES) =       19.2
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    200.00 =    1724.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 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) =  1500.10  DOWNSTREAM(FEET) =  1495.00
  FLOW LENGTH(FEET) =   216.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.93
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.57
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   16.44
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    222.00 =    1940.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.257
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8852
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =       19.4   TOTAL RUNOFF(CFS) =      36.97
  TC(MIN.) =   16.44

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    224.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1495.00  DOWNSTREAM(FEET) =   1494.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   290.50   CHANNEL SLOPE =  0.0017
  CHANNEL BASE(FEET) = 1000.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.895
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7290
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.64
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   7.55
 Tc(MIN.) =   23.99
 SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.69
 TOTAL AREA(ACRES) =       19.9         PEAK FLOW RATE(CFS) =      37.66

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    224.00 =    2231.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1494.50  DOWNSTREAM(FEET) =  1489.50
 FLOW LENGTH(FEET) =    56.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.31
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      37.66
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   24.03
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    226.00 =    2287.80 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       19.9  TC(MIN.) =     24.03
 PEAK FLOW RATE(CFS)   =      37.66
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2014 Advanced Engineering Software (aes)
                    (Rational Tabling Version 21.0)
                Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                           San Diego, California 92110
                         619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* CHICAGO AVE (J-19427)                                                  *
* 100-YEAR, 1-HOUR PEAK FLOW RATE                                        *
* PROPOSED CONDITIONS (BASIN 300)                                        *
 **************************************************************************

  FILE NAME: CA300P00.RAT
  TIME/DATE OF STUDY: 11:56 05/06/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.630
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.704
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.840
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.240
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4685655
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4625021
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.240
  SLOPE OF INTENSITY DURATION CURVE = 0.4625
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.020/0.020/0.020   0.50    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  7.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    304.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   391.50
  UPSTREAM ELEVATION(FEET) =   1539.50
  DOWNSTREAM ELEVATION(FEET) =   1531.90
  ELEVATION DIFFERENCE(FEET) =      7.60
  TC = 0.469*[(  391.50**3)/(     7.60)]**.2 =   11.244
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.690
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7979
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    307.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1531.90  DOWNSTREAM ELEVATION(FEET) = 1524.90
  STREET LENGTH(FEET) =   132.20   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    6.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
```

```
  STREET FLOW TRAVEL TIME(MIN.) =   0.48   Tc(MIN.) =   11.73
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.638
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7962
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.10
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       3.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   7.78
  FLOW VELOCITY(FEET/SEC.) =  4.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    307.00 =     523.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1521.90  DOWNSTREAM(FEET) =  1516.50
  FLOW LENGTH(FEET) =   334.70   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.82
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   12.60
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    310.00 =     858.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.552
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7932
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    2.43
  TOTAL AREA(ACRES) =        3.0   TOTAL RUNOFF(CFS) =       6.25
  TC(MIN.) =   12.60

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 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) =  1516.50  DOWNSTREAM(FEET) =  1514.00
  FLOW LENGTH(FEET) =   156.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.25
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   12.96
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    313.00 =    1014.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.519
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8190
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    5.16
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      11.40
  TC(MIN.) =   12.96

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1512.40  DOWNSTREAM(FEET) =  1508.00
  FLOW LENGTH(FEET) =   139.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.40
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   13.17
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    316.00 =    1154.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.500
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7913
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    2.37
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      13.78
  TC(MIN.) =   13.17

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    319.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  5112.40  DOWNSTREAM(FEET) =  1508.10
  FLOW LENGTH(FEET) =   277.60   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  99.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.78
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.22
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    319.00 =    1431.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.496
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8184
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    3.20   SUBAREA RUNOFF(CFS) =    6.54
  TOTAL AREA(ACRES) =        9.9   TOTAL RUNOFF(CFS) =      20.32
  TC(MIN.) =   13.22

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 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) =  1508.10  DOWNSTREAM(FEET) =  1491.10
  FLOW LENGTH(FEET) =   463.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.25
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.32
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   13.80
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    322.00 =    1895.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    322.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.447
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8170
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    3.80   SUBAREA RUNOFF(CFS) =    7.60
  TOTAL AREA(ACRES) =       13.7   TOTAL RUNOFF(CFS) =      27.91
  TC(MIN.) =   13.80
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1491.10  DOWNSTREAM(FEET) =  1488.50
  FLOW LENGTH(FEET) =   134.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.91
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   14.01
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    325.00 =    2029.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.430
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =       14.3   TOTAL RUNOFF(CFS) =      29.06
  TC(MIN.) =   14.01

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    328.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1488.50  DOWNSTREAM(FEET) =  1487.50
  FLOW LENGTH(FEET) =   127.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.06
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   14.27
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    328.00 =    2157.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.409
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8159
  SOIL CLASSIFICATION IS "D"
```

```
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.98
  TOTAL AREA(ACRES) =       14.8   TOTAL RUNOFF(CFS) =      30.04
  TC(MIN.) =   14.27

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    331.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1487.50  DOWNSTREAM(FEET) =  1486.80
  FLOW LENGTH(FEET) =   118.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.14
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.04
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   14.54
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    331.00 =    2275.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.388
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8294
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.98
  TOTAL AREA(ACRES) =       15.8   TOTAL RUNOFF(CFS) =      32.03
  TC(MIN.) =   14.54

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1486.80  DOWNSTREAM(FEET) =  1485.90
  FLOW LENGTH(FEET) =   122.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.93
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.03
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   14.80
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    334.00 =    2397.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.369
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8289
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    1.77
  TOTAL AREA(ACRES) =       16.7   TOTAL RUNOFF(CFS) =      33.79
  TC(MIN.) =   14.80

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    349.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1485.90  DOWNSTREAM(FEET) =  1484.50
  FLOW LENGTH(FEET) =   206.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.79
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   15.24
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    349.00 =    2604.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    349.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.338
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8281
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.94
  TOTAL AREA(ACRES) =       17.7   TOTAL RUNOFF(CFS) =      35.73
  TC(MIN.) =   15.24

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    349.00 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.) =   15.24
  RAINFALL INTENSITY(INCH/HR) =   2.34
  TOTAL STREAM AREA(ACRES) =    17.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.73

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    340.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   378.20
  UPSTREAM ELEVATION(FEET) =   1543.00
  DOWNSTREAM ELEVATION(FEET) =   1537.90
  ELEVATION DIFFERENCE(FEET) =      5.10
  TC = 0.469*[(  378.20**3)/(     5.10)]**.2 =   11.928
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.618
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7955
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.87
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.87

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    343.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) = 1537.90  DOWNSTREAM ELEVATION(FEET) = 1532.90
  STREET LENGTH(FEET) =   308.50   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =    9.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =   13.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.458
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8173
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    3.01
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       4.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.60
```

```
  FLOW VELOCITY(FEET/SEC.) =  3.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    343.00 =     686.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    343.00 TO NODE    346.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1529.90  DOWNSTREAM(FEET) =  1523.40
  FLOW LENGTH(FEET) =   307.80   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.89
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   14.35
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    346.00 =     994.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    346.00 TO NODE    346.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.403
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8157
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.20   SUBAREA RUNOFF(CFS) =    8.23
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =      13.12
  TC(MIN.) =   14.35

****************************************************************************
  FLOW PROCESS FROM NODE    346.00 TO NODE    349.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1523.40  DOWNSTREAM(FEET) =  1484.90
  FLOW LENGTH(FEET) =   539.50   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.12
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   14.94
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    349.00 =    1534.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    349.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.359
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8144
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.80   SUBAREA RUNOFF(CFS) =    9.22
  TOTAL AREA(ACRES) =       11.4   TOTAL RUNOFF(CFS) =      22.34
  TC(MIN.) =   14.94

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    349.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.94
  RAINFALL INTENSITY(INCH/HR) =   2.36
  TOTAL STREAM AREA(ACRES) =    11.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.34

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       35.73    15.24        2.338         17.70
      2       22.34    14.94        2.359         11.40

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       57.37    14.94       2.359
      2       57.87    15.24       2.338

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      57.87   Tc(MIN.) =   15.24
  TOTAL AREA(ACRES) =       29.1
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    349.00 =    2604.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    352.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1484.90  DOWNSTREAM(FEET) =  1482.00
  FLOW LENGTH(FEET) =   431.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.87
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   16.04
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    352.00 =    3035.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    352.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.283
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8120
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.10   SUBAREA RUNOFF(CFS) =    7.60
  TOTAL AREA(ACRES) =       33.2   TOTAL RUNOFF(CFS) =      65.47
  TC(MIN.) =   16.04

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    355.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1482.00  DOWNSTREAM(FEET) =  1481.10
  FLOW LENGTH(FEET) =   132.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.11
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.47
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   16.28
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    355.00 =    3167.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    355.00 TO NODE    355.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.267
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7820
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =       34.0   TOTAL RUNOFF(CFS) =      66.88
```

```
  TC(MIN.) =   16.28

****************************************************************************
  FLOW PROCESS FROM NODE    355.00 TO NODE    379.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1481.10  DOWNSTREAM(FEET) =  1480.20
  FLOW LENGTH(FEET) =   160.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.65
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.88
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   16.59
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    379.00 =    3328.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    379.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.247
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8257
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    2.41
  TOTAL AREA(ACRES) =       35.3   TOTAL RUNOFF(CFS) =      69.30
  TC(MIN.) =   16.59

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    379.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.59
  RAINFALL INTENSITY(INCH/HR) =   2.25
  TOTAL STREAM AREA(ACRES) =    35.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     69.30

****************************************************************************
  FLOW PROCESS FROM NODE    358.00 TO NODE    361.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   243.40
```

```
  UPSTREAM ELEVATION(FEET) =   1518.00
  DOWNSTREAM ELEVATION(FEET) =   1512.70
  ELEVATION DIFFERENCE(FEET) =      5.30
  TC = 0.422*[(  243.40**3)/(     5.30)]**.2 =    8.172
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.118
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8326
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.30
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.30

****************************************************************************
  FLOW PROCESS FROM NODE    361.00 TO NODE    364.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1512.73  DOWNSTREAM ELEVATION(FEET) = 1511.50
  STREET LENGTH(FEET) =     5.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   10.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.14
  STREET FLOW TRAVEL TIME(MIN.) =   0.01   Tc(MIN.) =    8.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.116
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8326
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.34
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   4.53
  FLOW VELOCITY(FEET/SEC.) =  9.20   DEPTH*VELOCITY(FT*FT/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE    358.00 TO NODE    364.00 =     248.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    364.00 TO NODE    367.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1508.50  DOWNSTREAM(FEET) =  1505.60
  FLOW LENGTH(FEET) =   194.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.63
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    8.71
  LONGEST FLOWPATH FROM NODE    358.00 TO NODE    367.00 =     442.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    367.00 TO NODE    367.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.028
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8424
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    4.59
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =       8.22
  TC(MIN.) =    8.71

****************************************************************************
  FLOW PROCESS FROM NODE    367.00 TO NODE    370.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1505.60  DOWNSTREAM(FEET) =  1504.10
  FLOW LENGTH(FEET) =   252.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.34
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.22
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    358.00 TO NODE    370.00 =     695.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    370.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.909
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8404
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    4.40
  TOTAL AREA(ACRES) =        5.0   TOTAL RUNOFF(CFS) =      12.62
```

```
  TC(MIN.) =    9.50

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    373.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1504.10  DOWNSTREAM(FEET) =  1502.70
  FLOW LENGTH(FEET) =   229.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.62
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   10.14
  LONGEST FLOWPATH FROM NODE    358.00 TO NODE    373.00 =     924.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.822
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8388
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    1.89
  TOTAL AREA(ACRES) =        5.8   TOTAL RUNOFF(CFS) =      14.52
  TC(MIN.) =   10.14

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    376.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1502.70  DOWNSTREAM(FEET) =  1501.50
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.52
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.62
  LONGEST FLOWPATH FROM NODE    358.00 TO NODE    376.00 =    1109.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    376.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.762
```

```
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8376
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    4.16
  TOTAL AREA(ACRES) =        7.6   TOTAL RUNOFF(CFS) =      18.68
  TC(MIN.) =   10.62

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    379.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1501.50  DOWNSTREAM(FEET) =  1480.60
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.80
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.68
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   10.98
  LONGEST FLOWPATH FROM NODE    358.00 TO NODE    379.00 =    1444.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    379.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.720
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8368
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    3.30   SUBAREA RUNOFF(CFS) =    7.51
  TOTAL AREA(ACRES) =       10.9   TOTAL RUNOFF(CFS) =      26.19
  TC(MIN.) =   10.98

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    379.00 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.) =   10.98
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =    10.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.19

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       69.30    16.59        2.247         35.30
```

```
     2       26.19    10.98        2.720         10.90

 ********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       72.06    10.98       2.720
      2       90.94    16.59       2.247

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      90.94   Tc(MIN.) =   16.59
  TOTAL AREA(ACRES) =       46.2
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    379.00 =    3328.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    379.00 TO NODE    382.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1479.30  DOWNSTREAM(FEET) =  1478.40
  FLOW LENGTH(FEET) =   161.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.36
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.94
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   16.87
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    382.00 =    3489.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    382.00 TO NODE    382.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.230
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8252
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =       47.5   TOTAL RUNOFF(CFS) =      93.33
  TC(MIN.) =   16.87

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

```
  FLOW PROCESS FROM NODE    382.00 TO NODE    385.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1479.30  DOWNSTREAM(FEET) =  1478.40
  FLOW LENGTH(FEET) =   161.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.40
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.33
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   17.16
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    385.00 =    3651.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    385.00 TO NODE    385.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.212
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8247
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    3.47
  TOTAL AREA(ACRES) =       49.4   TOTAL RUNOFF(CFS) =      96.80
  TC(MIN.) =   17.16

****************************************************************************
  FLOW PROCESS FROM NODE    385.00 TO NODE    388.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1478.40  DOWNSTREAM(FEET) =  1477.60
  FLOW LENGTH(FEET) =   193.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.80
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   17.54
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    388.00 =    3845.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    388.00 TO NODE    388.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.190
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8089
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.48
```

```
  TOTAL AREA(ACRES) =       50.8   TOTAL RUNOFF(CFS) =      99.28
  TC(MIN.) =   17.54

****************************************************************************
  FLOW PROCESS FROM NODE    388.00 TO NODE    391.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1477.60  DOWNSTREAM(FEET) =  1477.20
  FLOW LENGTH(FEET) =   165.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.96
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      99.28
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   17.94
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    391.00 =    4010.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    391.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.167
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .8081
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    4.00   SUBAREA RUNOFF(CFS) =    7.01
  TOTAL AREA(ACRES) =       54.8   TOTAL RUNOFF(CFS) =     106.28
  TC(MIN.) =   17.94

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    393.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1477.20  DOWNSTREAM(FEET) =  1472.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.30
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.28
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   18.18
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    393.00 =    4245.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1472.00  DOWNSTREAM(FEET) =   1471.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   224.10   CHANNEL SLOPE =  0.0022
  CHANNEL BASE(FEET) =  125.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.033
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7386
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     107.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.55
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   2.41
  Tc(MIN.) =   20.59
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.70
  TOTAL AREA(ACRES) =       56.6         PEAK FLOW RATE(CFS) =     108.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    395.00 =    4469.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    397.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1471.50  DOWNSTREAM(FEET) =  1466.50
  FLOW LENGTH(FEET) =    70.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     108.99
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   20.64
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    397.00 =    4540.00 FEET.
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       56.6  TC(MIN.) =     20.64
  PEAK FLOW RATE(CFS)   =     108.99
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix C

Preliminary Storm Drain Sizing Calculations

1. Worksheet of Preliminary Storm Drain Sizing

TTLC Chicago Ave.
J-19427
12/23/2022

Preliminary Storm Drain Size

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

Manning's n: 0.013

Sizing Factor (%): 30

			Slope at:	0.6%		0.7%		0.8%		0.9%		1.1%		1.3%	
Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])		Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
108-110	9.6	12.5		1.76	24"	1.71	24"	1.67	24"	1.63	24"	1.57	24"	1.52	24"
110-118	20.2	26.3		2.33	30"	2.26	30"	2.20	30"	2.16	30"	2.08	30"	2.01	24"
116-118	9.3	12.1		1.74	24"	1.69	24"	1.65	24"	1.61	24"	1.55	24"	1.50	18"
118-125	29.7	38.6		2.69	36"	2.61	36"	2.55	36"	2.49	30"	2.40	30"	2.32	30"
125-145	49.1	63.8		3.24	42"	3.15	42"	3.07	42"	3.01	42"	2.90	36"	2.81	36"
130-131	3.7	4.8		1.23	18"	1.20	18"	1.17	18"	1.14	18"	1.10	18"	1.06	18"
131-133	10.2	13.3		1.80	24"	1.75	24"	1.71	24"	1.67	24"	1.61	24"	1.56	24"
133-145	14.9	19.4		2.07	30"	2.02	30"	1.97	24"	1.92	24"	1.85	24"	1.79	24"
145-147	65.3	84.9		3.61	48"	3.51	48"	3.42	42"	3.35	42"	3.22	42"	3.12	42"
149-151	67.2	87.4		3.65	48"	3.55	48"	3.46	42"	3.38	42"	3.26	42"	3.16	42"
205-220	14.3	18.6		2.04	30"	1.98	24"	1.94	24"	1.89	24"	1.82	24"	1.77	24"
212-213	7.1	9.2		1.57	24"	1.53	24"	1.49	18"	1.46	18"	1.40	18"	1.36	18"
213-220	11.8	15.3		1.90	24"	1.85	24"	1.80	24"	1.76	24"	1.70	24"	1.64	24"
220-222	38.0	49.4		2.95	36"	2.86	36"	2.79	36"	2.73	36"	2.63	36"	2.55	36"
224-226	39.5	51.4		2.99	36"	2.90	36"	2.83	36"	2.77	36"	2.67	36"	2.59	36"
307-310	6.6	8.6		1.53	24"	1.49	18"	1.45	18"	1.42	18"	1.36	18"	1.32	18"
310-313	10.6	13.8		1.83	24"	1.77	24"	1.73	24"	1.69	24"	1.63	24"	1.58	24"
313-316	15.8	20.5		2.12	30"	2.06	30"	2.01	24"	1.97	24"	1.89	24"	1.83	24"
316-319	19.8	25.7		2.31	30"	2.24	30"	2.19	30"	2.14	30"	2.06	30"	2.00	24"
319-322	28.1	36.5		2.63	36"	2.56	36"	2.49	30"	2.44	30"	2.35	30"	2.28	30"
322-325	40.4	52.5		3.02	42"	2.93	36"	2.86	36"	2.79	36"	2.69	36"	2.61	36"
325-328	42.9	55.8		3.08	42"	3.00	36"	2.92	36"	2.86	36"	2.75	36"	2.67	36"
328-331	44.9	58.4		3.14	42"	3.05	42"	2.97	36"	2.91	36"	2.80	36"	2.71	36"
331-334	46.9	61.0		3.19	42"	3.10	42"	3.02	42"	2.96	36"	2.85	36"	2.76	36"
334-349	49.3	64.1		3.25	42"	3.16	42"	3.08	42"	3.01	42"	2.90	36"	2.81	36"
343-346	5.3	6.9		1.41	18"	1.37	18"	1.33	18"	1.30	18"	1.26	18"	1.22	18"
346-349	13.6	17.7		2.00	24"	1.95	24"	1.90	24"	1.86	24"	1.79	24"	1.73	24"
349-352	75.3	97.9		3.81	48"	3.70	48"	3.61	48"	3.53	48"	3.40	42"	3.29	42"
352-355	83.0	107.9		3.95	48"	3.84	48"	3.74	48"	3.66	48"	3.53	48"	3.42	42"
355-379	84.8	110.2		3.98	48"	3.87	48"	3.77	48"	3.69	48"	3.55	48"	3.44	42"
364-367	6.0	7.8		1.47	18"	1.43	18"	1.40	18"	1.37	18"	1.32	18"	1.28	18"
367-370	10.6	13.8		1.83	24"	1.77	24"	1.73	24"	1.69	24"	1.63	24"	1.58	24"
370-373	15.0	19.5		2.08	30"	2.02	30"	1.97	24"	1.93	24"	1.86	24"	1.80	24"
373-376	17.1	22.2		2.18	30"	2.12	30"	2.07	30"	2.02	30"	1.95	24"	1.89	24"
376-379	22.7	29.5		2.43	30"	2.36	30"	2.30	30"	2.25	30"	2.17	30"	2.10	30"
379-385	112.5	146.3		4.43	54"	4.30	54"	4.19	54"	4.10	54"	3.95	48"	3.83	48"
382-385	114.9	149.4		4.46	54"	4.34	54"	4.23	54"	4.14	54"	3.98	48"	3.86	48"
385-388	119.2	155.0		4.52	60"	4.40	54"	4.29	54"	4.19	54"	4.04	54"	3.91	48"
388-391	121.7	158.2		4.56	60"	4.43	54"	4.32	54"	4.23	54"	4.07	54"	3.94	48"
391-393	129.3	168.1		4.66	60"	4.53	60"	4.42	54"	4.32	54"	4.16	54"	4.04	54"
393-395	131.5	171.0		4.69	60"	4.56	60"	4.45	54"	4.35	54"	4.19	54"	4.06	54"
385-388	59.6	77.5		3.49	42"	3.39	42"	3.31	42"	3.23	42"	3.11	42"	3.02	42"

Note:
1. "cfs" = cubic feet per second.
2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor.

TTLC Chicago Ave.
J-19427
12/23/2022

Manning's n: 0.013

Sizing Factor (: 30

			1.4%		1.5%		2.0%		2.3%		2.4%		2.5%		3.3%		4.0%	
Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
108-110	9.6	12.5	1.50	18"	1.48	18"	1.40	18"	1.37	18"	1.36	18"	1.35	18"	1.28	18"	1.23	18"
110-118	20.2	26.3	1.98	24"	1.96	24"	2.16	30"	1.81	24"	1.79	24"	1.78	24"	1.69	24"	1.63	24"
116-118	9.3	12.1	1.48	18"	1.46	18"	1.61	24"	1.35	18"	1.34	18"	1.33	18"	1.26	18"	1.22	18"
118-125	29.7	38.6	2.29	30"	2.26	30"	2.49	30"	2.09	30"	2.07	30"	2.06	30"	1.95	24"	1.88	24"
125-145	49.1	63.8	2.77	36"	2.73	36"	3.01	42"	2.52	36"	2.50	30"	2.48	30"	2.36	30"	2.27	30"
130-131	3.7	4.8	1.05	18"	1.04	18"	1.14	18"	0.96	12"	0.95	12"	0.94	12"	0.89	12"	0.86	12"
131-133	10.2	13.3	1.54	24"	1.52	24"	1.67	24"	1.40	18"	1.39	18"	1.38	18"	1.31	18"	1.26	18"
133-145	14.9	19.4	1.77	24"	1.75	24"	1.92	24"	1.61	24"	1.60	24"	1.59	24"	1.51	18"	1.45	18"
145-147	65.3	84.9	3.08	42"	3.04	42"	3.35	42"	2.81	36"	2.78	36"	2.76	36"	2.62	36"	2.53	36"
149-151	67.2	87.4	3.11	42"	3.07	42"	3.38	42"	2.84	36"	2.81	36"	2.79	36"	2.65	36"	2.56	36"
205-220	14.3	18.6	1.74	24"	1.72	24"	1.89	24"	1.59	24"	1.58	24"	1.56	24"	1.48	18"	1.43	18"
212-213	7.1	9.2	1.34	18"	1.32	18"	1.46	18"	1.22	18"	1.21	18"	1.20	18"	1.14	18"	1.10	18"
213-220	11.8	15.3	1.62	24"	1.60	24"	1.76	24"	1.48	18"	1.47	18"	1.45	18"	1.38	18"	1.33	18"
220-222	38.0	49.4	2.51	36"	2.48	30"	2.73	36"	2.29	30"	2.27	30"	2.26	30"	2.14	30"	2.06	30"
224-226	39.5	51.4	2.55	36"	2.52	36"	2.77	36"	2.32	30"	2.31	30"	2.29	30"	2.17	30"	2.10	30"
307-310	6.6	8.6	1.30	18"	1.29	18"	1.42	18"	1.19	18"	1.18	18"	1.17	18"	1.11	18"	1.07	18"
310-313	10.6	13.8	1.56	24"	1.54	24"	1.69	24"	1.42	18"	1.41	18"	1.40	18"	1.33	18"	1.28	18"
313-316	15.8	20.5	1.81	24"	1.79	24"	1.97	24"	1.65	24"	1.64	24"	1.62	24"	1.54	24"	1.49	18"
316-319	19.8	25.7	1.97	24"	1.94	24"	2.14	30"	1.79	24"	1.78	24"	1.77	24"	1.68	24"	1.62	24"
319-322	28.1	36.5	2.25	30"	2.22	30"	2.44	30"	2.05	30"	2.03	30"	2.01	24"	1.91	24"	1.84	24"
322-325	40.4	52.5	2.57	36"	2.54	36"	2.79	36"	2.34	30"	2.33	30"	2.31	30"	2.19	30"	2.11	30"
325-328	12.9	16.8	2.63	36"	2.60	36"	2.86	36"	2.40	30"	2.38	30"	2.36	30"	2.24	30"	2.16	30"
328-331	44.9	58.4	2.68	36"	2.64	36"	2.91	36"	2.44	30"	2.42	30"	2.40	30"	2.28	30"	2.20	30"
331-334	46.9	61.0	2.72	36"	2.69	36"	2.96	36"	2.48	30"	2.46	30"	2.44	30"	2.32	30"	2.23	30"
334-349	49.3	64.1	2.77	36"	2.74	36"	3.01	42"	2.53	36"	2.51	36"	2.49	30"	2.36	30"	2.28	30"
343-346	5.3	6.9	1.20	18"	1.19	18"	1.30	18"	1.09	18"	1.09	18"	1.08	18"	1.02	18"	0.99	12"
346-349	13.6	17.7	1.71	24"	1.69	24"	1.86	24"	1.56	24"	1.55	24"	1.53	24"	1.46	18"	1.40	18"
349-352	75.3	97.9	3.25	42"	3.21	42"	3.53	48"	2.96	36"	2.94	36"	2.91	36"	2.77	36"	2.67	36"
352-355	83.0	107.9	3.37	42"	3.33	42"	3.66	48"	3.07	42"	3.05	42"	3.02	42"	2.87	36"	2.77	36"
355-379	84.8	110.2	3.40	42"	3.35	42"	3.69	48"	3.10	42"	3.07	42"	3.05	42"	2.89	36"	2.79	36"
364-367	6.0	7.8	1.26	18"	1.24	18"	1.37	18"	1.15	18"	1.14	18"	1.13	18"	1.07	18"	1.03	18"
367-370	10.6	13.8	1.56	24"	1.54	24"	1.69	24"	1.42	18"	1.41	18"	1.40	18"	1.33	18"	1.28	18"
370-373	15.0	19.5	1.77	24"	1.75	24"	1.93	24"	1.62	24"	1.60	24"	1.59	24"	1.51	18"	1.46	18"
373-376	17.1	22.2	1.86	24"	1.84	24"	2.02	30"	1.70	24"	1.68	24"	1.67	24"	1.59	24"	1.53	24"
376-379	22.7	29.5	2.07	30"	2.05	30"	2.25	30"	1.89	24"	1.87	24"	1.86	24"	1.76	24"	1.70	24"
379-385	112.5	146.3	3.78	48"	3.73	48"	4.10	54"	3.44	42"	3.41	42"	3.39	42"	3.22	42"	3.10	42"
382-385	114.9	149.4	3.81	48"	3.76	48"	4.14	54"	3.47	42"	3.44	42"	3.41	42"	3.24	42"	3.13	42"
385-388	119.2	155.0	3.86	48"	3.81	48"	4.19	54"	3.52	48"	3.49	42"	3.46	42"	3.29	42"	3.17	42"
388-391	121.7	158.2	3.89	48"	3.84	48"	4.23	54"	3.54	48"	3.52	48"	3.49	42"	3.31	42"	3.19	42"
391-393	129.3	168.1	3.98	48"	3.93	48"	4.32	54"	3.63	48"	3.60	48"	3.57	48"	3.39	42"	3.27	42"
393-395	131.5	171.0	4.00	48"	3.95	48"	4.35	54"	3.65	48"	3.62	48"	3.59	48"	3.41	42"	3.29	42"
385-388	119.2	155.0	2.98	36"	2.94	36"	3.23	42"	2.71	36"	2.69	36"	2.67	36"	2.53	36"	2.44	30"

TTLC Chicago Ave.
J-19427
12/23/2022

Manning's n: 0.013

Sizing Factor (: 30

			5.0%		7.1%		8.8%		9.2%	
Node	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
108-110	9.6	12.5	1.18	18"	1.11	18"	1.06	18"	1.05	18"
110-118	20.2	26.3	1.56	24"	1.46	18"	1.41	18"	1.39	18"
116-118	9.3	12.1	1.17	18"	1.09	18"	1.05	18"	1.04	18"
118-125	29.7	38.6	1.81	24"	1.69	24"	1.62	24"	1.61	24"
125-145	49.1	63.8	2.18	30"	2.04	30"	1.96	24"	1.94	24"
130-131	3.7	4.8	0.83	10"	0.77	10"	0.74	10"	0.74	10"
131-133	10.2	13.3	1.21	18"	1.13	18"	1.09	18"	1.08	18"
133-145	14.9	19.4	1.39	18"	1.31	18"	1.25	18"	1.24	18"
145-147	65.3	84.9	2.43	30"	2.27	30"	2.18	30"	2.16	30"
149-151	67.2	87.4	2.45	30"	2.30	30"	2.21	30"	2.19	30"
205-220	14.3	18.6	1.37	18"	1.29	18"	1.23	18"	1.22	18"
212-213	7.1	9.2	1.06	18"	0.99	12"	0.95	12"	0.94	12"
213-220	11.8	15.3	1.28	18"	1.20	18"	1.15	18"	1.14	18"
220-222	38.0	49.4	1.98	24"	1.85	24"	1.78	24"	1.77	24"
224-226	39.5	51.4	2.01	24"	1.88	24"	1.81	24"	1.79	24"
307-310	6.6	8.6	1.03	18"	0.96	12"	0.92	12"	0.92	12"
310-313	10.6	13.8	1.23	18"	1.15	18"	1.10	18"	1.09	18"
313-316	15.8	20.5	1.42	18"	1.33	18"	1.28	18"	1.27	18"
316-319	19.8	25.7	1.55	24"	1.45	18"	1.39	18"	1.38	18"
319-322	28.1	36.5	1.77	24"	1.66	24"	1.59	24"	1.58	24"
322-325	40.4	52.5	2.03	30"	1.90	24"	1.82	24"	1.81	24"
325-328	12.9	16.8	2.07	30"	1.94	24"	1.86	24"	1.85	24"
328-331	44.9	58.4	2.11	30"	1.97	24"	1.90	24"	1.88	24"
331-334	46.9	61.0	2.14	30"	2.01	24"	1.93	24"	1.91	24"
334-349	49.3	64.1	2.18	30"	2.04	30"	1.96	24"	1.95	24"
343-346	5.3	6.9	0.95	12"	0.89	12"	0.85	12"	0.84	10"
346-349	13.6	17.7	1.35	18"	1.26	18"	1.21	18"	1.20	18"
349-352	75.3	97.9	2.56	36"	2.40	30"	2.30	30"	2.28	30"
352-355	83.0	107.9	2.65	36"	2.49	30"	2.39	30"	2.37	30"
355-379	84.8	110.2	2.68	36"	2.51	36"	2.41	30"	2.39	30"
364-367	6.0	7.8	0.99	12"	0.93	12"	0.89	12"	0.88	12"
367-370	10.6	13.8	1.23	18"	1.15	18"	1.10	18"	1.09	18"
370-373	15.0	19.5	1.40	18"	1.31	18"	1.26	18"	1.25	18"
373-376	17.1	22.2	1.47	18"	1.37	18"	1.32	18"	1.31	18"
376-379	22.7	29.5	1.63	24"	1.53	24"	1.47	18"	1.46	18"
379-385	112.5	146.3	2.98	36"	2.79	36"	2.68	36"	2.65	36"
382-385	114.9	149.4	3.00	36"	2.81	36"	2.70	36"	2.67	36"
385-388	119.2	155.0	3.04	42"	2.85	36"	2.73	36"	2.71	36"
388-391	121.7	158.2	3.06	42"	2.87	36"	2.76	36"	2.73	36"
391-393	129.3	168.1	3.13	42"	2.93	36"	2.82	36"	2.80	36"
393-395	131.5	171.0	3.15	42"	2.95	36"	2.84	36"	2.81	36"
385-388	119.2	155.0	2.34	30"	2.20	30"	2.11	30"	2.09	30"

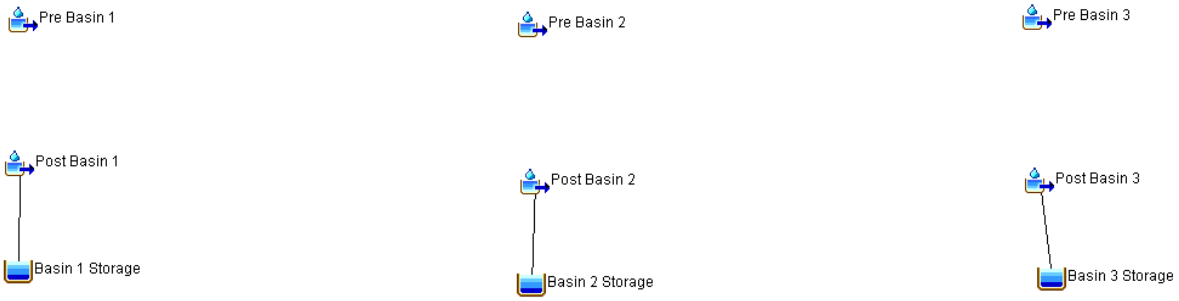
Appendix D

Preliminary HEC-HMS Detention Results

1. 2-Year 24-Hour Results
2. 10-Year 24-Hour Results
3. HEC-HMS Pre-processor inputs
4. Typical Detention Basin Section

Arroyo Vista JN-19427 HEC-HMS Detention Results 5/7/2024

HEC-HMS Basin Configuration



10-Year 24 Hour Storm Event

Global Summary

Global Summary Results for Run "3 Basin 10yr 24hr"

Project: ChicagoAve_updated Simulation Run: 3 Basin 10yr 24hr

Start of Run: 01Jan2000, 00:00
End of Run: 04Jan2000, 00:00
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Routed 3 Basins
Meteorologic Model: 3 Basin 10yr 24hr Post
Control Specifications: 72 hr

Show Elements: All Elements Volume Units: IN ACRE-FT Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
Pre Basin 1	0.0462	4.2	01Jan2000, 13:30	0.98
Pre Basin 2	0.0312	2.8	01Jan2000, 13:30	0.66
Pre Basin 3	0.0855	7.7	01Jan2000, 13:30	1.82
Post Basin 1	0.0462	6.5	01Jan2000, 13:30	1.81
Basin 1 Storage	0.0462	4.0	01Jan2000, 15:00	1.81
Post Basin 2	0.0312	4.3	01Jan2000, 13:30	1.22
Basin 2 Storage	0.0312	2.8	01Jan2000, 14:50	1.22
Post Basin 3	0.0855	11.4	01Jan2000, 13:30	3.34
Basin 3 Storage	0.0855	7.0	01Jan2000, 15:20	3.34

Basin 100 Results

Summary Results for Reservoir "Basin 1 Storage"

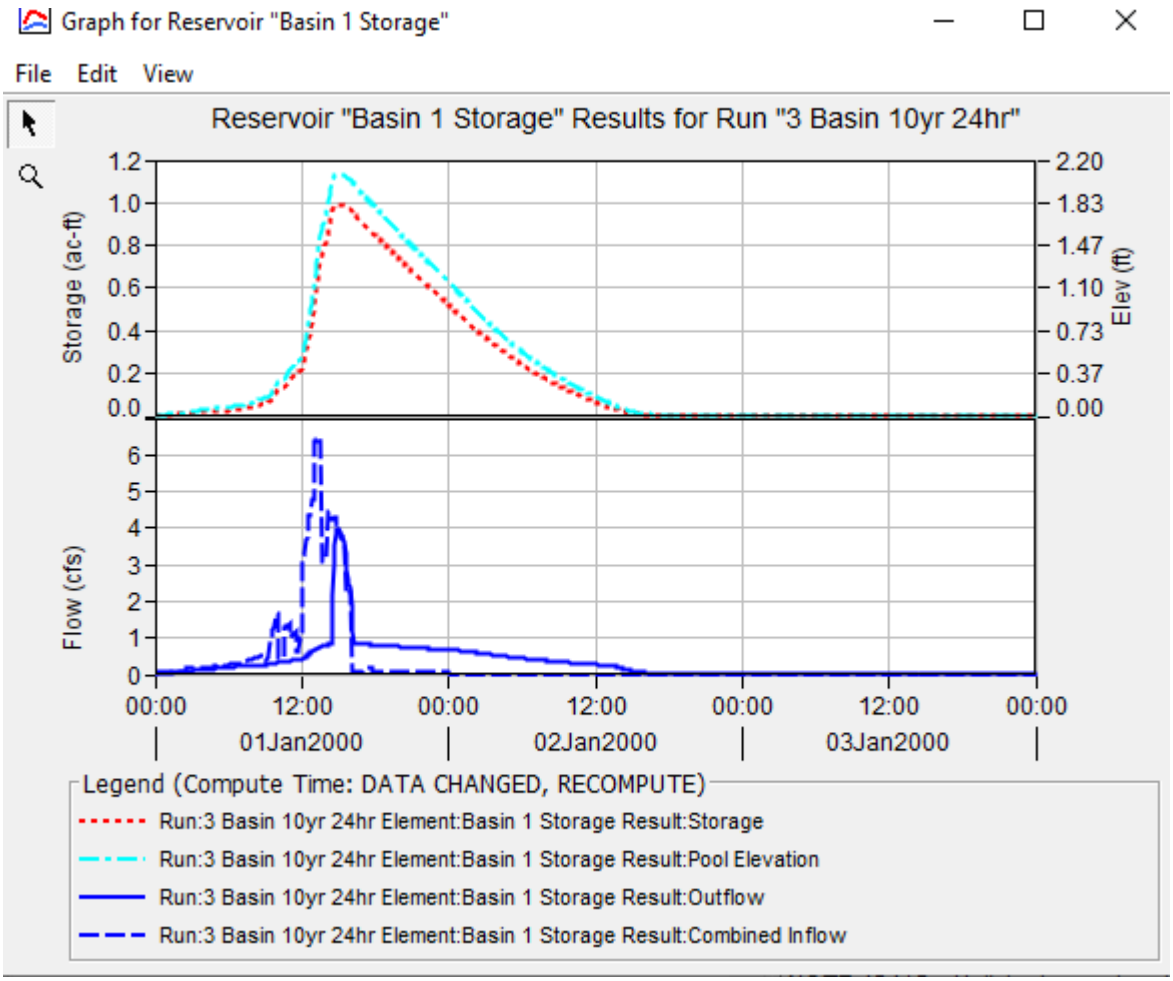
Project: ChicagoAve_updated Simulation Run: 3 Basin 10yr 24hr
Reservoir: Basin 1 Storage

Start of Run:	01Jan2000, 00:00	Basin Model:	Routed 3 Basins
End of Run:	04Jan2000, 00:00	Meteorologic Model:	3 Basin 10yr 24hr Post
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	72 hr

Volume Units: ○ IN ◉ ACRE-FT

Computed Results

Peak Inflow:	6.5 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 13:30
Peak Discharge:	4.0 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 15:00
Inflow Volume:	1.81 (ACRE-FT)	Peak Storage:	0.99 (ACRE-FT)
Discharge Volume:	1.81 (ACRE-FT)	Peak Elevation:	2.1 (FT)



Basin 200 Results

Summary Results for Reservoir "Basin 2 Storage"

Project: ChicagoAve_updated Simulation Run: 3 Basin 10yr 24hr
Reservoir: Basin 2 Storage

Start of Run:	01Jan2000, 00:00	Basin Model:	Routed 3 Basins
End of Run:	04Jan2000, 00:00	Meteorologic Model:	3 Basin 10yr 24hr Post
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	72 hr

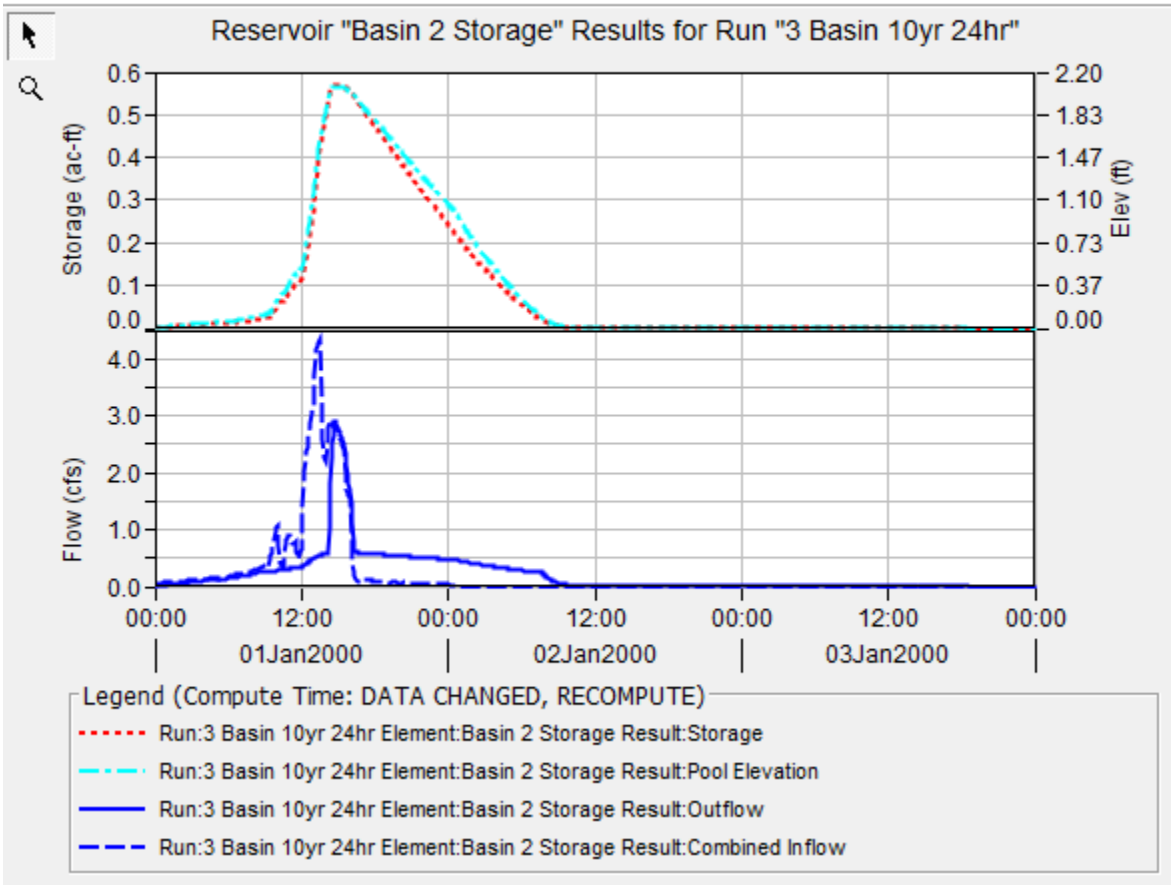
Volume Units: ○ IN ◉ ACRE-FT

Computed Results

Peak Inflow:	4.3 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 13:30
Peak Discharge:	2.8 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 14:50
Inflow Volume:	1.22 (ACRE-FT)	Peak Storage:	0.57 (ACRE-FT)
Discharge Volume:	1.22 (ACRE-FT)	Peak Elevation:	2.1 (FT)

Graph for Reservoir "Basin 2 Storage"

File Edit View



Basin 300 Results

Summary Results for Reservoir "Basin 3 Storage"

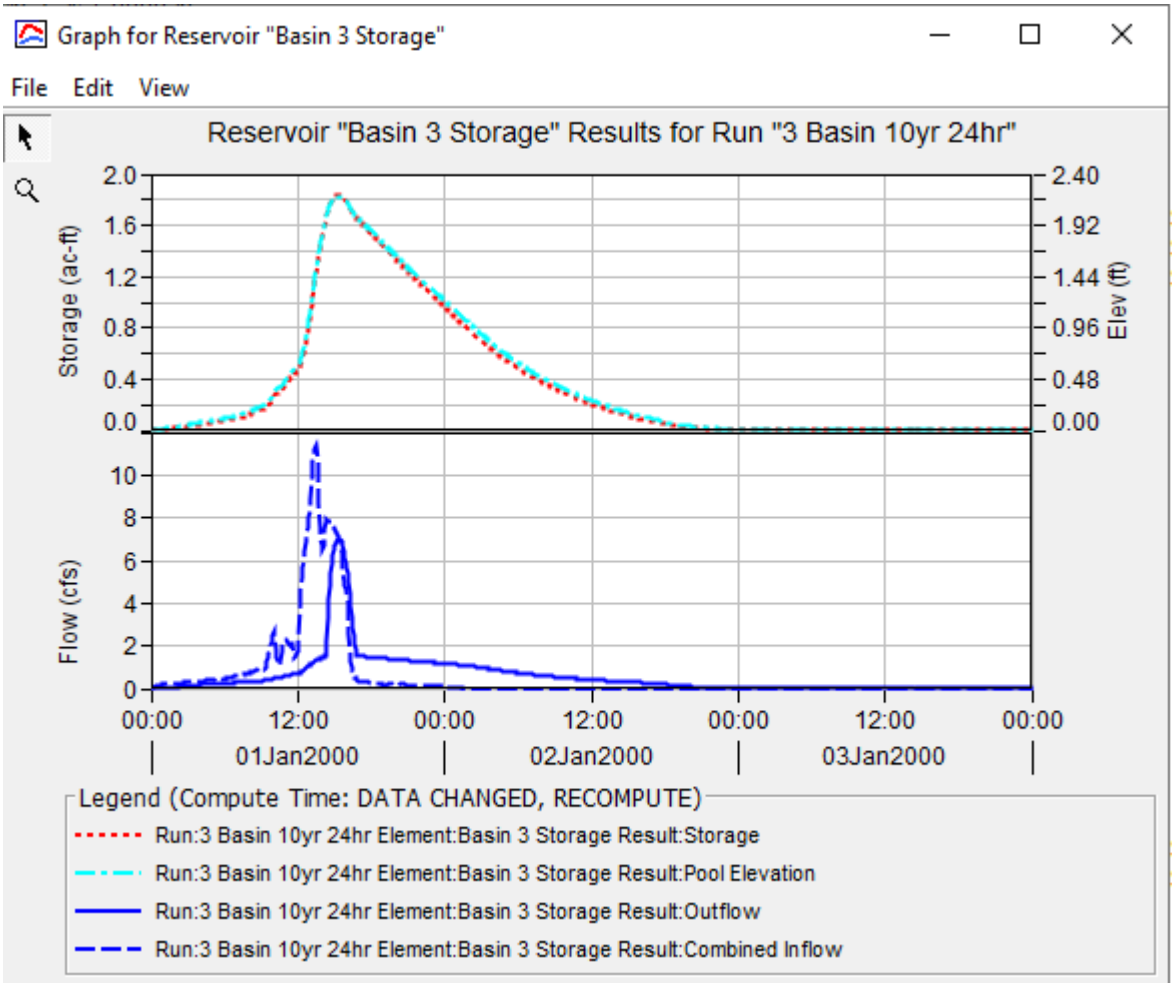
Project: ChicagoAve_updated Simulation Run: 3 Basin 10yr 24hr
Reservoir: Basin 3 Storage

Start of Run:	01Jan2000, 00:00	Basin Model:	Routed 3 Basins
End of Run:	04Jan2000, 00:00	Meteorologic Model:	3 Basin 10yr 24hr Post
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	72 hr

Volume Units: ○ IN ◉ ACRE-FT

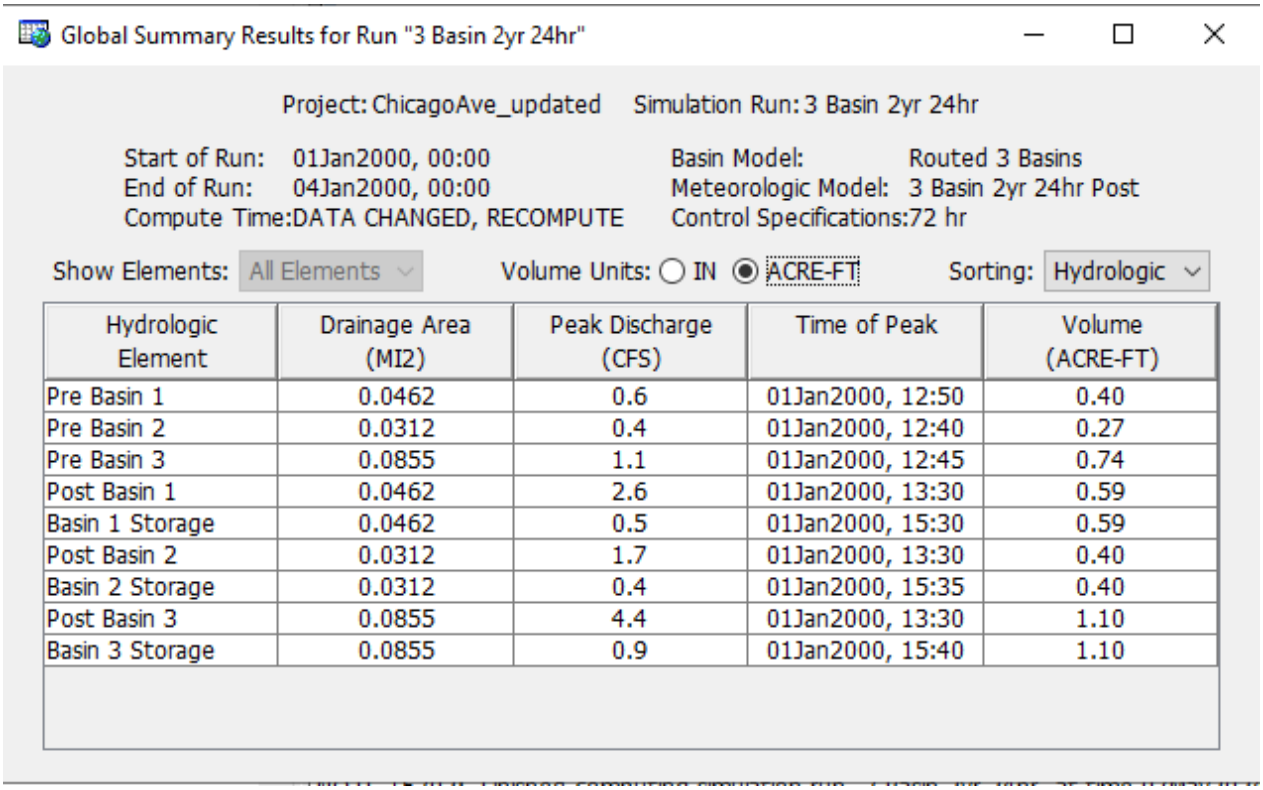
Computed Results

Peak Inflow:	11.4 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 13:30
Peak Discharge:	7.0 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 15:20
Inflow Volume:	3.34 (ACRE-FT)	Peak Storage:	1.83 (ACRE-FT)
Discharge Volume:	3.34 (ACRE-FT)	Peak Elevation:	2.2 (FT)



2 Year Storm Event

Global Summary



Global Summary Results for Run "3 Basin 2yr 24hr"

Project: ChicagoAve_updated Simulation Run: 3 Basin 2yr 24hr

Start of Run: 01Jan2000, 00:00
End of Run: 04Jan2000, 00:00
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Routed 3 Basins
Meteorologic Model: 3 Basin 2yr 24hr Post
Control Specifications: 72 hr

Show Elements: All Elements | Volume Units: IN / ACRE-FT | Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
Pre Basin 1	0.0462	0.6	01Jan2000, 12:50	0.40
Pre Basin 2	0.0312	0.4	01Jan2000, 12:40	0.27
Pre Basin 3	0.0855	1.1	01Jan2000, 12:45	0.74
Post Basin 1	0.0462	2.6	01Jan2000, 13:30	0.59
Basin 1 Storage	0.0462	0.5	01Jan2000, 15:30	0.59
Post Basin 2	0.0312	1.7	01Jan2000, 13:30	0.40
Basin 2 Storage	0.0312	0.4	01Jan2000, 15:35	0.40
Post Basin 3	0.0855	4.4	01Jan2000, 13:30	1.10
Basin 3 Storage	0.0855	0.9	01Jan2000, 15:40	1.10

Basin 100 Results

Summary Results for Reservoir "Basin 1 Storage"

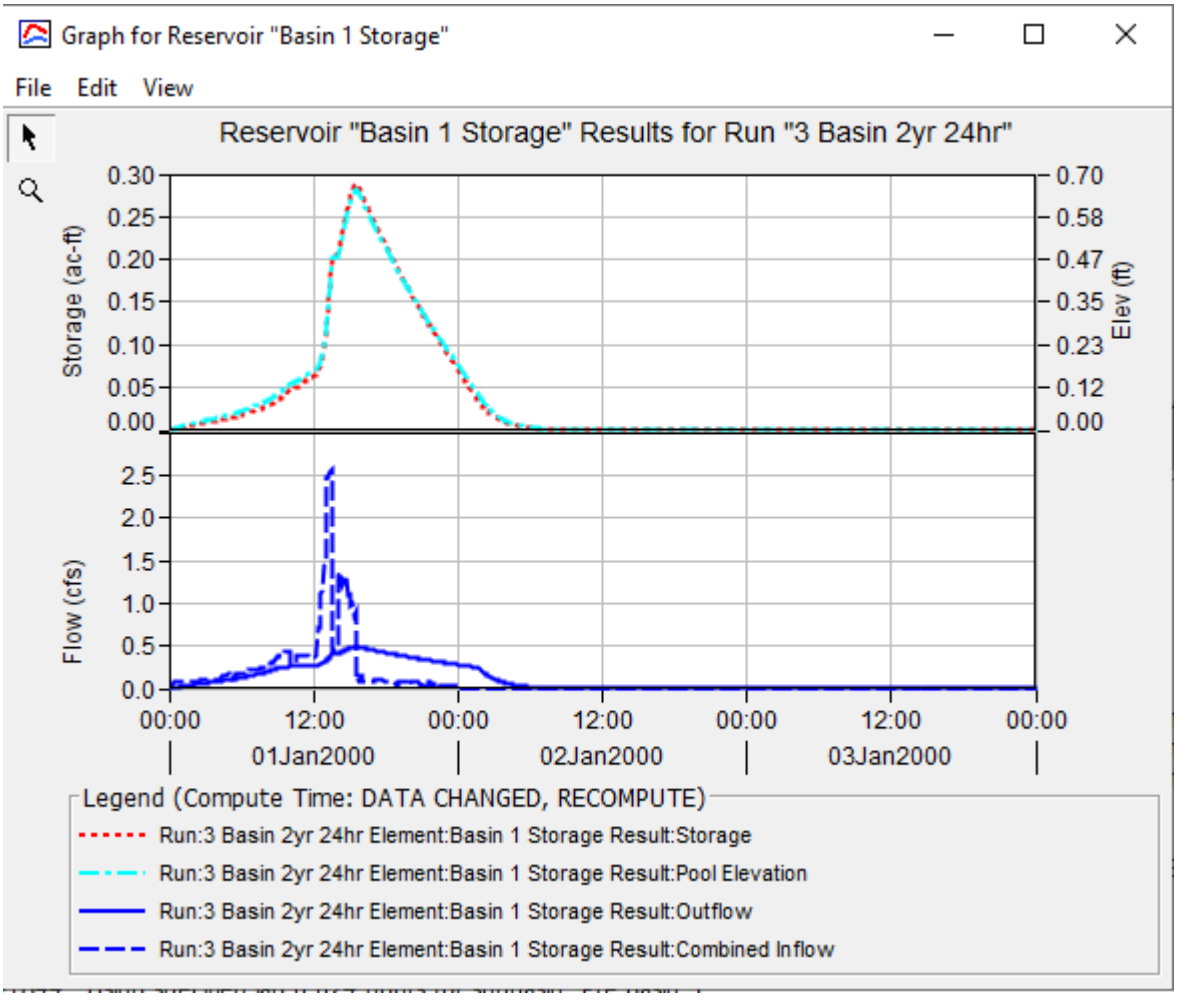
Project: ChicagoAve_updated Simulation Run: 3 Basin 2yr 24hr
Reservoir: Basin 1 Storage

Start of Run:	01Jan2000, 00:00	Basin Model:	Routed 3 Basins
End of Run:	04Jan2000, 00:00	Meteorologic Model:	3 Basin 2yr 24hr Post
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	72 hr

Volume Units: ○ IN ◉ ACRE-FT

Computed Results

Peak Inflow:	2.6 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 13:30
Peak Discharge:	0.5 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 15:30
Inflow Volume:	0.59 (ACRE-FT)	Peak Storage:	0.29 (ACRE-FT)
Discharge Volume:	0.59 (ACRE-FT)	Peak Elevation:	0.7 (FT)



Basin 200 Results

Summary Results for Reservoir "Basin 2 Storage"

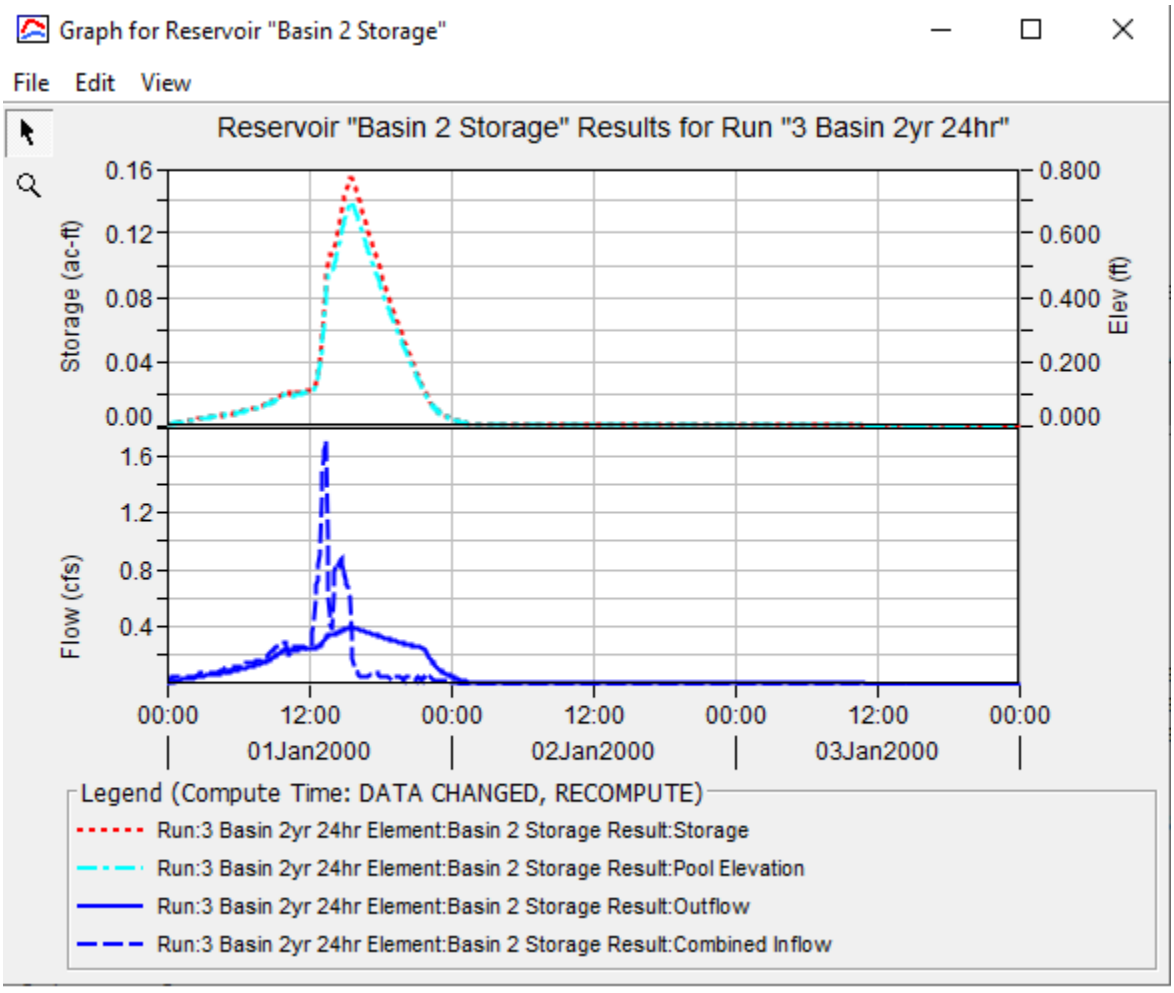
Project: ChicagoAve_updated Simulation Run: 3 Basin 2yr 24hr
Reservoir: Basin 2 Storage

Start of Run:	01Jan2000, 00:00	Basin Model:	Routed 3 Basins
End of Run:	04Jan2000, 00:00	Meteorologic Model:	3 Basin 2yr 24hr Post
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	72 hr

Volume Units: ○ IN ◉ ACRE-FT

Computed Results

Peak Inflow:	1.7 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 13:30
Peak Discharge:	0.4 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 15:35
Inflow Volume:	0.40 (ACRE-FT)	Peak Storage:	0.15 (ACRE-FT)
Discharge Volume:	0.40 (ACRE-FT)	Peak Elevation:	0.7 (FT)



Basin 300 Results

Summary Results for Reservoir "Basin 3 Storage"

Project: ChicagoAve_updated Simulation Run: 3 Basin 2yr 24hr
Reservoir: Basin 3 Storage

Start of Run:	01Jan2000, 00:00	Basin Model:	Routed 3 Basins
End of Run:	04Jan2000, 00:00	Meteorologic Model:	3 Basin 2yr 24hr Post
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	72 hr

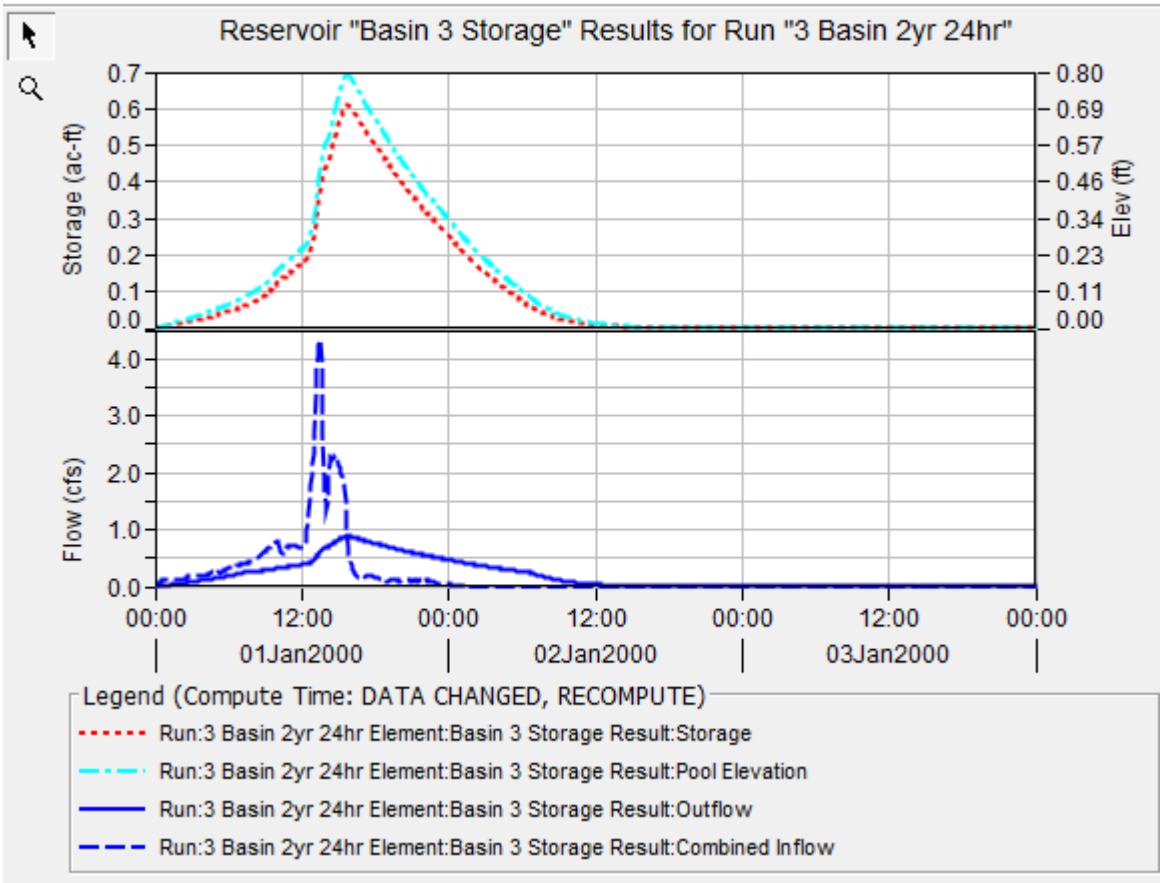
Volume Units: ○ IN ◉ ACRE-FT

Computed Results

Peak Inflow:	4.4 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 13:30
Peak Discharge:	0.9 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 15:40
Inflow Volume:	1.10 (ACRE-FT)	Peak Storage:	0.61 (ACRE-FT)
Discharge Volume:	1.10 (ACRE-FT)	Peak Elevation:	0.8 (FT)

Graph for Reservoir "Basin 3 Storage"

File Edit View



HEC-HMS Preprocessor Inputs

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0855 sq mi

1 Hour Storm		*3 Hour Storm*		*6 Hour Storm*		*24 Hour Storm*	
Point Precipitation	0.704 in.	Point Precipitation	1.12 in.	Point Precipitation	1.49 in.	Point Precipitation	2.63 in.
Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %
Adjusted Point Precipitation	0.7	Adjusted Point Precipitation	1.12	Adjusted Point Precipitation	1.49	Adjusted Point Precipitation	2.63
Slope of Rainfall Intensity - Duration Curve	0.52						

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	4142	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	1449	ft
Elevation Difference	64	ft
Lag Time	**0.174**	**hr**
40% Lag Time	4.2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

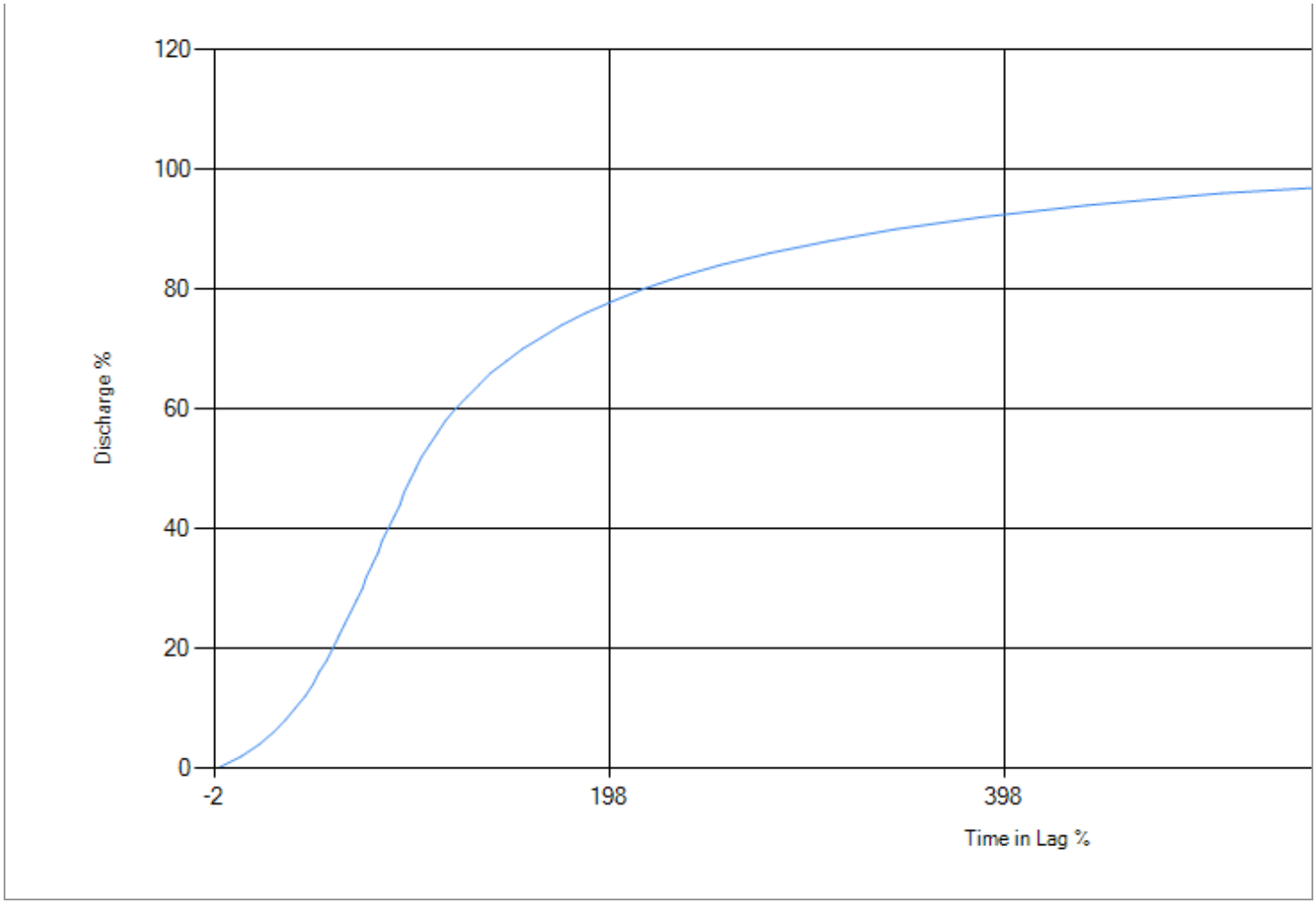
Run S Graphs

S-Graph 1		S-Graph 2		S-Graph 3		S-Graph 4	
Type:	Mountain	Type:	Valley	Type:	Foothill	Type:	Desert
Weight %		Weight %	100	Weight %		Weight %	
Time in Percent of Lag	Discharge (percent)	Time in Percent of Lag	Discharge (percent)	Time in Percent of Lag	Discharge (percent)	Time in Percent of Lag	Discharge (percent)
0	0	0	0	0	0	0	0
0	2	12	2	0	2	0	2
0	4	21	4	0	4	0	4
0	6	28	6	0	6	0	6
0	8	34	8	0	8	0	8
0	10	39	10	0	10	0	10
0	12	44	12	0	12	0	12
0	14	48	14	0	14	0	14
0	16	51	16	0	16	0	16
0	18	55	18	0	18	0	18

S-Graph Combined	
Type:	Combined
Weight %	
Time in Percent of Lag	Discharge (percent)
0	0
12	2
21	4
28	6
34	8
39	10
44	12
48	14
51	16

0	20	58	20	0	20	0	20	55	18
0	22	61	22	0	22	0	22	58	20
0	24	64	24	0	24	0	24	61	22
0	26	67	26	0	26	0	26	64	24
0	28	70	28	0	28	0	28	67	26
0	30	73	30	0	30	0	30	70	28
0	32	75	32	0	32	0	32	73	30
0	34	78	34	0	34	0	34	75	32
0	36	81	36	0	36	0	36	78	34
0	38	83	38	0	38	0	38	81	36
0	40	86	40	0	40	0	40	83	38
0	42	89	42	0	42	0	42	86	40
0	44	92	44	0	44	0	44	89	42
0	46	94	46	0	46	0	46	92	44
0	48	97	48	0	48	0	48	94	46
0	50	100	50	0	50	0	50	97	48
0	52	103	52	0	52	0	52	100	50
0	54	107	54	0	54	0	54	103	52
0	56	111	56	0	56	0	56	107	54
0	58	115	58	0	58	0	58	111	56
0	60	120	60	0	60	0	60	115	58
0	62	126	62	0	62	0	62	120	60
0	64	132	64	0	64	0	64	126	62
0	66	138	66	0	66	0	66	132	64
0	68	146	68	0	68	0	68	138	66
0	70	154	70	0	70	0	70	146	68
0	72	164	72	0	72	0	72	154	70
0	74	174	74	0	74	0	74	164	72
0	76	186	76	0	76	0	76	174	74
0	78	200	78	0	78	0	78	186	76
0	80	215	80	0	80	0	80	200	78
0	82	233	82	0	82	0	82	215	80
0	84	254	84	0	84	0	84	233	82
0	86	279	86	0	86	0	86	254	84
0	88	309	88	0	88	0	88	279	86
0	90	343	90	0	90	0	90	309	88
0	92	386	92	0	92	0	92	343	90
0	94	440	94	0	94	0	94	386	92
0	96	508	96	0	96	0	96	440	94
0	98	611	98	0	98	0	98	508	96
0	100	820	100	0	100	0	100	611	98
								820	100

S-Graph Combined


120
100
80
60
40
20
0
Discharge %
-2
198
398
Time in Lag %

Basin 100 Loss Rate

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0462 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	1196	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	802	ft
Elevation Difference	44	ft
Lag Time	**0.037**	**hr**
40% Lag Time	0.9	min

Run

Loss Rate Data Effective Rainfall S-Graphs

(●) Average Adjusted Loss Rate Calculator (Plate E-2.1) ( ) Average Adjusted Loss Rate (Manual Entry)

Add Loss Rate Values

AMC Condition: II

Soil Group / Cover Type View Chart	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)		
-							Add	

Soil Group / Cover Type	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)	Area/ Total Area	Ave. Adj. Rate (in/hr)
Pasture, Dryland Fair C	79	0.25600	Natural or Agriculture (0)	0	0.256	28.6	1	0.256 X
					Total area =	28.6		
							Average Soil Loss =	0.256

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area .0462 sq mi

1 Hour Storm		3 Hour Storm		6 Hour Storm		24 Hour Storm	
Point Precipitation	.422 in.	Point Precipitation	.721 in.	Point Precipitation	.974 in.	Point Precipitation	1.69 in.
Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %
Adjusted Point Precipitation	0.42	Adjusted Point Precipitation	0.72	Adjusted Point Precipitation	0.97	Adjusted Point Precipitation	1.69
Slope of Rainfall Intensity - Duration Curve	.52						

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	2110	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	627	ft
Elevation Difference	59	ft
Lag Time	**0.088**	**hr**
40% Lag Time	2.1	min

Run

Loss Rate Data Effective Rainfall S-Graphs

(●) Average Adjusted Loss Rate Calculator (Plate E-2.1) ( ) Average Adjusted Loss Rate (Manual Entry)

Add Loss Rate Values

AMC Condition: II

Soil Group / Cover Type View Chart	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)		
-							Add	

Soil Group / Cover Type	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)	Area/ Total Area	Ave. Adj. Rate (in/hr)
Urban Landscaping Good D	75	0.30300	7,200-10,000 S.F. Lots (50)	50	0.167	28.6	1	0.167 X
					Total area =	28.6		
							Average Soil Loss =	0.167

Basin 200 Loss Rate

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0311 sq mi

1 Hour Storm		3 Hour Storm		6 Hour Storm		24 Hour Storm	
Point Precipitation	.422 in.	Point Precipitation	.721 in.	Point Precipitation	.974 in.	Point Precipitation	1.69 in.
Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %
Adjusted Point Precipitation	0.42	Adjusted Point Precipitation	0.72	Adjusted Point Precipitation	0.97	Adjusted Point Precipitation	1.69
Slope of Rainfall Intensity - Duration Curve	.52						

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	648	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	251	ft
Elevation Difference	32	ft
Lag Time	**0.018**	**hr**
40% Lag Time	0.4	min

Run

Loss Rate Data Effective Rainfall S-Graphs

(●) Average Adjusted Loss Rate Calculator (Plate E-2.1) ( ) Average Adjusted Loss Rate (Manual Entry)

Add Loss Rate Values

AMC Condition: II

Soil Group / Cover Type View Chart	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)		
-							Add	

Soil Group / Cover Type	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)	Area/ Total Area	Ave. Adj. Rate (in/hr)
Pasture, Dryland Fair C	79	0.25600	Natural or Agriculture (0)	0	0.256	19.9	1	0.256 X
					Total area =	19.9		
							Average Soil Loss =	0.256

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0311 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	1972	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	620	ft
Elevation Difference	56	ft
Lag Time	**0.085**	**hr**
40% Lag Time	2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

(●) Average Adjusted Loss Rate Calculator (Plate E-2.1) ( ) Average Adjusted Loss Rate (Manual Entry)

Add Loss Rate Values

AMC Condition: II

Soil Group / Cover Type View Chart	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)		
-							Add	

Soil Group / Cover Type	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)	Area/ Total Area	Ave. Adj. Rate (in/hr)
Urban Landscaping Good D	75	0.30300	7,200-10,000 S.F. Lots (50)	50	0.167	19.9	1	0.167 X
					Total area =	19.9		
							Average Soil Loss =	0.167

Basin 300 Loss Rate

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area .0884 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	1227	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	340	ft
Elevation Difference	56	ft
Lag Time	**0.026**	**hr**
40% Lag Time	0.6	min

Run

Loss Rate Data Effective Rainfall S-Graphs

(●) Average Adjusted Loss Rate Calculator (Plate E-2.1) ( ) Average Adjusted Loss Rate (Manual Entry)

Add Loss Rate Values

AMC Condition: II

Soil Group / Cover Type View Chart	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)		
-							Add	

Soil Group / Cover Type	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)	Area/ Total Area	Ave. Adj. Rate (in/hr)
Pasture, Dryland Fair C	79	0.25600	Natural or Agriculture (0)	0	0.256	56.6	1	0.256 X
					Total area =	56.6		
							Average Soil Loss =	0.256

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0884 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	4142	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	1449	ft
Elevation Difference	64	ft
Lag Time	**0.174**	**hr**
40% Lag Time	4.2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

(●) Average Adjusted Loss Rate Calculator (Plate E-2.1) ( ) Average Adjusted Loss Rate (Manual Entry)

Add Loss Rate Values

AMC Condition: II

Soil Group / Cover Type View Chart	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)		
-							Add	

Soil Group / Cover Type	RI Number	Perv. Area Infiltrn Rate (in/hr)	Land Use	Imp. Area Decimal %	Adj.Infiltrn Rate (in/hr)	Area (acres)	Area/ Total Area	Ave. Adj. Rate (in/hr)
Urban Landscaping Good D	75	0.30300	7,200-10,000 S.F. Lots (50)	50	0.167	56.6	1	0.167 X
					Total area =	56.6		
							Average Soil Loss =	0.167

Basin 100 Precipitation

2 YR Pre-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0462 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	1196	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	802	ft
Elevation Difference	44	ft
Lag Time	**0.037**	**hr**
40% Lag Time	0.9	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0018
00:10	0.0018
00:15	0.0018
00:20	0.0020
00:25	0.0057
00:30	0.0048
00:35	0.0099
00:40	0.0150
00:45	0.0318
00:50	0.1044
00:55	0.0078
01:00	0.0019

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0009
00:10	0.0009
00:15	0.0008
00:20	0.0011
00:25	0.0011
00:30	0.0013
00:35	0.0011
00:40	0.0013
00:45	0.0013
00:50	0.0011
00:55	0.0012
01:00	0.0013
01:05	0.0016
01:10	0.0016
01:15	0.0016
01:20	0.0014
01:25	0.0019
01:30	0.0019
01:35	0.0017
01:40	0.0019
01:45	0.0025
01:50	0.0010
01:55	0.0021
02:00	0.0003
02:05	0.0010
02:10	0.0089
02:15	0.0147
02:20	0.0039
02:25	0.0277
02:30	0.0313
02:35	0.0378
02:40	0.0212
02:45	0.0014
02:50	0.0013
02:55	0.0013
03:00	0.0004

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0005
00:10	0.0006
00:15	0.0006
00:20	0.0006
00:25	0.0006
00:30	0.0007
00:35	0.0007
00:40	0.0007
00:45	0.0007
00:50	0.0007
00:55	0.0007
01:00	0.0008
01:05	0.0008
01:10	0.0008
01:15	0.0008
01:20	0.0008
01:25	0.0008
01:30	0.0008
01:35	0.0008
01:40	0.0008
01:45	0.0008
01:50	0.0008
01:55	0.0008
02:00	0.0009
02:05	0.0008
02:10	0.0009
02:15	0.0009
02:20	0.0009
02:25	0.0009
02:30	0.0009
02:35	0.0009
02:40	0.0009
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0001
00:10	0.0001
00:15	0.0001
00:20	0.0002
00:25	0.0002
00:30	0.0002
00:35	0.0002
00:40	0.0002
00:45	0.0002
00:50	0.0002
00:55	0.0002
01:00	0.0002
01:05	0.0002
01:10	0.0002
01:15	0.0002
01:20	0.0002
01:25	0.0002
01:30	0.0002
01:35	0.0002
01:40	0.0002
01:45	0.0002
01:50	0.0002
01:55	0.0002
02:00	0.0002
02:05	0.0002
02:10	0.0002
02:15	0.0002
02:20	0.0002
02:25	0.0002
02:30	0.0002
02:35	0.0003
02:40	0.0003
02:45	0.0003
02:50	0.0003
02:55	0.0003
03:00	0.0003

03:05	0.0010	03:05	0.0003
03:10	0.0011	03:10	0.0003
03:15	0.0011	03:15	0.0003
03:20	0.0011	03:20	0.0003
03:25	0.0012	03:25	0.0003
03:30	0.0013	03:30	0.0003
03:35	0.0014	03:35	0.0003
03:40	0.0014	03:40	0.0003
03:45	0.0015	03:45	0.0003
03:50	0.0015	03:50	0.0003
03:55	0.0016	03:55	0.0003
04:00	0.0016	04:00	0.0003
04:05	0.0017	04:05	0.0003
04:10	0.0018	04:10	0.0003
04:15	0.0019	04:15	0.0003
04:20	0.0019	04:20	0.0004
04:25	0.0020	04:25	0.0004
04:30	0.0020	04:30	0.0004
04:35	0.0001	04:35	0.0004
04:40	0.0011	04:40	0.0004
04:45	0.0020	04:45	0.0004
04:50	0.0020	04:50	0.0005
04:55	0.0030	04:55	0.0005
05:00	0.0040	05:00	0.0005
05:05	0.0089	05:05	0.0003
05:10	0.0137	05:10	0.0003
05:15	0.0167	05:15	0.0003
05:20	0.0196	05:20	0.0004
05:25	0.0244	05:25	0.0004
05:30	0.0332	05:30	0.0004
05:35	0.0019	05:35	0.0005
05:40	0.0009	05:40	0.0005
05:45	0.0006	05:45	0.0005
05:50	0.0005	05:50	0.0005
05:55	0.0003	05:55	0.0005
06:00	0.0002	06:00	0.0005
		06:05	0.0005
		06:10	0.0005
		06:15	0.0005
		06:20	0.0005
		06:25	0.0005

06:30	0.0005
06:35	0.0006
06:40	0.0006
06:45	0.0006
06:50	0.0006
06:55	0.0006
07:00	0.0006
07:05	0.0006
07:10	0.0006
07:15	0.0006
07:20	0.0006
07:25	0.0006
07:30	0.0006
07:35	0.0007
07:40	0.0007
07:45	0.0007
07:50	0.0007
07:55	0.0007
08:00	0.0007
08:05	0.0008
08:10	0.0008
08:15	0.0008
08:20	0.0008
08:25	0.0008
08:30	0.0008
08:35	0.0009
08:40	0.0009
08:45	0.0009
08:50	0.0010
08:55	0.0010
09:00	0.0010
09:05	0.0011
09:10	0.0011
09:15	0.0011
09:20	0.0011
09:25	0.0011
09:30	0.0011
09:35	0.0012
09:40	0.0012
09:45	0.0012
09:50	0.0012

09:55	0.0012
10:00	0.0012
10:05	0.0008
10:10	0.0008
10:15	0.0008
10:20	0.0008
10:25	0.0008
10:30	0.0008
10:35	0.0011
10:40	0.0011
10:45	0.0011
10:50	0.0011
10:55	0.0011
11:00	0.0011
11:05	0.0011
11:10	0.0011
11:15	0.0011
11:20	0.0011
11:25	0.0011
11:30	0.0011
11:35	0.0010
11:40	0.0010
11:45	0.0010
11:50	0.0010
11:55	0.0010
12:00	0.0010
12:05	0.0014
12:10	0.0014
12:15	0.0014
12:20	0.0015
12:25	0.0015
12:30	0.0015
12:35	0.0016
12:40	0.0016
12:45	0.0016
12:50	0.0016
12:55	0.0016
13:00	0.0016
13:05	0.0004
13:10	0.0004
13:15	0.0005

13:20	0.0006
13:25	0.0007
13:30	0.0008
13:35	0.0013
13:40	0.0013
13:45	0.0013
13:50	0.0013
13:55	0.0013
14:00	0.0013
14:05	0.0015
14:10	0.0015
14:15	0.0015
14:20	0.0015
14:25	0.0015
14:30	0.0015
14:35	0.0015
14:40	0.0015
14:45	0.0015
14:50	0.0014
14:55	0.0014
15:00	0.0014
15:05	0.0014
15:10	0.0014
15:15	0.0014
15:20	0.0013
15:25	0.0013
15:30	0.0013
15:35	0.0011
15:40	0.0011
15:45	0.0011
15:50	0.0011
15:55	0.0011
16:00	0.0011
16:05	0.0002
16:10	0.0002
16:15	0.0002
16:20	0.0002
16:25	0.0002
16:30	0.0002
16:35	0.0002
16:40	0.0002

16:45	0.0002
16:50	0.0002
16:55	0.0002
17:00	0.0002
17:05	0.0003
17:10	0.0003
17:15	0.0003
17:20	0.0003
17:25	0.0003
17:30	0.0003
17:35	0.0003
17:40	0.0003
17:45	0.0003
17:50	0.0002
17:55	0.0002
18:00	0.0002
18:05	0.0002
18:10	0.0002
18:15	0.0002
18:20	0.0002
18:25	0.0002
18:30	0.0002
18:35	0.0002
18:40	0.0002
18:45	0.0002
18:50	0.0001
18:55	0.0001
19:00	0.0001
19:05	0.0002
19:10	0.0002
19:15	0.0002
19:20	0.0002
19:25	0.0002
19:30	0.0002
19:35	0.0002
19:40	0.0002
19:45	0.0002
19:50	0.0001
19:55	0.0001
20:00	0.0001
20:05	0.0002

20:10	0.0002
20:15	0.0002
20:20	0.0002
20:25	0.0002
20:30	0.0002
20:35	0.0002
20:40	0.0002
20:45	0.0002
20:50	0.0001
20:55	0.0001
21:00	0.0001
21:05	0.0002
21:10	0.0002
21:15	0.0002
21:20	0.0001
21:25	0.0001
21:30	0.0001
21:35	0.0002
21:40	0.0002
21:45	0.0002
21:50	0.0001
21:55	0.0001
22:00	0.0001
22:05	0.0002
22:10	0.0002
22:15	0.0002
22:20	0.0001
22:25	0.0001
22:30	0.0001
22:35	0.0001
22:40	0.0001
22:45	0.0001
22:50	0.0001
22:55	0.0001
23:00	0.0001
23:05	0.0001
23:10	0.0001
23:15	0.0001
23:20	0.0001
23:25	0.0001
23:30	0.0001

			23:35	0.0001
			23:40	0.0001
			23:45	0.0001
			23:50	0.0001
			23:55	0.0001
			00:00	0.0001

Basin 100 Precipitation

10 YR Pre-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0447 sq mi

1 Hour Storm

Point Precipitation	.704	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.7	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	1.12	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.12	

6 Hour Storm

Point Precipitation	1.49	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.49	

24 Hour Storm

Point Precipitation	2.653	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	2.65	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	1196	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	802	ft
Elevation Difference	44	ft
Lag Time	**0.037**	**hr**
40% Lag Time	0.9	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0089
00:10	0.0089
00:15	0.0139
00:20	0.0096
00:25	0.0209
00:30	0.0230
00:35	0.0287
00:40	0.0392
00:45	0.0695
00:50	0.1871
00:55	0.0287
01:00	0.0096

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0015
00:10	0.0015
00:15	0.0012
00:20	0.0017
00:25	0.0017
00:30	0.0020
00:35	0.0017
00:40	0.0020
00:45	0.0020
00:50	0.0017
00:55	0.0018
01:00	0.0020
01:05	0.0033
01:10	0.0033
01:15	0.0033
01:20	0.0011
01:25	0.0078
01:30	0.0089
01:35	0.0055
01:40	0.0089
01:45	0.0156
01:50	0.0134
01:55	0.0111
02:00	0.0123
02:05	0.0134
02:10	0.0257
02:15	0.0347
02:20	0.0179
02:25	0.0548
02:30	0.0604
02:35	0.0705
02:40	0.0447
02:45	0.0011
02:50	0.0020
02:55	0.0020
03:00	0.0007

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0007
00:10	0.0009
00:15	0.0009
00:20	0.0009
00:25	0.0009
00:30	0.0010
00:35	0.0010
00:40	0.0010
00:45	0.0010
00:50	0.0010
00:55	0.0010
01:00	0.0012
01:05	0.0012
01:10	0.0012
01:15	0.0012
01:20	0.0012
01:25	0.0012
01:30	0.0012
01:35	0.0012
01:40	0.0012
01:45	0.0012
01:50	0.0012
01:55	0.0012
02:00	0.0013
02:05	0.0012
02:10	0.0013
02:15	0.0013
02:20	0.0013
02:25	0.0013
02:30	0.0013
02:35	0.0013
02:40	0.0013
02:45	0.0015
02:50	0.0015
02:55	0.0015
03:00	0.0015

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0002
00:10	0.0002
00:15	0.0002
00:20	0.0003
00:25	0.0003
00:30	0.0003
00:35	0.0003
00:40	0.0003
00:45	0.0003
00:50	0.0003
00:55	0.0003
01:00	0.0003
01:05	0.0003
01:10	0.0003
01:15	0.0003
01:20	0.0003
01:25	0.0003
01:30	0.0003
01:35	0.0003
01:40	0.0003
01:45	0.0003
01:50	0.0003
01:55	0.0003
02:00	0.0003
02:05	0.0003
02:10	0.0003
02:15	0.0003
02:20	0.0003
02:25	0.0003
02:30	0.0003
02:35	0.0005
02:40	0.0005
02:45	0.0005
02:50	0.0005
02:55	0.0005
03:00	0.0005

03:05	0.0015	03:05	0.0005
03:10	0.0016	03:10	0.0005
03:15	0.0016	03:15	0.0005
03:20	0.0016	03:20	0.0005
03:25	0.0018	03:25	0.0005
03:30	0.0019	03:30	0.0005
03:35	0.0021	03:35	0.0005
03:40	0.0021	03:40	0.0005
03:45	0.0010	03:45	0.0005
03:50	0.0010	03:50	0.0005
03:55	0.0025	03:55	0.0005
04:00	0.0025	04:00	0.0005
04:05	0.0040	04:05	0.0005
04:10	0.0055	04:10	0.0005
04:15	0.0070	04:15	0.0005
04:20	0.0085	04:20	0.0006
04:25	0.0100	04:25	0.0006
04:30	0.0100	04:30	0.0006
04:35	0.0114	04:35	0.0006
04:40	0.0129	04:40	0.0006
04:45	0.0144	04:45	0.0006
04:50	0.0144	04:50	0.0007
04:55	0.0159	04:55	0.0007
05:00	0.0174	05:00	0.0007
05:05	0.0249	05:05	0.0005
05:10	0.0323	05:10	0.0005
05:15	0.0368	05:15	0.0005
05:20	0.0412	05:20	0.0006
05:25	0.0487	05:25	0.0006
05:30	0.0621	05:30	0.0006
05:35	0.0070	05:35	0.0007
05:40	0.0013	05:40	0.0007
05:45	0.0009	05:45	0.0007
05:50	0.0007	05:50	0.0007
05:55	0.0004	05:55	0.0007
06:00	0.0003	06:00	0.0007
		06:05	0.0008
		06:10	0.0008
		06:15	0.0008
		06:20	0.0008
		06:25	0.0008

06:30	0.0008
06:35	0.0009
06:40	0.0009
06:45	0.0009
06:50	0.0009
06:55	0.0009
07:00	0.0009
07:05	0.0009
07:10	0.0009
07:15	0.0009
07:20	0.0010
07:25	0.0010
07:30	0.0010
07:35	0.0011
07:40	0.0011
07:45	0.0011
07:50	0.0011
07:55	0.0011
08:00	0.0011
08:05	0.0013
08:10	0.0013
08:15	0.0013
08:20	0.0013
08:25	0.0013
08:30	0.0013
08:35	0.0014
08:40	0.0014
08:45	0.0014
08:50	0.0015
08:55	0.0015
09:00	0.0015
09:05	0.0017
09:10	0.0017
09:15	0.0017
09:20	0.0018
09:25	0.0018
09:30	0.0018
09:35	0.0019
09:40	0.0019
09:45	0.0019
09:50	0.0019

09:55	0.0019
10:00	0.0019
10:05	0.0013
10:10	0.0013
10:15	0.0013
10:20	0.0013
10:25	0.0013
10:30	0.0013
10:35	0.0018
10:40	0.0018
10:45	0.0018
10:50	0.0018
10:55	0.0018
11:00	0.0018
11:05	0.0017
11:10	0.0017
11:15	0.0017
11:20	0.0017
11:25	0.0017
11:30	0.0017
11:35	0.0015
11:40	0.0015
11:45	0.0015
11:50	0.0016
11:55	0.0016
12:00	0.0016
12:05	0.0021
12:10	0.0022
12:15	0.0023
12:20	0.0035
12:25	0.0036
12:30	0.0037
12:35	0.0054
12:40	0.0054
12:45	0.0055
12:50	0.0067
12:55	0.0068
13:00	0.0069
13:05	0.0112
13:10	0.0113
13:15	0.0114

13:20	0.0115
13:25	0.0116
13:30	0.0117
13:35	0.0022
13:40	0.0023
13:45	0.0024
13:50	0.0025
13:55	0.0026
14:00	0.0027
14:05	0.0062
14:10	0.0063
14:15	0.0064
14:20	0.0057
14:25	0.0058
14:30	0.0059
14:35	0.0060
14:40	0.0061
14:45	0.0062
14:50	0.0052
14:55	0.0053
15:00	0.0054
15:05	0.0046
15:10	0.0047
15:15	0.0048
15:20	0.0041
15:25	0.0042
15:30	0.0043
15:35	0.0006
15:40	0.0007
15:45	0.0008
15:50	0.0009
15:55	0.0010
16:00	0.0010
16:05	0.0003
16:10	0.0003
16:15	0.0003
16:20	0.0003
16:25	0.0003
16:30	0.0003
16:35	0.0003
16:40	0.0003

16:45	0.0003
16:50	0.0003
16:55	0.0003
17:00	0.0003
17:05	0.0005
17:10	0.0005
17:15	0.0005
17:20	0.0005
17:25	0.0005
17:30	0.0005
17:35	0.0005
17:40	0.0005
17:45	0.0005
17:50	0.0003
17:55	0.0003
18:00	0.0003
18:05	0.0003
18:10	0.0003
18:15	0.0003
18:20	0.0003
18:25	0.0003
18:30	0.0003
18:35	0.0003
18:40	0.0003
18:45	0.0003
18:50	0.0002
18:55	0.0002
19:00	0.0002
19:05	0.0003
19:10	0.0003
19:15	0.0003
19:20	0.0003
19:25	0.0003
19:30	0.0003
19:35	0.0003
19:40	0.0003
19:45	0.0003
19:50	0.0002
19:55	0.0002
20:00	0.0002
20:05	0.0003

20:10	0.0003
20:15	0.0003
20:20	0.0003
20:25	0.0003
20:30	0.0003
20:35	0.0003
20:40	0.0003
20:45	0.0003
20:50	0.0002
20:55	0.0002
21:00	0.0002
21:05	0.0003
21:10	0.0003
21:15	0.0003
21:20	0.0002
21:25	0.0002
21:30	0.0002
21:35	0.0003
21:40	0.0003
21:45	0.0003
21:50	0.0002
21:55	0.0002
22:00	0.0002
22:05	0.0003
22:10	0.0003
22:15	0.0003
22:20	0.0002
22:25	0.0002
22:30	0.0002
22:35	0.0002
22:40	0.0002
22:45	0.0002
22:50	0.0002
22:55	0.0002
23:00	0.0002
23:05	0.0002
23:10	0.0002
23:15	0.0002
23:20	0.0002
23:25	0.0002
23:30	0.0002

			23:35	0.0002
			23:40	0.0002
			23:45	0.0002
			23:50	0.0002
			23:55	0.0002
			00:00	0.0002

Basin 100 Precipitation

2 YR Post-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area .0462 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	2110	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	627	ft
Elevation Difference	59	ft
Lag Time	**0.088**	**hr**
40% Lag Time	2.1	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0042
00:10	0.0042
00:15	0.0042
00:20	0.0063
00:25	0.0131
00:30	0.0122
00:35	0.0173
00:40	0.0224
00:45	0.0393
00:50	0.1118
00:55	0.0152
01:00	0.0051

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0009
00:10	0.0009
00:15	0.0008
00:20	0.0011
00:25	0.0011
00:30	0.0013
00:35	0.0011
00:40	0.0013
00:45	0.0013
00:50	0.0011
00:55	0.0012
01:00	0.0013
01:05	0.0019
01:10	0.0019
01:15	0.0019
01:20	0.0005
01:25	0.0048
01:30	0.0056
01:35	0.0034
01:40	0.0056
01:45	0.0099
01:50	0.0084
01:55	0.0070
02:00	0.0077
02:05	0.0084
02:10	0.0164
02:15	0.0221
02:20	0.0113
02:25	0.0351
02:30	0.0387
02:35	0.0452
02:40	0.0286
02:45	0.0005
02:50	0.0013
02:55	0.0013
03:00	0.0004

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0005
00:10	0.0006
00:15	0.0006
00:20	0.0006
00:25	0.0006
00:30	0.0007
00:35	0.0007
00:40	0.0007
00:45	0.0007
00:50	0.0007
00:55	0.0007
01:00	0.0008
01:05	0.0008
01:10	0.0008
01:15	0.0008
01:20	0.0008
01:25	0.0008
01:30	0.0008
01:35	0.0008
01:40	0.0008
01:45	0.0008
01:50	0.0008
01:55	0.0008
02:00	0.0009
02:05	0.0008
02:10	0.0009
02:15	0.0009
02:20	0.0009
02:25	0.0009
02:30	0.0009
02:35	0.0009
02:40	0.0009
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0001
00:10	0.0001
00:15	0.0001
00:20	0.0002
00:25	0.0002
00:30	0.0002
00:35	0.0002
00:40	0.0002
00:45	0.0002
00:50	0.0002
00:55	0.0002
01:00	0.0002
01:05	0.0002
01:10	0.0002
01:15	0.0002
01:20	0.0002
01:25	0.0002
01:30	0.0002
01:35	0.0002
01:40	0.0002
01:45	0.0002
01:50	0.0002
01:55	0.0002
02:00	0.0002
02:05	0.0002
02:10	0.0002
02:15	0.0002
02:20	0.0002
02:25	0.0002
02:30	0.0002
02:35	0.0003
02:40	0.0003
02:45	0.0003
02:50	0.0003
02:55	0.0003
03:00	0.0003

03:05	0.0010	03:05	0.0003
03:10	0.0011	03:10	0.0003
03:15	0.0011	03:15	0.0003
03:20	0.0011	03:20	0.0003
03:25	0.0012	03:25	0.0003
03:30	0.0013	03:30	0.0003
03:35	0.0014	03:35	0.0003
03:40	0.0014	03:40	0.0003
03:45	0.0007	03:45	0.0003
03:50	0.0007	03:50	0.0003
03:55	0.0017	03:55	0.0003
04:00	0.0017	04:00	0.0003
04:05	0.0026	04:05	0.0003
04:10	0.0036	04:10	0.0003
04:15	0.0046	04:15	0.0003
04:20	0.0056	04:20	0.0004
04:25	0.0065	04:25	0.0004
04:30	0.0065	04:30	0.0004
04:35	0.0075	04:35	0.0004
04:40	0.0085	04:40	0.0004
04:45	0.0095	04:45	0.0004
04:50	0.0095	04:50	0.0005
04:55	0.0104	04:55	0.0005
05:00	0.0114	05:00	0.0005
05:05	0.0163	05:05	0.0003
05:10	0.0211	05:10	0.0003
05:15	0.0241	05:15	0.0003
05:20	0.0270	05:20	0.0004
05:25	0.0319	05:25	0.0004
05:30	0.0406	05:30	0.0004
05:35	0.0046	05:35	0.0005
05:40	0.0009	05:40	0.0005
05:45	0.0006	05:45	0.0005
05:50	0.0005	05:50	0.0005
05:55	0.0003	05:55	0.0005
06:00	0.0002	06:00	0.0005
		06:05	0.0005
		06:10	0.0005
		06:15	0.0005
		06:20	0.0005
		06:25	0.0005

06:30	0.0005
06:35	0.0006
06:40	0.0006
06:45	0.0006
06:50	0.0006
06:55	0.0006
07:00	0.0006
07:05	0.0006
07:10	0.0006
07:15	0.0006
07:20	0.0006
07:25	0.0006
07:30	0.0006
07:35	0.0007
07:40	0.0007
07:45	0.0007
07:50	0.0007
07:55	0.0007
08:00	0.0007
08:05	0.0008
08:10	0.0008
08:15	0.0008
08:20	0.0008
08:25	0.0008
08:30	0.0008
08:35	0.0009
08:40	0.0009
08:45	0.0009
08:50	0.0010
08:55	0.0010
09:00	0.0010
09:05	0.0011
09:10	0.0011
09:15	0.0011
09:20	0.0011
09:25	0.0011
09:30	0.0011
09:35	0.0012
09:40	0.0012
09:45	0.0012
09:50	0.0012

09:55	0.0012
10:00	0.0012
10:05	0.0008
10:10	0.0008
10:15	0.0008
10:20	0.0008
10:25	0.0008
10:30	0.0008
10:35	0.0011
10:40	0.0011
10:45	0.0011
10:50	0.0011
10:55	0.0011
11:00	0.0011
11:05	0.0011
11:10	0.0011
11:15	0.0011
11:20	0.0011
11:25	0.0011
11:30	0.0011
11:35	0.0010
11:40	0.0010
11:45	0.0010
11:50	0.0010
11:55	0.0010
12:00	0.0010
12:05	0.0010
12:10	0.0011
12:15	0.0012
12:20	0.0019
12:25	0.0020
12:30	0.0020
12:35	0.0031
12:40	0.0032
12:45	0.0032
12:50	0.0040
12:55	0.0040
13:00	0.0041
13:05	0.0069
13:10	0.0069
13:15	0.0070

13:20	0.0071
13:25	0.0071
13:30	0.0072
13:35	0.0012
13:40	0.0012
13:45	0.0013
13:50	0.0013
13:55	0.0014
14:00	0.0015
14:05	0.0037
14:10	0.0038
14:15	0.0038
14:20	0.0034
14:25	0.0034
14:30	0.0035
14:35	0.0036
14:40	0.0036
14:45	0.0037
14:50	0.0030
14:55	0.0031
15:00	0.0032
15:05	0.0027
15:10	0.0028
15:15	0.0028
15:20	0.0024
15:25	0.0024
15:30	0.0025
15:35	0.0002
15:40	0.0002
15:45	0.0003
15:50	0.0003
15:55	0.0004
16:00	0.0004
16:05	0.0002
16:10	0.0002
16:15	0.0002
16:20	0.0002
16:25	0.0002
16:30	0.0002
16:35	0.0002
16:40	0.0002

16:45	0.0002
16:50	0.0002
16:55	0.0002
17:00	0.0002
17:05	0.0003
17:10	0.0003
17:15	0.0003
17:20	0.0003
17:25	0.0003
17:30	0.0003
17:35	0.0003
17:40	0.0003
17:45	0.0003
17:50	0.0002
17:55	0.0002
18:00	0.0002
18:05	0.0002
18:10	0.0002
18:15	0.0002
18:20	0.0002
18:25	0.0002
18:30	0.0002
18:35	0.0002
18:40	0.0002
18:45	0.0002
18:50	0.0001
18:55	0.0001
19:00	0.0001
19:05	0.0002
19:10	0.0002
19:15	0.0002
19:20	0.0002
19:25	0.0002
19:30	0.0002
19:35	0.0002
19:40	0.0002
19:45	0.0002
19:50	0.0001
19:55	0.0001
20:00	0.0001
20:05	0.0002

20:10	0.0002
20:15	0.0002
20:20	0.0002
20:25	0.0002
20:30	0.0002
20:35	0.0002
20:40	0.0002
20:45	0.0002
20:50	0.0001
20:55	0.0001
21:00	0.0001
21:05	0.0002
21:10	0.0002
21:15	0.0002
21:20	0.0001
21:25	0.0001
21:30	0.0001
21:35	0.0002
21:40	0.0002
21:45	0.0002
21:50	0.0001
21:55	0.0001
22:00	0.0001
22:05	0.0002
22:10	0.0002
22:15	0.0002
22:20	0.0001
22:25	0.0001
22:30	0.0001
22:35	0.0001
22:40	0.0001
22:45	0.0001
22:50	0.0001
22:55	0.0001
23:00	0.0001
23:05	0.0001
23:10	0.0001
23:15	0.0001
23:20	0.0001
23:25	0.0001
23:30	0.0001

23:35	0.0001
23:40	0.0001
23:45	0.0001
23:50	0.0001
23:55	0.0001
00:00	0.0001

Basin 100 Precipitation

10 YR Post-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0462 sq mi

1 Hour Storm		3 Hour Storm		6 Hour Storm		24 Hour Storm	
Point Precipitation	0.704 in.	Point Precipitation	1.12 in.	Point Precipitation	1.49 in.	Point Precipitation	2.63 in.
Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %	Areal Adjustment Factor	100 %
Adjusted Point Precipitation	0.7	Adjusted Point Precipitation	1.12	Adjusted Point Precipitation	1.49	Adjusted Point Precipitation	2.63
Slope of Rainfall Intensity - Duration Curve	0.52						

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	2110	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	627	ft
Elevation Difference	59	ft
Lag Time	**0.088**	**hr**
40% Lag Time	2.1	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour		3 Hour		6 Hour		24 Hour	
Unit Time	Effective Rainfall (inches)	Unit Time	Effective Rainfall (inches)	Unit Time	Effective Rainfall (inches)	Unit Time	Effective Rainfall (inches)
00:00		00:05	0.0006	00:05	0.0007	00:05	0.0002
00:05	0.0164	00:10	0.0006	00:10	0.0009	00:10	0.0002
00:10	0.0164	00:15	0.0012	00:15	0.0009	00:15	0.0002
00:15	0.0213	00:20	0.0029	00:20	0.0009	00:20	0.0003
00:20	0.0171	00:25	0.0029	00:25	0.0009	00:25	0.0003
00:25	0.0283	00:30	0.0062	00:30	0.0010	00:30	0.0003

00:30	0.0304
00:35	0.0361
00:40	0.0466
00:45	0.0769
00:50	0.1945
00:55	0.0361
01:00	0.0171

00:35	0.0029
00:40	0.0062
00:45	0.0062
00:50	0.0029
00:55	0.0040
01:00	0.0062
01:05	0.0107
01:10	0.0107
01:15	0.0107
01:20	0.0085
01:25	0.0152
01:30	0.0163
01:35	0.0130
01:40	0.0163
01:45	0.0230
01:50	0.0208
01:55	0.0186
02:00	0.0197
02:05	0.0208
02:10	0.0331
02:15	0.0421
02:20	0.0253
02:25	0.0622
02:30	0.0678
02:35	0.0779
02:40	0.0522
02:45	0.0085
02:50	0.0062
02:55	0.0062
03:00	0.0007

00:35	0.0010
00:40	0.0010
00:45	0.0010
00:50	0.0010
00:55	0.0010
01:00	0.0012
01:05	0.0012
01:10	0.0012
01:15	0.0012
01:20	0.0012
01:25	0.0012
01:30	0.0012
01:35	0.0012
01:40	0.0012
01:45	0.0012
01:50	0.0012
01:55	0.0012
02:00	0.0013
02:05	0.0012
02:10	0.0013
02:15	0.0013
02:20	0.0013
02:25	0.0013
02:30	0.0013
02:35	0.0013
02:40	0.0013
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010
03:05	0.0010
03:10	0.0025
03:15	0.0025
03:20	0.0025
03:25	0.0040
03:30	0.0055
03:35	0.0069
03:40	0.0069
03:45	0.0084
03:50	0.0084
03:55	0.0099
04:00	0.0099
04:05	0.0114
04:10	0.0129
04:15	0.0144
04:20	0.0159
04:25	0.0174
04:30	0.0174
04:35	0.0189
04:40	0.0204
04:45	0.0218
04:50	0.0218
04:55	0.0233
05:00	0.0248
05:05	0.0323

00:35	0.0003
00:40	0.0003
00:45	0.0003
00:50	0.0003
00:55	0.0003
01:00	0.0003
01:05	0.0003
01:10	0.0003
01:15	0.0003
01:20	0.0003
01:25	0.0003
01:30	0.0003
01:35	0.0003
01:40	0.0003
01:45	0.0003
01:50	0.0003
01:55	0.0003
02:00	0.0003
02:05	0.0003
02:10	0.0003
02:15	0.0003
02:20	0.0003
02:25	0.0003
02:30	0.0003
02:35	0.0004
02:40	0.0004
02:45	0.0004
02:50	0.0004
02:55	0.0004
03:00	0.0004
03:05	0.0004
03:10	0.0004
03:15	0.0004
03:20	0.0004
03:25	0.0004
03:30	0.0004
03:35	0.0004
03:40	0.0004
03:45	0.0004
03:50	0.0005
03:55	0.0005
04:00	0.0005
04:05	0.0005
04:10	0.0005
04:15	0.0005
04:20	0.0006
04:25	0.0006
04:30	0.0006
04:35	0.0006
04:40	0.0006
04:45	0.0006
04:50	0.0007
04:55	0.0007
05:00	0.0007
05:05	0.0005

05:10	0.0397	05:10	0.0005
05:15	0.0442	05:15	0.0005
05:20	0.0487	05:20	0.0006
05:25	0.0561	05:25	0.0006
05:30	0.0695	05:30	0.0006
05:35	0.0144	05:35	0.0007
05:40	0.0013	05:40	0.0007
05:45	0.0009	05:45	0.0007
05:50	0.0007	05:50	0.0007
05:55	0.0004	05:55	0.0007
06:00	0.0003	06:00	0.0007
		06:05	0.0008
		06:10	0.0008
		06:15	0.0008
		06:20	0.0008
		06:25	0.0008
		06:30	0.0008
		06:35	0.0009
		06:40	0.0009
		06:45	0.0009
		06:50	0.0009
		06:55	0.0009
		07:00	0.0009
		07:05	0.0009
		07:10	0.0009
		07:15	0.0009
		07:20	0.0010
		07:25	0.0010
		07:30	0.0010
		07:35	0.0011
		07:40	0.0011
		07:45	0.0011
		07:50	0.0011
		07:55	0.0011
		08:00	0.0011
		08:05	0.0013
		08:10	0.0013
		08:15	0.0013
		08:20	0.0013
		08:25	0.0013
		08:30	0.0013
		08:35	0.0014
		08:40	0.0014
		08:45	0.0014
		08:50	0.0015
		08:55	0.0015
		09:00	0.0015
		09:05	0.0011
		09:10	0.0011
		09:15	0.0012
		09:20	0.0023
		09:25	0.0024
		09:30	0.0025
		09:35	0.0034
		09:40	0.0034

09:45	0.0035
09:50	0.0044
09:55	0.0044
10:00	0.0045
10:05	0.0013
10:10	0.0013
10:15	0.0013
10:20	0.0013
10:25	0.0013
10:30	0.0013
10:35	0.0034
10:40	0.0035
10:45	0.0036
10:50	0.0036
10:55	0.0037
11:00	0.0038
11:05	0.0028
11:10	0.0028
11:15	0.0029
11:20	0.0030
11:25	0.0030
11:30	0.0031
11:35	0.0016
11:40	0.0017
11:45	0.0017
11:50	0.0026
11:55	0.0027
12:00	0.0027
12:05	0.0088
12:10	0.0089
12:15	0.0090
12:20	0.0101
12:25	0.0101
12:30	0.0102
12:35	0.0119
12:40	0.0119
12:45	0.0120
12:50	0.0131
12:55	0.0132
13:00	0.0132
13:05	0.0175
13:10	0.0176
13:15	0.0176
13:20	0.0177
13:25	0.0177
13:30	0.0178
13:35	0.0084
13:40	0.0085
13:45	0.0085
13:50	0.0086
13:55	0.0086
14:00	0.0087
14:05	0.0122
14:10	0.0122
14:15	0.0123

14:20	0.0116
14:25	0.0116
14:30	0.0117
14:35	0.0117
14:40	0.0118
14:45	0.0118
14:50	0.0108
14:55	0.0109
15:00	0.0110
15:05	0.0102
15:10	0.0103
15:15	0.0103
15:20	0.0096
15:25	0.0097
15:30	0.0097
15:35	0.0061
15:40	0.0061
15:45	0.0062
15:50	0.0062
15:55	0.0063
16:00	0.0063
16:05	0.0003
16:10	0.0003
16:15	0.0003
16:20	0.0003
16:25	0.0003
16:30	0.0003
16:35	0.0003
16:40	0.0003
16:45	0.0003
16:50	0.0003
16:55	0.0003
17:00	0.0003
17:05	0.0004
17:10	0.0004
17:15	0.0004
17:20	0.0004
17:25	0.0004
17:30	0.0004
17:35	0.0004
17:40	0.0004
17:45	0.0004
17:50	0.0003
17:55	0.0003
18:00	0.0003
18:05	0.0003
18:10	0.0003
18:15	0.0003
18:20	0.0003
18:25	0.0003
18:30	0.0003
18:35	0.0003
18:40	0.0003
18:45	0.0003
18:50	0.0002

18:55	0.0002
19:00	0.0002
19:05	0.0003
19:10	0.0003
19:15	0.0003
19:20	0.0003
19:25	0.0003
19:30	0.0003
19:35	0.0003
19:40	0.0003
19:45	0.0003
19:50	0.0002
19:55	0.0002
20:00	0.0002
20:05	0.0003
20:10	0.0003
20:15	0.0003
20:20	0.0003
20:25	0.0003
20:30	0.0003
20:35	0.0003
20:40	0.0003
20:45	0.0003
20:50	0.0002
20:55	0.0002
21:00	0.0002
21:05	0.0003
21:10	0.0003
21:15	0.0003
21:20	0.0002
21:25	0.0002
21:30	0.0002
21:35	0.0003
21:40	0.0003
21:45	0.0003
21:50	0.0002
21:55	0.0002
22:00	0.0002
22:05	0.0003
22:10	0.0003
22:15	0.0003
22:20	0.0002
22:25	0.0002
22:30	0.0002
22:35	0.0002
22:40	0.0002
22:45	0.0002
22:50	0.0002
22:55	0.0002
23:00	0.0002
23:05	0.0002
23:10	0.0002
23:15	0.0002
23:20	0.0002
23:25	0.0002

			23:30	0.0002
			23:35	0.0002
			23:40	0.0002
			23:45	0.0002
			23:50	0.0002
			23:55	0.0002
			00:00	0.0002

Basin 200 Precipitation

2 YR Pre-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0311 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	648	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	251	ft
Elevation Difference	32	ft
Lag Time	**0.018**	**hr**
40% Lag Time	0.4	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0018
00:10	0.0018
00:15	0.0018
00:20	0.0020
00:25	0.0057
00:30	0.0048
00:35	0.0099
00:40	0.0150
00:45	0.0318
00:50	0.1044
00:55	0.0078
01:00	0.0019

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0009
00:10	0.0009
00:15	0.0008
00:20	0.0011
00:25	0.0011
00:30	0.0013
00:35	0.0011
00:40	0.0013
00:45	0.0013
00:50	0.0011
00:55	0.0012
01:00	0.0013
01:05	0.0016
01:10	0.0016
01:15	0.0016
01:20	0.0014
01:25	0.0019
01:30	0.0019
01:35	0.0017
01:40	0.0019
01:45	0.0025
01:50	0.0010
01:55	0.0021
02:00	0.0003
02:05	0.0010
02:10	0.0089
02:15	0.0147
02:20	0.0039
02:25	0.0277
02:30	0.0313
02:35	0.0378
02:40	0.0212
02:45	0.0014
02:50	0.0013
02:55	0.0013
03:00	0.0004

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0005
00:10	0.0006
00:15	0.0006
00:20	0.0006
00:25	0.0006
00:30	0.0007
00:35	0.0007
00:40	0.0007
00:45	0.0007
00:50	0.0007
00:55	0.0007
01:00	0.0008
01:05	0.0008
01:10	0.0008
01:15	0.0008
01:20	0.0008
01:25	0.0008
01:30	0.0008
01:35	0.0008
01:40	0.0008
01:45	0.0008
01:50	0.0008
01:55	0.0008
02:00	0.0009
02:05	0.0008
02:10	0.0009
02:15	0.0009
02:20	0.0009
02:25	0.0009
02:30	0.0009
02:35	0.0009
02:40	0.0009
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0001
00:10	0.0001
00:15	0.0001
00:20	0.0002
00:25	0.0002
00:30	0.0002
00:35	0.0002
00:40	0.0002
00:45	0.0002
00:50	0.0002
00:55	0.0002
01:00	0.0002
01:05	0.0002
01:10	0.0002
01:15	0.0002
01:20	0.0002
01:25	0.0002
01:30	0.0002
01:35	0.0002
01:40	0.0002
01:45	0.0002
01:50	0.0002
01:55	0.0002
02:00	0.0002
02:05	0.0002
02:10	0.0002
02:15	0.0002
02:20	0.0002
02:25	0.0002
02:30	0.0002
02:35	0.0003
02:40	0.0003
02:45	0.0003
02:50	0.0003
02:55	0.0003
03:00	0.0003

03:05	0.0010	03:05	0.0003
03:10	0.0011	03:10	0.0003
03:15	0.0011	03:15	0.0003
03:20	0.0011	03:20	0.0003
03:25	0.0012	03:25	0.0003
03:30	0.0013	03:30	0.0003
03:35	0.0014	03:35	0.0003
03:40	0.0014	03:40	0.0003
03:45	0.0015	03:45	0.0003
03:50	0.0015	03:50	0.0003
03:55	0.0016	03:55	0.0003
04:00	0.0016	04:00	0.0003
04:05	0.0017	04:05	0.0003
04:10	0.0018	04:10	0.0003
04:15	0.0019	04:15	0.0003
04:20	0.0019	04:20	0.0004
04:25	0.0020	04:25	0.0004
04:30	0.0020	04:30	0.0004
04:35	0.0001	04:35	0.0004
04:40	0.0011	04:40	0.0004
04:45	0.0020	04:45	0.0004
04:50	0.0020	04:50	0.0005
04:55	0.0030	04:55	0.0005
05:00	0.0040	05:00	0.0005
05:05	0.0089	05:05	0.0003
05:10	0.0137	05:10	0.0003
05:15	0.0167	05:15	0.0003
05:20	0.0196	05:20	0.0004
05:25	0.0244	05:25	0.0004
05:30	0.0332	05:30	0.0004
05:35	0.0019	05:35	0.0005
05:40	0.0009	05:40	0.0005
05:45	0.0006	05:45	0.0005
05:50	0.0005	05:50	0.0005
05:55	0.0003	05:55	0.0005
06:00	0.0002	06:00	0.0005
		06:05	0.0005
		06:10	0.0005
		06:15	0.0005
		06:20	0.0005
		06:25	0.0005

06:30	0.0005
06:35	0.0006
06:40	0.0006
06:45	0.0006
06:50	0.0006
06:55	0.0006
07:00	0.0006
07:05	0.0006
07:10	0.0006
07:15	0.0006
07:20	0.0006
07:25	0.0006
07:30	0.0006
07:35	0.0007
07:40	0.0007
07:45	0.0007
07:50	0.0007
07:55	0.0007
08:00	0.0007
08:05	0.0008
08:10	0.0008
08:15	0.0008
08:20	0.0008
08:25	0.0008
08:30	0.0008
08:35	0.0009
08:40	0.0009
08:45	0.0009
08:50	0.0010
08:55	0.0010
09:00	0.0010
09:05	0.0011
09:10	0.0011
09:15	0.0011
09:20	0.0011
09:25	0.0011
09:30	0.0011
09:35	0.0012
09:40	0.0012
09:45	0.0012
09:50	0.0012

09:55	0.0012
10:00	0.0012
10:05	0.0008
10:10	0.0008
10:15	0.0008
10:20	0.0008
10:25	0.0008
10:30	0.0008
10:35	0.0011
10:40	0.0011
10:45	0.0011
10:50	0.0011
10:55	0.0011
11:00	0.0011
11:05	0.0011
11:10	0.0011
11:15	0.0011
11:20	0.0011
11:25	0.0011
11:30	0.0011
11:35	0.0010
11:40	0.0010
11:45	0.0010
11:50	0.0010
11:55	0.0010
12:00	0.0010
12:05	0.0014
12:10	0.0014
12:15	0.0014
12:20	0.0015
12:25	0.0015
12:30	0.0015
12:35	0.0016
12:40	0.0016
12:45	0.0016
12:50	0.0016
12:55	0.0016
13:00	0.0016
13:05	0.0004
13:10	0.0004
13:15	0.0005

13:20	0.0006
13:25	0.0007
13:30	0.0008
13:35	0.0013
13:40	0.0013
13:45	0.0013
13:50	0.0013
13:55	0.0013
14:00	0.0013
14:05	0.0015
14:10	0.0015
14:15	0.0015
14:20	0.0015
14:25	0.0015
14:30	0.0015
14:35	0.0015
14:40	0.0015
14:45	0.0015
14:50	0.0014
14:55	0.0014
15:00	0.0014
15:05	0.0014
15:10	0.0014
15:15	0.0014
15:20	0.0013
15:25	0.0013
15:30	0.0013
15:35	0.0011
15:40	0.0011
15:45	0.0011
15:50	0.0011
15:55	0.0011
16:00	0.0011
16:05	0.0002
16:10	0.0002
16:15	0.0002
16:20	0.0002
16:25	0.0002
16:30	0.0002
16:35	0.0002
16:40	0.0002

16:45	0.0002
16:50	0.0002
16:55	0.0002
17:00	0.0002
17:05	0.0003
17:10	0.0003
17:15	0.0003
17:20	0.0003
17:25	0.0003
17:30	0.0003
17:35	0.0003
17:40	0.0003
17:45	0.0003
17:50	0.0002
17:55	0.0002
18:00	0.0002
18:05	0.0002
18:10	0.0002
18:15	0.0002
18:20	0.0002
18:25	0.0002
18:30	0.0002
18:35	0.0002
18:40	0.0002
18:45	0.0002
18:50	0.0001
18:55	0.0001
19:00	0.0001
19:05	0.0002
19:10	0.0002
19:15	0.0002
19:20	0.0002
19:25	0.0002
19:30	0.0002
19:35	0.0002
19:40	0.0002
19:45	0.0002
19:50	0.0001
19:55	0.0001
20:00	0.0001
20:05	0.0002

20:10	0.0002
20:15	0.0002
20:20	0.0002
20:25	0.0002
20:30	0.0002
20:35	0.0002
20:40	0.0002
20:45	0.0002
20:50	0.0001
20:55	0.0001
21:00	0.0001
21:05	0.0002
21:10	0.0002
21:15	0.0002
21:20	0.0001
21:25	0.0001
21:30	0.0001
21:35	0.0002
21:40	0.0002
21:45	0.0002
21:50	0.0001
21:55	0.0001
22:00	0.0001
22:05	0.0002
22:10	0.0002
22:15	0.0002
22:20	0.0001
22:25	0.0001
22:30	0.0001
22:35	0.0001
22:40	0.0001
22:45	0.0001
22:50	0.0001
22:55	0.0001
23:00	0.0001
23:05	0.0001
23:10	0.0001
23:15	0.0001
23:20	0.0001
23:25	0.0001
23:30	0.0001

23:35	0.0001
23:40	0.0001
23:45	0.0001
23:50	0.0001
23:55	0.0001
00:00	0.0001

Basin 200 Precipitation

10 YR Pre-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area .0311 sq mi

1 Hour Storm

Point Precipitation	.704	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.7	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	1.12	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.12	

6 Hour Storm

Point Precipitation	1.49	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.49	

24 Hour Storm

Point Precipitation	2.653	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	2.65	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	648	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	251	ft
Elevation Difference	32	ft
Lag Time	**0.018**	**hr**
40% Lag Time	0.4	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0089
00:10	0.0089
00:15	0.0139
00:20	0.0096
00:25	0.0209
00:30	0.0230
00:35	0.0287
00:40	0.0392
00:45	0.0695
00:50	0.1871
00:55	0.0287
01:00	0.0096

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0015
00:10	0.0015
00:15	0.0012
00:20	0.0017
00:25	0.0017
00:30	0.0020
00:35	0.0017
00:40	0.0020
00:45	0.0020
00:50	0.0017
00:55	0.0018
01:00	0.0020
01:05	0.0033
01:10	0.0033
01:15	0.0033
01:20	0.0011
01:25	0.0078
01:30	0.0089
01:35	0.0055
01:40	0.0089
01:45	0.0156
01:50	0.0134
01:55	0.0111
02:00	0.0123
02:05	0.0134
02:10	0.0257
02:15	0.0347
02:20	0.0179
02:25	0.0548
02:30	0.0604
02:35	0.0705
02:40	0.0447
02:45	0.0011
02:50	0.0020
02:55	0.0020
03:00	0.0007

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0007
00:10	0.0009
00:15	0.0009
00:20	0.0009
00:25	0.0009
00:30	0.0010
00:35	0.0010
00:40	0.0010
00:45	0.0010
00:50	0.0010
00:55	0.0010
01:00	0.0012
01:05	0.0012
01:10	0.0012
01:15	0.0012
01:20	0.0012
01:25	0.0012
01:30	0.0012
01:35	0.0012
01:40	0.0012
01:45	0.0012
01:50	0.0012
01:55	0.0012
02:00	0.0013
02:05	0.0012
02:10	0.0013
02:15	0.0013
02:20	0.0013
02:25	0.0013
02:30	0.0013
02:35	0.0013
02:40	0.0013
02:45	0.0015
02:50	0.0015
02:55	0.0015
03:00	0.0015

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0002
00:10	0.0002
00:15	0.0002
00:20	0.0003
00:25	0.0003
00:30	0.0003
00:35	0.0003
00:40	0.0003
00:45	0.0003
00:50	0.0003
00:55	0.0003
01:00	0.0003
01:05	0.0003
01:10	0.0003
01:15	0.0003
01:20	0.0003
01:25	0.0003
01:30	0.0003
01:35	0.0003
01:40	0.0003
01:45	0.0003
01:50	0.0003
01:55	0.0003
02:00	0.0003
02:05	0.0003
02:10	0.0003
02:15	0.0003
02:20	0.0003
02:25	0.0003
02:30	0.0003
02:35	0.0005
02:40	0.0005
02:45	0.0005
02:50	0.0005
02:55	0.0005
03:00	0.0005

03:05	0.0015	03:05	0.0005
03:10	0.0016	03:10	0.0005
03:15	0.0016	03:15	0.0005
03:20	0.0016	03:20	0.0005
03:25	0.0018	03:25	0.0005
03:30	0.0019	03:30	0.0005
03:35	0.0021	03:35	0.0005
03:40	0.0021	03:40	0.0005
03:45	0.0010	03:45	0.0005
03:50	0.0010	03:50	0.0005
03:55	0.0025	03:55	0.0005
04:00	0.0025	04:00	0.0005
04:05	0.0040	04:05	0.0005
04:10	0.0055	04:10	0.0005
04:15	0.0070	04:15	0.0005
04:20	0.0085	04:20	0.0006
04:25	0.0100	04:25	0.0006
04:30	0.0100	04:30	0.0006
04:35	0.0114	04:35	0.0006
04:40	0.0129	04:40	0.0006
04:45	0.0144	04:45	0.0006
04:50	0.0144	04:50	0.0007
04:55	0.0159	04:55	0.0007
05:00	0.0174	05:00	0.0007
05:05	0.0249	05:05	0.0005
05:10	0.0323	05:10	0.0005
05:15	0.0368	05:15	0.0005
05:20	0.0412	05:20	0.0006
05:25	0.0487	05:25	0.0006
05:30	0.0621	05:30	0.0006
05:35	0.0070	05:35	0.0007
05:40	0.0013	05:40	0.0007
05:45	0.0009	05:45	0.0007
05:50	0.0007	05:50	0.0007
05:55	0.0004	05:55	0.0007
06:00	0.0003	06:00	0.0007
		06:05	0.0008
		06:10	0.0008
		06:15	0.0008
		06:20	0.0008
		06:25	0.0008

06:30	0.0008
06:35	0.0009
06:40	0.0009
06:45	0.0009
06:50	0.0009
06:55	0.0009
07:00	0.0009
07:05	0.0009
07:10	0.0009
07:15	0.0009
07:20	0.0010
07:25	0.0010
07:30	0.0010
07:35	0.0011
07:40	0.0011
07:45	0.0011
07:50	0.0011
07:55	0.0011
08:00	0.0011
08:05	0.0013
08:10	0.0013
08:15	0.0013
08:20	0.0013
08:25	0.0013
08:30	0.0013
08:35	0.0014
08:40	0.0014
08:45	0.0014
08:50	0.0015
08:55	0.0015
09:00	0.0015
09:05	0.0017
09:10	0.0017
09:15	0.0017
09:20	0.0018
09:25	0.0018
09:30	0.0018
09:35	0.0019
09:40	0.0019
09:45	0.0019
09:50	0.0019

09:55	0.0019
10:00	0.0019
10:05	0.0013
10:10	0.0013
10:15	0.0013
10:20	0.0013
10:25	0.0013
10:30	0.0013
10:35	0.0018
10:40	0.0018
10:45	0.0018
10:50	0.0018
10:55	0.0018
11:00	0.0018
11:05	0.0017
11:10	0.0017
11:15	0.0017
11:20	0.0017
11:25	0.0017
11:30	0.0017
11:35	0.0015
11:40	0.0015
11:45	0.0015
11:50	0.0016
11:55	0.0016
12:00	0.0016
12:05	0.0021
12:10	0.0022
12:15	0.0023
12:20	0.0035
12:25	0.0036
12:30	0.0037
12:35	0.0054
12:40	0.0054
12:45	0.0055
12:50	0.0067
12:55	0.0068
13:00	0.0069
13:05	0.0112
13:10	0.0113
13:15	0.0114

13:20	0.0115
13:25	0.0116
13:30	0.0117
13:35	0.0022
13:40	0.0023
13:45	0.0024
13:50	0.0025
13:55	0.0026
14:00	0.0027
14:05	0.0062
14:10	0.0063
14:15	0.0064
14:20	0.0057
14:25	0.0058
14:30	0.0059
14:35	0.0060
14:40	0.0061
14:45	0.0062
14:50	0.0052
14:55	0.0053
15:00	0.0054
15:05	0.0046
15:10	0.0047
15:15	0.0048
15:20	0.0041
15:25	0.0042
15:30	0.0043
15:35	0.0006
15:40	0.0007
15:45	0.0008
15:50	0.0009
15:55	0.0010
16:00	0.0010
16:05	0.0003
16:10	0.0003
16:15	0.0003
16:20	0.0003
16:25	0.0003
16:30	0.0003
16:35	0.0003
16:40	0.0003

16:45	0.0003
16:50	0.0003
16:55	0.0003
17:00	0.0003
17:05	0.0005
17:10	0.0005
17:15	0.0005
17:20	0.0005
17:25	0.0005
17:30	0.0005
17:35	0.0005
17:40	0.0005
17:45	0.0005
17:50	0.0003
17:55	0.0003
18:00	0.0003
18:05	0.0003
18:10	0.0003
18:15	0.0003
18:20	0.0003
18:25	0.0003
18:30	0.0003
18:35	0.0003
18:40	0.0003
18:45	0.0003
18:50	0.0002
18:55	0.0002
19:00	0.0002
19:05	0.0003
19:10	0.0003
19:15	0.0003
19:20	0.0003
19:25	0.0003
19:30	0.0003
19:35	0.0003
19:40	0.0003
19:45	0.0003
19:50	0.0002
19:55	0.0002
20:00	0.0002
20:05	0.0003

20:10	0.0003
20:15	0.0003
20:20	0.0003
20:25	0.0003
20:30	0.0003
20:35	0.0003
20:40	0.0003
20:45	0.0003
20:50	0.0002
20:55	0.0002
21:00	0.0002
21:05	0.0003
21:10	0.0003
21:15	0.0003
21:20	0.0002
21:25	0.0002
21:30	0.0002
21:35	0.0003
21:40	0.0003
21:45	0.0003
21:50	0.0002
21:55	0.0002
22:00	0.0002
22:05	0.0003
22:10	0.0003
22:15	0.0003
22:20	0.0002
22:25	0.0002
22:30	0.0002
22:35	0.0002
22:40	0.0002
22:45	0.0002
22:50	0.0002
22:55	0.0002
23:00	0.0002
23:05	0.0002
23:10	0.0002
23:15	0.0002
23:20	0.0002
23:25	0.0002
23:30	0.0002

			23:35	0.0002
			23:40	0.0002
			23:45	0.0002
			23:50	0.0002
			23:55	0.0002
			00:00	0.0002

Basin 200 Precipitation

2 YR Post-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0311 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	1972	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	620	ft
Elevation Difference	56	ft
Lag Time	**0.085**	**hr**
40% Lag Time	2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0042
00:10	0.0042
00:15	0.0042
00:20	0.0063
00:25	0.0131
00:30	0.0122
00:35	0.0173
00:40	0.0224
00:45	0.0393
00:50	0.1118
00:55	0.0152
01:00	0.0051

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0009
00:10	0.0009
00:15	0.0008
00:20	0.0011
00:25	0.0011
00:30	0.0013
00:35	0.0011
00:40	0.0013
00:45	0.0013
00:50	0.0011
00:55	0.0012
01:00	0.0013
01:05	0.0019
01:10	0.0019
01:15	0.0019
01:20	0.0005
01:25	0.0048
01:30	0.0056
01:35	0.0034
01:40	0.0056
01:45	0.0099
01:50	0.0084
01:55	0.0070
02:00	0.0077
02:05	0.0084
02:10	0.0164
02:15	0.0221
02:20	0.0113
02:25	0.0351
02:30	0.0387
02:35	0.0452
02:40	0.0286
02:45	0.0005
02:50	0.0013
02:55	0.0013
03:00	0.0004

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0005
00:10	0.0006
00:15	0.0006
00:20	0.0006
00:25	0.0006
00:30	0.0007
00:35	0.0007
00:40	0.0007
00:45	0.0007
00:50	0.0007
00:55	0.0007
01:00	0.0008
01:05	0.0008
01:10	0.0008
01:15	0.0008
01:20	0.0008
01:25	0.0008
01:30	0.0008
01:35	0.0008
01:40	0.0008
01:45	0.0008
01:50	0.0008
01:55	0.0008
02:00	0.0009
02:05	0.0008
02:10	0.0009
02:15	0.0009
02:20	0.0009
02:25	0.0009
02:30	0.0009
02:35	0.0009
02:40	0.0009
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0001
00:10	0.0001
00:15	0.0001
00:20	0.0002
00:25	0.0002
00:30	0.0002
00:35	0.0002
00:40	0.0002
00:45	0.0002
00:50	0.0002
00:55	0.0002
01:00	0.0002
01:05	0.0002
01:10	0.0002
01:15	0.0002
01:20	0.0002
01:25	0.0002
01:30	0.0002
01:35	0.0002
01:40	0.0002
01:45	0.0002
01:50	0.0002
01:55	0.0002
02:00	0.0002
02:05	0.0002
02:10	0.0002
02:15	0.0002
02:20	0.0002
02:25	0.0002
02:30	0.0002
02:35	0.0003
02:40	0.0003
02:45	0.0003
02:50	0.0003
02:55	0.0003
03:00	0.0003

03:05	0.0010	03:05	0.0003
03:10	0.0011	03:10	0.0003
03:15	0.0011	03:15	0.0003
03:20	0.0011	03:20	0.0003
03:25	0.0012	03:25	0.0003
03:30	0.0013	03:30	0.0003
03:35	0.0014	03:35	0.0003
03:40	0.0014	03:40	0.0003
03:45	0.0007	03:45	0.0003
03:50	0.0007	03:50	0.0003
03:55	0.0017	03:55	0.0003
04:00	0.0017	04:00	0.0003
04:05	0.0026	04:05	0.0003
04:10	0.0036	04:10	0.0003
04:15	0.0046	04:15	0.0003
04:20	0.0056	04:20	0.0004
04:25	0.0065	04:25	0.0004
04:30	0.0065	04:30	0.0004
04:35	0.0075	04:35	0.0004
04:40	0.0085	04:40	0.0004
04:45	0.0095	04:45	0.0004
04:50	0.0095	04:50	0.0005
04:55	0.0104	04:55	0.0005
05:00	0.0114	05:00	0.0005
05:05	0.0163	05:05	0.0003
05:10	0.0211	05:10	0.0003
05:15	0.0241	05:15	0.0003
05:20	0.0270	05:20	0.0004
05:25	0.0319	05:25	0.0004
05:30	0.0406	05:30	0.0004
05:35	0.0046	05:35	0.0005
05:40	0.0009	05:40	0.0005
05:45	0.0006	05:45	0.0005
05:50	0.0005	05:50	0.0005
05:55	0.0003	05:55	0.0005
06:00	0.0002	06:00	0.0005
		06:05	0.0005
		06:10	0.0005
		06:15	0.0005
		06:20	0.0005
		06:25	0.0005

06:30	0.0005
06:35	0.0006
06:40	0.0006
06:45	0.0006
06:50	0.0006
06:55	0.0006
07:00	0.0006
07:05	0.0006
07:10	0.0006
07:15	0.0006
07:20	0.0006
07:25	0.0006
07:30	0.0006
07:35	0.0007
07:40	0.0007
07:45	0.0007
07:50	0.0007
07:55	0.0007
08:00	0.0007
08:05	0.0008
08:10	0.0008
08:15	0.0008
08:20	0.0008
08:25	0.0008
08:30	0.0008
08:35	0.0009
08:40	0.0009
08:45	0.0009
08:50	0.0010
08:55	0.0010
09:00	0.0010
09:05	0.0011
09:10	0.0011
09:15	0.0011
09:20	0.0011
09:25	0.0011
09:30	0.0011
09:35	0.0012
09:40	0.0012
09:45	0.0012
09:50	0.0012

09:55	0.0012
10:00	0.0012
10:05	0.0008
10:10	0.0008
10:15	0.0008
10:20	0.0008
10:25	0.0008
10:30	0.0008
10:35	0.0011
10:40	0.0011
10:45	0.0011
10:50	0.0011
10:55	0.0011
11:00	0.0011
11:05	0.0011
11:10	0.0011
11:15	0.0011
11:20	0.0011
11:25	0.0011
11:30	0.0011
11:35	0.0010
11:40	0.0010
11:45	0.0010
11:50	0.0010
11:55	0.0010
12:00	0.0010
12:05	0.0010
12:10	0.0011
12:15	0.0012
12:20	0.0019
12:25	0.0020
12:30	0.0020
12:35	0.0031
12:40	0.0032
12:45	0.0032
12:50	0.0040
12:55	0.0040
13:00	0.0041
13:05	0.0069
13:10	0.0069
13:15	0.0070

13:20	0.0071
13:25	0.0071
13:30	0.0072
13:35	0.0012
13:40	0.0012
13:45	0.0013
13:50	0.0013
13:55	0.0014
14:00	0.0015
14:05	0.0037
14:10	0.0038
14:15	0.0038
14:20	0.0034
14:25	0.0034
14:30	0.0035
14:35	0.0036
14:40	0.0036
14:45	0.0037
14:50	0.0030
14:55	0.0031
15:00	0.0032
15:05	0.0027
15:10	0.0028
15:15	0.0028
15:20	0.0024
15:25	0.0024
15:30	0.0025
15:35	0.0002
15:40	0.0002
15:45	0.0003
15:50	0.0003
15:55	0.0004
16:00	0.0004
16:05	0.0002
16:10	0.0002
16:15	0.0002
16:20	0.0002
16:25	0.0002
16:30	0.0002
16:35	0.0002
16:40	0.0002

16:45	0.0002
16:50	0.0002
16:55	0.0002
17:00	0.0002
17:05	0.0003
17:10	0.0003
17:15	0.0003
17:20	0.0003
17:25	0.0003
17:30	0.0003
17:35	0.0003
17:40	0.0003
17:45	0.0003
17:50	0.0002
17:55	0.0002
18:00	0.0002
18:05	0.0002
18:10	0.0002
18:15	0.0002
18:20	0.0002
18:25	0.0002
18:30	0.0002
18:35	0.0002
18:40	0.0002
18:45	0.0002
18:50	0.0001
18:55	0.0001
19:00	0.0001
19:05	0.0002
19:10	0.0002
19:15	0.0002
19:20	0.0002
19:25	0.0002
19:30	0.0002
19:35	0.0002
19:40	0.0002
19:45	0.0002
19:50	0.0001
19:55	0.0001
20:00	0.0001
20:05	0.0002

20:10	0.0002
20:15	0.0002
20:20	0.0002
20:25	0.0002
20:30	0.0002
20:35	0.0002
20:40	0.0002
20:45	0.0002
20:50	0.0001
20:55	0.0001
21:00	0.0001
21:05	0.0002
21:10	0.0002
21:15	0.0002
21:20	0.0001
21:25	0.0001
21:30	0.0001
21:35	0.0002
21:40	0.0002
21:45	0.0002
21:50	0.0001
21:55	0.0001
22:00	0.0001
22:05	0.0002
22:10	0.0002
22:15	0.0002
22:20	0.0001
22:25	0.0001
22:30	0.0001
22:35	0.0001
22:40	0.0001
22:45	0.0001
22:50	0.0001
22:55	0.0001
23:00	0.0001
23:05	0.0001
23:10	0.0001
23:15	0.0001
23:20	0.0001
23:25	0.0001
23:30	0.0001

			23:35	0.0001
			23:40	0.0001
			23:45	0.0001
			23:50	0.0001
			23:55	0.0001
			00:00	0.0001

Basin 200 Precipitation

10 YR Post-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0311 sq mi

1 Hour Storm

Point Precipitation	.704	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.7	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	1.12	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.12	

6 Hour Storm

Point Precipitation	1.49	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.49	

24 Hour Storm

Point Precipitation	2.653	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	2.65	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	1972	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	620	ft
Elevation Difference	56	ft
Lag Time	**0.085**	**hr**
40% Lag Time	2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0164
00:10	0.0164
00:15	0.0213
00:20	0.0171
00:25	0.0283
00:30	0.0304
00:35	0.0361
00:40	0.0466
00:45	0.0769
00:50	0.1945
00:55	0.0361
01:00	0.0171

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0006
00:10	0.0006
00:15	0.0012
00:20	0.0029
00:25	0.0029
00:30	0.0062
00:35	0.0029
00:40	0.0062
00:45	0.0062
00:50	0.0029
00:55	0.0040
01:00	0.0062
01:05	0.0107
01:10	0.0107
01:15	0.0107
01:20	0.0085
01:25	0.0152
01:30	0.0163
01:35	0.0130
01:40	0.0163
01:45	0.0230
01:50	0.0208
01:55	0.0186
02:00	0.0197
02:05	0.0208
02:10	0.0331
02:15	0.0421
02:20	0.0253
02:25	0.0622
02:30	0.0678
02:35	0.0779
02:40	0.0522
02:45	0.0085
02:50	0.0062
02:55	0.0062
03:00	0.0007

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0007
00:10	0.0009
00:15	0.0009
00:20	0.0009
00:25	0.0009
00:30	0.0010
00:35	0.0010
00:40	0.0010
00:45	0.0010
00:50	0.0010
00:55	0.0010
01:00	0.0012
01:05	0.0012
01:10	0.0012
01:15	0.0012
01:20	0.0012
01:25	0.0012
01:30	0.0012
01:35	0.0012
01:40	0.0012
01:45	0.0012
01:50	0.0012
01:55	0.0012
02:00	0.0013
02:05	0.0012
02:10	0.0013
02:15	0.0013
02:20	0.0013
02:25	0.0013
02:30	0.0013
02:35	0.0013
02:40	0.0013
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0002
00:10	0.0002
00:15	0.0002
00:20	0.0003
00:25	0.0003
00:30	0.0003
00:35	0.0003
00:40	0.0003
00:45	0.0003
00:50	0.0003
00:55	0.0003
01:00	0.0003
01:05	0.0003
01:10	0.0003
01:15	0.0003
01:20	0.0003
01:25	0.0003
01:30	0.0003
01:35	0.0003
01:40	0.0003
01:45	0.0003
01:50	0.0003
01:55	0.0003
02:00	0.0003
02:05	0.0003
02:10	0.0003
02:15	0.0003
02:20	0.0003
02:25	0.0003
02:30	0.0003
02:35	0.0005
02:40	0.0005
02:45	0.0005
02:50	0.0005
02:55	0.0005
03:00	0.0005

03:05	0.0010	03:05	0.0005
03:10	0.0025	03:10	0.0005
03:15	0.0025	03:15	0.0005
03:20	0.0025	03:20	0.0005
03:25	0.0040	03:25	0.0005
03:30	0.0055	03:30	0.0005
03:35	0.0069	03:35	0.0005
03:40	0.0069	03:40	0.0005
03:45	0.0084	03:45	0.0005
03:50	0.0084	03:50	0.0005
03:55	0.0099	03:55	0.0005
04:00	0.0099	04:00	0.0005
04:05	0.0114	04:05	0.0005
04:10	0.0129	04:10	0.0005
04:15	0.0144	04:15	0.0005
04:20	0.0159	04:20	0.0006
04:25	0.0174	04:25	0.0006
04:30	0.0174	04:30	0.0006
04:35	0.0189	04:35	0.0006
04:40	0.0204	04:40	0.0006
04:45	0.0218	04:45	0.0006
04:50	0.0218	04:50	0.0007
04:55	0.0233	04:55	0.0007
05:00	0.0248	05:00	0.0007
05:05	0.0323	05:05	0.0005
05:10	0.0397	05:10	0.0005
05:15	0.0442	05:15	0.0005
05:20	0.0487	05:20	0.0006
05:25	0.0561	05:25	0.0006
05:30	0.0695	05:30	0.0006
05:35	0.0144	05:35	0.0007
05:40	0.0013	05:40	0.0007
05:45	0.0009	05:45	0.0007
05:50	0.0007	05:50	0.0007
05:55	0.0004	05:55	0.0007
06:00	0.0003	06:00	0.0007
		06:05	0.0008
		06:10	0.0008
		06:15	0.0008
		06:20	0.0008
		06:25	0.0008

06:30	0.0008
06:35	0.0009
06:40	0.0009
06:45	0.0009
06:50	0.0009
06:55	0.0009
07:00	0.0009
07:05	0.0009
07:10	0.0009
07:15	0.0009
07:20	0.0010
07:25	0.0010
07:30	0.0010
07:35	0.0011
07:40	0.0011
07:45	0.0011
07:50	0.0011
07:55	0.0011
08:00	0.0011
08:05	0.0013
08:10	0.0013
08:15	0.0013
08:20	0.0013
08:25	0.0013
08:30	0.0013
08:35	0.0014
08:40	0.0014
08:45	0.0014
08:50	0.0015
08:55	0.0015
09:00	0.0015
09:05	0.0012
09:10	0.0013
09:15	0.0014
09:20	0.0025
09:25	0.0026
09:30	0.0026
09:35	0.0035
09:40	0.0036
09:45	0.0037
09:50	0.0045

09:55	0.0046
10:00	0.0047
10:05	0.0013
10:10	0.0013
10:15	0.0013
10:20	0.0013
10:25	0.0013
10:30	0.0013
10:35	0.0036
10:40	0.0036
10:45	0.0037
10:50	0.0038
10:55	0.0038
11:00	0.0039
11:05	0.0029
11:10	0.0030
11:15	0.0031
11:20	0.0031
11:25	0.0032
11:30	0.0033
11:35	0.0017
11:40	0.0018
11:45	0.0019
11:50	0.0027
11:55	0.0028
12:00	0.0029
12:05	0.0090
12:10	0.0091
12:15	0.0092
12:20	0.0103
12:25	0.0103
12:30	0.0104
12:35	0.0121
12:40	0.0121
12:45	0.0122
12:50	0.0133
12:55	0.0134
13:00	0.0134
13:05	0.0178
13:10	0.0178
13:15	0.0179

13:20	0.0179
13:25	0.0180
13:30	0.0181
13:35	0.0086
13:40	0.0086
13:45	0.0087
13:50	0.0087
13:55	0.0088
14:00	0.0089
14:05	0.0124
14:10	0.0124
14:15	0.0125
14:20	0.0118
14:25	0.0118
14:30	0.0119
14:35	0.0119
14:40	0.0120
14:45	0.0120
14:50	0.0110
14:55	0.0111
15:00	0.0112
15:05	0.0104
15:10	0.0105
15:15	0.0105
15:20	0.0098
15:25	0.0098
15:30	0.0099
15:35	0.0062
15:40	0.0063
15:45	0.0063
15:50	0.0064
15:55	0.0064
16:00	0.0065
16:05	0.0003
16:10	0.0003
16:15	0.0003
16:20	0.0003
16:25	0.0003
16:30	0.0003
16:35	0.0003
16:40	0.0003

16:45	0.0003
16:50	0.0003
16:55	0.0003
17:00	0.0003
17:05	0.0005
17:10	0.0005
17:15	0.0005
17:20	0.0005
17:25	0.0005
17:30	0.0005
17:35	0.0005
17:40	0.0005
17:45	0.0005
17:50	0.0003
17:55	0.0003
18:00	0.0003
18:05	0.0003
18:10	0.0003
18:15	0.0003
18:20	0.0003
18:25	0.0003
18:30	0.0003
18:35	0.0003
18:40	0.0003
18:45	0.0003
18:50	0.0002
18:55	0.0002
19:00	0.0002
19:05	0.0003
19:10	0.0003
19:15	0.0003
19:20	0.0003
19:25	0.0003
19:30	0.0003
19:35	0.0003
19:40	0.0003
19:45	0.0003
19:50	0.0002
19:55	0.0002
20:00	0.0002
20:05	0.0003

20:10	0.0003
20:15	0.0003
20:20	0.0003
20:25	0.0003
20:30	0.0003
20:35	0.0003
20:40	0.0003
20:45	0.0003
20:50	0.0002
20:55	0.0002
21:00	0.0002
21:05	0.0003
21:10	0.0003
21:15	0.0003
21:20	0.0002
21:25	0.0002
21:30	0.0002
21:35	0.0003
21:40	0.0003
21:45	0.0003
21:50	0.0002
21:55	0.0002
22:00	0.0002
22:05	0.0003
22:10	0.0003
22:15	0.0003
22:20	0.0002
22:25	0.0002
22:30	0.0002
22:35	0.0002
22:40	0.0002
22:45	0.0002
22:50	0.0002
22:55	0.0002
23:00	0.0002
23:05	0.0002
23:10	0.0002
23:15	0.0002
23:20	0.0002
23:25	0.0002
23:30	0.0002

			23:35	0.0002
			23:40	0.0002
			23:45	0.0002
			23:50	0.0002
			23:55	0.0002
			00:00	0.0002

Basin 300 Precipitation

2 YR Pre-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area .0884 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	1227	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	340	ft
Elevation Difference	56	ft
Lag Time	**0.026**	**hr**
40% Lag Time	0.6	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0018
00:10	0.0018
00:15	0.0018
00:20	0.0020
00:25	0.0057
00:30	0.0048
00:35	0.0099
00:40	0.0150
00:45	0.0318
00:50	0.1044
00:55	0.0078
01:00	0.0019

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0009
00:10	0.0009
00:15	0.0008
00:20	0.0011
00:25	0.0011
00:30	0.0013
00:35	0.0011
00:40	0.0013
00:45	0.0013
00:50	0.0011
00:55	0.0012
01:00	0.0013
01:05	0.0016
01:10	0.0016
01:15	0.0016
01:20	0.0014
01:25	0.0019
01:30	0.0019
01:35	0.0017
01:40	0.0019
01:45	0.0025
01:50	0.0010
01:55	0.0021
02:00	0.0003
02:05	0.0010
02:10	0.0089
02:15	0.0147
02:20	0.0039
02:25	0.0277
02:30	0.0313
02:35	0.0378
02:40	0.0212
02:45	0.0014
02:50	0.0013
02:55	0.0013
03:00	0.0004

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0005
00:10	0.0006
00:15	0.0006
00:20	0.0006
00:25	0.0006
00:30	0.0007
00:35	0.0007
00:40	0.0007
00:45	0.0007
00:50	0.0007
00:55	0.0007
01:00	0.0008
01:05	0.0008
01:10	0.0008
01:15	0.0008
01:20	0.0008
01:25	0.0008
01:30	0.0008
01:35	0.0008
01:40	0.0008
01:45	0.0008
01:50	0.0008
01:55	0.0008
02:00	0.0009
02:05	0.0008
02:10	0.0009
02:15	0.0009
02:20	0.0009
02:25	0.0009
02:30	0.0009
02:35	0.0009
02:40	0.0009
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0001
00:10	0.0001
00:15	0.0001
00:20	0.0002
00:25	0.0002
00:30	0.0002
00:35	0.0002
00:40	0.0002
00:45	0.0002
00:50	0.0002
00:55	0.0002
01:00	0.0002
01:05	0.0002
01:10	0.0002
01:15	0.0002
01:20	0.0002
01:25	0.0002
01:30	0.0002
01:35	0.0002
01:40	0.0002
01:45	0.0002
01:50	0.0002
01:55	0.0002
02:00	0.0002
02:05	0.0002
02:10	0.0002
02:15	0.0002
02:20	0.0002
02:25	0.0002
02:30	0.0002
02:35	0.0003
02:40	0.0003
02:45	0.0003
02:50	0.0003
02:55	0.0003
03:00	0.0003

03:05	0.0010	03:05	0.0003
03:10	0.0011	03:10	0.0003
03:15	0.0011	03:15	0.0003
03:20	0.0011	03:20	0.0003
03:25	0.0012	03:25	0.0003
03:30	0.0013	03:30	0.0003
03:35	0.0014	03:35	0.0003
03:40	0.0014	03:40	0.0003
03:45	0.0015	03:45	0.0003
03:50	0.0015	03:50	0.0003
03:55	0.0016	03:55	0.0003
04:00	0.0016	04:00	0.0003
04:05	0.0017	04:05	0.0003
04:10	0.0018	04:10	0.0003
04:15	0.0019	04:15	0.0003
04:20	0.0019	04:20	0.0004
04:25	0.0020	04:25	0.0004
04:30	0.0020	04:30	0.0004
04:35	0.0001	04:35	0.0004
04:40	0.0011	04:40	0.0004
04:45	0.0020	04:45	0.0004
04:50	0.0020	04:50	0.0005
04:55	0.0030	04:55	0.0005
05:00	0.0040	05:00	0.0005
05:05	0.0089	05:05	0.0003
05:10	0.0137	05:10	0.0003
05:15	0.0167	05:15	0.0003
05:20	0.0196	05:20	0.0004
05:25	0.0244	05:25	0.0004
05:30	0.0332	05:30	0.0004
05:35	0.0019	05:35	0.0005
05:40	0.0009	05:40	0.0005
05:45	0.0006	05:45	0.0005
05:50	0.0005	05:50	0.0005
05:55	0.0003	05:55	0.0005
06:00	0.0002	06:00	0.0005
		06:05	0.0005
		06:10	0.0005
		06:15	0.0005
		06:20	0.0005
		06:25	0.0005

06:30	0.0005
06:35	0.0006
06:40	0.0006
06:45	0.0006
06:50	0.0006
06:55	0.0006
07:00	0.0006
07:05	0.0006
07:10	0.0006
07:15	0.0006
07:20	0.0006
07:25	0.0006
07:30	0.0006
07:35	0.0007
07:40	0.0007
07:45	0.0007
07:50	0.0007
07:55	0.0007
08:00	0.0007
08:05	0.0008
08:10	0.0008
08:15	0.0008
08:20	0.0008
08:25	0.0008
08:30	0.0008
08:35	0.0009
08:40	0.0009
08:45	0.0009
08:50	0.0010
08:55	0.0010
09:00	0.0010
09:05	0.0011
09:10	0.0011
09:15	0.0011
09:20	0.0011
09:25	0.0011
09:30	0.0011
09:35	0.0012
09:40	0.0012
09:45	0.0012
09:50	0.0012

09:55	0.0012
10:00	0.0012
10:05	0.0008
10:10	0.0008
10:15	0.0008
10:20	0.0008
10:25	0.0008
10:30	0.0008
10:35	0.0011
10:40	0.0011
10:45	0.0011
10:50	0.0011
10:55	0.0011
11:00	0.0011
11:05	0.0011
11:10	0.0011
11:15	0.0011
11:20	0.0011
11:25	0.0011
11:30	0.0011
11:35	0.0010
11:40	0.0010
11:45	0.0010
11:50	0.0010
11:55	0.0010
12:00	0.0010
12:05	0.0014
12:10	0.0014
12:15	0.0014
12:20	0.0015
12:25	0.0015
12:30	0.0015
12:35	0.0016
12:40	0.0016
12:45	0.0016
12:50	0.0016
12:55	0.0016
13:00	0.0016
13:05	0.0004
13:10	0.0004
13:15	0.0005

13:20	0.0006
13:25	0.0007
13:30	0.0008
13:35	0.0013
13:40	0.0013
13:45	0.0013
13:50	0.0013
13:55	0.0013
14:00	0.0013
14:05	0.0015
14:10	0.0015
14:15	0.0015
14:20	0.0015
14:25	0.0015
14:30	0.0015
14:35	0.0015
14:40	0.0015
14:45	0.0015
14:50	0.0014
14:55	0.0014
15:00	0.0014
15:05	0.0014
15:10	0.0014
15:15	0.0014
15:20	0.0013
15:25	0.0013
15:30	0.0013
15:35	0.0011
15:40	0.0011
15:45	0.0011
15:50	0.0011
15:55	0.0011
16:00	0.0011
16:05	0.0002
16:10	0.0002
16:15	0.0002
16:20	0.0002
16:25	0.0002
16:30	0.0002
16:35	0.0002
16:40	0.0002

16:45	0.0002
16:50	0.0002
16:55	0.0002
17:00	0.0002
17:05	0.0003
17:10	0.0003
17:15	0.0003
17:20	0.0003
17:25	0.0003
17:30	0.0003
17:35	0.0003
17:40	0.0003
17:45	0.0003
17:50	0.0002
17:55	0.0002
18:00	0.0002
18:05	0.0002
18:10	0.0002
18:15	0.0002
18:20	0.0002
18:25	0.0002
18:30	0.0002
18:35	0.0002
18:40	0.0002
18:45	0.0002
18:50	0.0001
18:55	0.0001
19:00	0.0001
19:05	0.0002
19:10	0.0002
19:15	0.0002
19:20	0.0002
19:25	0.0002
19:30	0.0002
19:35	0.0002
19:40	0.0002
19:45	0.0002
19:50	0.0001
19:55	0.0001
20:00	0.0001
20:05	0.0002

20:10	0.0002
20:15	0.0002
20:20	0.0002
20:25	0.0002
20:30	0.0002
20:35	0.0002
20:40	0.0002
20:45	0.0002
20:50	0.0001
20:55	0.0001
21:00	0.0001
21:05	0.0002
21:10	0.0002
21:15	0.0002
21:20	0.0001
21:25	0.0001
21:30	0.0001
21:35	0.0002
21:40	0.0002
21:45	0.0002
21:50	0.0001
21:55	0.0001
22:00	0.0001
22:05	0.0002
22:10	0.0002
22:15	0.0002
22:20	0.0001
22:25	0.0001
22:30	0.0001
22:35	0.0001
22:40	0.0001
22:45	0.0001
22:50	0.0001
22:55	0.0001
23:00	0.0001
23:05	0.0001
23:10	0.0001
23:15	0.0001
23:20	0.0001
23:25	0.0001
23:30	0.0001

			23:35	0.0001
			23:40	0.0001
			23:45	0.0001
			23:50	0.0001
			23:55	0.0001
			00:00	0.0001

Basin 300 Precipitation

10 YR Pre-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0884 sq mi

1 Hour Storm

Point Precipitation	.704	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.7	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	1.12	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.12	

6 Hour Storm

Point Precipitation	1.49	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.49	

24 Hour Storm

Point Precipitation	2.653	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	2.65	

Lag Time Calculator

Basin Factor - n	0.015	
Length along longest watercourse - L	1227	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	342	ft
Elevation Difference	80	ft
Lag Time	**0.024**	**hr**
40% Lag Time	0.6	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0089
00:10	0.0089
00:15	0.0139
00:20	0.0096
00:25	0.0209
00:30	0.0230
00:35	0.0287
00:40	0.0392
00:45	0.0695
00:50	0.1871
00:55	0.0287
01:00	0.0096

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0015
00:10	0.0015
00:15	0.0012
00:20	0.0017
00:25	0.0017
00:30	0.0020
00:35	0.0017
00:40	0.0020
00:45	0.0020
00:50	0.0017
00:55	0.0018
01:00	0.0020
01:05	0.0033
01:10	0.0033
01:15	0.0033
01:20	0.0011
01:25	0.0078
01:30	0.0089
01:35	0.0055
01:40	0.0089
01:45	0.0156
01:50	0.0134
01:55	0.0111
02:00	0.0123
02:05	0.0134
02:10	0.0257
02:15	0.0347
02:20	0.0179
02:25	0.0548
02:30	0.0604
02:35	0.0705
02:40	0.0447
02:45	0.0011
02:50	0.0020
02:55	0.0020
03:00	0.0007

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0007
00:10	0.0009
00:15	0.0009
00:20	0.0009
00:25	0.0009
00:30	0.0010
00:35	0.0010
00:40	0.0010
00:45	0.0010
00:50	0.0010
00:55	0.0010
01:00	0.0012
01:05	0.0012
01:10	0.0012
01:15	0.0012
01:20	0.0012
01:25	0.0012
01:30	0.0012
01:35	0.0012
01:40	0.0012
01:45	0.0012
01:50	0.0012
01:55	0.0012
02:00	0.0013
02:05	0.0012
02:10	0.0013
02:15	0.0013
02:20	0.0013
02:25	0.0013
02:30	0.0013
02:35	0.0013
02:40	0.0013
02:45	0.0015
02:50	0.0015
02:55	0.0015
03:00	0.0015

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0002
00:10	0.0002
00:15	0.0002
00:20	0.0003
00:25	0.0003
00:30	0.0003
00:35	0.0003
00:40	0.0003
00:45	0.0003
00:50	0.0003
00:55	0.0003
01:00	0.0003
01:05	0.0003
01:10	0.0003
01:15	0.0003
01:20	0.0003
01:25	0.0003
01:30	0.0003
01:35	0.0003
01:40	0.0003
01:45	0.0003
01:50	0.0003
01:55	0.0003
02:00	0.0003
02:05	0.0003
02:10	0.0003
02:15	0.0003
02:20	0.0003
02:25	0.0003
02:30	0.0003
02:35	0.0005
02:40	0.0005
02:45	0.0005
02:50	0.0005
02:55	0.0005
03:00	0.0005

03:05	0.0015	03:05	0.0005
03:10	0.0016	03:10	0.0005
03:15	0.0016	03:15	0.0005
03:20	0.0016	03:20	0.0005
03:25	0.0018	03:25	0.0005
03:30	0.0019	03:30	0.0005
03:35	0.0021	03:35	0.0005
03:40	0.0021	03:40	0.0005
03:45	0.0010	03:45	0.0005
03:50	0.0010	03:50	0.0005
03:55	0.0025	03:55	0.0005
04:00	0.0025	04:00	0.0005
04:05	0.0040	04:05	0.0005
04:10	0.0055	04:10	0.0005
04:15	0.0070	04:15	0.0005
04:20	0.0085	04:20	0.0006
04:25	0.0100	04:25	0.0006
04:30	0.0100	04:30	0.0006
04:35	0.0114	04:35	0.0006
04:40	0.0129	04:40	0.0006
04:45	0.0144	04:45	0.0006
04:50	0.0144	04:50	0.0007
04:55	0.0159	04:55	0.0007
05:00	0.0174	05:00	0.0007
05:05	0.0249	05:05	0.0005
05:10	0.0323	05:10	0.0005
05:15	0.0368	05:15	0.0005
05:20	0.0412	05:20	0.0006
05:25	0.0487	05:25	0.0006
05:30	0.0621	05:30	0.0006
05:35	0.0070	05:35	0.0007
05:40	0.0013	05:40	0.0007
05:45	0.0009	05:45	0.0007
05:50	0.0007	05:50	0.0007
05:55	0.0004	05:55	0.0007
06:00	0.0003	06:00	0.0007
		06:05	0.0008
		06:10	0.0008
		06:15	0.0008
		06:20	0.0008
		06:25	0.0008

06:30	0.0008
06:35	0.0009
06:40	0.0009
06:45	0.0009
06:50	0.0009
06:55	0.0009
07:00	0.0009
07:05	0.0009
07:10	0.0009
07:15	0.0009
07:20	0.0010
07:25	0.0010
07:30	0.0010
07:35	0.0011
07:40	0.0011
07:45	0.0011
07:50	0.0011
07:55	0.0011
08:00	0.0011
08:05	0.0013
08:10	0.0013
08:15	0.0013
08:20	0.0013
08:25	0.0013
08:30	0.0013
08:35	0.0014
08:40	0.0014
08:45	0.0014
08:50	0.0015
08:55	0.0015
09:00	0.0015
09:05	0.0017
09:10	0.0017
09:15	0.0017
09:20	0.0018
09:25	0.0018
09:30	0.0018
09:35	0.0019
09:40	0.0019
09:45	0.0019
09:50	0.0019

09:55	0.0019
10:00	0.0019
10:05	0.0013
10:10	0.0013
10:15	0.0013
10:20	0.0013
10:25	0.0013
10:30	0.0013
10:35	0.0018
10:40	0.0018
10:45	0.0018
10:50	0.0018
10:55	0.0018
11:00	0.0018
11:05	0.0017
11:10	0.0017
11:15	0.0017
11:20	0.0017
11:25	0.0017
11:30	0.0017
11:35	0.0015
11:40	0.0015
11:45	0.0015
11:50	0.0016
11:55	0.0016
12:00	0.0016
12:05	0.0021
12:10	0.0022
12:15	0.0023
12:20	0.0035
12:25	0.0036
12:30	0.0037
12:35	0.0054
12:40	0.0054
12:45	0.0055
12:50	0.0067
12:55	0.0068
13:00	0.0069
13:05	0.0112
13:10	0.0113
13:15	0.0114

13:20	0.0115
13:25	0.0116
13:30	0.0117
13:35	0.0022
13:40	0.0023
13:45	0.0024
13:50	0.0025
13:55	0.0026
14:00	0.0027
14:05	0.0062
14:10	0.0063
14:15	0.0064
14:20	0.0057
14:25	0.0058
14:30	0.0059
14:35	0.0060
14:40	0.0061
14:45	0.0062
14:50	0.0052
14:55	0.0053
15:00	0.0054
15:05	0.0046
15:10	0.0047
15:15	0.0048
15:20	0.0041
15:25	0.0042
15:30	0.0043
15:35	0.0006
15:40	0.0007
15:45	0.0008
15:50	0.0009
15:55	0.0010
16:00	0.0010
16:05	0.0003
16:10	0.0003
16:15	0.0003
16:20	0.0003
16:25	0.0003
16:30	0.0003
16:35	0.0003
16:40	0.0003

16:45	0.0003
16:50	0.0003
16:55	0.0003
17:00	0.0003
17:05	0.0005
17:10	0.0005
17:15	0.0005
17:20	0.0005
17:25	0.0005
17:30	0.0005
17:35	0.0005
17:40	0.0005
17:45	0.0005
17:50	0.0003
17:55	0.0003
18:00	0.0003
18:05	0.0003
18:10	0.0003
18:15	0.0003
18:20	0.0003
18:25	0.0003
18:30	0.0003
18:35	0.0003
18:40	0.0003
18:45	0.0003
18:50	0.0002
18:55	0.0002
19:00	0.0002
19:05	0.0003
19:10	0.0003
19:15	0.0003
19:20	0.0003
19:25	0.0003
19:30	0.0003
19:35	0.0003
19:40	0.0003
19:45	0.0003
19:50	0.0002
19:55	0.0002
20:00	0.0002
20:05	0.0003

20:10	0.0003
20:15	0.0003
20:20	0.0003
20:25	0.0003
20:30	0.0003
20:35	0.0003
20:40	0.0003
20:45	0.0003
20:50	0.0002
20:55	0.0002
21:00	0.0002
21:05	0.0003
21:10	0.0003
21:15	0.0003
21:20	0.0002
21:25	0.0002
21:30	0.0002
21:35	0.0003
21:40	0.0003
21:45	0.0003
21:50	0.0002
21:55	0.0002
22:00	0.0002
22:05	0.0003
22:10	0.0003
22:15	0.0003
22:20	0.0002
22:25	0.0002
22:30	0.0002
22:35	0.0002
22:40	0.0002
22:45	0.0002
22:50	0.0002
22:55	0.0002
23:00	0.0002
23:05	0.0002
23:10	0.0002
23:15	0.0002
23:20	0.0002
23:25	0.0002
23:30	0.0002

23:35	0.0002
23:40	0.0002
23:45	0.0002
23:50	0.0002
23:55	0.0002
00:00	0.0002

Basin 300 Precipitation

2 YR Post-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0884 sq mi

1 Hour Storm

Point Precipitation	.422	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.42	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	.721	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.72	

6 Hour Storm

Point Precipitation	.974	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.97	

24 Hour Storm

Point Precipitation	1.69	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.69	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	4142	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	1449	ft
Elevation Difference	64	ft
Lag Time	**0.174**	**hr**
40% Lag Time	4.2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0042
00:10	0.0042
00:15	0.0042
00:20	0.0063
00:25	0.0131
00:30	0.0122
00:35	0.0173
00:40	0.0224
00:45	0.0393
00:50	0.1118
00:55	0.0152
01:00	0.0051

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0009
00:10	0.0009
00:15	0.0008
00:20	0.0011
00:25	0.0011
00:30	0.0013
00:35	0.0011
00:40	0.0013
00:45	0.0013
00:50	0.0011
00:55	0.0012
01:00	0.0013
01:05	0.0019
01:10	0.0019
01:15	0.0019
01:20	0.0005
01:25	0.0048
01:30	0.0056
01:35	0.0034
01:40	0.0056
01:45	0.0099
01:50	0.0084
01:55	0.0070
02:00	0.0077
02:05	0.0084
02:10	0.0164
02:15	0.0221
02:20	0.0113
02:25	0.0351
02:30	0.0387
02:35	0.0452
02:40	0.0286
02:45	0.0005
02:50	0.0013
02:55	0.0013
03:00	0.0004

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0005
00:10	0.0006
00:15	0.0006
00:20	0.0006
00:25	0.0006
00:30	0.0007
00:35	0.0007
00:40	0.0007
00:45	0.0007
00:50	0.0007
00:55	0.0007
01:00	0.0008
01:05	0.0008
01:10	0.0008
01:15	0.0008
01:20	0.0008
01:25	0.0008
01:30	0.0008
01:35	0.0008
01:40	0.0008
01:45	0.0008
01:50	0.0008
01:55	0.0008
02:00	0.0009
02:05	0.0008
02:10	0.0009
02:15	0.0009
02:20	0.0009
02:25	0.0009
02:30	0.0009
02:35	0.0009
02:40	0.0009
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0001
00:10	0.0001
00:15	0.0001
00:20	0.0002
00:25	0.0002
00:30	0.0002
00:35	0.0002
00:40	0.0002
00:45	0.0002
00:50	0.0002
00:55	0.0002
01:00	0.0002
01:05	0.0002
01:10	0.0002
01:15	0.0002
01:20	0.0002
01:25	0.0002
01:30	0.0002
01:35	0.0002
01:40	0.0002
01:45	0.0002
01:50	0.0002
01:55	0.0002
02:00	0.0002
02:05	0.0002
02:10	0.0002
02:15	0.0002
02:20	0.0002
02:25	0.0002
02:30	0.0002
02:35	0.0003
02:40	0.0003
02:45	0.0003
02:50	0.0003
02:55	0.0003
03:00	0.0003

03:05	0.0010	03:05	0.0003
03:10	0.0011	03:10	0.0003
03:15	0.0011	03:15	0.0003
03:20	0.0011	03:20	0.0003
03:25	0.0012	03:25	0.0003
03:30	0.0013	03:30	0.0003
03:35	0.0014	03:35	0.0003
03:40	0.0014	03:40	0.0003
03:45	0.0007	03:45	0.0003
03:50	0.0007	03:50	0.0003
03:55	0.0017	03:55	0.0003
04:00	0.0017	04:00	0.0003
04:05	0.0026	04:05	0.0003
04:10	0.0036	04:10	0.0003
04:15	0.0046	04:15	0.0003
04:20	0.0056	04:20	0.0004
04:25	0.0065	04:25	0.0004
04:30	0.0065	04:30	0.0004
04:35	0.0075	04:35	0.0004
04:40	0.0085	04:40	0.0004
04:45	0.0095	04:45	0.0004
04:50	0.0095	04:50	0.0005
04:55	0.0104	04:55	0.0005
05:00	0.0114	05:00	0.0005
05:05	0.0163	05:05	0.0003
05:10	0.0211	05:10	0.0003
05:15	0.0241	05:15	0.0003
05:20	0.0270	05:20	0.0004
05:25	0.0319	05:25	0.0004
05:30	0.0406	05:30	0.0004
05:35	0.0046	05:35	0.0005
05:40	0.0009	05:40	0.0005
05:45	0.0006	05:45	0.0005
05:50	0.0005	05:50	0.0005
05:55	0.0003	05:55	0.0005
06:00	0.0002	06:00	0.0005
		06:05	0.0005
		06:10	0.0005
		06:15	0.0005
		06:20	0.0005
		06:25	0.0005

06:30	0.0005
06:35	0.0006
06:40	0.0006
06:45	0.0006
06:50	0.0006
06:55	0.0006
07:00	0.0006
07:05	0.0006
07:10	0.0006
07:15	0.0006
07:20	0.0006
07:25	0.0006
07:30	0.0006
07:35	0.0007
07:40	0.0007
07:45	0.0007
07:50	0.0007
07:55	0.0007
08:00	0.0007
08:05	0.0008
08:10	0.0008
08:15	0.0008
08:20	0.0008
08:25	0.0008
08:30	0.0008
08:35	0.0009
08:40	0.0009
08:45	0.0009
08:50	0.0010
08:55	0.0010
09:00	0.0010
09:05	0.0011
09:10	0.0011
09:15	0.0011
09:20	0.0011
09:25	0.0011
09:30	0.0011
09:35	0.0012
09:40	0.0012
09:45	0.0012
09:50	0.0012

09:55	0.0012
10:00	0.0012
10:05	0.0008
10:10	0.0008
10:15	0.0008
10:20	0.0008
10:25	0.0008
10:30	0.0008
10:35	0.0011
10:40	0.0011
10:45	0.0011
10:50	0.0011
10:55	0.0011
11:00	0.0011
11:05	0.0011
11:10	0.0011
11:15	0.0011
11:20	0.0011
11:25	0.0011
11:30	0.0011
11:35	0.0010
11:40	0.0010
11:45	0.0010
11:50	0.0010
11:55	0.0010
12:00	0.0010
12:05	0.0010
12:10	0.0011
12:15	0.0012
12:20	0.0019
12:25	0.0020
12:30	0.0020
12:35	0.0031
12:40	0.0032
12:45	0.0032
12:50	0.0040
12:55	0.0040
13:00	0.0041
13:05	0.0069
13:10	0.0069
13:15	0.0070

13:20	0.0071
13:25	0.0071
13:30	0.0072
13:35	0.0012
13:40	0.0012
13:45	0.0013
13:50	0.0013
13:55	0.0014
14:00	0.0015
14:05	0.0037
14:10	0.0038
14:15	0.0038
14:20	0.0034
14:25	0.0034
14:30	0.0035
14:35	0.0036
14:40	0.0036
14:45	0.0037
14:50	0.0030
14:55	0.0031
15:00	0.0032
15:05	0.0027
15:10	0.0028
15:15	0.0028
15:20	0.0024
15:25	0.0024
15:30	0.0025
15:35	0.0002
15:40	0.0002
15:45	0.0003
15:50	0.0003
15:55	0.0004
16:00	0.0004
16:05	0.0002
16:10	0.0002
16:15	0.0002
16:20	0.0002
16:25	0.0002
16:30	0.0002
16:35	0.0002
16:40	0.0002

16:45	0.0002
16:50	0.0002
16:55	0.0002
17:00	0.0002
17:05	0.0003
17:10	0.0003
17:15	0.0003
17:20	0.0003
17:25	0.0003
17:30	0.0003
17:35	0.0003
17:40	0.0003
17:45	0.0003
17:50	0.0002
17:55	0.0002
18:00	0.0002
18:05	0.0002
18:10	0.0002
18:15	0.0002
18:20	0.0002
18:25	0.0002
18:30	0.0002
18:35	0.0002
18:40	0.0002
18:45	0.0002
18:50	0.0001
18:55	0.0001
19:00	0.0001
19:05	0.0002
19:10	0.0002
19:15	0.0002
19:20	0.0002
19:25	0.0002
19:30	0.0002
19:35	0.0002
19:40	0.0002
19:45	0.0002
19:50	0.0001
19:55	0.0001
20:00	0.0001
20:05	0.0002

20:10	0.0002
20:15	0.0002
20:20	0.0002
20:25	0.0002
20:30	0.0002
20:35	0.0002
20:40	0.0002
20:45	0.0002
20:50	0.0001
20:55	0.0001
21:00	0.0001
21:05	0.0002
21:10	0.0002
21:15	0.0002
21:20	0.0001
21:25	0.0001
21:30	0.0001
21:35	0.0002
21:40	0.0002
21:45	0.0002
21:50	0.0001
21:55	0.0001
22:00	0.0001
22:05	0.0002
22:10	0.0002
22:15	0.0002
22:20	0.0001
22:25	0.0001
22:30	0.0001
22:35	0.0001
22:40	0.0001
22:45	0.0001
22:50	0.0001
22:55	0.0001
23:00	0.0001
23:05	0.0001
23:10	0.0001
23:15	0.0001
23:20	0.0001
23:25	0.0001
23:30	0.0001

			23:35	0.0001
			23:40	0.0001
			23:45	0.0001
			23:50	0.0001
			23:55	0.0001
			00:00	0.0001

Basin 300 Precipitation

10 YR Post-Project

HEC HMS Preprocessor

User Manual
Contact Project Planning **(951) 955-1200**

Watershed Area 0.0884 sq mi

1 Hour Storm

Point Precipitation	.704	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	0.7	
Slope of Rainfall Intensity - Duration Curve	.52	

3 Hour Storm

Point Precipitation	1.12	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.12	

6 Hour Storm

Point Precipitation	1.49	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	1.49	

24 Hour Storm

Point Precipitation	2.653	in.
Areal Adjustment Factor	100	%
Adjusted Point Precipitation	2.65	

Lag Time Calculator

Basin Factor - n	0.03	
Length along longest watercourse - L	4142	ft
Length along longest watercourse measured upstream to a point opposite the centroid of the area - Lca	1449	ft
Elevation Difference	64	ft
Lag Time	**0.174**	**hr**
40% Lag Time	4.2	min

Run

Loss Rate Data Effective Rainfall S-Graphs

Unit Time Period 5 min (Use interval less than 40% of lag time)
Low Loss 90 %
Fm (Percentage of F) (24-hour Storm Only) 50 % (Typically 50-75%)

Run

1 Hour

Unit Time	Effective Rainfall (inches)
00:00	
00:05	0.0164
00:10	0.0164
00:15	0.0213
00:20	0.0171
00:25	0.0283
00:30	0.0304
00:35	0.0361
00:40	0.0466
00:45	0.0769
00:50	0.1945
00:55	0.0361
01:00	0.0171

3 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0006
00:10	0.0006
00:15	0.0012
00:20	0.0029
00:25	0.0029
00:30	0.0062
00:35	0.0029
00:40	0.0062
00:45	0.0062
00:50	0.0029
00:55	0.0040
01:00	0.0062
01:05	0.0107
01:10	0.0107
01:15	0.0107
01:20	0.0085
01:25	0.0152
01:30	0.0163
01:35	0.0130
01:40	0.0163
01:45	0.0230
01:50	0.0208
01:55	0.0186
02:00	0.0197
02:05	0.0208
02:10	0.0331
02:15	0.0421
02:20	0.0253
02:25	0.0622
02:30	0.0678
02:35	0.0779
02:40	0.0522
02:45	0.0085
02:50	0.0062
02:55	0.0062
03:00	0.0007

6 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0007
00:10	0.0009
00:15	0.0009
00:20	0.0009
00:25	0.0009
00:30	0.0010
00:35	0.0010
00:40	0.0010
00:45	0.0010
00:50	0.0010
00:55	0.0010
01:00	0.0012
01:05	0.0012
01:10	0.0012
01:15	0.0012
01:20	0.0012
01:25	0.0012
01:30	0.0012
01:35	0.0012
01:40	0.0012
01:45	0.0012
01:50	0.0012
01:55	0.0012
02:00	0.0013
02:05	0.0012
02:10	0.0013
02:15	0.0013
02:20	0.0013
02:25	0.0013
02:30	0.0013
02:35	0.0013
02:40	0.0013
02:45	0.0010
02:50	0.0010
02:55	0.0010
03:00	0.0010

24 Hour

Unit Time	Effective Rainfall (inches)
00:05	0.0002
00:10	0.0002
00:15	0.0002
00:20	0.0003
00:25	0.0003
00:30	0.0003
00:35	0.0003
00:40	0.0003
00:45	0.0003
00:50	0.0003
00:55	0.0003
01:00	0.0003
01:05	0.0003
01:10	0.0003
01:15	0.0003
01:20	0.0003
01:25	0.0003
01:30	0.0003
01:35	0.0003
01:40	0.0003
01:45	0.0003
01:50	0.0003
01:55	0.0003
02:00	0.0003
02:05	0.0003
02:10	0.0003
02:15	0.0003
02:20	0.0003
02:25	0.0003
02:30	0.0003
02:35	0.0005
02:40	0.0005
02:45	0.0005
02:50	0.0005
02:55	0.0005
03:00	0.0005

03:05	0.0010	03:05	0.0005
03:10	0.0025	03:10	0.0005
03:15	0.0025	03:15	0.0005
03:20	0.0025	03:20	0.0005
03:25	0.0040	03:25	0.0005
03:30	0.0055	03:30	0.0005
03:35	0.0069	03:35	0.0005
03:40	0.0069	03:40	0.0005
03:45	0.0084	03:45	0.0005
03:50	0.0084	03:50	0.0005
03:55	0.0099	03:55	0.0005
04:00	0.0099	04:00	0.0005
04:05	0.0114	04:05	0.0005
04:10	0.0129	04:10	0.0005
04:15	0.0144	04:15	0.0005
04:20	0.0159	04:20	0.0006
04:25	0.0174	04:25	0.0006
04:30	0.0174	04:30	0.0006
04:35	0.0189	04:35	0.0006
04:40	0.0204	04:40	0.0006
04:45	0.0218	04:45	0.0006
04:50	0.0218	04:50	0.0007
04:55	0.0233	04:55	0.0007
05:00	0.0248	05:00	0.0007
05:05	0.0323	05:05	0.0005
05:10	0.0397	05:10	0.0005
05:15	0.0442	05:15	0.0005
05:20	0.0487	05:20	0.0006
05:25	0.0561	05:25	0.0006
05:30	0.0695	05:30	0.0006
05:35	0.0144	05:35	0.0007
05:40	0.0013	05:40	0.0007
05:45	0.0009	05:45	0.0007
05:50	0.0007	05:50	0.0007
05:55	0.0004	05:55	0.0007
06:00	0.0003	06:00	0.0007
		06:05	0.0008
		06:10	0.0008
		06:15	0.0008
		06:20	0.0008
		06:25	0.0008

06:30	0.0008
06:35	0.0009
06:40	0.0009
06:45	0.0009
06:50	0.0009
06:55	0.0009
07:00	0.0009
07:05	0.0009
07:10	0.0009
07:15	0.0009
07:20	0.0010
07:25	0.0010
07:30	0.0010
07:35	0.0011
07:40	0.0011
07:45	0.0011
07:50	0.0011
07:55	0.0011
08:00	0.0011
08:05	0.0013
08:10	0.0013
08:15	0.0013
08:20	0.0013
08:25	0.0013
08:30	0.0013
08:35	0.0014
08:40	0.0014
08:45	0.0014
08:50	0.0015
08:55	0.0015
09:00	0.0015
09:05	0.0012
09:10	0.0013
09:15	0.0014
09:20	0.0025
09:25	0.0026
09:30	0.0026
09:35	0.0035
09:40	0.0036
09:45	0.0037
09:50	0.0045

09:55	0.0046
10:00	0.0047
10:05	0.0013
10:10	0.0013
10:15	0.0013
10:20	0.0013
10:25	0.0013
10:30	0.0013
10:35	0.0036
10:40	0.0036
10:45	0.0037
10:50	0.0038
10:55	0.0038
11:00	0.0039
11:05	0.0029
11:10	0.0030
11:15	0.0031
11:20	0.0031
11:25	0.0032
11:30	0.0033
11:35	0.0017
11:40	0.0018
11:45	0.0019
11:50	0.0027
11:55	0.0028
12:00	0.0029
12:05	0.0090
12:10	0.0091
12:15	0.0092
12:20	0.0103
12:25	0.0103
12:30	0.0104
12:35	0.0121
12:40	0.0121
12:45	0.0122
12:50	0.0133
12:55	0.0134
13:00	0.0134
13:05	0.0178
13:10	0.0178
13:15	0.0179

13:20	0.0179
13:25	0.0180
13:30	0.0181
13:35	0.0086
13:40	0.0086
13:45	0.0087
13:50	0.0087
13:55	0.0088
14:00	0.0089
14:05	0.0124
14:10	0.0124
14:15	0.0125
14:20	0.0118
14:25	0.0118
14:30	0.0119
14:35	0.0119
14:40	0.0120
14:45	0.0120
14:50	0.0110
14:55	0.0111
15:00	0.0112
15:05	0.0104
15:10	0.0105
15:15	0.0105
15:20	0.0098
15:25	0.0098
15:30	0.0099
15:35	0.0062
15:40	0.0063
15:45	0.0063
15:50	0.0064
15:55	0.0064
16:00	0.0065
16:05	0.0003
16:10	0.0003
16:15	0.0003
16:20	0.0003
16:25	0.0003
16:30	0.0003
16:35	0.0003
16:40	0.0003

16:45	0.0003
16:50	0.0003
16:55	0.0003
17:00	0.0003
17:05	0.0005
17:10	0.0005
17:15	0.0005
17:20	0.0005
17:25	0.0005
17:30	0.0005
17:35	0.0005
17:40	0.0005
17:45	0.0005
17:50	0.0003
17:55	0.0003
18:00	0.0003
18:05	0.0003
18:10	0.0003
18:15	0.0003
18:20	0.0003
18:25	0.0003
18:30	0.0003
18:35	0.0003
18:40	0.0003
18:45	0.0003
18:50	0.0002
18:55	0.0002
19:00	0.0002
19:05	0.0003
19:10	0.0003
19:15	0.0003
19:20	0.0003
19:25	0.0003
19:30	0.0003
19:35	0.0003
19:40	0.0003
19:45	0.0003
19:50	0.0002
19:55	0.0002
20:00	0.0002
20:05	0.0003

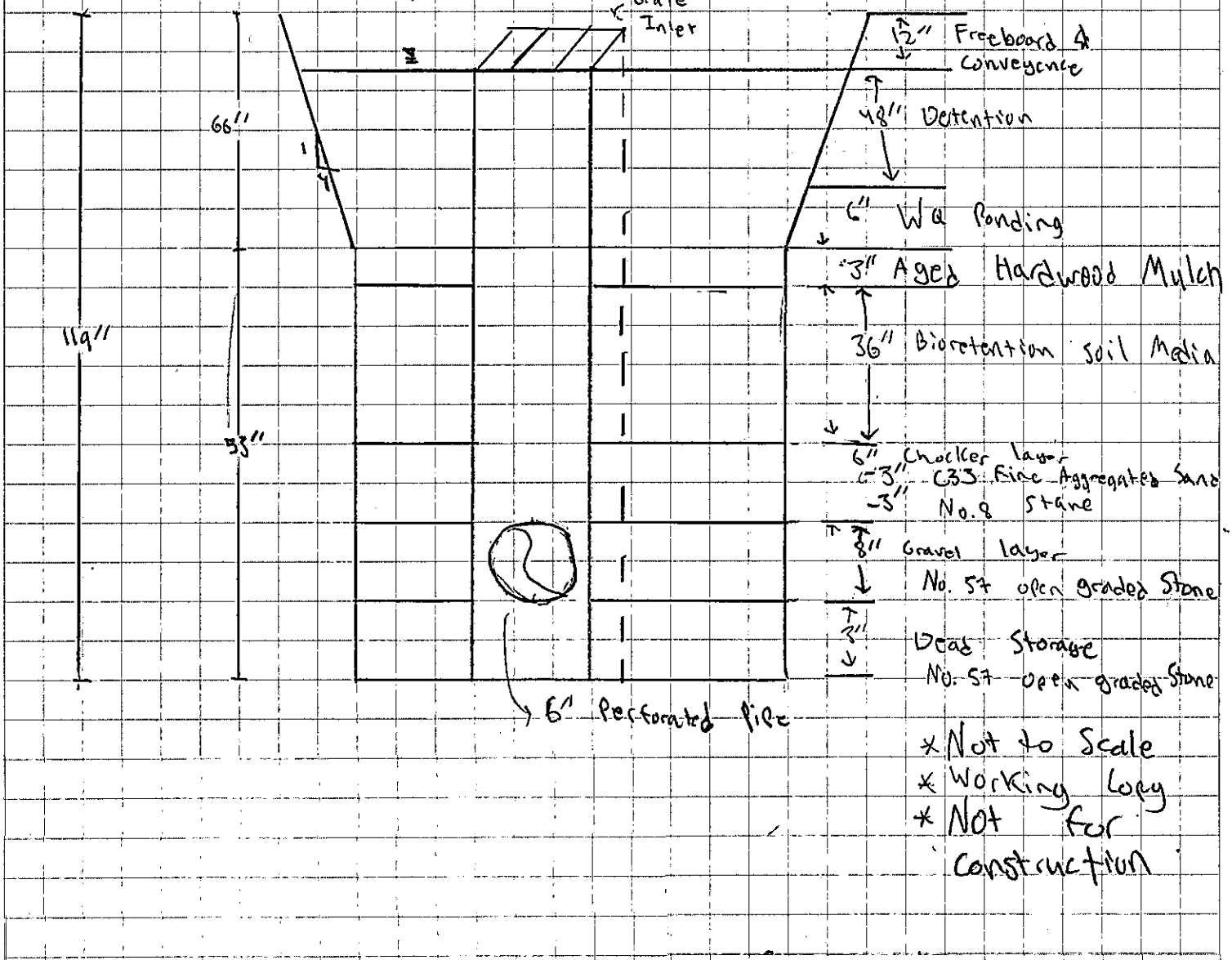
20:10	0.0003
20:15	0.0003
20:20	0.0003
20:25	0.0003
20:30	0.0003
20:35	0.0003
20:40	0.0003
20:45	0.0003
20:50	0.0002
20:55	0.0002
21:00	0.0002
21:05	0.0003
21:10	0.0003
21:15	0.0003
21:20	0.0002
21:25	0.0002
21:30	0.0002
21:35	0.0003
21:40	0.0003
21:45	0.0003
21:50	0.0002
21:55	0.0002
22:00	0.0002
22:05	0.0003
22:10	0.0003
22:15	0.0003
22:20	0.0002
22:25	0.0002
22:30	0.0002
22:35	0.0002
22:40	0.0002
22:45	0.0002
22:50	0.0002
22:55	0.0002
23:00	0.0002
23:05	0.0002
23:10	0.0002
23:15	0.0002
23:20	0.0002
23:25	0.0002
23:30	0.0002

23:35	0.0002
23:40	0.0002
23:45	0.0002
23:50	0.0002
23:55	0.0002
00:00	0.0002

RICK ENGINEERING COMPANY™
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

Date 12/08/2022
Job No. 19427
Page
Done By TR
Checked By

Chicago Avenue Typical Bioretention BMP Cross Section



* Not to Scale
* Working Copy
* Not for Construction