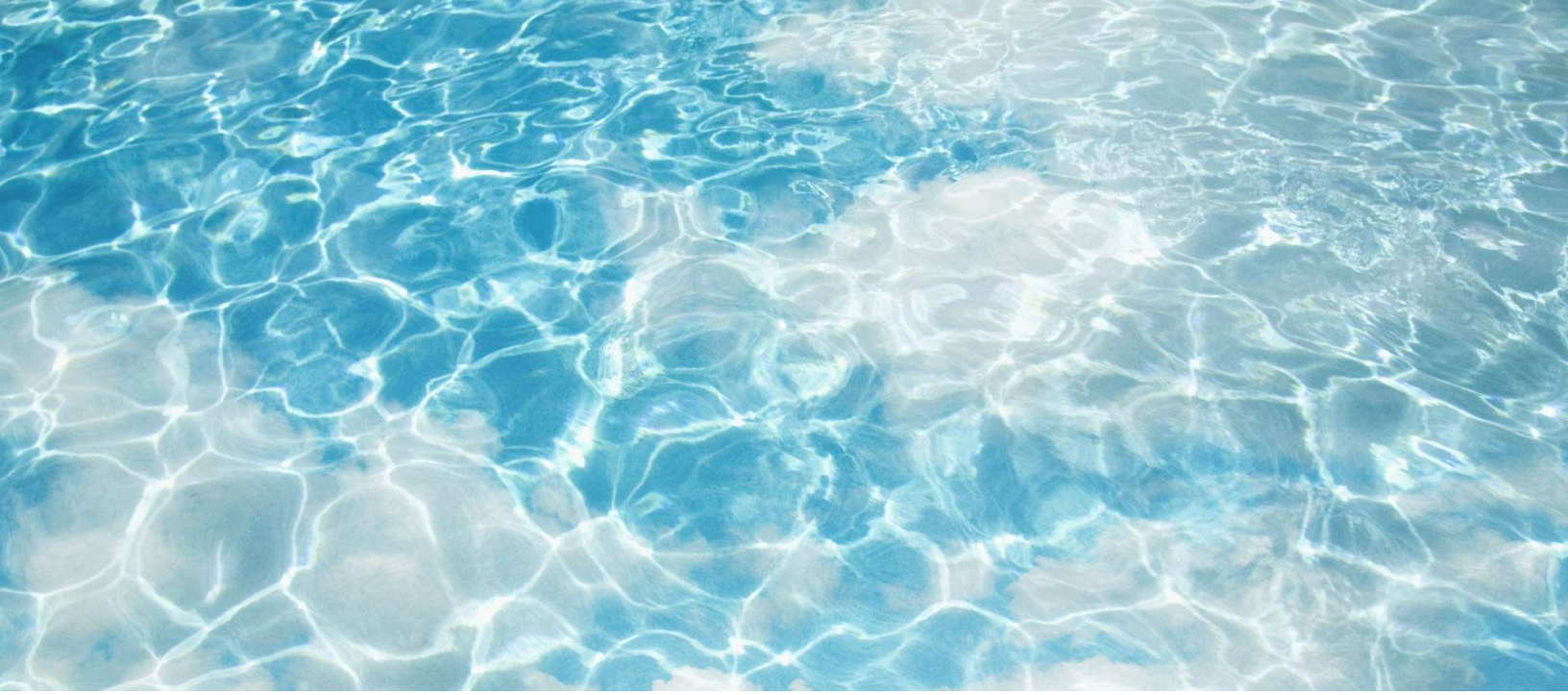

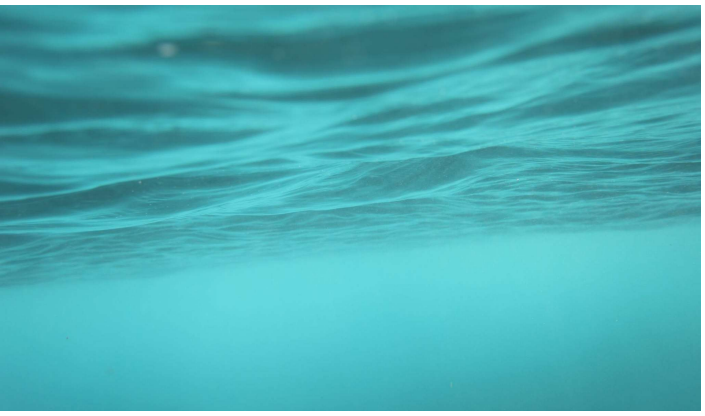

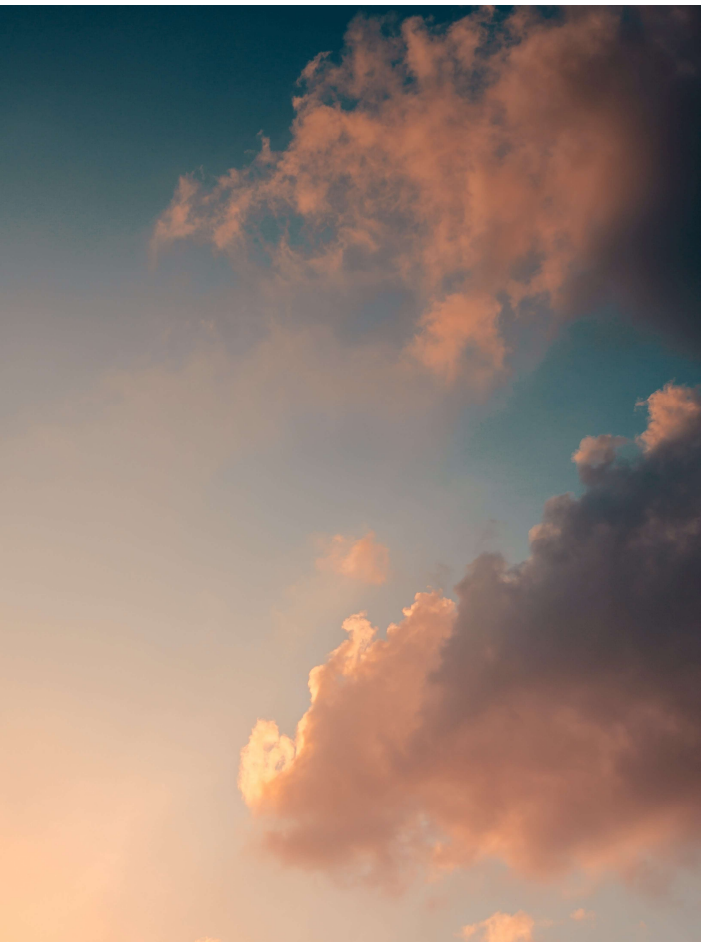

FUSCOE ENGINEERING

Terravita

Preliminary Drainage Study

Prepared for:

Kingsbarn Realty Capital

2500 Sand Hill Road, Suite 320

Menlo Park, CA 94025

Project Manager: Julian Blevins

Date Prepared: February 2026

Project Number: 4014-002

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PRELIMINARY
DRAINAGE STUDY

TERRAVITA

LAGUNA HILLS, CA

APN#
588-141-11
588-141-12

Prepared by Nicholas Malone Under the Responsible Charge of:

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For

Kingsbarn Realty Capital
2500 Sand Hill Road, Suite 320
Menlo Park, CA 94025

December 2025

TABLE OF CONTENTS

1. INTRODUCTION

The purpose of this drainage study is to compare the 100-year storm event pre- and post-development stormwater runoff flows for the Terravita Project located northeast of Mill Creek Dr, north of Ridge Route Dr, and west of Moulton Pkwy. This study will verify that the proposed development will not generate an increase of stormwater runoff compared to existing conditions, preventing an impact to the existing storm drainage facilities downstream. Per the City of Laguna Hills' requirements, the criteria used for this drainage study is the Orange County Hydrology Manual (October 1986), FEMA and Army Corp and other applicable agencies.

1.1 Project Description

The project proposes improvements for the site located west of the existing 5 State Freeway. The parcel is found in the eastern portion of the site and contains a mixed single-family and multi-family residentials development on 18.51 gross acre area (15.97 acre net drainage area). The site is bordered by Mill Creek Dr to the southwest, Ridge Route Dr to the south, and Moulton Parkway to the east. The proposed development will consist of 480 dwelling units. There is a separate parcel to the west that will be part of the entitlement planning process but will have a separate drainage report.

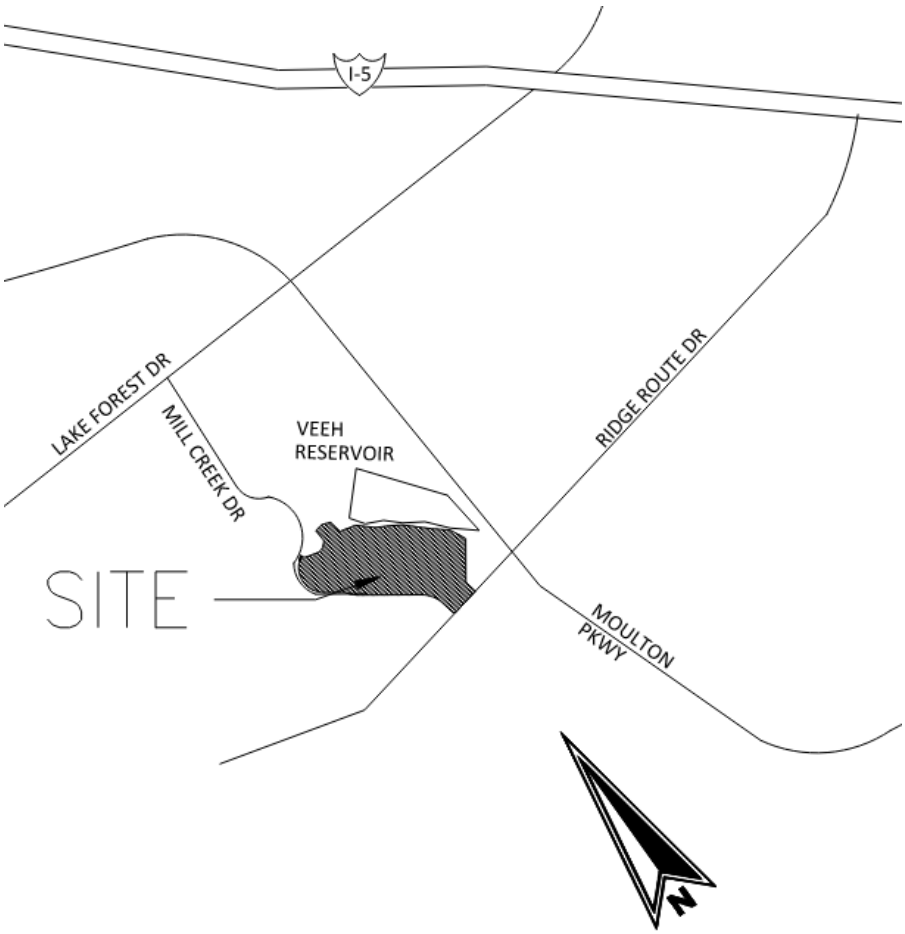

Figure 1. Vicinity Map

1.2 Existing Conditions

The project site in existing conditions is an area mainly occupied by an asphalt parking lot and its pertaining multi-story commercial buildings, located southwest of the Veeh Reservoir. The site was previously graded in 1985 and slopes multidirectional, having an average slope of 2%. The western portion of the site adjacent to Mill Creek Dr contains the largest parking lot section along its connecting driveways that are surrounded by landscape islands. The project site includes utility easements for storm drain and for pipe or pipelines, public utilities, and for underground electrical supply and communication systems. An existing 6-inch sewer easement is located at the western edge of the property. The site is accessed through the driveways located on Mill Creek Dr and on Ridge Route Dr. A portion of the site along the northeastern property boundary is located within the FEMA 100-year Floodplain and Floodway.

The largest section, located in the northwestern side, consists primarily of sheet flow in the parking lot that drains south into storm drain inlets located at Node 112 and Node 115 from the Existing Conditions Hydrology Map (Appendix 1) that lead directly into an existing headwall (Node 110) at a vacant lot southwest of Mill Creek Dr. The accumulated stormwater of this lot reaches into another existing headwall (Node 109) and flows through an existing 36-inch RCP main, connecting to the existing 48-inch RCP main leading along Moulton Parkway and discharging into the Veeh Reservoir. The flow of the included driveways of the largest section drains into the curb and gutter on the northeastern side of Mill Creek Dr and confluences at a Type II storm drain inlet found at Node 111, which leads the flow into the existing headwall at Node 110, joining the flow path of the stormwater that passes through Node 111 into the Veeh Reservoir.

A smaller portion located on the southeastern side comprises mainly of sheet flow that confluences south into the curb and gutter on the northern side of Ridge Route Dr, which leads to a 10 ft catch basin Type II on the northeastern edge of the street. The flow is then carried by an existing 48-inch RCP storm drain main north on Moulton Parkway and into the Veeh Reservoir.

A significant area of the site identified as the 200 series consists mostly of concentrated flow and can be found behind the existing buildings on the northeastern section adjacent to a steep slope bordering the Veeh Reservoir, draining first into ditches, and subsequently into the Veeh Reservoir along the steep slope.

1.3 Proposed Conditions

The project is currently located within the FEMA 100-year Floodplain and Floodway (Zone A), per FEMA FIRM Map Number 060059C0426J (refer to Appendix 6). The proposed building finished floor elevations have been set a minimum of 1 foot above the 100-year flood base elevations per the Orange County Flood Control District Design Manual requirements. A Conditional Letter of Map Revision (CLOMR) will be required to be processed with FEMA.

The proposed residential development will consist of 480 dwelling units, approximately 700,000 SF of a combination of a multifamily residential building, multiple duplexes and triplexes, and associated amenity spaces such as parks and lounges. Some existing driveways will be removed, and new asphalt driveways will be added to existing access roads on Mill Creek Drive and Ridge Route Drive. New improvements in the area and its frontage include the addition of public storm drain, water, & sewer utilities.

The project will maintain existing drainage patterns to the maximum extent practical. As in existing conditions, stormwater runoff from the proposed development will ultimately discharge to the Veeh Reservoir located northeast of the property boundary.

The onsite drainage identified as series 100 is divided into flow originating from the multistory area and flow originating around the single-family residential area. It is composed of concentrated flow moving towards the south through the proposed storm drain pipeline system. Onsite storm water runoff from both areas is detained in a proprietary underground storage system with the purpose of reaching 100-year peak flow attenuation. This runoff is then conveyed to a proprietary treatment control BMP system that leads to a proposed 24-inch storm drain main joined to an existing 48-inch RCP storm drain main in Ridge Route Dr, ultimately draining north into the Veeh Reservoir.

Offsite drainage on Mill Creek Drive will continue to convey into the storm drain inlet at Node 111 of the Existing Hydrology Map where it eventually leads to the Veeh Reservoir. Offset drainage on Ridge Route Drive will continue to move along the northern side of the street into the type II storm drain catch basin. This flow will advance north via the existing 48-inch RCP storm drain main into the Veeh Reservoir.

The runoff at the asphalt parking lot on the western section and the residential's gate entrance area will be carried across the northeastern curb and gutter of Mill Creek Dr into the existing storm drain inlet and joins the rest of the offsite flow that reaches Node 111 from the Existing Hydrology Map into the Veeh Reservoir.

The 200 Node series area is reduced compared to existing conditions due to the construction of duplexes on the northeastern side and is comprised of sheet flow that is led into the Veeh Reservoir.

The project will not result in increased 100-yr peak flow rates in the proposed condition, but mitigation of the 100-year runoff will still be provided on site. As shown in section 3.1 of this report, the total Proposed 100-yr peak discharge is 68.36 cfs compared to the total Existing peak discharge of 69.28. Effects of mitigation on the proposed peak discharge will be analyzed in the future final drainage study. The proposed project is not anticipated to negatively affect the downstream facilities compared to existing conditions. The project proposes work within the floodplain and floodway and a Hydraulic Analysis demonstrating the project impacts has been prepared by Chang Consultants, see Appendix 10.

2. METHODOLOGY

2.1 Rational Method

Runoff was calculated using the Modified Rational Method equation below:

$Q = C \times I \times A$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)

Modified Rational Method calculations were performed using the Advanced Engineering Software AES 2014) computer program. To perform the hydrology routing, the total watershed area was divided into sub-areas which discharge at designated nodes. The procedure for the sub-area summation model is as follows:

(1) Subdivide the watershed into an initial sub-area (generally 1 lot) and subsequent sub- areas, which are generally less than 10 acres in size. Assign upstream and downstream node numbers to each sub-area.

(2) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation. The minimum T_c considered is 5.0 minutes.

(3) Using the initial T_c, determine the corresponding values of I. Then Q = CIA.

(4) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to a particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows. The AES 2014 computer software sub-area menu is as follows:

SUBAREA HYDROLOGIC PROCESS

1. Confluence analysis at node.
2. Initial sub-area analysis (including time of concentration calculation).
3. Pipe flow travel time (computer estimated).
4. Pipe flow travel time (user specified).
5. Trapezoidal channel travel time.
6. Street flow analysis through sub-area.
7. User-specified information at node.
8. Addition of sub-area runoff to main line.
9. V-gutter flow through area.
10. Copy main stream data to memory bank
11. Confluence main stream data with a memory bank
12. Clear a memory bank

At the confluence point of two or more basins, the following procedure is used to combine peak flow rates to account for differences in the basin's times of concentration. This adjustment is based on the assumption that each basin's hydrographs are triangular in shape.

(1). If the collection streams have the same times of concentration, then the Q values are directly summed,

$$Q_p = Q_a + Q_b;\ T_p = T_a = T_b$$

(2). If the collection streams have different times of concentration, the smaller of the tributary Q values may be adjusted as follows:

(i). The most frequent case is where the collection stream with the longer time of concentration has the larger Q. The smaller Q value is adjusted by a ratio of rainfall intensities.

$$Q_p = Q_b + Q_a (I_b/I_a);\ T_p = T_a$$

(ii). In some cases, the collection stream with the shorter time of concentration has the larger Q. Then the smaller Q is adjusted by a ratio of the T values.

$$Q_p = Q_b + Q_a (T_b/T_a)\ ;\ T_p = T_b$$

2.2 Computing Detention Pond Routing

Detention pond routing is the process of passing a flood hydrograph through a storage reservoir or detention pond. This process changes the pattern of flow with respect to time but conserves volume. The purpose of detention pond routing is usually to reduce the peak flow to a predetermined level, or to delay the peak. The routing procedure used by Hydraflow Hydrographs Extension is known as the Storage Indication method and begins with a stage- storage-discharge relationship, an inflow hydrograph, and the following equation:

$$I - O = \frac{ds}{dt}$$

Where:
I = inflow, O = outflow, ds/dt = change in storage

2.3 Runoff Coefficient

The runoff coefficient for the project was calculated with the Runoff Coefficient formula from the 1986 Orange County Hydrology Manual:

$$C = \begin{cases} 0.90\,(a_i + \dfrac{(I - F_p)a_p}{I}), & \text{for I greater than } F_p; \\ 0.90\,a_i, & \text{for I less than or equal to } F_p \end{cases} \qquad (D.3)$$

Where I= rainfall intensity (in/hr)
A_i/A_o= ratio of impervious area to pervious area
And F_p= infiltration rate for pervious areas (in/hr)

with the corresponding percentage of impervious surface for each tributary area. The site contains Hydrologic Soil Group D soils and has a runoff coefficient of 0.85 for existing conditions. In the proposed conditions a 20% pervious area was assumed (residential areas with 11+ units per acre), which roughly equates to a runoff coefficient of 0.89.

2.4 Rainfall Intensity

Rainfall intensity was determined by using AES software, which utilizes Figure B-3: Mean Precipitation Intensities for Non-mountainous Areas of the Orange County Hydrology Manual, see Appendix 9.

2.5 Tributary Areas

Drainage areas are delineated on the Existing Conditions Hydrology Map in Appendix 1 and on the Proposed Conditions Hydrology Map in Appendix 2.

2.6 Stage Storage

Hydraflow Hydrograph by Autodesk will be used to perform stage storage calculations for the underground storage system (HMP 1). The underground storage system will be modeled to determine the volume capacity and peak flow attenuation of the system during a 100-year storm event. See Appendix 8 for basin routing calculations.

3. CALCULATIONS/RESULTS

3.1 Peak Flow Comparison

The summary table below presentS the comparison between pre- and post-development flows for each point of compliance. The proposed flow rates do not reflect the stage storage analysis for the underground detention system. The onsite underground detention system will be sized to attenuate the 100-yr storm event. Stage storage calculations will be prepared and included in the next submittal and will be included in Appendix 8 to show peak flow attenuation. No increase in runoff is anticipated in the proposed condition compared to existing conditions.

100-YEAR PEAK FLOW SUMMARY						
NODE	CONVEYANCE	AREA (AC)		100-YR PEAK FLOW Q100 (CFS)		
		EXISTING	PROPOSED	EXISTING	PROPOSED	PROPOSED WITH MITIGATION
100	SERIES 1	12.02	15.56	51.44	66.16	-
200	SERIES 2	3.95	0.41	17.84	2.20	-
TOTAL		15.97	15.97	69.28	68.36	-

3.2 Public Storm Drain

The proposed storm drain system will convey onsite and offsite runoff to the discharge point in Veeh Reservoir. The proposed drain system is located within the effective 100-Year floodplain. The Node 100 Series includes runoff from the southwestern area of the site and discharges into an existing 48" RCP storm drain at Node 104 on the Proposed Hydrology Map. The northeastern system includes runoff in Series 200 and connects to the Veeh Reservoir after sliding down a steep slope.

Hydraflow Storm Sewers by Autodesk will be used to analyze and size the proposed public storm drain, refer to Appendix 11 for the analysis results. The proposed pipes will be sized to provide minimum 1' freeboard from the 100-Year HGL to the proposed finished surface. The system model will also check the capacity of the existing 48" storm drain to confirm no upsizing of existing pipes is required for this project.

4. CONCLUSION

The project will match existing drainage patterns to the maximum extent feasible and will utilize the existing discharge points to Veeh Reservoir. The project will result in a decrease in 100-year peak flow rates after mitigating the 100-year runoff compared to existing conditions. This will be accomplished by implementing underground detention vaults for hydromodification management and peak flow attenuation. The proposed project is not anticipated to have any adverse effect on the downstream facilities, including Veeh Reservoir. The proposed building finished floor will be set at a minimum 1.0ft above the FEMA 100-year water surface elevation. A Conditional Letter of Map Revision (CLOMR) will be required to be processed with FEMA.

Appendix 1

EXISTING CONDITIONS HYDROLOGY MAP

EXISTING RESERVOIR

200 295.2 FS
201 307.8 FS
0.12AC
345.1 FS
117
354.8 FS
202
0.17AC
116 344.2 FS
3.83AC
114 401.6 FS
0.29AC
400.0 FS
113
338.1 FS
107 401.4 FS
0.30AC
105 401.6 FS
0.20AC
400.0 FS
106
330.9 FS
400.0 FS
104
331.4 FS
0.93AC
5.76AC
1.04AC
2.42AC
0.80AC
353.2 FS
119
0.11AC
349.5 FS
118
332.5 FL
328.5 IE
115
332.2 FL
~328 IE
112
330.0 TC
329.1 FL
325.1 IE-IN
324.7 IE-OUT
111
330.0 TC
329.1 FL
322.2 IE-IN
322.1 IE-OUT
110
321.9 FL
109
318.8 FL
MILL CREEK DR
RIDGE ROUTE DR
EX 36" RCP SD MAIN PER TPM 79-145 (WO 34-326)
EX 48" RCP PER TPM 79-145 (WO 34-326)
EX 48" RCP PER WO34-326 (SP79-55P)
318.0 FL
312.9 IE
103
306.8 FL
102
~298.0 IE
289.3 IE
297.7 FS
(~293 IE)
101
(~276 IE)
100
DENSE TREES
MIXED NOTIONAL

LEGEND

- RIGHT-OF-WAY
- CENTERLINE
- HYDROLOGY NODE NUMBER (153)
- FLOW PATH
- SURFACE FLOW DIRECTION
- DRAINAGE MANAGEMENT AREA (DMA) LIMIT
- EXISTING CONTOUR (300)
- PROPOSED STORM DRAIN (-SD-)

50' 0' 25' 50' 100'
SCALE: 1" = 50'

TERRAVITA

EXISTING HYDROLOGY MAP

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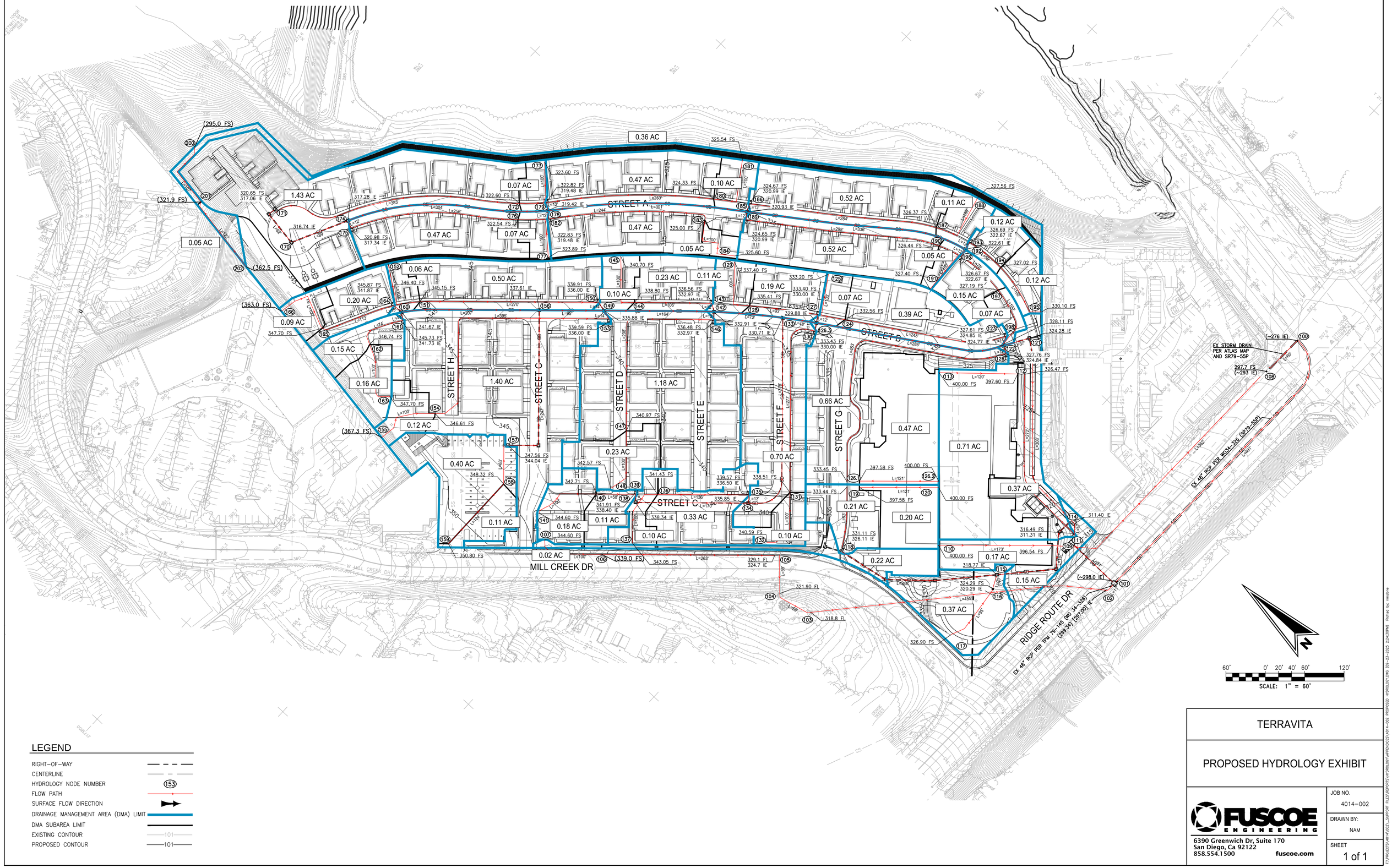
JOB NO. 4014-02
DRAWN BY: CC
SHEET 1 of 1

Appendix 2

PROPOSED CONDITIONS HYDROLOGY MAP



LEGEND

- RIGHT-OF-WAY
- CENTERLINE
- HYDROLOGY NODE NUMBER (153)
- FLOW PATH
- SURFACE FLOW DIRECTION
- DRAINAGE MANAGEMENT AREA (DMA) LIMIT
- DMA SUBAREA LIMIT
- EXISTING CONTOUR 101
- PROPOSED CONTOUR 101

TERRAVITA

PROPOSED HYDROLOGY EXHIBIT

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DRAWN BY: NAM

SHEET 1 of 1

Appendix 3

EXISTING HYDROLOGY CALCULATIONS

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www.fuscoe.com

Job Name: Terravita
Job #: 4014-002
Run Name: Existing Series 100
Date: 9/27/2024
Notes: Assumed roof elevations and flat roof

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3
117	116	2	345.1	344.2	111	0.85	0.17				
116	115	9	344.2	332.5	951	0.85	5.76				
115	111	3	328.5	325.1	100						
111	111	1						1 of 3			
119	118	2	353.2	349.5	92	0.85	0.11				
118	111	6	349.5	329.1	466	0.85	0.80				
111	111	1						2 of 3			
114	113	2	401.6	400.0	78	0.85	0.29				
113	112	9	338.1	332.2	320	0.85	1.04				
112	111	3	328.0	325.1	84						
111	111	1						3 of 3			
111	110	3	325.1	321.9	60	0.85					
110	109	5	321.9	318.8	53	0.85	0.00				
109	100	3	318.8	276.0	970						
100	100	10						Store Bank 1			
107	106	2	401.4	400.0	77	0.85	0.30				
106	102	9	330.9	306.8	662	0.85	2.42				
102	102	1						1 of 2			
105	104	2	401.6	400.0	81	0.85	0.20				
104	103	9	331.4	318.0	386	0.85	0.93				
103	102	3	312.9	306.8	36						
102	102	1						2 of 2			
102	101	6	306.8	297.7	357	0.85	0.00				
101	100	3	293.0	276.0	60						
100	100	11						Confluence with Bank 1			
					Area Sub-Total:		12.02	ac			

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                        Fuscoe Engineering, Inc.
                           6390 Greenwich Dr.
                               Suite #170
                          San Diego, CA 92122

 ************************* DESCRIPTION OF STUDY *************************
* TERRAVITA                                                             *
* 100-YR STORM EVENT - EXISTING CONDITIONS  series 100                  *
* LAGUNA HILLS, CALIOFNIA                                               *
 ************************************************************************

  FILE NAME: EX100S1.DAT
  TIME/DATE OF STUDY: 15:01 09/30/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     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   0.67    1.50 0.0313 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    116.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   111.00
  ELEVATION DATA: UPSTREAM(FEET) =    345.10  DOWNSTREAM(FEET) =    344.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.239
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.024
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    115.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    344.20
  DOWNSTREAM NODE ELEVATION(FEET) =    332.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   951.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.100
  PAVEMENT LIP(FEET) =  0.375   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.709
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        5.76      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     13.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.64
  AVERAGE FLOW DEPTH(FEET) =   0.60   FLOOD WIDTH(FEET) =   15.02
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.81   Tc(MIN.) =    8.05
  SUBAREA AREA(ACRES) =    5.76       SUBAREA RUNOFF(CFS) =   24.31
  EFFECTIVE AREA(ACRES) =    5.93     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =      25.03

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOOD WIDTH(FEET) =   26.73
  FLOW VELOCITY(FEET/SEC.) =   5.21   DEPTH*VELOCITY(FT*FT/SEC) =   3.71
```

```
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    115.00 =    1062.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.50  DOWNSTREAM(FEET) =   325.10
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.03
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    111.00 =    1162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       5.93
  TOTAL STREAM AREA(ACRES) =       5.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.03

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    118.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  ELEVATION DATA: UPSTREAM(FEET) =    353.20  DOWNSTREAM(FEET) =    349.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.11      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    111.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  349.50  DOWNSTREAM ELEVATION(FEET) =  329.10
  STREET LENGTH(FEET) =   466.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   1.94   Tc(MIN.) =    6.94
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.126
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.80      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.68
  EFFECTIVE AREA(ACRES) =      0.91    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       4.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    111.00 =     558.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   5.13
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.91
  TOTAL STREAM AREA(ACRES) =       0.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.18

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    113.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    78.00
  ELEVATION DATA: UPSTREAM(FEET) =    401.60  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    338.10
  DOWNSTREAM NODE ELEVATION(FEET) =    332.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.500
  PAVEMENT LIP(FEET) =  0.375   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.770
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                  D        1.04      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.24
  AVERAGE FLOW DEPTH(FEET) =   0.88   FLOOD WIDTH(FEET) =    3.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.65   Tc(MIN.) =    5.65
  SUBAREA AREA(ACRES) =    1.04       SUBAREA RUNOFF(CFS) =    5.38
  EFFECTIVE AREA(ACRES) =    1.33     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       6.88

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOOD WIDTH(FEET) =    3.00
  FLOW VELOCITY(FEET/SEC.) =   8.24   DEPTH*VELOCITY(FT*FT/SEC) =   7.21
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    112.00 =     398.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.00  DOWNSTREAM(FEET) =   325.10
  FLOW LENGTH(FEET) =    84.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.72
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.88
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.79
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    111.00 =     482.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.79
  RAINFALL INTENSITY(INCH/HR) =   5.69
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.33
  TOTAL STREAM AREA(ACRES) =       1.33
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.03    8.18    4.667  0.20( 0.02) 0.10       5.9     117.00
      2        4.18    6.94    5.126  0.20( 0.02) 0.10       0.9     119.00
      3        6.88    5.79    5.688  0.20( 0.02) 0.10       1.3     114.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       32.37    5.79    5.688  0.20( 0.02) 0.10       6.3     114.00
      2       33.73    6.94    5.126  0.20( 0.02) 0.10       7.3     119.00
      3       34.48    8.18    4.667  0.20( 0.02) 0.10       8.2     117.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.48    Tc(MIN.) =     8.18
  EFFECTIVE AREA(ACRES) =       8.17   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    111.00 =    1162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 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) =   325.10  DOWNSTREAM(FEET) =   321.90
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.45
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    110.00 =    1222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    109.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    321.90  DOWNSTREAM(FEET) =    318.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    53.00   CHANNEL SLOPE =  0.0585
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
```

```
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      34.48
  FLOW VELOCITY(FEET/SEC.) =   6.73   FLOW DEPTH(FEET) =   0.47
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =    8.37
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    109.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   318.80  DOWNSTREAM(FEET) =   276.00
  FLOW LENGTH(FEET) =   970.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.81
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.48
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    100.00 =    2245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    77.00
  ELEVATION DATA: UPSTREAM(FEET) =    401.40  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.30      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    102.00 IS CODE =  91
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    330.90
  DOWNSTREAM NODE ELEVATION(FEET) =    306.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   662.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.300
  PAVEMENT LIP(FEET) =  0.038   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.172
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.42      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.01
  AVERAGE FLOW DEPTH(FEET) =   0.43   FLOOD WIDTH(FEET) =   11.78
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =    6.84
  SUBAREA AREA(ACRES) =    2.42       SUBAREA RUNOFF(CFS) =   11.22
  EFFECTIVE AREA(ACRES) =    2.72     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.7         PEAK FLOW RATE(CFS) =      12.61

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOOD WIDTH(FEET) =   17.89
  FLOW VELOCITY(FEET/SEC.) =   5.96   DEPTH*VELOCITY(FT*FT/SEC) =   2.90
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    102.00 =     739.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    6.84
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.72
  TOTAL STREAM AREA(ACRES) =       2.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.61

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    81.00
  ELEVATION DATA: UPSTREAM(FEET) =    401.60  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    331.40
  DOWNSTREAM NODE ELEVATION(FEET) =    318.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   386.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.300
  PAVEMENT LIP(FEET) =  0.038   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.526
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.93      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.90
  AVERAGE FLOW DEPTH(FEET) =   0.34   FLOOD WIDTH(FEET) =    3.33
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    6.09
  SUBAREA AREA(ACRES) =    0.93       SUBAREA RUNOFF(CFS) =    4.61
  EFFECTIVE AREA(ACRES) =    1.13     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       5.60

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOOD WIDTH(FEET) =    9.05
  FLOW VELOCITY(FEET/SEC.) =   6.04   DEPTH*VELOCITY(FT*FT/SEC) =   2.40
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    103.00 =     467.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   312.90  DOWNSTREAM(FEET) =   306.80
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.45
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.60
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.13
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    102.00 =     503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    6.13
  RAINFALL INTENSITY(INCH/HR) =   5.51
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.60

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.61    6.84    5.172  0.20( 0.02) 0.10       2.7     107.00
      2        5.60    6.13    5.507  0.20( 0.02) 0.10       1.1     105.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.64    6.13    5.507  0.20( 0.02) 0.10       3.6     105.00
      2       17.87    6.84    5.172  0.20( 0.02) 0.10       3.8     107.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.87    Tc(MIN.) =     6.84
```

```
  EFFECTIVE AREA(ACRES) =       3.85   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    102.00 =     739.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    101.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  306.80  DOWNSTREAM ELEVATION(FEET) =  297.70
  STREET LENGTH(FEET) =   357.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.53
  STREET FLOW TRAVEL TIME(MIN.) =   1.16   Tc(MIN.) =    7.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.729
  SUBAREA AREA(ACRES) =    0.00      SUBAREA RUNOFF(CFS) =    0.00
  EFFECTIVE AREA(ACRES) =      3.85    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =      17.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.32
  FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.53
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    101.00 =    1096.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   293.00  DOWNSTREAM(FEET) =   276.00
```

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.11
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.87
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.03
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    100.00 =    1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.64    7.33    4.970  0.20( 0.02) 0.10       3.6     105.00
      2       17.87    8.03    4.716  0.20( 0.02) 0.10       3.8     107.00
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    100.00 =    1156.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       32.37    7.02    5.093  0.20( 0.02) 0.10       6.3     114.00
      2       33.73    8.16    4.672  0.20( 0.02) 0.10       7.3     119.00
      3       34.48    9.39    4.311  0.20( 0.02) 0.10       8.2     117.00
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    100.00 =    2245.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       49.69    7.02    5.093  0.20( 0.02) 0.10       9.7     114.00
      2       50.37    7.33    4.970  0.20( 0.02) 0.10      10.1     105.00
      3       51.44    8.03    4.716  0.20( 0.02) 0.10      11.0     107.00
      4       51.43    8.16    4.672  0.20( 0.02) 0.10      11.1     119.00
      5       50.81    9.39    4.311  0.20( 0.02) 0.10      12.0     117.00
    TOTAL AREA(ACRES) =        12.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       51.44  Tc(MIN.) =    8.031
  EFFECTIVE AREA(ACRES) =     11.01  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    100.00 =    2245.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       12.0  TC(MIN.) =      8.03
  EFFECTIVE AREA(ACRES) =     11.01  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
```

PEAK FLOW RATE(CFS) = 51.44

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	49.69	7.02	5.093	0.20(0.02)	0.10	9.7	114.00
2	50.37	7.33	4.970	0.20(0.02)	0.10	10.1	105.00
3	51.44	8.03	4.716	0.20(0.02)	0.10	11.0	107.00
4	51.43	8.16	4.672	0.20(0.02)	0.10	11.1	119.00
5	50.81	9.39	4.311	0.20(0.02)	0.10	12.0	117.00

END OF RATIONAL METHOD ANALYSIS

FUSCOE ENGINEERING
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Job Name: Terravita
Job #: 4014-002
Run Name: Existing Series 200
Date: 9/27/2024
Notes:

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3
202	201	2	354.8	307.8	119	0.85	0.12				
201	200	5	307.8	295.2	52		3.83				
					Area Sub-Total:		3.95	ac			

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                        Fuscoe Engineering, Inc.
                           6390 Greenwich Dr.
                               Suite #170
                          San Diego, CA 92122

 ************************* DESCRIPTION OF STUDY *************************
* TERRAVITA                                                             *
* 100-YR STORM EVENT - EXISTING CONDITIONS series 200                   *
* LAGUNA HILLS, CALIFORNIA                                              *
 *************************************************************************

  FILE NAME: EX100S2.DAT
  TIME/DATE OF STUDY: 15:43 09/30/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

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

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

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

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   119.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.80  DOWNSTREAM(FEET) =    307.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.711
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND"                  D        0.12      0.20     1.000    79    5.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    200.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    307.80  DOWNSTREAM(FEET) =    295.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =    52.00   CHANNEL SLOPE =  0.2423
  CHANNEL BASE(FEET) = 1000.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.220
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND"                  D        3.83      0.20     1.000    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.89
  AVERAGE FLOW DEPTH(FEET) =   0.01   TRAVEL TIME(MIN.) =   0.98
  Tc(MIN.) =    6.73
  SUBAREA AREA(ACRES) =     3.83       SUBAREA RUNOFF(CFS) =   17.30
  EFFECTIVE AREA(ACRES) =      3.95     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.9         PEAK FLOW RATE(CFS) =      17.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.01   FLOW VELOCITY(FEET/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    202.00 TO NODE    200.00 =     171.00 FEET.
```

```
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.9  TC(MIN.) =      6.73
  EFFECTIVE AREA(ACRES) =      3.95  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      17.84
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   312.90  DOWNSTREAM(FEET) =   306.80
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.70
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.37
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.13
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    102.00 =     503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    6.13
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.89    6.78    4.058  0.20( 0.02) 0.10       2.7     107.00
      2        4.37    6.13    4.297  0.20( 0.02) 0.10       1.1     105.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.83    6.13    4.297  0.20( 0.02) 0.10       3.6     105.00
      2       14.01    6.78    4.058  0.20( 0.02) 0.10       3.8     107.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.01    Tc(MIN.) =     6.78
```

```
  EFFECTIVE AREA(ACRES) =       3.85   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    102.00 =     739.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    101.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  306.80  DOWNSTREAM ELEVATION(FEET) =  297.70
  STREET LENGTH(FEET) =   357.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.23   Tc(MIN.) =    8.02
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.693
  SUBAREA AREA(ACRES) =    0.00      SUBAREA RUNOFF(CFS) =    0.00
  EFFECTIVE AREA(ACRES) =      3.85    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =      14.01
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.68
  FLOW VELOCITY(FEET/SEC.) =  4.83   DEPTH*VELOCITY(FT*FT/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    101.00 =    1096.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   293.00  DOWNSTREAM(FEET) =   276.00
```

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.32
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.01
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    100.00 =    1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.83    7.41    3.861  0.20( 0.02) 0.10       3.6     105.00
      2       14.01    8.06    3.682  0.20( 0.02) 0.10       3.8     107.00
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    100.00 =    1156.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.98    7.50    3.834  0.20( 0.02) 0.10       6.7     114.00
      2       26.83    8.38    3.602  0.20( 0.02) 0.10       7.5     119.00
      3       27.31    9.29    3.397  0.20( 0.02) 0.10       8.2     117.00
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    100.00 =    2245.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.67    7.41    3.861  0.20( 0.02) 0.10      10.2     105.00
      2       39.83    7.50    3.834  0.20( 0.02) 0.10      10.3     114.00
      3       40.53    8.06    3.682  0.20( 0.02) 0.10      11.1     107.00
      4       40.53    8.38    3.602  0.20( 0.02) 0.10      11.3     119.00
      5       40.23    9.29    3.397  0.20( 0.02) 0.10      12.0     117.00
    TOTAL AREA(ACRES) =        12.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       40.53  Tc(MIN.) =    8.378
  EFFECTIVE AREA(ACRES) =     11.34  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    100.00 =    2245.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       12.0  TC(MIN.) =      8.38
  EFFECTIVE AREA(ACRES) =     11.34  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
```

PEAK FLOW RATE(CFS) = 40.53

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	39.67	7.41	3.861	0.20(0.02)	0.10	10.2	105.00
2	39.83	7.50	3.834	0.20(0.02)	0.10	10.3	114.00
3	40.53	8.06	3.682	0.20(0.02)	0.10	11.1	107.00
4	40.53	8.38	3.602	0.20(0.02)	0.10	11.3	119.00
5	40.23	9.29	3.397	0.20(0.02)	0.10	12.0	117.00

END OF RATIONAL METHOD ANALYSIS

Appendix 4

PROPOSED HYDROLOGY CALCULATIONS

FUSCOE ENGINEERING
FULL CIRCLE THINKING

Job Name: MILL CREEK H.E.R.E.
Job #: 4014-002
Run Name: PROP100
Date: 909/22/2025
Notes: PROPOSED DRAINAGE CONDITIONS. 100-YR STORM EVENT.
NO DETENTION. FLAT ROOFS, ASSUMED ELEVATIONS.

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Assumed Pervious	Soil Group	Approx. C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3	Q100 (cfs)
198	197	2	328.11	327.19	100	20%	D	0.89	0.07					0.38
197	196	6	327.19	326.67	75	20%	D	0.89	0.15	STREET 1				1.09
196	192	3	322.65	322.61	12	-	-	-	-	PROP S.D.				1.09
192	192	1	-	-	-	-	-	-	-	1 OF 2				1.09
195	194	2	330.10	327.02	100	20%	D	0.89	0.12					0.66
194	193	6	327.02	326.69	59	20%	D	0.89	0.12	STREET 1				1.23
193	192	3	322.67	322.61	12	-	-	-	-	PROP S.D.				1.23
192	192	1	-	-	-	-	-	-	-	2 OF 2				2.29
192	185	3	322.61	320.93	336	-	-	-	-	PROP S.D.				2.29
185	185	1	-	-	-	-	-	-	-	1 OF 3				2.29
191	190	2	327.40	326.44	100	20%	D	0.89	0.05					0.27
190	189	6	326.44	324.65	295	20%	D	0.89	0.52	STREET 1				2.36
189	185	3	320.99	320.93	12	-	-	-	-	PROP S.D.				2.36
185	185	1	-	-	-	-	-	-	-	2 OF 3				2.36
188	187	2	327.56	326.37	100	20%	D	0.89	0.11					0.61
187	186	6	326.37	324.67	284	20%	D	0.89	0.52	STREET 1				2.70
186	185	3	320.99	320.93	12	-	-	-	-	PROP S.D.				2.70
185	185	1	-	-	-	-	-	-	-	3 OF 3				7.27
185	178	3	320.93	319.42	301	-	-	-	-	PROP S.D.				7.27
178	178	1	-	-	-	-	-	-	-	1 OF 3				7.27
184	183	2	325.60	325.00	100	20%	D	0.89	0.05					0.26
183	182	6	325.00	322.83	244	20%	D	0.89	0.47	STREET 1				2.21
182	178	3	319.48	319.42	12	-	-	-	-	PROP S.D.				2.21
178	178	1	-	-	-	-	-	-	-	2 OF 3				2.21
181	180	2	325.54	324.33	100	20%	D	0.89	0.10					0.55
180	179	6	324.33	322.82	253	20%	D	0.89	0.47	STREET 1				2.48
179	178	3	319.48	319.42	12	-	-	-	-	PROP S.D.				2.48
178	178	1	-	-	-	-	-	-	-	3 OF 3				11.65
178	174	3	319.42	317.28	304	-	-	-	-	PROP S.D.				11.65
174	174	1	-	-	-	-	-	-	-	1 OF 2				11.65
177	176	2	323.89	322.54	100	20%	D	0.89	0.07					0.39
176	175	6	322.54	320.98	256	20%	D	0.89	0.47	STREET 1				2.34
175	174	3	317.34	317.28	12	-	-	-	-	PROP S.D.				2.34
174	174	1	-	-	-	-	-	-	-	2 OF 2				13.80
174	170	3	317.28	316.74	89	-	-	-	-	PROP S.D.				13.80
170	170	1	-	-	-	-	-	-	-	1 OF 2				13.80
173	172	2	323.60	322.60	100	20%	D	0.89	0.07					0.38

FUSCOE ENGINEERING
FULL CIRCLE THINKING

Job Name: MILL CREEK H.E.R.E.
Job #: 4014-002
Run Name: PROP100
Date: 909/22/2025
Notes: PROPOSED DRAINAGE CONDITIONS. 100-YR STORM EVENT.
NO DETENTION. FLAT ROOFS, ASSUMED ELEVATIONS.

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Assumed Pervious	Soil Group	Approx. C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3	Q100 (cfs)
172	171	6	322.60	320.65	383	20%	D	0.89	1.43	STREET 1				6.07
171	170	3	317.06	316.74	62	-	-	-	-	PROP S.D.				6.07
170	170	1	-	-	-	-	-	-	-	2 OF 2				19.83
170	160	4	341.69	341.67	1	-	-	-	-	FORCE MAIN TO 160.				19.83
160	160	1	-	-	-	-	-	-	-	1 OF 3				19.83
166	165	2	363.00	347.70	100	20%	D	0.89	0.09					0.50
165	164	6	347.70	345.87	113	20%	D	0.89	0.20	STREET 1				1.47
164	160	3	341.87	341.67	15	-	-	-	-	PROP S.D.				1.47
160	160	1	-	-	-	-	-	-	-	2 OF 3				1.47
163	162	2	347.70	346.74	100	20%	D	0.89	0.16					0.87
162	161	6	346.74	345.73	74	20%	D	0.89	0.15	STREET 1				1.58
161	160	3	341.73	341.67	12	-	-	-	-	PROP S.D.				1.58
160	160	1	-	-	-	-	-	-	-	3 OF 3				22.24
160	156	3	341.67	337.61	207	-	-	-	-	PROP S.D.				22.24
156	156	1	-	-	-	-	-	-	-	1 OF 2				22.24
159	158	2	350.80	348.32	124	20%	D	0.89	0.11					0.61
158	157	9	348.32	347.56	63	20%	D	0.89	0.40					2.67
157	156	3	344.04	337.61	247	-	-	-	-	PROP S.D.				2.67
156	156	1	-	-	-	-	-	-	-	2 OF 2				24.35
156	149	3	337.61	335.88	95	-	-	-	-	PROP S.D.				24.35
149	149	1	-	-	-	-	-	-	-	1 OF 3				24.35
155	154	2	367.30	346.61	100	20%	D	0.89	0.12					0.66
154	153	6	346.61	339.59	395	20%	D	0.89	1.40	STREET 1				6.85
153	149	3	336.00	335.88	14	-	-	-	-	PROP S.D.				6.85
149	149	1	-	-	-	-	-	-	-	2 OF 3				6.85
152	151	2	346.40	345.15	100	20%	D	0.89	0.06					0.33
151	150	6	345.15	339.91	270	20%	D	0.89	0.50	STREET 1				2.61
150	149	3	336.00	335.88	14	-	-	-	-	PROP S.D.				2.61
149	149	1	-	-	-	-	-	-	-	3 OF 3				32.56
149	142	3	335.88	332.91	164	-	-	-	-	PROP S.D.				32.56
142	142	1	-	-	-	-	-	-	-	1 OF 3				32.56
148	147	2	342.57	340.97	100	20%	D	0.89	0.23					1.27
147	146	6	340.97	336.48	298	20%	D	0.89	1.18	STREET 4				6.59
146	142	3	332.97	332.91	12	-	-	-	-	PROP S.D.				6.59
142	142	1	-	-	-	-	-	-	-	2 OF 3				6.59
145	144	2	340.70	338.80	100	20%	D	0.89	0.10					0.55
144	143	6	338.80	336.56	106	20%	D	0.89	0.23	STREET 1				1.69
143	142	3	332.97	332.91	12	-	-	-	-	PROP S.D.				1.69

FUSCOE ENGINEERING
FULL CIRCLE THINKING

Job Name: MILL CREEK H.E.R.E.
Job #: 4014-002
Run Name: PROP100
Date: 909/22/2025
Notes: PROPOSED DRAINAGE CONDITIONS. 100-YR STORM EVENT.
NO DETENTION. FLAT ROOFS, ASSUMED ELEVATIONS.

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Assumed Pervious	Soil Group	Approx. C Factor	Area (acres)	Comments	BANK			Q100 (cfs)
											1	2	3	
142	142	1	-	-	-	-	-	-	-	3 OF 3				40.23
142	133	3	332.91	330.71	72	-	-	-	-	PROP S.D.				40.23
133	133	10	-	-	-	-	-	-	-	FLOW TO BANK 1	X			40.23
141	140	2	344.60	342.71	100	20%	D	0.89	0.18		X			1.00
140	139	6	342.71	341.91	58	20%	D	0.89	0.11	STREET 3	X			1.53
139	138	3	338.40	338.34	11	-	-	-	-	PROP S.D.	X			1.53
138	134	3	338.34	335.85	170	-	-	-	-	PROP S.D.	X			1.53
134	134	1	-	-	-	-	-	-	-	1 OF 2	X			1.53
137	136	2	343.05	341.43	100	20%	D	0.89	0.10		X			0.55
136	135	6	341.43	339.57	136	20%	D	0.89	0.33	STREET 3	X			2.14
135	134	3	336.50	335.85	13	-	-	-	-	PROP S.D.	X			2.14
134	134	1	-	-	-	-	-	-	-	2 OF 2	X			3.66
134	133	3	335.85	330.71	318	-	-	-	-	PROP S.D.	X			3.66
133	133	11	-	-	-	-	-	-	-	COMBINE W/ BANK 1	X			43.74
133	133	12	-	-	-	-	-	-	-	CLEAR BANK				43.74
133	126.3	3	330.71	329.88	48	-	-	-	-	PROP S.D.				43.74
126.3	126.3	1	-	-	-	-	-	-	-	1 OF 3				43.74
132	131	2	340.59	338.51	100	20%	D	0.89	0.10					0.55
131	130	6	338.51	333.43	277	20%	D	0.89	0.70	STREET 5				3.67
130	126.3	3	330.00	329.88	11	-	-	-	-	PROP S.D.				3.67
126.3	126.3	1	-	-	-	-	-	-	-	2 OF 3				3.67
129	128	2	337.40	335.41	100	20%	D	0.89	0.11					0.61
128	127	6	335.41	333.40	93	20%	D	0.89	0.19	STREET 1				1.55
127	126.3	3	330.00	329.88	12	-	-	-	-	PROP S.D.				1.55
126.3	126.3	1	-	-	-	-	-	-	-	3 OF 3				48.71
126.3	122	3	329.88	324.77	286	-	-	-	-	PROP S.D.				48.71
122	122	1	-	-	-	-	-	-	-	1 OF 3				48.71
126.2	126.1	2	400.00	397.58	121	20%	D	0.89	0.47					2.60
126.1	126	6	333.45	327.76	453	20%	D	0.89	0.66	STREET 6				4.84
126	122	3	324.84	324.77	12	-	-	-	-	PROP S.D.				4.84
122	122	1	-	-	-	-	-	-	-	2 OF 3				4.84
125	124	2	333.20	332.56	100	20%	D	0.89	0.07					0.36
124	123	6	332.56	327.61	248	20%	D	0.89	0.39	STREET 1				2.05
123	122	3	324.85	324.77	14	-	-	-	-	PROP S.D.				2.05
122	122	1	-	-	-	-	-	-	-	3 OF 3				55.48
122	121	3	324.77	324.28	37	-	-	-	-	PROP S.D.				55.48
121	114	3	324.28	311.40	308	-	-	-	-	PROP S.D.				55.48
114	114	10	-	-	-	-	-	-	-	STORE BANK 1	X			55.48

FUSCOE ENGINEERING
FULL CIRCLE THINKING

Job Name: MILL CREEK H.E.R.E.
Job #: 4014-002
Run Name: PROP100
Date: 909/22/2025
Notes: PROPOSED DRAINAGE CONDITIONS. 100-YR STORM EVENT.
NO DETENTION. FLAT ROOFS, ASSUMED ELEVATIONS.

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Assumed Pervious	Soil Group	Approx. C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3	Q100 (cfs)
120	119	2	400.00	397.58	121	20%	D	0.89	0.20		X			1.11
119	118	6	333.44	331.11	93	20%	D	0.89	0.21	STREET 7	X			2.14
118	115	3	326.11	318.77	246	-	-	-	-	PROP S.D.	X			2.14
115	115	1	-	-	-	-	-	-	-	1 OF 2	X			2.14
117	116	2	326.90	324.29	95	20%	D	0.89	0.37		X			2.05
116	115	3	320.29	318.77	20	-	-	-	-	PROP S.D.	X			2.05
115	115	1	-	-	-	-	-	-	-	2 OF 2	X			4.01
115	114	3	318.77	311.40	167	-	-	-	-	PROP S.D.	X			4.01
114	114	11	-	-	-	-	-	-	-	COMBINE W/ BANK 1	X			59.04
114	114	12	-	-	-	-	-	-	-	CLEAR BANK 1				59.04
114	111	3	311.40	311.31	17	-	-	-	-	PROP S.D.				59.04
111	111	1	-	-	-	-	-	-	-	1 OF 2				59.04
113	112	2	400.00	397.60	120	20%	D	0.89	0.71					3.93
112	111	6	326.47	316.49	272	20%	D	0.89	0.37	STREET 2				5.35
111	111	1	-	-	-	-	-	-	-	2 OF 2				63.68
111	101	3	311.31	298.00	81	-	-	-	-	PROP S.D.				63.68
101	101	1	-	-	-	-	-	-	-	1 OF 2				63.68
107	106	2	344.60	339.00	100	20%	D	0.89	0.02					0.11
106	105	6	339.00	329.10	263	20%	D	0.89	0.22	STREET 8				1.16
105	104	4	324.70	321.90	59	-	-	-	-	EXIST 27" SD				1.16
104	103	5	321.90	318.80	59	-	-	-	-	VALLEY				1.16
103	102	4	318.80	299.34	455	-	-	-	-	EXIST 36" SD				1.16
102	101	4	299.34	298.00	11	-	-	-	-	EXIST 48" SD				1.16
101	101	1	-	-	-	-	-	-	-	2 OF 2				64.82
101	100	4	298.00	276.00	491	-	-	-	-	EXIST 48" SD				64.82
100	100	1	-	-	-	-	-	-	-	1 OF 2				64.82
110	109	2	400.00	396.54	173	20%	D	0.89	0.17					0.88
109	108	6	396.54	297.70	362	20%	D	0.89	0.15	STREET 9				1.57
108	100	4	293.00	276.00	60	-	-	-	-	EXIST 21" SD				1.57
100	100	1	-	-	-	-	-	-	-	2 OF 2				66.16
									15.56	**POC 1**				**66.16**
202	201	2	362.50	321.90	123	20%	D	0.89	0.05					0.28
201	200	5	321.90	295.00	107	20%	D	0.89	0.36	CHANNEL				2.20
									0.41	**POC 2**				**2.20**

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                        Fuscoe Engineering, Inc.
                           6390 Greenwich Dr.
                               Suite #170
                          San Diego, CA 92122

------------------------------------------------------------------------------
  FILE NAME: PROP100.DAT
  TIME/DATE OF STUDY: 13:35 09/23/2025
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   13.0      6.0    0.020/0.020/0.050   0.50    1.50 0.0313 0.125 0.0150
  2   24.5     12.0    0.020/0.020/0.050   0.50    1.50 0.0313 0.125 0.0150
  3   26.0     13.0    0.020/0.020/0.050   0.50    1.50 0.0313 0.125 0.0150
  4   20.0     10.0    0.020/0.020/0.050   0.50    1.50 0.0313 0.125 0.0150
  5   26.0     13.0    0.031/0.012/0.050   0.50    1.50 0.0313 0.125 0.0150
  6   25.8     12.0    0.020/0.020/0.050   0.50    1.50 0.0313 0.125 0.0150
  7   26.0     13.0    0.020/0.017/0.050   0.50    1.50 0.0313 0.125 0.0150
  8   21.5     10.0    0.029/0.029/0.015   0.50    1.50 0.0313 0.125 0.0150
  9   42.0     21.0    0.012/0.012/0.050   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED
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  FLOW PROCESS FROM NODE    198.00 TO NODE    197.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    328.11  DOWNSTREAM(FEET) =    327.19

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.221
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.036
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.07      0.20     0.200    91    5.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    196.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  327.19  DOWNSTREAM ELEVATION(FEET) =  326.67
  STREET LENGTH(FEET) =    75.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    6.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.544
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.15      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.74
  EFFECTIVE AREA(ACRES) =      0.22    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.42
  FLOW VELOCITY(FEET/SEC.) =  1.63   DEPTH*VELOCITY(FT*FT/SEC.) =   0.45
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    196.00 =     175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   322.65  DOWNSTREAM(FEET) =   322.61
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.56
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.09
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.13
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    192.00 =     187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 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.) =    6.13
  RAINFALL INTENSITY(INCH/HR) =   5.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.22
  TOTAL STREAM AREA(ACRES) =       0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.09

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    194.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    330.10  DOWNSTREAM(FEET) =    327.02

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.12      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.66
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.66

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    193.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  327.02  DOWNSTREAM ELEVATION(FEET) =  326.69
  STREET LENGTH(FEET) =    59.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =    5.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.753
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.12      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.62
  EFFECTIVE AREA(ACRES) =      0.24    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.27
  FLOW VELOCITY(FEET/SEC.) =  1.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.45
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    193.00 =     159.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   322.67  DOWNSTREAM(FEET) =   322.61
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.23
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.74
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    192.00 =     171.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 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.) =    5.74
  RAINFALL INTENSITY(INCH/HR) =   5.72
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.09    6.13    5.503  0.20( 0.04) 0.20       0.2     198.00
```

```
      2        1.23    5.74    5.716  0.20( 0.04) 0.20       0.2     195.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.29    5.74    5.716  0.20( 0.04) 0.20       0.4     195.00
      2        2.28    6.13    5.503  0.20( 0.04) 0.20       0.5     198.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.29    Tc(MIN.) =     5.74
  EFFECTIVE AREA(ACRES) =       0.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.5
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    192.00 =     187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    185.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   322.61  DOWNSTREAM(FEET) =   320.93
  FLOW LENGTH(FEET) =   336.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    185.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.36
  RAINFALL INTENSITY(INCH/HR) =   4.96
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.45
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.29

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

```
 FLOW PROCESS FROM NODE    191.00 TO NODE    190.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    327.40  DOWNSTREAM(FEET) =    326.44

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.177
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.065
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.05      0.20     0.200    91    5.18
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.05   PEAK FLOW RATE(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    190.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  326.44  DOWNSTREAM ELEVATION(FEET) =  324.65
 STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 13.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.36
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.55
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.60
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =    8.25
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.645
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.16
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.80
  FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    191.00 TO NODE    189.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    185.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.99  DOWNSTREAM(FEET) =   320.93
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.36
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE    191.00 TO NODE    185.00 =     407.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.30
  RAINFALL INTENSITY(INCH/HR) =   4.63
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.36

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    187.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    327.56  DOWNSTREAM(FEET) =    326.37

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.11      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61

********************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    186.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  326.37  DOWNSTREAM ELEVATION(FEET) =  324.67
  STREET LENGTH(FEET) =   284.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   2.78   Tc(MIN.) =    7.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.801
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.23
  EFFECTIVE AREA(ACRES) =      0.63    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.45
  FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE    188.00 TO NODE    186.00 =     384.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    185.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.99  DOWNSTREAM(FEET) =   320.93
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.70
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.84
  LONGEST FLOWPATH FROM NODE    188.00 TO NODE    185.00 =     396.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.84
  RAINFALL INTENSITY(INCH/HR) =   4.78
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.63
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.29    7.36    4.960  0.20( 0.04) 0.20       0.4     195.00
      1        2.28    7.75    4.812  0.20( 0.04) 0.20       0.5     198.00
      2        2.36    8.30    4.627  0.20( 0.04) 0.20       0.6     191.00
```

```
     3        2.70    7.84    4.782  0.20( 0.04) 0.20       0.6     188.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.17    7.36    4.960  0.20( 0.04) 0.20       1.5     195.00
      2        7.26    7.75    4.812  0.20( 0.04) 0.20       1.6     198.00
      3        7.27    7.84    4.782  0.20( 0.04) 0.20       1.6     188.00
      4        7.16    8.30    4.627  0.20( 0.04) 0.20       1.7     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.27    Tc(MIN.) =     7.84
  EFFECTIVE AREA(ACRES) =       1.63   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.7
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    185.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.93  DOWNSTREAM(FEET) =   319.42
  FLOW LENGTH(FEET) =   301.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.27
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    178.00 =     824.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.89
  RAINFALL INTENSITY(INCH/HR) =   4.45
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.27
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    183.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    325.60  DOWNSTREAM(FEET) =    325.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.687
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.747
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.05      0.20     0.200    91    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.05   PEAK FLOW RATE(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  325.00  DOWNSTREAM ELEVATION(FEET) =  322.83
  STREET LENGTH(FEET) =   244.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.47      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.47      SUBAREA RUNOFF(CFS) =    2.00
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.67
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    182.00 =     344.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   319.48  DOWNSTREAM(FEET) =   319.42
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.46
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.21
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    178.00 =     356.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.95
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    180.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    325.54  DOWNSTREAM(FEET) =    324.33

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.10      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.10   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    179.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  324.33  DOWNSTREAM ELEVATION(FEET) =  322.82
  STREET LENGTH(FEET) =   253.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   2.56   Tc(MIN.) =    7.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.881
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.47      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.47      SUBAREA RUNOFF(CFS) =    2.05
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.08
  FLOW VELOCITY(FEET/SEC.) =  1.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    179.00 =     353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   319.48  DOWNSTREAM(FEET) =   319.42
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.62
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    178.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.62
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.17    8.41    4.593  0.20( 0.04) 0.20       1.5     195.00
```

```
     1        7.26    8.81    4.473  0.20( 0.04) 0.20       1.6     198.00
     1        7.27    8.89    4.449  0.20( 0.04) 0.20       1.6     188.00
     1        7.16    9.36    4.320  0.20( 0.04) 0.20       1.7     191.00
     2        2.21    7.95    4.744  0.20( 0.04) 0.20       0.5     184.00
     3        2.48    7.62    4.860  0.20( 0.04) 0.20       0.6     181.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.53    7.62    4.860  0.20( 0.04) 0.20       2.5     181.00
      2       11.63    7.95    4.744  0.20( 0.04) 0.20       2.5     184.00
      3       11.65    8.41    4.593  0.20( 0.04) 0.20       2.6     195.00
      4       11.63    8.81    4.473  0.20( 0.04) 0.20       2.7     198.00
      5       11.61    8.89    4.449  0.20( 0.04) 0.20       2.7     188.00
      6       11.38    9.36    4.320  0.20( 0.04) 0.20       2.7     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.65    Tc(MIN.) =     8.41
  EFFECTIVE AREA(ACRES) =       2.63   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.7
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    178.00 =     824.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    174.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   319.42  DOWNSTREAM(FEET) =   317.28
  FLOW LENGTH(FEET) =   304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.95
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.65
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    9.26
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    174.00 =    1128.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    174.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.26
  RAINFALL INTENSITY(INCH/HR) =   4.35
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.63
  TOTAL STREAM AREA(ACRES) =       2.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.65

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    176.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    323.89  DOWNSTREAM(FEET) =    322.54

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.07      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    175.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  322.54  DOWNSTREAM ELEVATION(FEET) =  320.98
  STREET LENGTH(FEET) =   256.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
  STREET FLOW TRAVEL TIME(MIN.) =   2.61   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.864
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.47      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.47      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.80
  FLOW VELOCITY(FEET/SEC.) =  1.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
  LONGEST FLOWPATH FROM NODE    177.00 TO NODE    175.00 =     356.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    174.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   317.34  DOWNSTREAM(FEET) =   317.28
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.34
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.67
  LONGEST FLOWPATH FROM NODE    177.00 TO NODE    174.00 =     368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    174.00 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.) =    7.67
  RAINFALL INTENSITY(INCH/HR) =   4.84
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.54
 TOTAL STREAM AREA(ACRES) =       0.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.34

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       11.53    8.47    4.574  0.20( 0.04) 0.20       2.5     181.00
     1       11.63    8.80    4.475  0.20( 0.04) 0.20       2.5     184.00
     1       11.65    9.26    4.346  0.20( 0.04) 0.20       2.6     195.00
     1       11.63    9.66    4.243  0.20( 0.04) 0.20       2.7     198.00
     1       11.61    9.74    4.222  0.20( 0.04) 0.20       2.7     188.00
     1       11.38   10.21    4.109  0.20( 0.04) 0.20       2.7     191.00
     2        2.34    7.67    4.843  0.20( 0.04) 0.20       0.5     177.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.40    7.67    4.843  0.20( 0.04) 0.20       2.8     177.00
     2       13.74    8.47    4.574  0.20( 0.04) 0.20       3.0     181.00
     3       13.80    8.80    4.475  0.20( 0.04) 0.20       3.1     184.00
     4       13.75    9.26    4.346  0.20( 0.04) 0.20       3.2     195.00
     5       13.68    9.66    4.243  0.20( 0.04) 0.20       3.2     198.00
     6       13.65    9.74    4.222  0.20( 0.04) 0.20       3.3     188.00
     7       13.36   10.21    4.109  0.20( 0.04) 0.20       3.3     191.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.80    Tc(MIN.) =     8.80
 EFFECTIVE AREA(ACRES) =       3.09   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        3.3
 LONGEST FLOWPATH FROM NODE    198.00 TO NODE    174.00 =    1128.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    174.00 TO NODE    170.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   317.28  DOWNSTREAM(FEET) =   316.74
 FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.80
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.05
```

```
 LONGEST FLOWPATH FROM NODE    198.00 TO NODE    170.00 =    1217.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.05
 RAINFALL INTENSITY(INCH/HR) =   4.40
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       3.09
 TOTAL STREAM AREA(ACRES) =       3.29
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.80

****************************************************************************
 FLOW PROCESS FROM NODE    173.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    323.60  DOWNSTREAM(FEET) =    322.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.135
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.094
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.07      0.20     0.200    91    5.14
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    172.00 TO NODE    171.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  322.60  DOWNSTREAM ELEVATION(FEET) =  320.65
 STREET LENGTH(FEET) =   383.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 13.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.45   Tc(MIN.) =    8.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.539
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.43      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    5.79
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.00
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    171.00 =     483.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    170.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   317.06  DOWNSTREAM(FEET) =   316.74
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.07
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.81
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    170.00 =     545.00 FEET.

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

```
 FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.81
 RAINFALL INTENSITY(INCH/HR) =   4.47
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       1.50
 TOTAL STREAM AREA(ACRES) =       1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.07

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.40    7.92    4.754  0.20( 0.04) 0.20       2.8     177.00
     1       13.74    8.72    4.498  0.20( 0.04) 0.20       3.0     181.00
     1       13.80    9.05    4.404  0.20( 0.04) 0.20       3.1     184.00
     1       13.75    9.51    4.280  0.20( 0.04) 0.20       3.2     195.00
     1       13.68    9.91    4.181  0.20( 0.04) 0.20       3.2     198.00
     1       13.65    9.99    4.161  0.20( 0.04) 0.20       3.3     188.00
     1       13.36   10.46    4.052  0.20( 0.04) 0.20       3.3     191.00
     2        6.07    8.81    4.472  0.20( 0.04) 0.20       1.5     173.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       19.20    7.92    4.754  0.20( 0.04) 0.20       4.1     177.00
     2       19.79    8.72    4.498  0.20( 0.04) 0.20       4.5     181.00
     3       19.83    8.81    4.472  0.20( 0.04) 0.20       4.5     173.00
     4       19.78    9.05    4.404  0.20( 0.04) 0.20       4.6     184.00
     5       19.56    9.51    4.280  0.20( 0.04) 0.20       4.7     195.00
     6       19.35    9.91    4.181  0.20( 0.04) 0.20       4.7     198.00
     7       19.30    9.99    4.161  0.20( 0.04) 0.20       4.8     188.00
     8       18.86   10.46    4.052  0.20( 0.04) 0.20       4.8     191.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      19.83    Tc(MIN.) =     8.81
 EFFECTIVE AREA(ACRES) =       4.53   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        4.8
 LONGEST FLOWPATH FROM NODE    198.00 TO NODE    170.00 =    1217.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.69  DOWNSTREAM(FEET) =   341.67
  FLOW LENGTH(FEET) =     1.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.29
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.83
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    8.81
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    160.00 =    1218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   4.47
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.53
  TOTAL STREAM AREA(ACRES) =       4.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.83

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    165.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    363.00  DOWNSTREAM(FEET) =    347.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.09      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.09   PEAK FLOW RATE(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    164.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  347.70  DOWNSTREAM ELEVATION(FEET) =  345.87
  STREET LENGTH(FEET) =   113.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    5.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.659
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.20      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.01
  EFFECTIVE AREA(ACRES) =      0.29    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE    166.00 TO NODE    164.00 =     213.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    160.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.73  DOWNSTREAM(FEET) =   341.67
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.20
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.47
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.91
  LONGEST FLOWPATH FROM NODE    166.00 TO NODE    160.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.91
  RAINFALL INTENSITY(INCH/HR) =   5.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.47

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    162.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    347.70  DOWNSTREAM(FEET) =    346.74

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.177
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.065
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.16      0.20     0.200    91    5.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.16   PEAK FLOW RATE(CFS) =      0.87
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    161.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  346.74  DOWNSTREAM ELEVATION(FEET) =  345.73
  STREET LENGTH(FEET) =    74.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =    5.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.712
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.15      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =      0.31    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  2.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    161.00 =     174.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    160.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   341.73  DOWNSTREAM(FEET) =   341.67
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.25
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.58
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.81
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    160.00 =     186.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.81
  RAINFALL INTENSITY(INCH/HR) =   5.68
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.58

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.20    7.92    4.754  0.20( 0.04) 0.20       4.1     177.00
      1       19.79    8.72    4.498  0.20( 0.04) 0.20       4.5     181.00
      1       19.83    8.81    4.471  0.20( 0.04) 0.20       4.5     173.00
      1       19.78    9.05    4.404  0.20( 0.04) 0.20       4.6     184.00
      1       19.56    9.51    4.280  0.20( 0.04) 0.20       4.7     195.00
      1       19.35    9.91    4.181  0.20( 0.04) 0.20       4.7     198.00
      1       19.30   10.00    4.160  0.20( 0.04) 0.20       4.8     188.00
      1       18.86   10.47    4.052  0.20( 0.04) 0.20       4.8     191.00
      2        1.47    5.91    5.624  0.20( 0.04) 0.20       0.3     166.00
      3        1.58    5.81    5.678  0.20( 0.04) 0.20       0.3     163.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.88    5.81    5.678  0.20( 0.04) 0.20       3.6     163.00
      2       20.00    5.91    5.624  0.20( 0.04) 0.20       3.7     166.00
      3       21.76    7.92    4.754  0.20( 0.04) 0.20       4.7     177.00
      4       22.21    8.72    4.498  0.20( 0.04) 0.20       5.1     181.00
```

```
      5       22.24    8.81    4.471  0.20( 0.04) 0.20       5.1     173.00
      6       22.15    9.05    4.404  0.20( 0.04) 0.20       5.2     184.00
      7       21.87    9.51    4.280  0.20( 0.04) 0.20       5.3     195.00
      8       21.60    9.91    4.181  0.20( 0.04) 0.20       5.3     198.00
      9       21.54   10.00    4.160  0.20( 0.04) 0.20       5.4     188.00
     10       21.04   10.47    4.052  0.20( 0.04) 0.20       5.4     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.24    Tc(MIN.) =     8.81
  EFFECTIVE AREA(ACRES) =       5.13   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    160.00 =    1218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.67  DOWNSTREAM(FEET) =   337.61
  FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.24
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    9.14
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    156.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   4.38
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.13
  TOTAL STREAM AREA(ACRES) =       5.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.24

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    158.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   124.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.80  DOWNSTREAM(FEET) =    348.32

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.11      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61

**************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    157.00 IS CODE =  91
--------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==========================================================================
  UPSTREAM NODE ELEVATION(FEET) =    348.32
  DOWNSTREAM NODE ELEVATION(FEET) =    347.56
  CHANNEL LENGTH THRU SUBAREA(FEET) =    63.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.125
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01300
  MAXIMUM DEPTH(FEET) =   0.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.857
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.66
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.09
  AVERAGE FLOW DEPTH(FEET) =   0.20   FLOOD WIDTH(FEET) =   13.64
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =    5.50
  SUBAREA AREA(ACRES) =    0.40       SUBAREA RUNOFF(CFS) =    2.09
  EFFECTIVE AREA(ACRES) =    0.51     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.67

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOOD WIDTH(FEET) =   17.81
  FLOW VELOCITY(FEET/SEC.) =   2.19   DEPTH*VELOCITY(FT*FT/SEC) =   0.51
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    157.00 =     187.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   344.04  DOWNSTREAM(FEET) =   337.61
  FLOW LENGTH(FEET) =   247.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    6.10
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    156.00 =     434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 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.) =    6.10
  RAINFALL INTENSITY(INCH/HR) =   5.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.67

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.88    6.16    5.492  0.20( 0.04) 0.20       3.6     163.00
      1       20.00    6.25    5.444  0.20( 0.04) 0.20       3.7     166.00
      1       21.76    8.25    4.644  0.20( 0.04) 0.20       4.7     177.00
      1       22.21    9.05    4.403  0.20( 0.04) 0.20       5.1     181.00
      1       22.24    9.14    4.378  0.20( 0.04) 0.20       5.1     173.00
      1       22.15    9.38    4.314  0.20( 0.04) 0.20       5.2     184.00
      1       21.87    9.84    4.197  0.20( 0.04) 0.20       5.3     195.00
      1       21.60   10.24    4.103  0.20( 0.04) 0.20       5.3     198.00
      1       21.54   10.33    4.083  0.20( 0.04) 0.20       5.4     188.00
      1       21.04   10.81    3.977  0.20( 0.04) 0.20       5.4     191.00
      2        2.67    6.10    5.521  0.20( 0.04) 0.20       0.5     159.00

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

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.48    6.10    5.521  0.20( 0.04) 0.20       4.1     159.00
     2       22.54    6.16    5.492  0.20( 0.04) 0.20       4.1     163.00
     3       22.63    6.25    5.444  0.20( 0.04) 0.20       4.2     166.00
     4       24.01    8.25    4.644  0.20( 0.04) 0.20       5.2     177.00
     5       24.34    9.05    4.403  0.20( 0.04) 0.20       5.6     181.00
     6       24.35    9.14    4.378  0.20( 0.04) 0.20       5.6     173.00
     7       24.23    9.38    4.314  0.20( 0.04) 0.20       5.7     184.00
     8       23.89    9.84    4.197  0.20( 0.04) 0.20       5.8     195.00
     9       23.58   10.24    4.103  0.20( 0.04) 0.20       5.9     198.00
    10       23.51   10.33    4.083  0.20( 0.04) 0.20       5.9     188.00
    11       22.96   10.81    3.977  0.20( 0.04) 0.20       5.9     191.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.35    Tc(MIN.) =     9.14
 EFFECTIVE AREA(ACRES) =       5.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.9
 LONGEST FLOWPATH FROM NODE    198.00 TO NODE    156.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    156.00 TO NODE    149.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   337.61  DOWNSTREAM(FEET) =   335.88
 FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.33
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      24.35
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.30
 LONGEST FLOWPATH FROM NODE    198.00 TO NODE    149.00 =    1520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    149.00 TO NODE    149.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.30
 RAINFALL INTENSITY(INCH/HR) =   4.34
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
```

```
  EFFECTIVE STREAM AREA(ACRES) =       5.64
  TOTAL STREAM AREA(ACRES) =       5.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.35

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    367.30  DOWNSTREAM(FEET) =    346.61

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.12      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.66
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.66

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    153.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  346.61  DOWNSTREAM ELEVATION(FEET) =  339.59
  STREET LENGTH(FEET) =   395.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    7.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.048
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    6.31
  EFFECTIVE AREA(ACRES) =      1.52    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.00
  FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    153.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    149.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.00  DOWNSTREAM(FEET) =   335.88
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.85
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.17
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    149.00 =     509.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    149.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.17
  RAINFALL INTENSITY(INCH/HR) =   5.03
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.85
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    346.40  DOWNSTREAM(FEET) =    345.15

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.06      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.06   PEAK FLOW RATE(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    150.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  345.15  DOWNSTREAM ELEVATION(FEET) =  339.91
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    6.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.217
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.50      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    2.33
  EFFECTIVE AREA(ACRES) =      0.56    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.83
  FLOW VELOCITY(FEET/SEC.) =  2.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    149.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.00  DOWNSTREAM(FEET) =   335.88
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.61
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.79
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    149.00 =     384.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    149.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.79
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.61

  ** CONFLUENCE DATA **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	22.48	6.25	5.442	0.20(0.04)	0.20	4.1	159.00
1	22.54	6.31	5.414	0.20(0.04)	0.20	4.1	163.00
1	22.63	6.41	5.368	0.20(0.04)	0.20	4.2	166.00
1	24.01	8.40	4.595	0.20(0.04)	0.20	5.2	177.00
1	24.34	9.21	4.361	0.20(0.04)	0.20	5.6	181.00
1	24.35	9.30	4.337	0.20(0.04)	0.20	5.6	173.00
1	24.23	9.53	4.274	0.20(0.04)	0.20	5.7	184.00
1	23.89	10.00	4.160	0.20(0.04)	0.20	5.8	195.00
1	23.58	10.39	4.068	0.20(0.04)	0.20	5.9	198.00
1	23.51	10.48	4.049	0.20(0.04)	0.20	5.9	188.00
1	22.96	10.97	3.945	0.20(0.04)	0.20	5.9	191.00
2	6.85	7.17	5.032	0.20(0.04)	0.20	1.5	155.00
3	2.61	6.79	5.194	0.20(0.04)	0.20	0.6	152.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	31.46	6.25	5.442	0.20(0.04)	0.20	5.9	159.00
2	31.56	6.31	5.414	0.20(0.04)	0.20	6.0	163.00
3	31.71	6.41	5.368	0.20(0.04)	0.20	6.1	166.00
4	32.19	6.79	5.194	0.20(0.04)	0.20	6.4	152.00
5	32.54	7.17	5.032	0.20(0.04)	0.20	6.7	155.00
6	32.56	8.40	4.595	0.20(0.04)	0.20	7.3	177.00
7	32.45	9.21	4.361	0.20(0.04)	0.20	7.7	181.00
8	32.42	9.30	4.337	0.20(0.04)	0.20	7.7	173.00
9	32.19	9.53	4.274	0.20(0.04)	0.20	7.8	184.00
10	31.63	10.00	4.160	0.20(0.04)	0.20	7.9	195.00
11	31.15	10.39	4.068	0.20(0.04)	0.20	7.9	198.00
12	31.04	10.48	4.049	0.20(0.04)	0.20	7.9	188.00
13	30.30	10.97	3.945	0.20(0.04)	0.20	8.0	191.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 32.56 Tc(MIN.) = 8.40
EFFECTIVE AREA(ACRES) = 7.31 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 8.0
LONGEST FLOWPATH FROM NODE 198.00 TO NODE 149.00 = 1520.00 FEET.

****
FLOW PROCESS FROM NODE 149.00 TO NODE 142.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 335.88 DOWNSTREAM(FEET) = 332.91

```
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.56
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    8.65
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    142.00 =    1684.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    142.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.65
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       7.31
  TOTAL STREAM AREA(ACRES) =       7.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.56

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    147.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    342.57  DOWNSTREAM(FEET) =    340.97

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    146.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  340.97  DOWNSTREAM ELEVATION(FEET) =  336.48
  STREET LENGTH(FEET) =   298.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    6.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.237
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.18      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    5.52
  EFFECTIVE AREA(ACRES) =      1.41    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       6.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE    148.00 TO NODE    146.00 =     398.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    142.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.97  DOWNSTREAM(FEET) =   332.91
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.59
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE    148.00 TO NODE    142.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    142.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.73
  RAINFALL INTENSITY(INCH/HR) =   5.22
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.41
  TOTAL STREAM AREA(ACRES) =       1.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.59

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    144.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    340.70  DOWNSTREAM(FEET) =    338.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.10      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.10   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  338.80  DOWNSTREAM ELEVATION(FEET) =  336.56
```

```
  STREET LENGTH(FEET) =   106.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   0.69   Tc(MIN.) =    5.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.743
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    1.18
  EFFECTIVE AREA(ACRES) =      0.33    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    145.00 TO NODE    143.00 =     206.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    142.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.97  DOWNSTREAM(FEET) =   332.91
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.30
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.69
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.75
```

```
  LONGEST FLOWPATH FROM NODE    145.00 TO NODE    142.00 =     218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    142.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.75
  RAINFALL INTENSITY(INCH/HR) =   5.71
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       31.46    6.50    5.323  0.20( 0.04) 0.20       5.9     159.00
      1       31.56    6.56    5.296  0.20( 0.04) 0.20       6.0     163.00
      1       31.71    6.65    5.252  0.20( 0.04) 0.20       6.1     166.00
      1       32.19    7.03    5.089  0.20( 0.04) 0.20       6.4     152.00
      1       32.54    7.42    4.935  0.20( 0.04) 0.20       6.7     155.00
      1       32.56    8.65    4.519  0.20( 0.04) 0.20       7.3     177.00
      1       32.45    9.45    4.296  0.20( 0.04) 0.20       7.7     181.00
      1       32.42    9.54    4.272  0.20( 0.04) 0.20       7.7     173.00
      1       32.19    9.78    4.212  0.20( 0.04) 0.20       7.8     184.00
      1       31.63   10.25    4.102  0.20( 0.04) 0.20       7.9     195.00
      1       31.15   10.64    4.013  0.20( 0.04) 0.20       7.9     198.00
      1       31.04   10.73    3.995  0.20( 0.04) 0.20       7.9     188.00
      1       30.30   11.22    3.894  0.20( 0.04) 0.20       8.0     191.00
      2        6.59    6.73    5.217  0.20( 0.04) 0.20       1.4     148.00
      3        1.69    5.75    5.709  0.20( 0.04) 0.20       0.3     145.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       37.74    5.75    5.709  0.20( 0.04) 0.20       6.8     145.00
      2       39.54    6.50    5.323  0.20( 0.04) 0.20       7.6     159.00
      3       39.65    6.56    5.296  0.20( 0.04) 0.20       7.7     163.00
      4       39.83    6.65    5.252  0.20( 0.04) 0.20       7.8     166.00
      5       39.95    6.73    5.217  0.20( 0.04) 0.20       7.9     148.00
      6       40.13    7.03    5.089  0.20( 0.04) 0.20       8.1     152.00
```

```
      7       40.23    7.42    4.935  0.20( 0.04) 0.20       8.4     155.00
      8       39.61    8.65    4.519  0.20( 0.04) 0.20       9.0     177.00
      9       39.15    9.45    4.296  0.20( 0.04) 0.20       9.4     181.00
     10       39.08    9.54    4.272  0.20( 0.04) 0.20       9.5     173.00
     11       38.75    9.78    4.212  0.20( 0.04) 0.20       9.5     184.00
     12       38.02   10.25    4.102  0.20( 0.04) 0.20       9.6     195.00
     13       37.40   10.64    4.013  0.20( 0.04) 0.20       9.7     198.00
     14       37.26   10.73    3.995  0.20( 0.04) 0.20       9.7     188.00
     15       36.36   11.22    3.894  0.20( 0.04) 0.20       9.7     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.23    Tc(MIN.) =     7.42
  EFFECTIVE AREA(ACRES) =       8.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    142.00 =    1684.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 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) =   332.91  DOWNSTREAM(FEET) =   330.71
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.30
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.23
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.50
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    133.00 =    1756.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    344.60  DOWNSTREAM(FEET) =    342.71

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.18      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    139.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.71  DOWNSTREAM ELEVATION(FEET) =  341.91
  STREET LENGTH(FEET) =    58.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   0.44   Tc(MIN.) =    5.44
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.895
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.11      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      0.29    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.47
 FLOW VELOCITY(FEET/SEC.) =  2.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE    141.00 TO NODE    139.00 =     158.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    138.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   338.40  DOWNSTREAM(FEET) =   338.34
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.53
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.50
 LONGEST FLOWPATH FROM NODE    141.00 TO NODE    138.00 =     169.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    138.00 TO NODE    134.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   338.34  DOWNSTREAM(FEET) =   335.85
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.83
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.53
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    6.08
 LONGEST FLOWPATH FROM NODE    141.00 TO NODE    134.00 =     339.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) =    6.08
 RAINFALL INTENSITY(INCH/HR) =   5.53
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.29
 TOTAL STREAM AREA(ACRES) =       0.29
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.53
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    136.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    343.05  DOWNSTREAM(FEET) =    341.43

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.10      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.10   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    135.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.43  DOWNSTREAM ELEVATION(FEET) =  339.57
  STREET LENGTH(FEET) =   136.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    6.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.558
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.33      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    1.64
  EFFECTIVE AREA(ACRES) =      0.43    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.73
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE    137.00 TO NODE    135.00 =     236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    134.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   335.85
  FLOW LENGTH(FEET) =    13.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.14
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.06
  LONGEST FLOWPATH FROM NODE    137.00 TO NODE    134.00 =     249.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) =    6.06
  RAINFALL INTENSITY(INCH/HR) =   5.54
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.14
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.53    6.08    5.530  0.20( 0.04) 0.20       0.3     141.00
      2        2.14    6.06    5.544  0.20( 0.04) 0.20       0.4     137.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.66    6.06    5.544  0.20( 0.04) 0.20       0.7     137.00
      2        3.66    6.08    5.530  0.20( 0.04) 0.20       0.7     141.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.66    Tc(MIN.) =     6.06
  EFFECTIVE AREA(ACRES) =       0.72   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    134.00 =     339.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 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) =   335.85  DOWNSTREAM(FEET) =   330.71
  FLOW LENGTH(FEET) =   318.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.66
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    6.92
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    133.00 =     657.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.66    6.92    5.137  0.20( 0.04) 0.20       0.7     137.00
      2        3.66    6.95    5.125  0.20( 0.04) 0.20       0.7     141.00
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    133.00 =     657.00 FEET.
```

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.74	5.84	5.661	0.20(0.04)	0.20	6.8	145.00
2	39.54	6.59	5.283	0.20(0.04)	0.20	7.6	159.00
3	39.65	6.64	5.258	0.20(0.04)	0.20	7.7	163.00
4	39.83	6.74	5.215	0.20(0.04)	0.20	7.8	166.00
5	39.95	6.82	5.180	0.20(0.04)	0.20	7.9	148.00
6	40.13	7.12	5.054	0.20(0.04)	0.20	8.1	152.00
7	40.23	7.50	4.904	0.20(0.04)	0.20	8.4	155.00
8	39.61	8.73	4.494	0.20(0.04)	0.20	9.0	177.00
9	39.15	9.54	4.274	0.20(0.04)	0.20	9.4	181.00
10	39.08	9.63	4.251	0.20(0.04)	0.20	9.5	173.00
11	38.75	9.87	4.191	0.20(0.04)	0.20	9.5	184.00
12	38.02	10.33	4.082	0.20(0.04)	0.20	9.6	195.00
13	37.40	10.73	3.994	0.20(0.04)	0.20	9.7	198.00
14	37.26	10.82	3.976	0.20(0.04)	0.20	9.7	188.00
15	36.36	11.30	3.877	0.20(0.04)	0.20	9.7	191.00

LONGEST FLOWPATH FROM NODE 198.00 TO NODE 133.00 = 1756.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.15	5.84	5.661	0.20(0.04)	0.20	7.4	145.00
2	43.13	6.59	5.283	0.20(0.04)	0.20	8.3	159.00
3	43.25	6.64	5.258	0.20(0.04)	0.20	8.4	163.00
4	43.45	6.74	5.215	0.20(0.04)	0.20	8.5	166.00
5	43.59	6.82	5.180	0.20(0.04)	0.20	8.6	148.00
6	43.67	6.92	5.137	0.20(0.04)	0.20	8.7	137.00
7	43.69	6.95	5.125	0.20(0.04)	0.20	8.7	141.00
8	43.74	7.12	5.054	0.20(0.04)	0.20	8.8	152.00
9	43.73	7.50	4.904	0.20(0.04)	0.20	9.1	155.00
10	42.81	8.73	4.494	0.20(0.04)	0.20	9.8	177.00
11	42.19	9.54	4.274	0.20(0.04)	0.20	10.1	181.00
12	42.11	9.63	4.251	0.20(0.04)	0.20	10.2	173.00
13	41.73	9.87	4.191	0.20(0.04)	0.20	10.2	184.00
14	40.93	10.33	4.082	0.20(0.04)	0.20	10.3	195.00
15	40.25	10.73	3.994	0.20(0.04)	0.20	10.4	198.00
16	40.09	10.82	3.976	0.20(0.04)	0.20	10.4	188.00
17	39.12	11.30	3.877	0.20(0.04)	0.20	10.4	191.00

TOTAL AREA(ACRES) = 10.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 43.74 Tc(MIN.) = 7.117
EFFECTIVE AREA(ACRES) = 8.84 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 10.4
LONGEST FLOWPATH FROM NODE 198.00 TO NODE 133.00 = 1756.00 FEET.

****

```
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    126.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.71  DOWNSTREAM(FEET) =   329.88
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.74
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    126.30 =    1804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.30 TO NODE    126.30 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.18
  RAINFALL INTENSITY(INCH/HR) =   5.03
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       8.84
  TOTAL STREAM AREA(ACRES) =      10.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.74

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    131.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    340.59  DOWNSTREAM(FEET) =    338.51

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.10      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.10   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    130.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  338.51  DOWNSTREAM ELEVATION(FEET) =  333.43
  STREET LENGTH(FEET) =   277.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.031
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.012

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =   11.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =    6.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.139
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.70      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  13.43
  FLOW VELOCITY(FEET/SEC.) =  2.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
```

```
 LONGEST FLOWPATH FROM NODE    132.00 TO NODE    130.00 =     377.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    126.30 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   329.88
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.40
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.67
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.95
 LONGEST FLOWPATH FROM NODE    132.00 TO NODE    126.30 =     388.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    126.30 TO NODE    126.30 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.95
 RAINFALL INTENSITY(INCH/HR) =   5.12
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.80
 TOTAL STREAM AREA(ACRES) =       0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.67

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    337.40  DOWNSTREAM(FEET) =    335.41

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.11      0.20     0.200    91    5.00
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    127.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  335.41  DOWNSTREAM ELEVATION(FEET) =  333.40
  STREET LENGTH(FEET) =    93.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   0.61   Tc(MIN.) =    5.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.795
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.19      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.98
  EFFECTIVE AREA(ACRES) =      0.30    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.70
  FLOW VELOCITY(FEET/SEC.) =  2.74   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    127.00 =     193.00 FEET.

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

```
 FLOW PROCESS FROM NODE    127.00 TO NODE    126.30 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   329.88
 FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.22
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.55
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.65
 LONGEST FLOWPATH FROM NODE    129.00 TO NODE    126.30 =     205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    126.30 TO NODE    126.30 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.65
 RAINFALL INTENSITY(INCH/HR) =   5.77
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.30
 TOTAL STREAM AREA(ACRES) =       0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.55

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       41.15    5.91    5.623  0.20( 0.04) 0.20       7.4     145.00
     1       43.13    6.66    5.252  0.20( 0.04) 0.20       8.3     159.00
     1       43.25    6.71    5.227  0.20( 0.04) 0.20       8.4     163.00
     1       43.45    6.81    5.185  0.20( 0.04) 0.20       8.5     166.00
     1       43.59    6.89    5.151  0.20( 0.04) 0.20       8.6     148.00
     1       43.67    6.99    5.108  0.20( 0.04) 0.20       8.7     137.00
     1       43.69    7.02    5.096  0.20( 0.04) 0.20       8.7     141.00
     1       43.74    7.18    5.027  0.20( 0.04) 0.20       8.8     152.00
     1       43.73    7.57    4.878  0.20( 0.04) 0.20       9.1     155.00
     1       42.81    8.80    4.474  0.20( 0.04) 0.20       9.8     177.00
     1       42.19    9.61    4.256  0.20( 0.04) 0.20      10.1     181.00
     1       42.11    9.70    4.233  0.20( 0.04) 0.20      10.2     173.00
     1       41.73    9.93    4.175  0.20( 0.04) 0.20      10.2     184.00
     1       40.93   10.40    4.067  0.20( 0.04) 0.20      10.3     195.00
     1       40.25   10.80    3.980  0.20( 0.04) 0.20      10.4     198.00
```

```
     1       40.09   10.89    3.962  0.20( 0.04) 0.20      10.4     188.00
     1       39.12   11.37    3.863  0.20( 0.04) 0.20      10.4     191.00
     2        3.67    6.95    5.124  0.20( 0.04) 0.20       0.8     132.00
     3        1.55    5.65    5.767  0.20( 0.04) 0.20       0.3     129.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.31    5.65    5.767  0.20( 0.04) 0.20       8.0     129.00
      2       46.09    5.91    5.623  0.20( 0.04) 0.20       8.4     145.00
      3       48.15    6.66    5.252  0.20( 0.04) 0.20       9.4     159.00
      4       48.28    6.71    5.227  0.20( 0.04) 0.20       9.5     163.00
      5       48.48    6.81    5.185  0.20( 0.04) 0.20       9.6     166.00
      6       48.63    6.89    5.151  0.20( 0.04) 0.20       9.7     148.00
      7       48.69    6.95    5.124  0.20( 0.04) 0.20       9.7     132.00
      8       48.71    6.99    5.108  0.20( 0.04) 0.20       9.8     137.00
      9       48.71    7.02    5.096  0.20( 0.04) 0.20       9.8     141.00
     10       48.69    7.18    5.027  0.20( 0.04) 0.20       9.9     152.00
     11       48.54    7.57    4.878  0.20( 0.04) 0.20      10.2     155.00
     12       47.22    8.80    4.474  0.20( 0.04) 0.20      10.9     177.00
     13       46.38    9.61    4.256  0.20( 0.04) 0.20      11.2     181.00
     14       46.27    9.70    4.233  0.20( 0.04) 0.20      11.3     173.00
     15       45.84    9.93    4.175  0.20( 0.04) 0.20      11.3     184.00
     16       44.93   10.40    4.067  0.20( 0.04) 0.20      11.4     195.00
     17       44.16   10.80    3.980  0.20( 0.04) 0.20      11.5     198.00
     18       43.99   10.89    3.962  0.20( 0.04) 0.20      11.5     188.00
     19       42.92   11.37    3.863  0.20( 0.04) 0.20      11.5     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.71    Tc(MIN.) =     7.02
  EFFECTIVE AREA(ACRES) =       9.80   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       11.5
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    126.30 =    1804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.30 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.88  DOWNSTREAM(FEET) =   324.77
  FLOW LENGTH(FEET) =   286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.04
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.71
```

```
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    122.00 =    2090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.41
  RAINFALL INTENSITY(INCH/HR) =   4.94
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       9.80
  TOTAL STREAM AREA(ACRES) =      11.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.71

****************************************************************************
  FLOW PROCESS FROM NODE    126.20 TO NODE    126.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   121.00
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    397.58

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.47      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.60
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      2.60

****************************************************************************
  FLOW PROCESS FROM NODE    126.10 TO NODE    126.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.45  DOWNSTREAM ELEVATION(FEET) =  327.76
  STREET LENGTH(FEET) =   453.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 25.84
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.03
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.67
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.72
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
 STREET FLOW TRAVEL TIME(MIN.) =   2.78   Tc(MIN.) =    7.78
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.804
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.66      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.66      SUBAREA RUNOFF(CFS) =    2.83
 EFFECTIVE AREA(ACRES) =      1.13    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       4.84

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.54
 FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
 LONGEST FLOWPATH FROM NODE    126.20 TO NODE    126.00 =     574.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    126.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   324.84  DOWNSTREAM(FEET) =   324.77
 FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.84
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.82
 LONGEST FLOWPATH FROM NODE    126.20 TO NODE    122.00 =     586.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.82
  RAINFALL INTENSITY(INCH/HR) =   4.79
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.84

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    333.20  DOWNSTREAM(FEET) =    332.56

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.614
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.790
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.07      0.20     0.200    91    5.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    123.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  332.56  DOWNSTREAM ELEVATION(FEET) =  327.61
  STREET LENGTH(FEET) =   248.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 13.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    7.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.999
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.39      SUBAREA RUNOFF(CFS) =    1.74
  EFFECTIVE AREA(ACRES) =      0.46    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.80
  FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    123.00 =     348.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.85  DOWNSTREAM(FEET) =   324.77
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.62
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.05
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.32
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    122.00 =     362.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
```

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

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 7.32
RAINFALL INTENSITY(INCH/HR) = 4.97
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.46
TOTAL STREAM AREA(ACRES) = 0.46
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.05

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	45.31	6.05	5.546	0.20(0.04)	0.20	8.0	129.00
1	46.09	6.31	5.417	0.20(0.04)	0.20	8.4	145.00
1	48.15	7.05	5.081	0.20(0.04)	0.20	9.4	159.00
1	48.28	7.11	5.058	0.20(0.04)	0.20	9.5	163.00
1	48.48	7.20	5.019	0.20(0.04)	0.20	9.6	166.00
1	48.63	7.28	4.988	0.20(0.04)	0.20	9.7	148.00
1	48.69	7.34	4.964	0.20(0.04)	0.20	9.7	132.00
1	48.71	7.38	4.949	0.20(0.04)	0.20	9.8	137.00
1	48.71	7.41	4.938	0.20(0.04)	0.20	9.8	141.00
1	48.69	7.58	4.875	0.20(0.04)	0.20	9.9	152.00
1	48.54	7.97	4.738	0.20(0.04)	0.20	10.2	155.00
1	47.22	9.20	4.363	0.20(0.04)	0.20	10.9	177.00
1	46.38	10.00	4.158	0.20(0.04)	0.20	11.2	181.00
1	46.27	10.09	4.137	0.20(0.04)	0.20	11.3	173.00
1	45.84	10.33	4.082	0.20(0.04)	0.20	11.3	184.00
1	44.93	10.80	3.980	0.20(0.04)	0.20	11.4	195.00
1	44.16	11.20	3.898	0.20(0.04)	0.20	11.5	198.00
1	43.99	11.29	3.880	0.20(0.04)	0.20	11.5	188.00
1	42.92	11.78	3.787	0.20(0.04)	0.20	11.5	191.00
2	4.84	7.82	4.788	0.20(0.04)	0.20	1.1	126.20
3	2.05	7.32	4.974	0.20(0.04)	0.20	0.5	125.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.55	6.05	5.546	0.20(0.04)	0.20	9.3	129.00
2	52.45	6.31	5.417	0.20(0.04)	0.20	9.7	145.00
3	54.80	7.05	5.081	0.20(0.04)	0.20	10.8	159.00
4	54.96	7.11	5.058	0.20(0.04)	0.20	10.9	163.00
5	55.20	7.20	5.019	0.20(0.04)	0.20	11.1	166.00

```
      6       55.38    7.28    4.988  0.20( 0.04) 0.20      11.2     148.00
      7       55.43    7.32    4.974  0.20( 0.04) 0.20      11.2     125.00
      8       55.46    7.34    4.964  0.20( 0.04) 0.20      11.3     132.00
      9       55.48    7.38    4.949  0.20( 0.04) 0.20      11.3     137.00
     10       55.48    7.41    4.938  0.20( 0.04) 0.20      11.3     141.00
     11       55.48    7.58    4.875  0.20( 0.04) 0.20      11.5     152.00
     12       55.42    7.82    4.788  0.20( 0.04) 0.20      11.7     126.20
     13       55.29    7.97    4.738  0.20( 0.04) 0.20      11.8     155.00
     14       53.43    9.20    4.363  0.20( 0.04) 0.20      12.5     177.00
     15       52.30   10.00    4.158  0.20( 0.04) 0.20      12.8     181.00
     16       52.16   10.09    4.137  0.20( 0.04) 0.20      12.9     173.00
     17       51.65   10.33    4.082  0.20( 0.04) 0.20      12.9     184.00
     18       50.59   10.80    3.980  0.20( 0.04) 0.20      13.0     195.00
     19       49.70   11.20    3.898  0.20( 0.04) 0.20      13.1     198.00
     20       49.50   11.29    3.880  0.20( 0.04) 0.20      13.1     188.00
     21       48.30   11.78    3.787  0.20( 0.04) 0.20      13.1     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.48    Tc(MIN.) =     7.58
  EFFECTIVE AREA(ACRES) =      11.49   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.1
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    122.00 =    2090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    121.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.77  DOWNSTREAM(FEET) =   324.28
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.07
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.64
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    121.00 =    2127.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.28  DOWNSTREAM(FEET) =   311.40
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.15
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      55.48
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.94
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    114.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    119.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   121.00
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    397.58

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.20      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.44  DOWNSTREAM ELEVATION(FEET) =  331.11
  STREET LENGTH(FEET) =    93.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =    5.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.829
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.21      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    1.09
  EFFECTIVE AREA(ACRES) =      0.41    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.37
  FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    118.00 =     214.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.11  DOWNSTREAM(FEET) =   318.77
  FLOW LENGTH(FEET) =   246.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.14
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    115.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 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.) =    6.15
```

```
  RAINFALL INTENSITY(INCH/HR) =   5.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.41
  TOTAL STREAM AREA(ACRES) =       0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.14

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    95.00
  ELEVATION DATA: UPSTREAM(FEET) =    326.90  DOWNSTREAM(FEET) =    324.29

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.37      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.05
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.29  DOWNSTREAM(FEET) =   318.77
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.05
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
  LONGEST FLOWPATH FROM NODE    117.00 TO NODE    115.00 =     115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 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.) =    5.03
  RAINFALL INTENSITY(INCH/HR) =   6.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.14    6.15    5.497  0.20( 0.04) 0.20       0.4     120.00
      2        2.05    5.03    6.163  0.20( 0.04) 0.20       0.4     117.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.01    5.03    6.163  0.20( 0.04) 0.20       0.7     117.00
      2        3.96    6.15    5.497  0.20( 0.04) 0.20       0.8     120.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.01    Tc(MIN.) =     5.03
  EFFECTIVE AREA(ACRES) =       0.71   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    115.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   318.77  DOWNSTREAM(FEET) =   311.40
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.01
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    5.33
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    114.00 =     627.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.01    5.33    5.962  0.20( 0.04) 0.20       0.7     117.00
      2        3.96    6.45    5.349  0.20( 0.04) 0.20       0.8     120.00
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    114.00 =     627.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.55    6.41    5.366  0.20( 0.04) 0.20       9.3     129.00
      2       52.45    6.66    5.248  0.20( 0.04) 0.20       9.7     145.00
      3       54.80    7.41    4.940  0.20( 0.04) 0.20      10.8     159.00
      4       54.96    7.46    4.919  0.20( 0.04) 0.20      10.9     163.00
      5       55.20    7.56    4.883  0.20( 0.04) 0.20      11.1     166.00
      6       55.38    7.64    4.854  0.20( 0.04) 0.20      11.2     148.00
      7       55.43    7.67    4.840  0.20( 0.04) 0.20      11.2     125.00
      8       55.46    7.70    4.832  0.20( 0.04) 0.20      11.3     132.00
      9       55.48    7.74    4.818  0.20( 0.04) 0.20      11.3     137.00
     10       55.48    7.77    4.808  0.20( 0.04) 0.20      11.3     141.00
     11       55.48    7.94    4.748  0.20( 0.04) 0.20      11.5     152.00
     12       55.42    8.18    4.668  0.20( 0.04) 0.20      11.7     126.20
     13       55.29    8.32    4.621  0.20( 0.04) 0.20      11.8     155.00
     14       53.43    9.56    4.269  0.20( 0.04) 0.20      12.5     177.00
     15       52.30   10.36    4.076  0.20( 0.04) 0.20      12.8     181.00
     16       52.16   10.45    4.055  0.20( 0.04) 0.20      12.9     173.00
     17       51.65   10.69    4.003  0.20( 0.04) 0.20      12.9     184.00
     18       50.59   11.16    3.906  0.20( 0.04) 0.20      13.0     195.00
     19       49.70   11.56    3.827  0.20( 0.04) 0.20      13.1     198.00
     20       49.50   11.65    3.811  0.20( 0.04) 0.20      13.1     188.00
     21       48.30   12.14    3.722  0.20( 0.04) 0.20      13.1     191.00
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    114.00 =    2435.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.70    5.33    5.962  0.20( 0.04) 0.20       8.4     117.00
      2       55.51    6.41    5.366  0.20( 0.04) 0.20      10.1     129.00
      3       55.63    6.45    5.349  0.20( 0.04) 0.20      10.1     120.00
      4       56.33    6.66    5.248  0.20( 0.04) 0.20      10.5     145.00
      5       58.46    7.41    4.940  0.20( 0.04) 0.20      11.6     159.00
      6       58.60    7.46    4.919  0.20( 0.04) 0.20      11.7     163.00
      7       58.81    7.56    4.883  0.20( 0.04) 0.20      11.8     166.00
      8       58.97    7.64    4.854  0.20( 0.04) 0.20      12.0     148.00
```

```
      9       59.01    7.67    4.840  0.20( 0.04) 0.20      12.0     125.00
     10       59.03    7.70    4.832  0.20( 0.04) 0.20      12.0     132.00
     11       59.04    7.74    4.818  0.20( 0.04) 0.20      12.1     137.00
     12       59.04    7.77    4.808  0.20( 0.04) 0.20      12.1     141.00
     13       59.00    7.94    4.748  0.20( 0.04) 0.20      12.3     152.00
     14       58.87    8.18    4.668  0.20( 0.04) 0.20      12.5     126.20
     15       58.70    8.32    4.621  0.20( 0.04) 0.20      12.6     155.00
     16       56.58    9.56    4.269  0.20( 0.04) 0.20      13.2     177.00
     17       55.31   10.36    4.076  0.20( 0.04) 0.20      13.6     181.00
     18       55.15   10.45    4.055  0.20( 0.04) 0.20      13.6     173.00
     19       54.60   10.69    4.003  0.20( 0.04) 0.20      13.7     184.00
     20       53.47   11.16    3.906  0.20( 0.04) 0.20      13.8     195.00
     21       52.53   11.56    3.827  0.20( 0.04) 0.20      13.9     198.00
     22       52.32   11.65    3.811  0.20( 0.04) 0.20      13.9     188.00
     23       51.05   12.14    3.722  0.20( 0.04) 0.20      13.9     191.00
    TOTAL AREA(ACRES) =        13.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       59.04  Tc(MIN.) =    7.738
  EFFECTIVE AREA(ACRES) =     12.08  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.9
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    114.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   311.40  DOWNSTREAM(FEET) =   311.31
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.04
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.77
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    111.00 =    2452.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    7.77
  RAINFALL INTENSITY(INCH/HR) =   4.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      12.08
  TOTAL STREAM AREA(ACRES) =      13.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      59.04

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    397.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.71      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.93
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      3.93

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  326.47  DOWNSTREAM ELEVATION(FEET) =  316.49
  STREET LENGTH(FEET) =   272.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.06   Tc(MIN.) =    6.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.544
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.37      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.37      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =      1.08    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       5.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.48
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    111.00 =     392.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    6.06
  RAINFALL INTENSITY(INCH/HR) =   5.54
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.08
  TOTAL STREAM AREA(ACRES) =       1.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       51.70    5.37    5.939  0.20( 0.04) 0.20       8.4     117.00
      1       55.51    6.45    5.349  0.20( 0.04) 0.20      10.1     129.00
      1       55.63    6.48    5.332  0.20( 0.04) 0.20      10.1     120.00
```

1	56.33	6.70	5.232	0.20(0.04) 0.20	10.5	145.00
1	58.46	7.44	4.926	0.20(0.04) 0.20	11.6	159.00
1	58.60	7.50	4.905	0.20(0.04) 0.20	11.7	163.00
1	58.81	7.59	4.870	0.20(0.04) 0.20	11.8	166.00
1	58.97	7.67	4.841	0.20(0.04) 0.20	12.0	148.00
1	59.01	7.71	4.828	0.20(0.04) 0.20	12.0	125.00
1	59.03	7.73	4.819	0.20(0.04) 0.20	12.0	132.00
1	59.04	7.77	4.805	0.20(0.04) 0.20	12.1	137.00
1	59.04	7.80	4.795	0.20(0.04) 0.20	12.1	141.00
1	59.00	7.97	4.736	0.20(0.04) 0.20	12.3	152.00
1	58.87	8.21	4.657	0.20(0.04) 0.20	12.5	126.20
1	58.70	8.36	4.610	0.20(0.04) 0.20	12.6	155.00
1	56.58	9.59	4.259	0.20(0.04) 0.20	13.2	177.00
1	55.31	10.40	4.067	0.20(0.04) 0.20	13.6	181.00
1	55.15	10.49	4.047	0.20(0.04) 0.20	13.6	173.00
1	54.60	10.73	3.995	0.20(0.04) 0.20	13.7	184.00
1	53.47	11.20	3.899	0.20(0.04) 0.20	13.8	195.00
1	52.53	11.60	3.821	0.20(0.04) 0.20	13.9	198.00
1	52.32	11.68	3.804	0.20(0.04) 0.20	13.9	188.00
1	51.05	12.18	3.716	0.20(0.04) 0.20	13.9	191.00
2	5.35	6.06	5.544	0.20(0.04) 0.20	1.1	113.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	56.79	5.37	5.939	0.20(0.04) 0.20		9.4	117.00
2	59.48	6.06	5.544	0.20(0.04) 0.20		10.5	113.00
3	60.67	6.45	5.349	0.20(0.04) 0.20		11.1	129.00
4	60.78	6.48	5.332	0.20(0.04) 0.20		11.2	120.00
5	61.38	6.70	5.232	0.20(0.04) 0.20		11.5	145.00
6	63.21	7.44	4.926	0.20(0.04) 0.20		12.7	159.00
7	63.33	7.50	4.905	0.20(0.04) 0.20		12.8	163.00
8	63.51	7.59	4.870	0.20(0.04) 0.20		12.9	166.00
9	63.64	7.67	4.841	0.20(0.04) 0.20		13.0	148.00
10	63.67	7.71	4.828	0.20(0.04) 0.20		13.1	125.00
11	63.68	7.73	4.819	0.20(0.04) 0.20		13.1	132.00
12	63.67	7.77	4.805	0.20(0.04) 0.20		13.2	137.00
13	63.66	7.80	4.795	0.20(0.04) 0.20		13.2	141.00
14	63.56	7.97	4.736	0.20(0.04) 0.20		13.4	152.00
15	63.36	8.21	4.657	0.20(0.04) 0.20		13.6	126.20
16	63.15	8.36	4.610	0.20(0.04) 0.20		13.7	155.00
17	60.68	9.59	4.259	0.20(0.04) 0.20		14.3	177.00
18	59.22	10.40	4.067	0.20(0.04) 0.20		14.7	181.00
19	59.05	10.49	4.047	0.20(0.04) 0.20		14.7	173.00
20	58.45	10.73	3.995	0.20(0.04) 0.20		14.8	184.00
21	57.22	11.20	3.899	0.20(0.04) 0.20		14.9	195.00
22	56.20	11.60	3.821	0.20(0.04) 0.20		14.9	198.00

```
    23       55.98   11.68    3.804  0.20( 0.04) 0.20      15.0     188.00
    24       54.62   12.18    3.716  0.20( 0.04) 0.20      15.0     191.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.68    Tc(MIN.) =     7.73
  EFFECTIVE AREA(ACRES) =      13.12   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       15.0
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    111.00 =    2452.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    101.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   311.31  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.24
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.68
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.78
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    101.00 =    2533.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 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.) =    7.78
  RAINFALL INTENSITY(INCH/HR) =   4.80
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      13.12
  TOTAL STREAM AREA(ACRES) =      14.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      63.68

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    344.60  DOWNSTREAM(FEET) =    339.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.02      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.02   PEAK FLOW RATE(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  8 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  339.00  DOWNSTREAM ELEVATION(FEET) =  329.10
  STREET LENGTH(FEET) =   263.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 21.52

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.029
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.029

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.015
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.18
    HALFSTREET FLOOD WIDTH(FEET) =    2.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    6.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.413
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.22      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      0.24    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
```

```
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   3.91
  FLOW VELOCITY(FEET/SEC.) =  3.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    105.00 =     363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    104.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   324.70  DOWNSTREAM(FEET) =   321.90
  FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  GIVEN PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.47
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    104.00 =     422.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    321.90  DOWNSTREAM(FEET) =    318.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    59.00   CHANNEL SLOPE =  0.0525
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.16
  FLOW VELOCITY(FEET/SEC) =   3.54 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    6.75
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    103.00 =     481.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   318.80  DOWNSTREAM(FEET) =   299.34
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    102.00 =     936.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    101.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   299.34  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.90
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.10
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    101.00 =     947.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   4.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       56.79    5.42    5.909  0.20( 0.04) 0.20       9.4     117.00
      1       59.48    6.10    5.520  0.20( 0.04) 0.20      10.5     113.00
      1       60.67    6.49    5.327  0.20( 0.04) 0.20      11.1     129.00
      1       60.78    6.53    5.310  0.20( 0.04) 0.20      11.2     120.00
      1       61.38    6.75    5.212  0.20( 0.04) 0.20      11.5     145.00
      1       63.21    7.49    4.910  0.20( 0.04) 0.20      12.7     159.00
      1       63.33    7.54    4.889  0.20( 0.04) 0.20      12.8     163.00
      1       63.51    7.64    4.854  0.20( 0.04) 0.20      12.9     166.00
      1       63.64    7.72    4.825  0.20( 0.04) 0.20      13.0     148.00
      1       63.67    7.75    4.812  0.20( 0.04) 0.20      13.1     125.00
      1       63.68    7.78    4.803  0.20( 0.04) 0.20      13.1     132.00
      1       63.67    7.82    4.789  0.20( 0.04) 0.20      13.2     137.00
      1       63.66    7.85    4.780  0.20( 0.04) 0.20      13.2     141.00
      1       63.56    8.02    4.721  0.20( 0.04) 0.20      13.4     152.00
      1       63.36    8.25    4.642  0.20( 0.04) 0.20      13.6     126.20
```

1	63.15	8.40	4.596	0.20(0.04)	0.20	13.7	155.00
1	60.68	9.64	4.248	0.20(0.04)	0.20	14.3	177.00
1	59.22	10.44	4.057	0.20(0.04)	0.20	14.7	181.00
1	59.05	10.54	4.037	0.20(0.04)	0.20	14.7	173.00
1	58.45	10.77	3.985	0.20(0.04)	0.20	14.8	184.00
1	57.22	11.24	3.889	0.20(0.04)	0.20	14.9	195.00
1	56.20	11.64	3.812	0.20(0.04)	0.20	14.9	198.00
1	55.98	11.73	3.795	0.20(0.04)	0.20	15.0	188.00
1	54.62	12.22	3.707	0.20(0.04)	0.20	15.0	191.00
2	1.16	8.10	4.694	0.20(0.04)	0.20	0.2	107.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	57.77	5.42	5.909	0.20(0.04)	0.20	9.5	117.00
2	60.51	6.10	5.520	0.20(0.04)	0.20	10.7	113.00
3	61.73	6.49	5.327	0.20(0.04)	0.20	11.3	129.00
4	61.84	6.53	5.310	0.20(0.04)	0.20	11.4	120.00
5	62.45	6.75	5.212	0.20(0.04)	0.20	11.7	145.00
6	64.33	7.49	4.910	0.20(0.04)	0.20	12.9	159.00
7	64.45	7.54	4.889	0.20(0.04)	0.20	13.0	163.00
8	64.64	7.64	4.854	0.20(0.04)	0.20	13.2	166.00
9	64.78	7.72	4.825	0.20(0.04)	0.20	13.3	148.00
10	64.81	7.75	4.812	0.20(0.04)	0.20	13.3	125.00
11	64.82	7.78	4.803	0.20(0.04)	0.20	13.3	132.00
12	64.82	7.82	4.789	0.20(0.04)	0.20	13.4	137.00
13	64.81	7.85	4.780	0.20(0.04)	0.20	13.4	141.00
14	64.72	8.02	4.721	0.20(0.04)	0.20	13.6	152.00
15	64.65	8.10	4.694	0.20(0.04)	0.20	13.7	107.00
16	64.51	8.25	4.642	0.20(0.04)	0.20	13.8	126.20
17	64.28	8.40	4.596	0.20(0.04)	0.20	13.9	155.00
18	61.73	9.64	4.248	0.20(0.04)	0.20	14.6	177.00
19	60.22	10.44	4.057	0.20(0.04)	0.20	14.9	181.00
20	60.05	10.54	4.037	0.20(0.04)	0.20	15.0	173.00
21	59.43	10.77	3.985	0.20(0.04)	0.20	15.0	184.00
22	58.18	11.24	3.889	0.20(0.04)	0.20	15.1	195.00
23	57.14	11.64	3.812	0.20(0.04)	0.20	15.2	198.00
24	56.91	11.73	3.795	0.20(0.04)	0.20	15.2	188.00
25	55.53	12.22	3.707	0.20(0.04)	0.20	15.2	191.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 64.82 Tc(MIN.) = 7.78
EFFECTIVE AREA(ACRES) = 13.35 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 15.2
LONGEST FLOWPATH FROM NODE 198.00 TO NODE 101.00 = 2533.00 FEET.

```
****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    100.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   276.00
  FLOW LENGTH(FEET) =   491.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.52
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.82
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    100.00 =    3024.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.22
  RAINFALL INTENSITY(INCH/HR) =   4.65
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      13.35
  TOTAL STREAM AREA(ACRES) =      15.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.82

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    396.54

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.566
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.818
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.17      0.20     0.200    91    5.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.88

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  9 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  396.54  DOWNSTREAM ELEVATION(FEET) =  297.70
  STREET LENGTH(FEET) =   362.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  21.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.012
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.012

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.050
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    9.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.54
  STREET FLOW TRAVEL TIME(MIN.) =   0.61   Tc(MIN.) =    6.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.480
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.15      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =      0.32    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.18   HALFSTREET FLOOD WIDTH(FEET) =   3.86
  FLOW VELOCITY(FEET/SEC.) =  7.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    100.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   293.00  DOWNSTREAM(FEET) =   276.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.08
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.57
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 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.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   5.44
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.32
  TOTAL STREAM AREA(ACRES) =       0.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.57

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       57.77    5.87    5.642  0.20( 0.04) 0.20       9.5     117.00
      1       60.51    6.55    5.299  0.20( 0.04) 0.20      10.7     113.00
      1       61.73    6.94    5.127  0.20( 0.04) 0.20      11.3     129.00
      1       61.84    6.98    5.112  0.20( 0.04) 0.20      11.4     120.00
      1       62.45    7.19    5.024  0.20( 0.04) 0.20      11.7     145.00
      1       64.33    7.93    4.751  0.20( 0.04) 0.20      12.9     159.00
      1       64.45    7.98    4.732  0.20( 0.04) 0.20      13.0     163.00
      1       64.64    8.08    4.700  0.20( 0.04) 0.20      13.2     166.00
      1       64.78    8.16    4.674  0.20( 0.04) 0.20      13.3     148.00
      1       64.81    8.20    4.661  0.20( 0.04) 0.20      13.3     125.00
      1       64.82    8.22    4.654  0.20( 0.04) 0.20      13.3     132.00
      1       64.82    8.26    4.641  0.20( 0.04) 0.20      13.4     137.00
      1       64.81    8.29    4.632  0.20( 0.04) 0.20      13.4     141.00
      1       64.72    8.46    4.578  0.20( 0.04) 0.20      13.6     152.00
      1       64.65    8.54    4.553  0.20( 0.04) 0.20      13.7     107.00
      1       64.51    8.70    4.505  0.20( 0.04) 0.20      13.8     126.20
      1       64.28    8.84    4.462  0.20( 0.04) 0.20      13.9     155.00
      1       61.73   10.09    4.138  0.20( 0.04) 0.20      14.6     177.00
```

1	60.22	10.90	3.960	0.20(0.04)	0.20	14.9	181.00
1	60.05	10.99	3.941	0.20(0.04)	0.20	15.0	173.00
1	59.43	11.23	3.892	0.20(0.04)	0.20	15.0	184.00
1	58.18	11.70	3.802	0.20(0.04)	0.20	15.1	195.00
1	57.14	12.10	3.728	0.20(0.04)	0.20	15.2	198.00
1	56.91	12.19	3.713	0.20(0.04)	0.20	15.2	188.00
1	55.53	12.68	3.629	0.20(0.04)	0.20	15.2	191.00
2	1.57	6.26	5.442	0.20(0.04)	0.20	0.3	110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	59.29	5.87	5.642	0.20(0.04)	0.20	9.8	117.00
2	60.88	6.26	5.442	0.20(0.04)	0.20	10.5	110.00
3	62.03	6.55	5.299	0.20(0.04)	0.20	11.0	113.00
4	63.20	6.94	5.127	0.20(0.04)	0.20	11.6	129.00
5	63.31	6.98	5.112	0.20(0.04)	0.20	11.7	120.00
6	63.90	7.19	5.024	0.20(0.04)	0.20	12.1	145.00
7	65.70	7.93	4.751	0.20(0.04)	0.20	13.2	159.00
8	65.81	7.98	4.732	0.20(0.04)	0.20	13.3	163.00
9	65.99	8.08	4.700	0.20(0.04)	0.20	13.5	166.00
10	66.12	8.16	4.674	0.20(0.04)	0.20	13.6	148.00
11	66.15	8.20	4.661	0.20(0.04)	0.20	13.6	125.00
12	66.16	8.22	4.654	0.20(0.04)	0.20	13.7	132.00
13	66.15	8.26	4.641	0.20(0.04)	0.20	13.7	137.00
14	66.14	8.29	4.632	0.20(0.04)	0.20	13.7	141.00
15	66.03	8.46	4.578	0.20(0.04)	0.20	13.9	152.00
16	65.96	8.54	4.553	0.20(0.04)	0.20	14.0	107.00
17	65.80	8.70	4.505	0.20(0.04)	0.20	14.1	126.20
18	65.56	8.84	4.462	0.20(0.04)	0.20	14.2	155.00
19	62.92	10.09	4.138	0.20(0.04)	0.20	14.9	177.00
20	61.36	10.90	3.960	0.20(0.04)	0.20	15.2	181.00
21	61.18	10.99	3.941	0.20(0.04)	0.20	15.3	173.00
22	60.55	11.23	3.892	0.20(0.04)	0.20	15.3	184.00
23	59.27	11.70	3.802	0.20(0.04)	0.20	15.4	195.00
24	58.21	12.10	3.728	0.20(0.04)	0.20	15.5	198.00
25	57.98	12.19	3.713	0.20(0.04)	0.20	15.5	188.00
26	56.58	12.68	3.629	0.20(0.04)	0.20	15.5	191.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 66.16 Tc(MIN.) = 8.22
EFFECTIVE AREA(ACRES) = 13.67 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 15.5
LONGEST FLOWPATH FROM NODE 198.00 TO NODE 100.00 = 3024.00 FEET.

****

```
 FLOW PROCESS FROM NODE    202.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   123.00
 ELEVATION DATA: UPSTREAM(FEET) =    362.50  DOWNSTREAM(FEET) =    321.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.05      0.20     0.200    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.05   PEAK FLOW RATE(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    200.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    321.90  DOWNSTREAM(FEET) =    295.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   107.00   CHANNEL SLOPE =  0.2514
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   0.960
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.014
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.36      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.01
 AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   0.25
 Tc(MIN.) =    5.25
 SUBAREA AREA(ACRES) =     0.36       SUBAREA RUNOFF(CFS) =    1.94
 EFFECTIVE AREA(ACRES) =      0.41     AREA-AVERAGED Fm(INCH/HR) =   0.04
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
 TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.20

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.53   FLOW VELOCITY(FEET/SEC.) =   8.14
```

```
  LONGEST FLOWPATH FROM NODE    202.00 TO NODE    200.00 =     230.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.4  TC(MIN.) =      5.25
  EFFECTIVE AREA(ACRES) =      0.41  AREA-AVERAGED Fm(INCH/HR)=  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       2.20
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix 5

CONCEPTUAL GRADING AND UTILITY PLANS

Appendix 6

FEMA FLOOD MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from the National Agriculture Imagery Program, dated 2005.

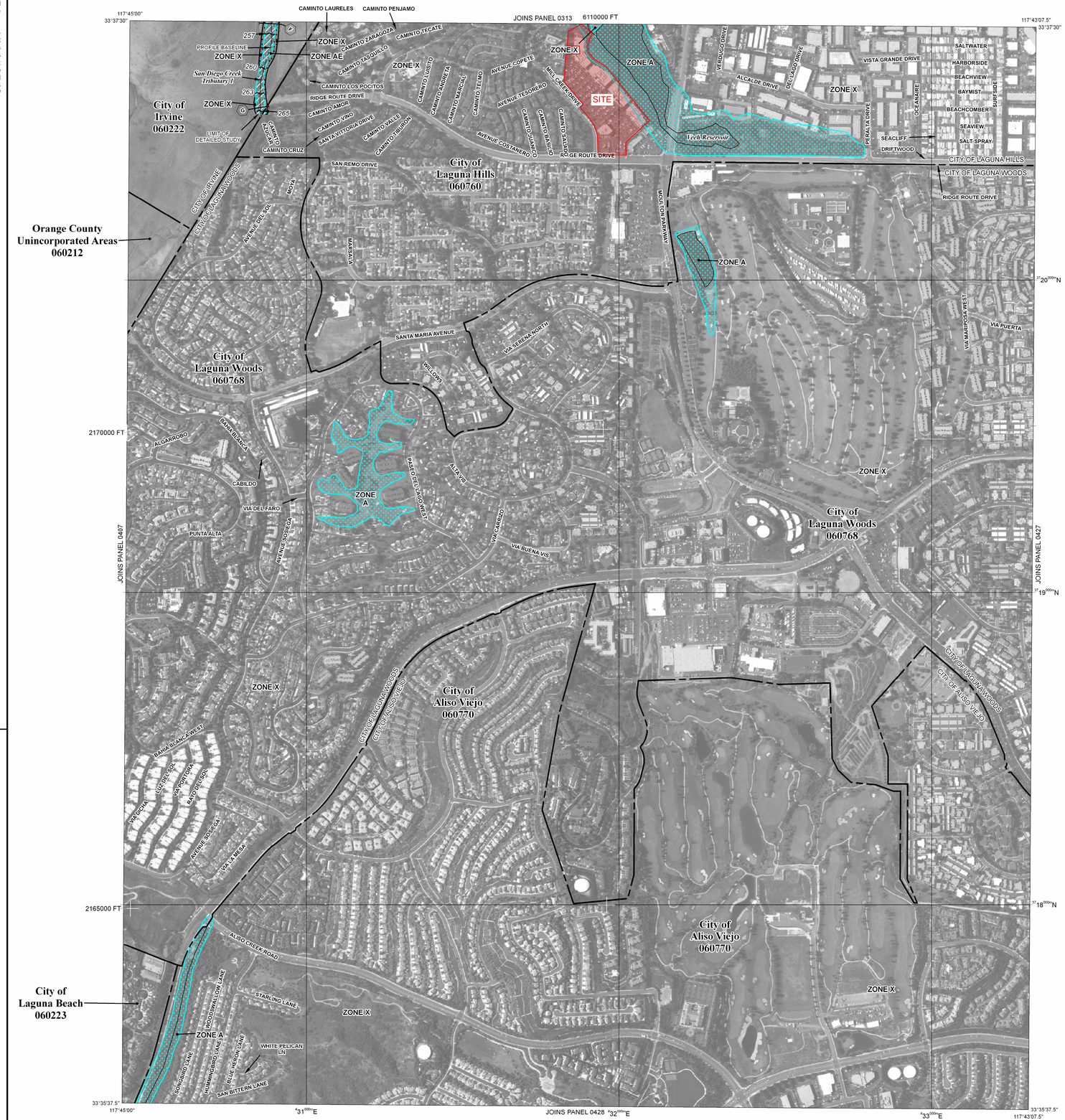
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 3776000mN — 1000-meter Universal Transverse Mercator grid values, zone NAD 1983 UTM Zone 11N
- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 15, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 5, 1992 - November 3, 1993 - January 3, 1997 - February 18, 2004 - December 3, 2009 : for description of revisions, see Notice to Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0426J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 426 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALISO VIEJO, CITY OF	060770	0426	J
IRVINE, CITY OF	060222	0426	J
LAGUNA BEACH, CITY OF	060223	0426	J
LAGUNA HILLS, CITY OF	060760	0426	J
LAGUNA WOODS, CITY OF	060768	0426	J
ORANGE COUNTY	060212	0426	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0426J

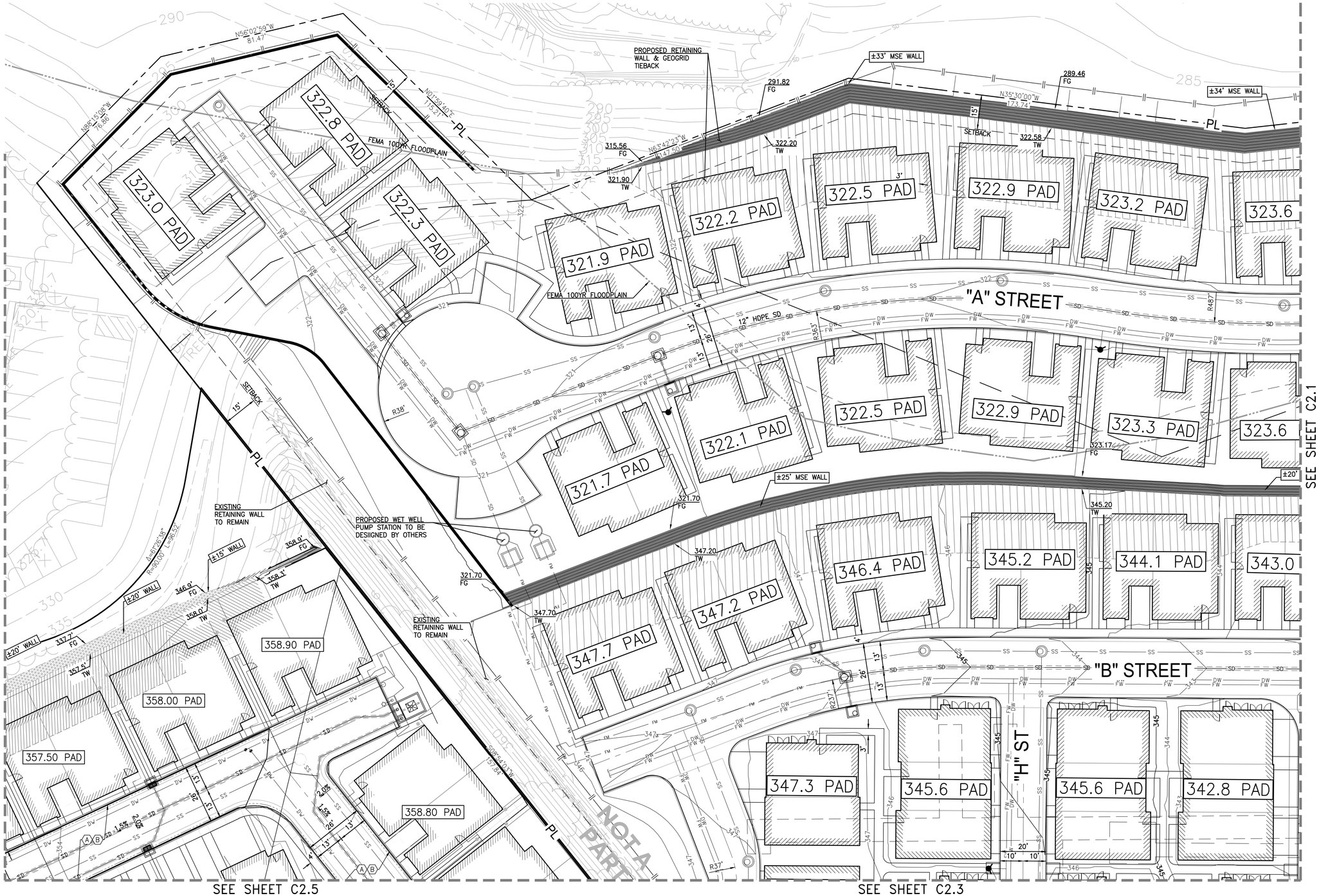
MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

Appendix 7

FEMA LETTER OF MAP REVISION (LOMR)

CONCEPTUAL GRADING AND UTILITY PLANS



LEGEND

PROPOSED:

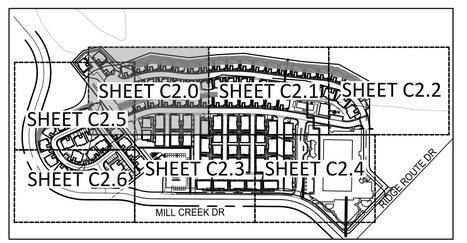
- STREET CENTERLINE
- RIGHT OF WAY (R/W)
- EASEMENT
- SEWER PIPE (SS)
- SEWER MANHOLE
- SEWER CLEANOUT
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- FIRE HYDRANT
- STORM DRAIN (SD)
- CATCH BASIN
- JUNCTION STRUCTURE
- STORM DRAIN INLET
- BUILDING
- CONCRETE
- ASPHALT CONCRETE
- ELECTRICAL (E)
- GAS (G)
- SIDEWALK
- CURB AND GUTTER
- MODULAR WETLAND SYSTEM (MWS)
- STORM WATER DETENTION VAULT
- FILTERRA BIOFILTRATION SYSTEM
- SEWER POC TO BUILDING (S)
- WATER POC TO BUILDING (W)
- ROOF DRAIN (RD)
- DEMOLITION OF UTILITY LINE
- STREET LIGHT
- AREA DRAIN
- SIDEWALK UNDERDRAIN
- FENCE PER LANDSCAPE PLANS
- SLOPE/MSE WALL
- GEOGRID/TIE-BACKS

EXISTING:

- STREET LIGHT
- SEWER PIPE (SS)
- SEWER MANHOLE
- UTILITY VALVE
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- STORM DRAIN
- FIRE HYDRANT

EASEMENTS NOTES

1. EASEMENT FOR OPEN YARD SPACE, RECORDED OCTOBER 8, 1982, INSTRUMENT NO.82-3555433, OF OFFICIAL RECORDS.
2. EASEMENT FOR EXCAVATION, CONSTRUCTION, GRADING, IMPROVEMENT, USE AND MAINTENANCE OF SLOPES RECORDED OCTOBER 8, 1982, INSTRUMENT NO. 82-355434, OF OFFICIAL RECORDS.
4. EASEMENT FOR PIPELINE OR PIPELINES, RECORDED SEPTEMBER 3, 1987, INSTRUMENT NO. 87-502144, AND RE-RECORDED JUNE 1, 19989, INSTRUMENT NO.89-289215, AND RE-RECORDED NOVEMBER 23,1999 INSTRUMENT NO. 99-811213, OF OFFICIAL RECORDS.
5. EASEMENT FOR PUBLIC UTILITIES, RECORDED SEPTEMBER 6, 1988, INSTRUMENT NO. 88-447131, AND RE-RECORDED JULY 18, 1989, INSTRUMENT NO. 89-377312, OF OFFICIAL RECORDS.
7. EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED 12, 1984 AS INSTRUMENT NO. 84-423525 OF OFFICIAL RECORDS. IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY.



TERRAVITA

LAGUNA HILLS | CA

KINGSBARN | KELEMEN CO. | 24-099

DATE 09 | 20 | 24

REGISTERED PROFESSIONAL ENGINEER
KENNETH T. KOZLIK
No. RCE 71883
Civil
STATE OF CALIFORNIA

KINGSBARN®
CAPITAL & DEVELOPMENT

KELEMEN COMPANY

FUSCOE ENGINEERING

1"=20'-0"SCALE
0 20 40

NORTH

F:\PROJECTS\4014\002\PLANS\ENTITLEMENTS\CONCEPTUAL GRADING PLAN\4014-002 GP.DWG (09-24-2025 9:00:50AM) Plotted by: nmalone

CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.0

URBAN ARENA

CONCEPTUAL GRADING AND UTILITY PLANS

LEGEND

PROPOSED:

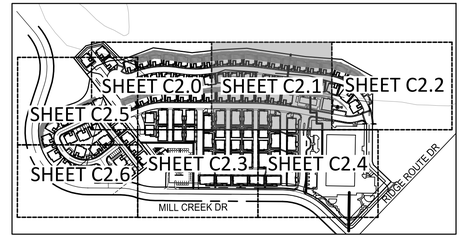
- STREET CENTERLINE
- RIGHT OF WAY (R/W)
- EASEMENT
- SEWER PIPE (SS)
- SEWER MANHOLE
- SEWER CLEANOUT
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- FIRE HYDRANT
- STORM DRAIN (SD)
- CATCH BASIN
- JUNCTION STRUCTURE
- STORM DRAIN INLET
- BUILDING
- CONCRETE
- ASPHALT CONCRETE
- ELECTRICAL (E)
- GAS (G)
- SIDEWALK
- CURB AND GUTTER
- MODULAR WETLAND SYSTEM (MWS)
- STORM WATER DETENTION VAULT
- FILTERRA BIOFILTRATION SYSTEM
- SEWER POC TO BUILDING (S)
- WATER POC TO BUILDING (W)
- ROOF DRAIN (RD)
- DEMOLITION OF UTILITY LINE
- STREET LIGHT
- AREA DRAIN
- SIDEWALK UNDERDRAIN
- FENCE PER LANDSCAPE PLANS
- SLOPE/MSE WALL
- GEOGRID/TIE-BACKS

EXISTING:

- STREET LIGHT
- SEWER PIPE (SS)
- SEWER MANHOLE
- UTILITY VALVE
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- STORM DRAIN
- FIRE HYDRANT

EASEMENTS NOTES

(4) EASEMENT FOR PIPELINE OR PIPELINES, RECORDED SEPTEMBER 3, 1987, INSTRUMENT NO. 87-502144, AND RE-RECORDED JUNE 1, 19989, INSTRUMENT NO.89-289215, AND RE-RECORDED NOVEMBER 23,1999 INSTRUMENT NO. 99-811213, OF OFFICIAL RECORDS.



TERRAVITA

LAGUNA HILLS | CA

KINGSBARN | KELEMEN CO. | 24-099

DATE 09 | 20 | 24

REGISTERED PROFESSIONAL ENGINEER — KENNETH T. KOLLIK — No. RCE 71883 — Civil — STATE OF CALIFORNIA

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KELEMEN COMPANY

FUSCOE ENGINEERING

1"=20'-0" SCALE (0, 20, 40) NORTH

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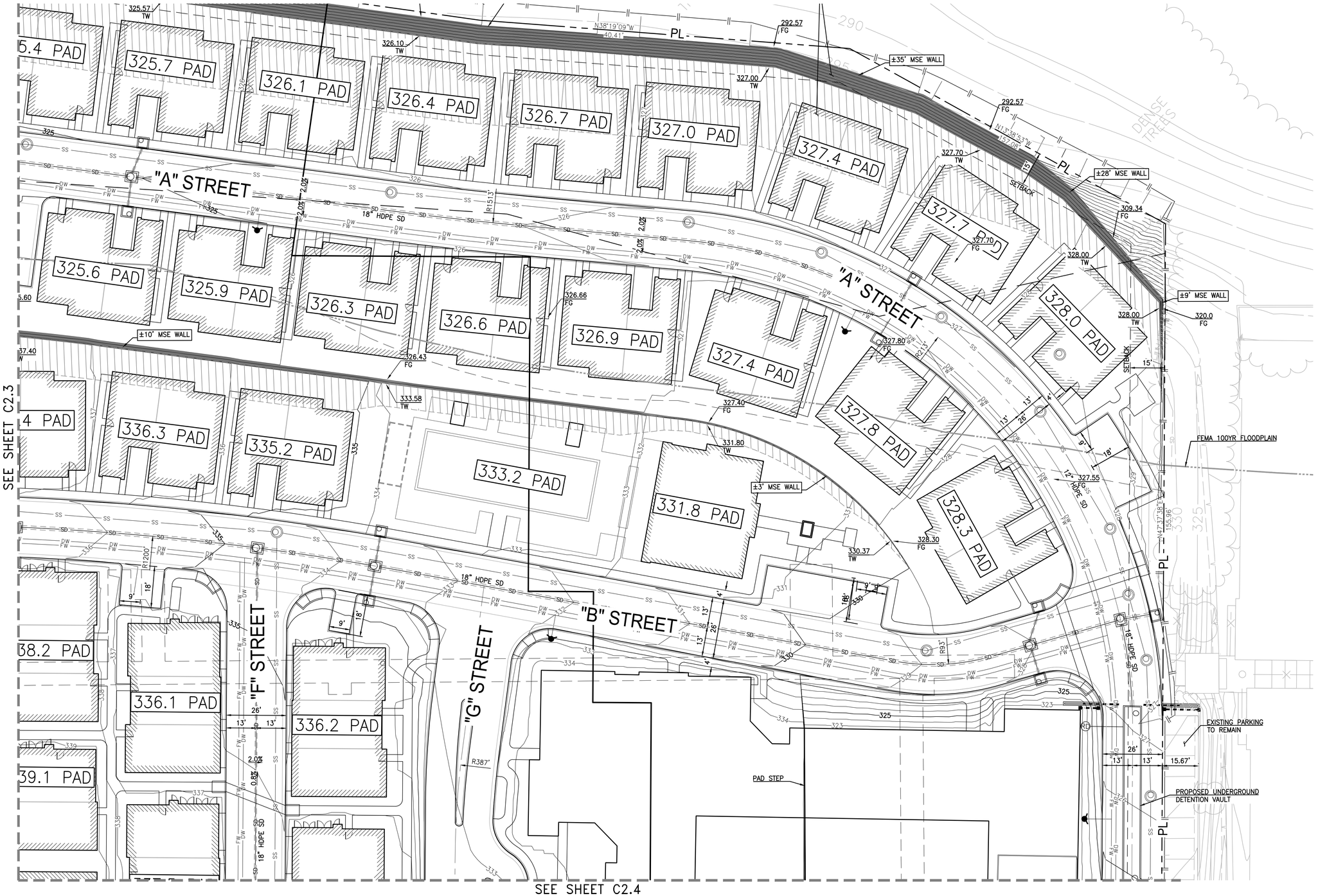
CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.1

URBAN ARENA

CONCEPTUAL GRADING AND UTILITY PLANS



LEGEND

PROPOSED:

- STREET CENTERLINE
- RIGHT OF WAY (R/W)
- EASEMENT
- SEWER PIPE (SS)
- SEWER MANHOLE
- SEWER CLEANOUT
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- FIRE HYDRANT
- STORM DRAIN (SD)
- CATCH BASIN
- JUNCTION STRUCTURE
- STORM DRAIN INLET
- BUILDING
- CONCRETE
- ASPHALT CONCRETE
- ELECTRICAL (E)
- GAS (G)
- SIDEWALK
- CURB AND GUTTER
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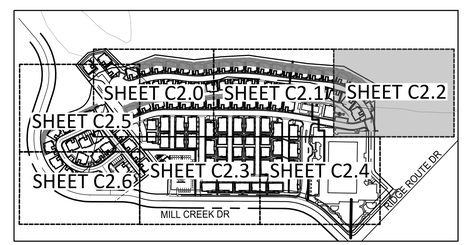
- FILTERRA BIOFILTRATION SYSTEM
- SEWER POC TO BUILDING (S)
- WATER POC TO BUILDING (W)
- ROOF DRAIN (RD)
- DEMOLITION OF UTILITY LINE
- STREET LIGHT
- AREA DRAIN
- SIDEWALK UNDERDRAIN
- FENCE PER LANDSCAPE PLANS
- SLOPE/MSE WALL
- GEOGRID/TIE-BACKS

EXISTING:

- STREET LIGHT
- SEWER PIPE (SS)
- SEWER MANHOLE
- UTILITY VALVE
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- STORM DRAIN (SD)
- FIRE HYDRANT

EASEMENTS NOTES

(4) EASEMENT FOR PIPELINE OR PIPELINES, RECORDED SEPTEMBER 3, 1987, INSTRUMENT NO. 87-502144, AND RE-RECORDED JUNE 1, 19989, INSTRUMENT NO.89-289215, AND RE-RECORDED NOVEMBER 23,1999 INSTRUMENT NO. 99-811213, OF OFFICIAL RECORDS.



TERRAVITA

LAGUNA HILLS | CA

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1"=20'-0" SCALE (0 | 20 | 40)

NORTH

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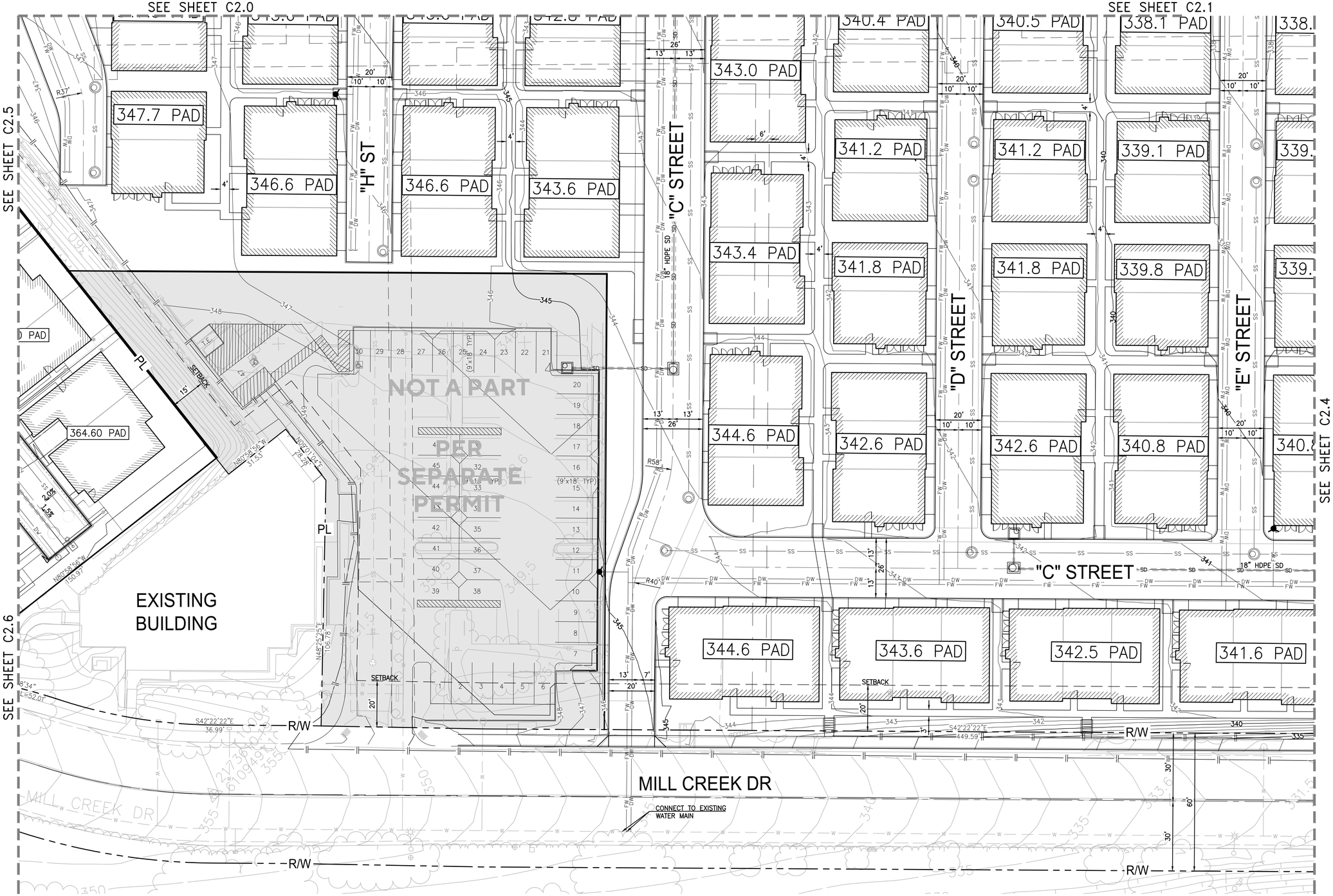
CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.2

URBAN ARENA

CONCEPTUAL GRADING AND UTILITY PLANS



LEGEND

PROPOSED:

- STREET CENTERLINE
- RIGHT OF WAY (R/W)
- EASEMENT
- SEWER PIPE (SS)
- SEWER MANHOLE
- SEWER CLEANOUT
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- FIRE HYDRANT
- STORM DRAIN (SD)
- CATCH BASIN
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EXISTING:

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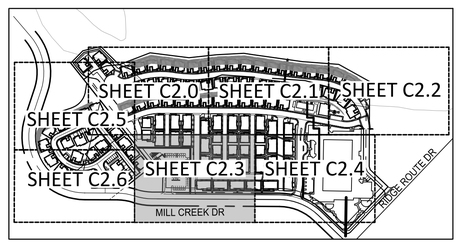
- UTILITY VALVE
- FIRE WATER (FW)
- DOMESTIC WATER (W)
- STORM DRAIN
- FIRE HYDRANT

EASEMENTS NOTES

(4) EASEMENT FOR PIPELINE OR PIPELINES, RECORDED SEPTEMBER 3, 1987, INSTRUMENT NO. 87-502144, AND RE-RECORDED JUNE 1, 19989, INSTRUMENT NO.89-289215, AND RE-RECORDED NOVEMBER 23,1999 INSTRUMENT NO. 99-811213, OF OFFICIAL RECORDS.

(5) EASEMENT FOR PUBLIC UTILITIES, RECORDED SEPTEMBER 6, 1988, INSTRUMENT NO. 88-447131, AND RE-RECORDED JULY 18, 1989, INSTRUMENT NO. 89-377312, OF OFFICIAL RECORDS.

(8) EASEMENT FOR INSTALL, ENLARGE, CONSTRUCT, RECONSTRUCT, REMOVE AND REPLACE, OPERATE, INSPECT, MAINTAIN REPAIR, IMPROVE AND RELOCATE PIPELINES, TOGETHER WITH INCIDENTAL APPURTENANCES, RECORDED NOVEMBER 2,1999, INSTRUMENT NO. 99-767419, OFFICIAL RECORDS.



TERRAVITA

LAGUNA HILLS | CA

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Civil
STATE OF CALIFORNIA

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1"=20'-0"SCALE
0 20 40

NORTH

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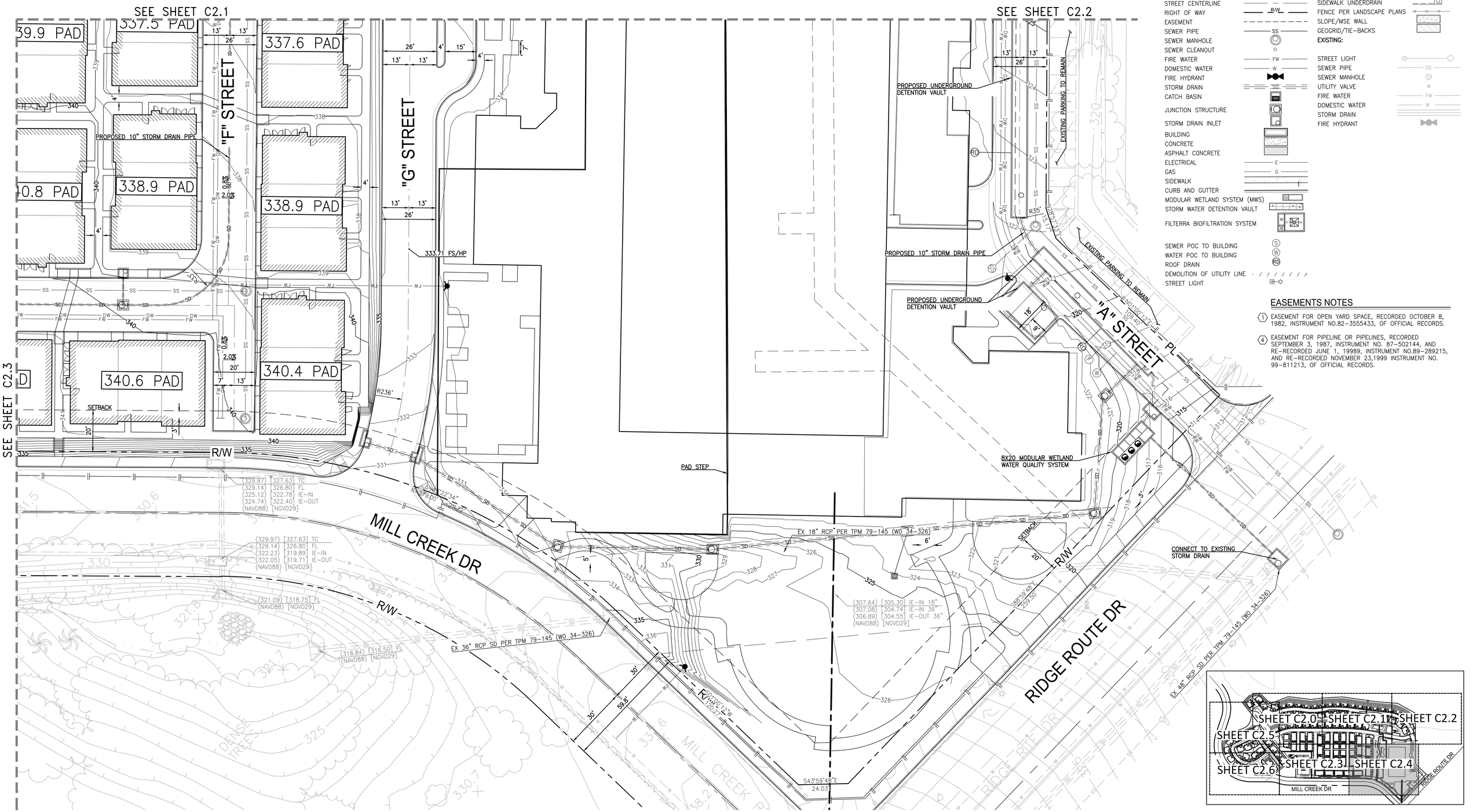
CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.3

URBAN ARENA

CONCEPTUAL GRADING AND UTILITY PLANS



LEGEND

PROPOSED:

- STREET CENTERLINE
- RIGHT OF WAY
- EASEMENT
- SEWER PIPE
- SEWER MANHOLE
- SEWER CLEANOUT
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- DOMESTIC WATER
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- SEWER PIPE
- SEWER MANHOLE
- UTILITY VALVE
- FIRE WATER
- DOMESTIC WATER
- STORM DRAIN
- FIRE HYDRANT

EASEMENTS NOTES

(1) EASEMENT FOR OPEN YARD SPACE, RECORDED OCTOBER 8, 1982, INSTRUMENT NO.82-3555433, OF OFFICIAL RECORDS.

(4) EASEMENT FOR PIPELINE OR PIPELINES, RECORDED SEPTEMBER 3, 1987, INSTRUMENT NO. 87-502144, AND RE-RECORDED JUNE 1, 19989, INSTRUMENT NO.89-289215, AND RE-RECORDED NOVEMBER 23,1999 INSTRUMENT NO. 99-811213, OF OFFICIAL RECORDS.

TERRAVITA

LAGUNA HILLS | CA

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KELEMEN COMPANY

FUSCOE ENGINEERING

1"=20'-0"SCALE
0 20 40

NORTH

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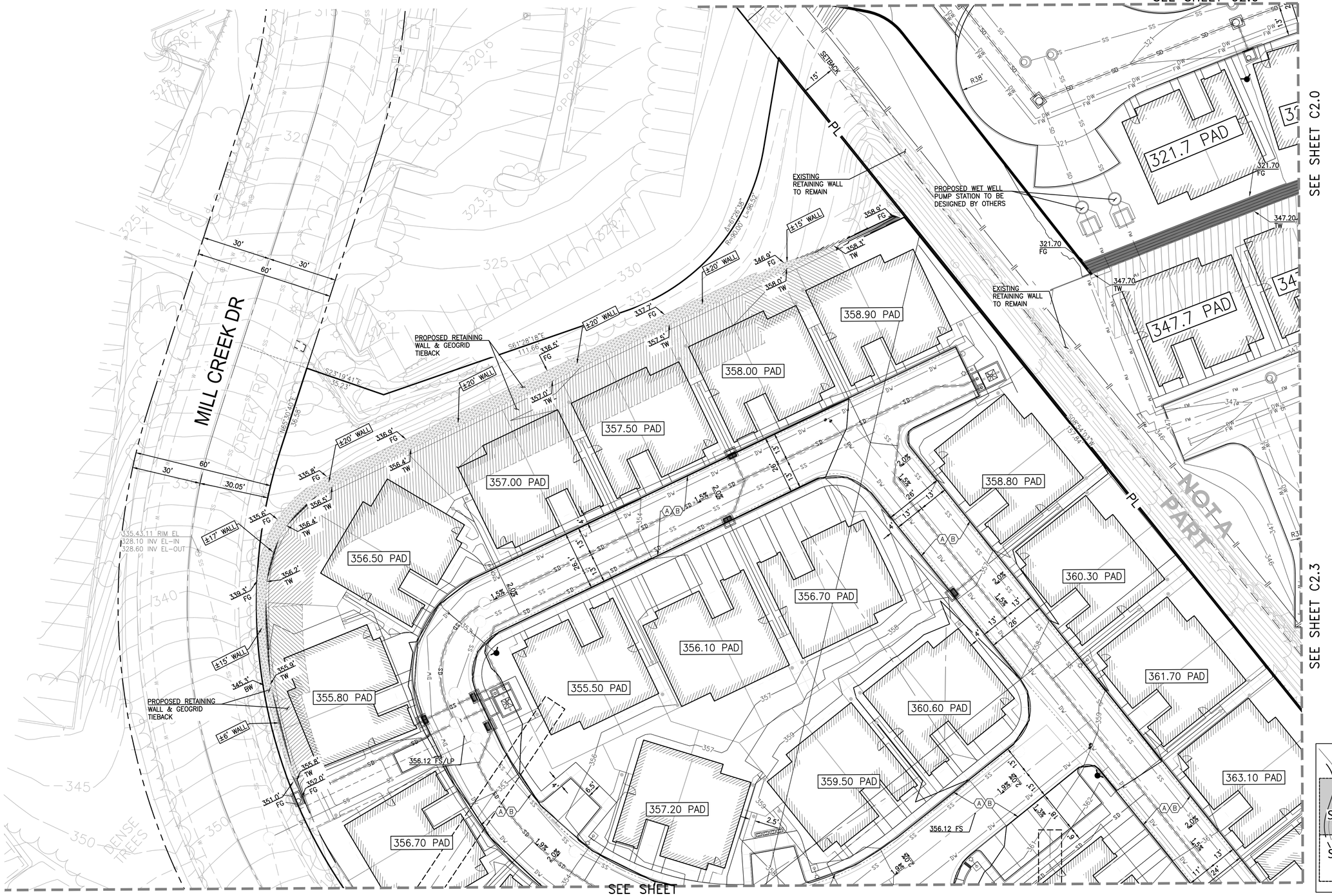
CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.4

URBAN ARENA

CONCEPTUAL GRADING AND UTILITY PLANS



LEGEND

PROPOSED:

- STREET CENTERLINE
- RIGHT OF WAY (R/W)
- EASEMENT
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- SEWER MANHOLE
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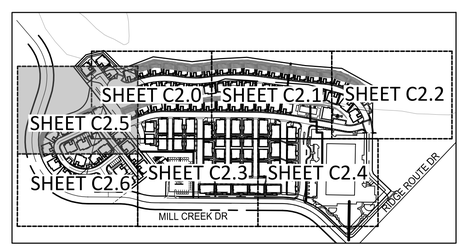
EASEMENTS NOTES

(A) EASEMENT FOR EMERGENCY ACCESS PURPOSES TO THE CITY OF LAGUNA HILLS

(B) EASEMENT TO EL TORO WATER DISTRICT FOR SEWER AND WATER PURPOSES



TERRAVITA

LAGUNA HILLS | CA

KINGSBARN | KELEMEN CO. | 24-099

DATE 09 | 20 | 24

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1"=20'-0" SCALE — 0 — 20 — 40

NORTH

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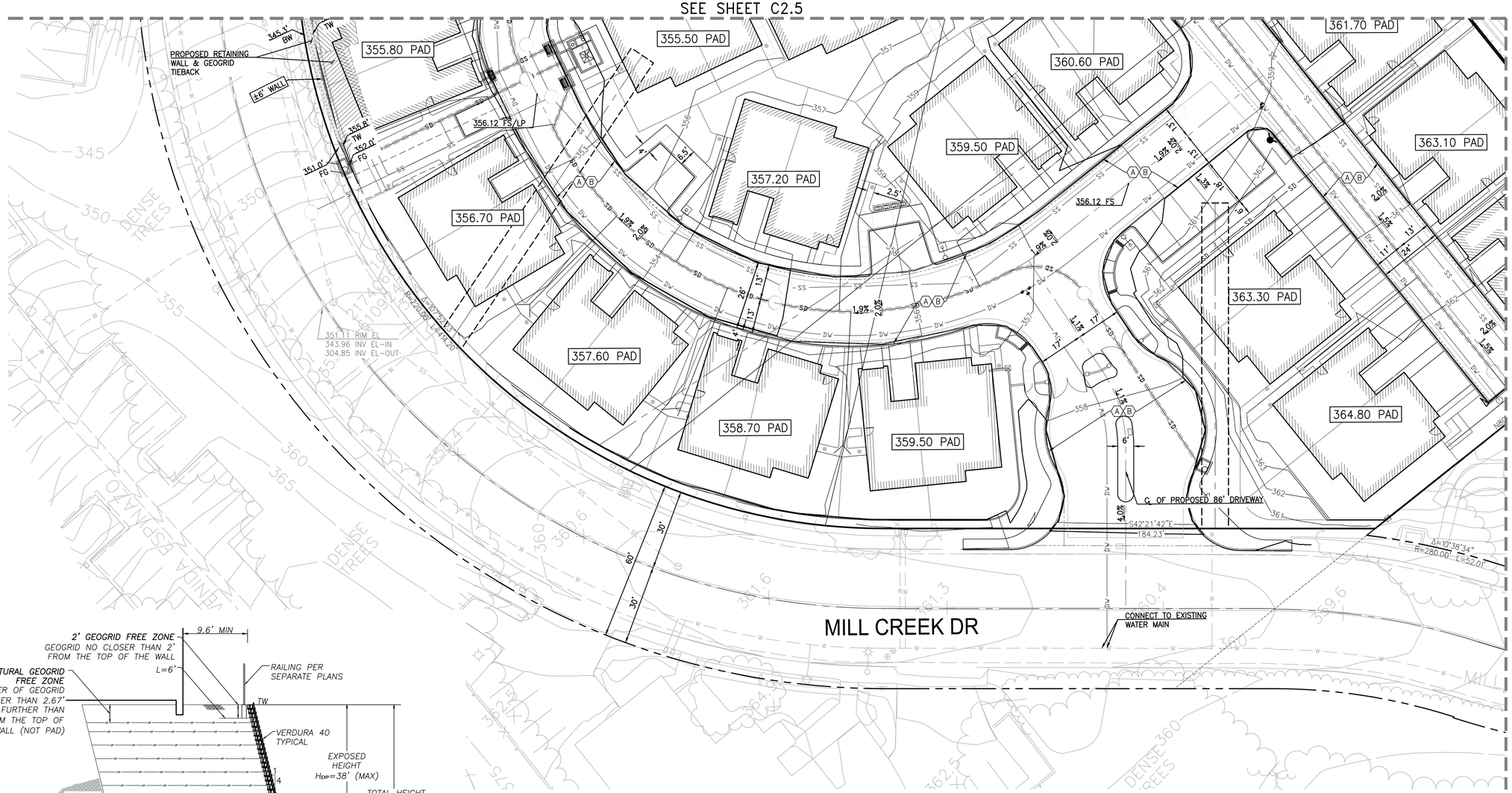
CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.5

URBAN ARENA

CONCEPTUAL GRADING AND UTILITY PLANS

SEE SHEET C2.5



LEGEND

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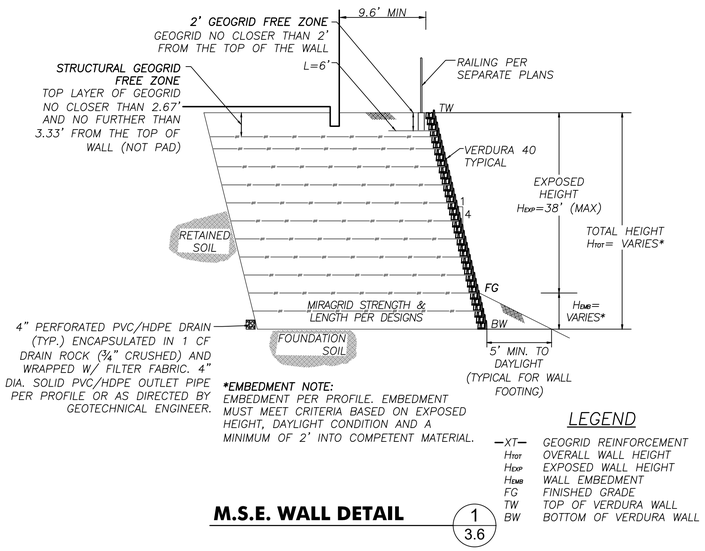
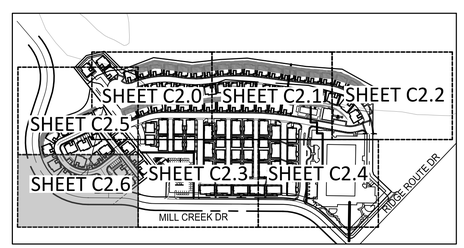


***EMBEDMENT NOTE:**
EMBEDMENT PER PROFILE. EMBEDMENT MUST MEET CRITERIA BASED ON EXPOSED HEIGHT, DAYLIGHT CONDITION AND A MINIMUM OF 2' INTO COMPETENT MATERIAL.

LEGEND

—XT—	GEOGRID REINFORCEMENT
H_{TOT}	OVERALL WALL HEIGHT
H_{EXP}	EXPOSED WALL HEIGHT
H_{EMB}	WALL EMBEDMENT
FG	FINISHED GRADE
TW	TOP OF VERDURA WALL
BW	BOTTOM OF VERDURA WALL

M.S.E. WALL DETAIL 1 / 3.6



TERRAVITA
LAGUNA HILLS | CA

KINGSBARN | KELEMEN CO. | 24-099

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1"=20'-0" SCALE (0, 20, 40) NORTH

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CONCEPTUAL GRADING AND DRAINAGE PLAN | C2.6

URBAN ARENA

Appendix 8

HYDROGRAPHS, STORAGE CURVES & INFLOW HYDROGRAPH INPUTS

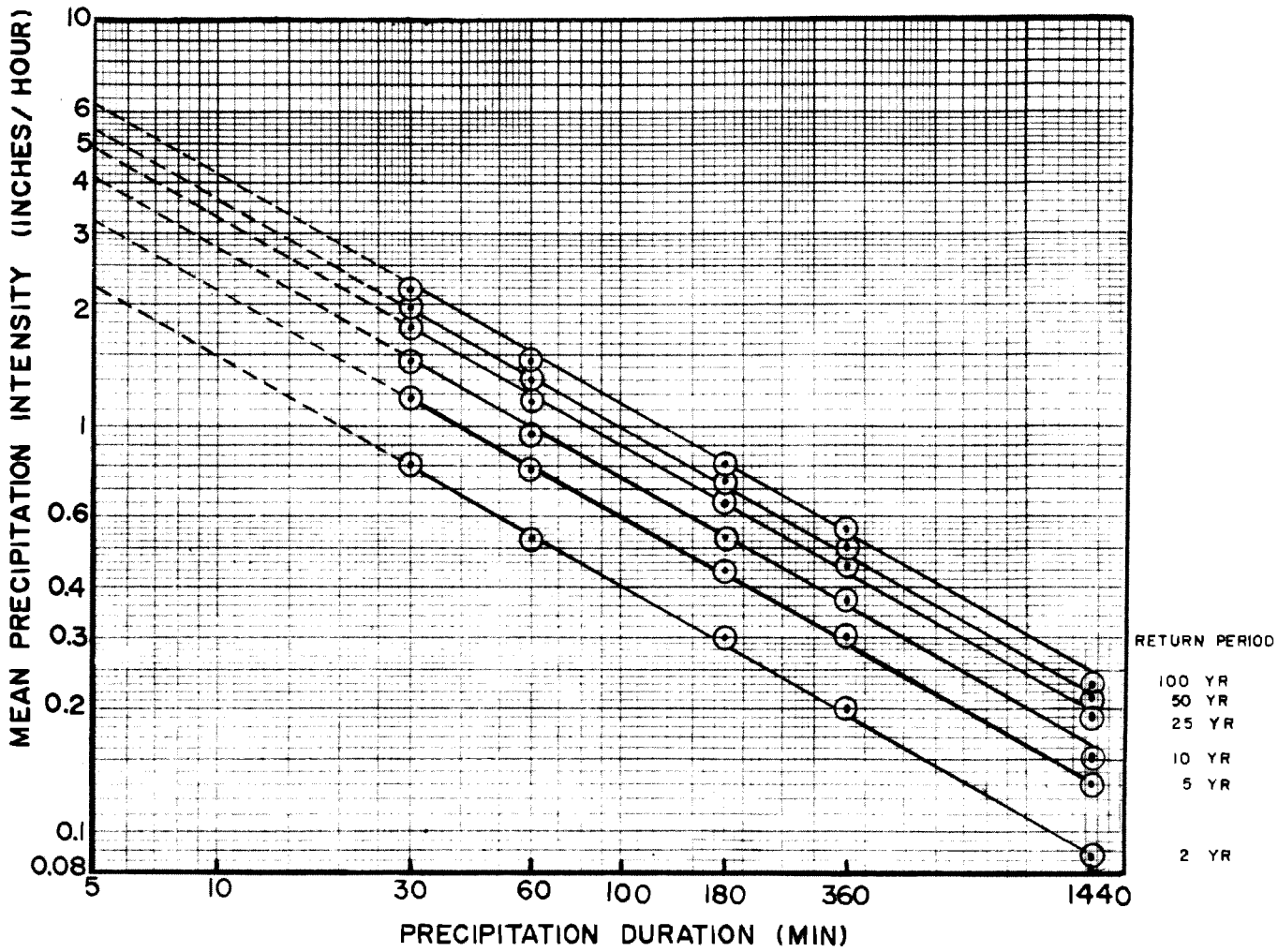
Appendix 9

ORANGE COUNTY PRECIPITATION INTENSITIES

Regression Equations: $I(t) = at^b$

(I= Intensity in inches/hour, t= duration in minutes)

Return Frequency (years)	a	b
2	5.702	-0.574
5	7.870	-0.562
10	10.209	-0.573
25	11.995	-0.566
50	13.521	-0.566
100	15.560	-0.573



ORANGE COUNTY
HYDROLOGY MANUAL

MEAN PRECIPITATION INTENSITIES FOR NONMOUNTAINOUS AREAS

Figure B-3

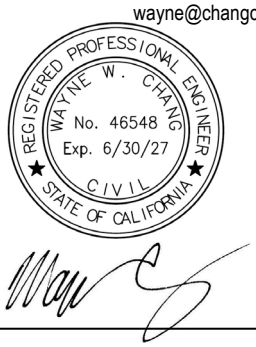
Appendix 10

HYDRAULIC ANALYSIS BY CHANG CONSULTANTS

ChangConsultants
Civil Engineering◦Hydrology◦Hydraulics◦Sedimentation

P.O. Box 9496
Rancho Santa Fe, CA 92067-4496
T: 858.692.0760
F: 858.832.1402
wayne@changconsultants.com

Memorandum



To: David See, Contract Planner, City of Laguna Hills
From: Wayne W. Chang
Re: Terravita Residential Development – Floodplain Compliance
Date: August 11, 2025

The City of Laguna Hills provided the following Flood Zone comment for the Terravita project in a June 17, 2025 letter:

> The project is proposed to be constructed in a FEMA 100-Year Floodplain in violation of the California Building Code. The drainage report is inadequate. The applicant proposes to construct residences on Lot 3 within a 100-Year Floodplain in violation of the California Building Code. While the applicant proposes to construct a 38 ft. high retaining wall adjacent to the adjoining reservoir to elevate the proposed residences within Lot 3 out of the floodplain, the drainage report is inadequate as a proposed FEMA map revision and technical documents were not submitted for review. Therefore, the proposed Project is potentially inconsistent with the floodplain management regulations.

The FEMA 100-year floodplain is delineated on the attached FIRMette (i.e., FEMA Flood Insurance Rate Map) and associated with Veeh Reservoir and the downstream Veeh Creek (San Diego Creek Tributary 2). The floodplain is designated as a Zone A, which is an approximate floodplain, not based on engineering analyses. Zone A delineations are frequently incorrect since they were not determined from hydrologic and hydraulic studies. It seems clear in this case that the floodplain is incorrect because it encroaches into the existing office park to the south, which is at the top of a hillside over 20 feet higher than the Veeh Reservoir. The Terravita project will be redeveloped within the office park. The County of Orange provided the attached Veeh Reservoir 100-year flow data from a 1975 Orange County Flood Control study. The results show a 100-year flow rate of 1,090 cubic feet per second at the Veeh Reservoir (existing condition at lower lake). This flow rate is not great enough to result in a flow depth exceeding 20 feet that can inundate the office park.

A HEC-RAS analysis was performed to determine the 100-year water surface elevations along the project. The Veeh Reservoir contains a concrete-lined trapezoidal spillway (see Figure 1) that conveys flow from the reservoir to the creek. The analysis was performed starting beyond the lower end of the spillway and up to the reservoir. The HEC-RAS cross-sections were based on 1-foot contour interval topographic mapping supplemented with Orange County 2-foot contour interval GIS mapping, where needed. The HEC-RAS cross-sections and topographic mapping are included on the HEC-RAS Work Map.

Figure 1. Veeh Reservoir Spillway

The additional HEC-RAS input parameters are as follows. The 100-year flow rate of 1,090 cfs was used. The roughness coefficients are 0.015 for the concrete, 0.030 for channel bed areas with water, and 0.030 to 0.050 for areas supporting vegetation. A site visit was performed to verify the roughness coefficients. A mixed flow regime was used since the spillway is hydraulically steep.

The results are attached and show that the 100-year flow will generally be conveyed along the spillway and not overtop the reservoir embankment. The flow depths range from just under 2-feet to just over 5-feet. The 100-year water surface elevation at the reservoir is 288.31 feet. The existing office park is at approximately elevation 303 feet or higher, so the floodplain is significantly lower than the proposed development pads. In addition, the proposed retaining wall will be above elevation 288.31 feet.

The HEC-RAS analyses confirm that the FEMA floodplain is inaccurate and the project will not be constructed within the floodplain. Therefore, the project is not subject to floodplain requirements from the California Building Code.

The City adopted the Orange County grading manual upon incorporation in 1991.
The grading manual requires that setbacks from retaining walls be at least as far back as the height of the upslope retaining wall.
This project proposes buildings closer than the required setback.
Variances are typically granted upon receipt of a slope stability analysis, which in turn dictates construction mitigation measures to prevent slope creep and increase the factor of safety of a slope.

4. Flood Zone

The project is proposed to be constructed in a FEMA 100-Year Floodplain in violation of the California Building Code. The drainage report is inadequate. The applicant proposes to construct residences on Lot 3 within a 100-Year Floodplain in violation of the California Building Code. While the applicant proposes to construct a 38 ft. high retaining wall adjacent to the adjoining reservoir to elevate the proposed residences within Lot 3 out of the floodplain, the drainage report is inadequate as a proposed FEMA map revision and technical documents were not submitted for review. Therefore, the proposed Project is potentially inconsistent with the floodplain management regulations.

5. Engineering Standards

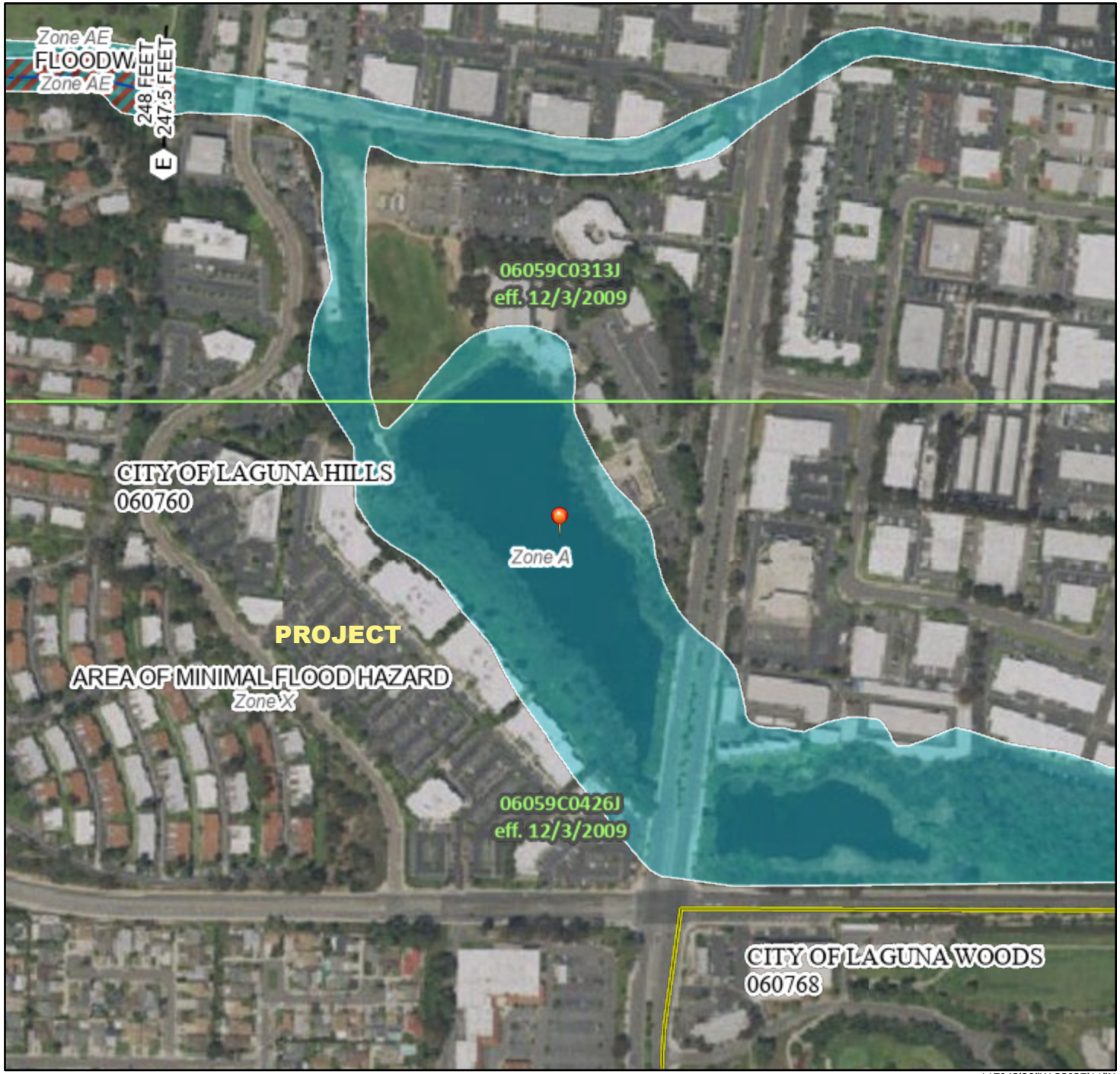
Pursuant to LHMC section 9-80, development review projects submitted to the City shall be subject to engineering and design standards adopted by the City. These standards consist of engineering design examples for a variety of utility, street, water, sewer, and transportation system components. Applicants are responsible to verify applicable standards with the City Engineer prior to design of projects or as a result of preliminary reviews. The City Engineer shall maintain a current set of standards and shall make portions of the standards relative to an applicant's property available upon request. Typical standards referenced here are the Orange County Environmental Management Agency standard plans as modified for Laguna Hills (Ord. 98-8 § 2 (part): prior code § 9-38.020). The design standards are the Orange County Public Works Standard Engineering Plans. For this project, Standard Plan No. 1107 is applicable. The proposed Project is inconsistent with the following applicable Engineering standards. The City acknowledges that the Applicant has requested waiver or modification of some of these standards pursuant to the Density Bonus Law.

a. Insufficient Private Street Widths LHMC 9-80.020. Depending on the layout of the development, "driveways" can be 24' wide but no longer than 150' in order to still be considered a driveway (Section 9-44 of LHMC, Table 9-44.D). Otherwise, the driveway is considered to be a private street subject to Standard Plan No. 1107 with a paved width of 28-36' and a sidewalk on one or both sides. On most streets within Lots 1, 2 and 3, this project has buildings on both sides of the private streets; therefore, the minimum paved width of 36' applies with sidewalks on both sides. Instead, this project proposes 26' wide streets with a sidewalk on one side of the street. In addition, on Lot 2, there are proposed 20' wide driveways, which wouldn't be sufficient enough for a vehicle to back out of a garage and turn. The proposed driveway width doesn't meet parking lot design standards. The Applicant also incorrectly dimensions the widths of private streets and driveways from back to back of rolled curb rather than the gutter line of rolled curbs.

National Flood Hazard Layer FIRMette

FEMA

117°44'15"W 33°37'41"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

117°43'38"W 33°37'11"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR 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
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

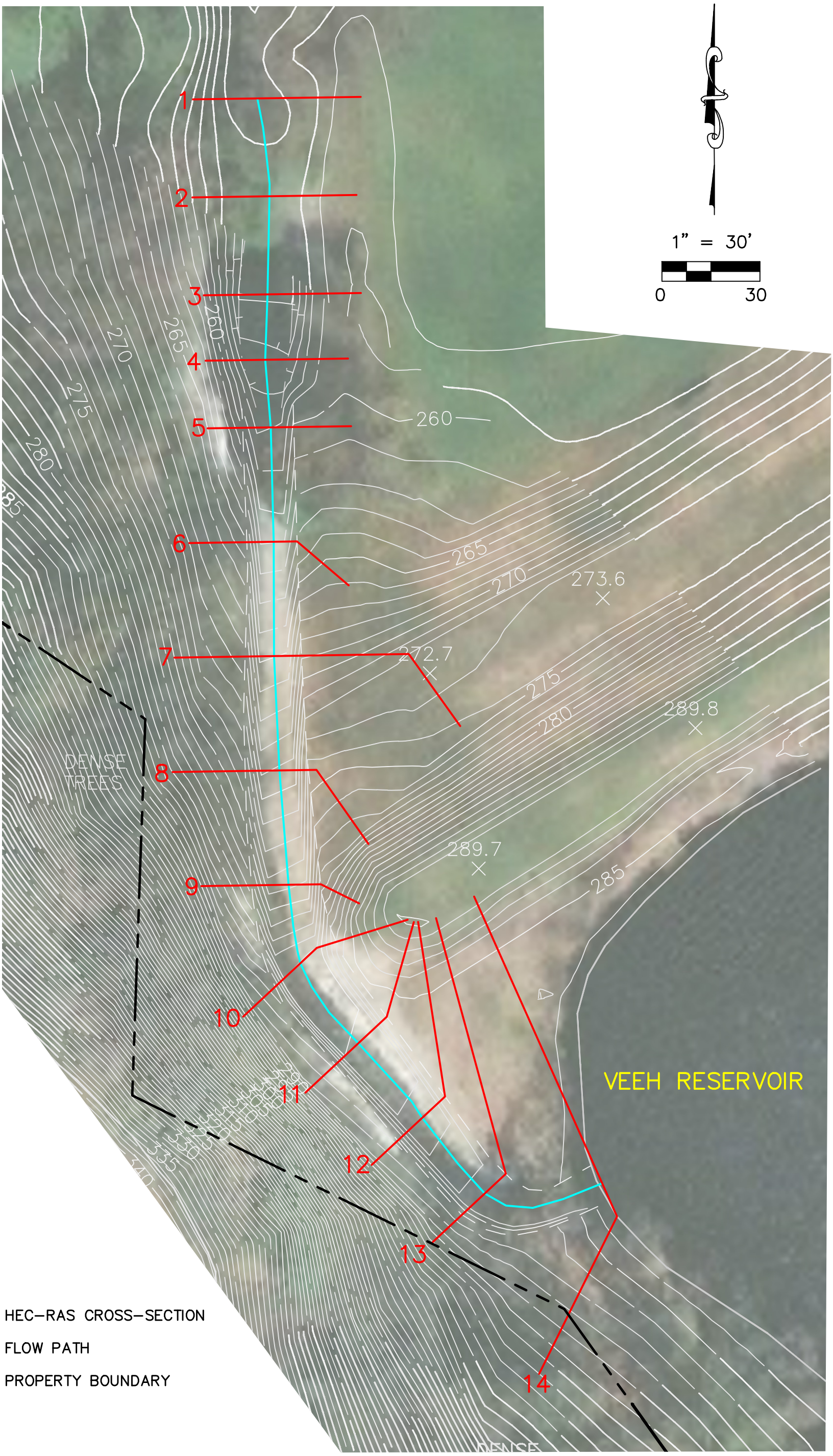
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/24/2025 at 9:19 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

WILLIAMSON & SCHMID · CIVIL ENGINEERS — VEEH RESERVOIR — DURING 100 YEAR STORM

Q OF 240 C.F.S. FROM STORM DRAIN OF MOULTON PARKWAY DISCHARGING INTO LOWER LAKE	UPPER LAKE			LOWER LAKE		
	PEAK Q IN	PEAK Q OUT	MAXIMUM WATER SURFACE	PEAK Q IN	PEAK Q OUT	MAXIMUM WATER SURFACE
EXISTING CONDITION	2000 C.F.S.	850 C.F.S. THRU R.C.B. TO LOWER LAKE 500 C.F.S. DOWN MOULTON	286.5 (OVERFLOW ELEV. OF 285.3± ON MOULTON)	1090 C.F.S.*	1090 C.F.S.	284.9
EXISTING CONDITION ELIMINATING DISCHARGE DOWN MOULTON BY BERMING TO ELEV. 288.0 ±	2000 C.F.S.	950 C.F.S.	287.3	1190 C.F.S.*	1190 C.F.S.	285.2
CONDITION PRIOR TO CONST. OF MOULTON OR WITH AN INFINITE NUMBER OF PIPES				2240 C.F.S.*	1770 C.F.S.	285.9
CONSTRUCT 1-96" PIPE & BERM MOULTON TO ELEV. 287.5 ±	2000 C.F.S.	1140 C.F.S.	286.7	1380 C.F.S.*	1380 C.F.S.	285.4
CONSTRUCT 2-96" PIPES & BERM MOULTON TO ELEV. 287.5 ±	2000 C.F.S.	1240 C.F.S.	286.5 S. Pilling 282.35	1480 C.F.S.*	1480 C.F.S.	285.6

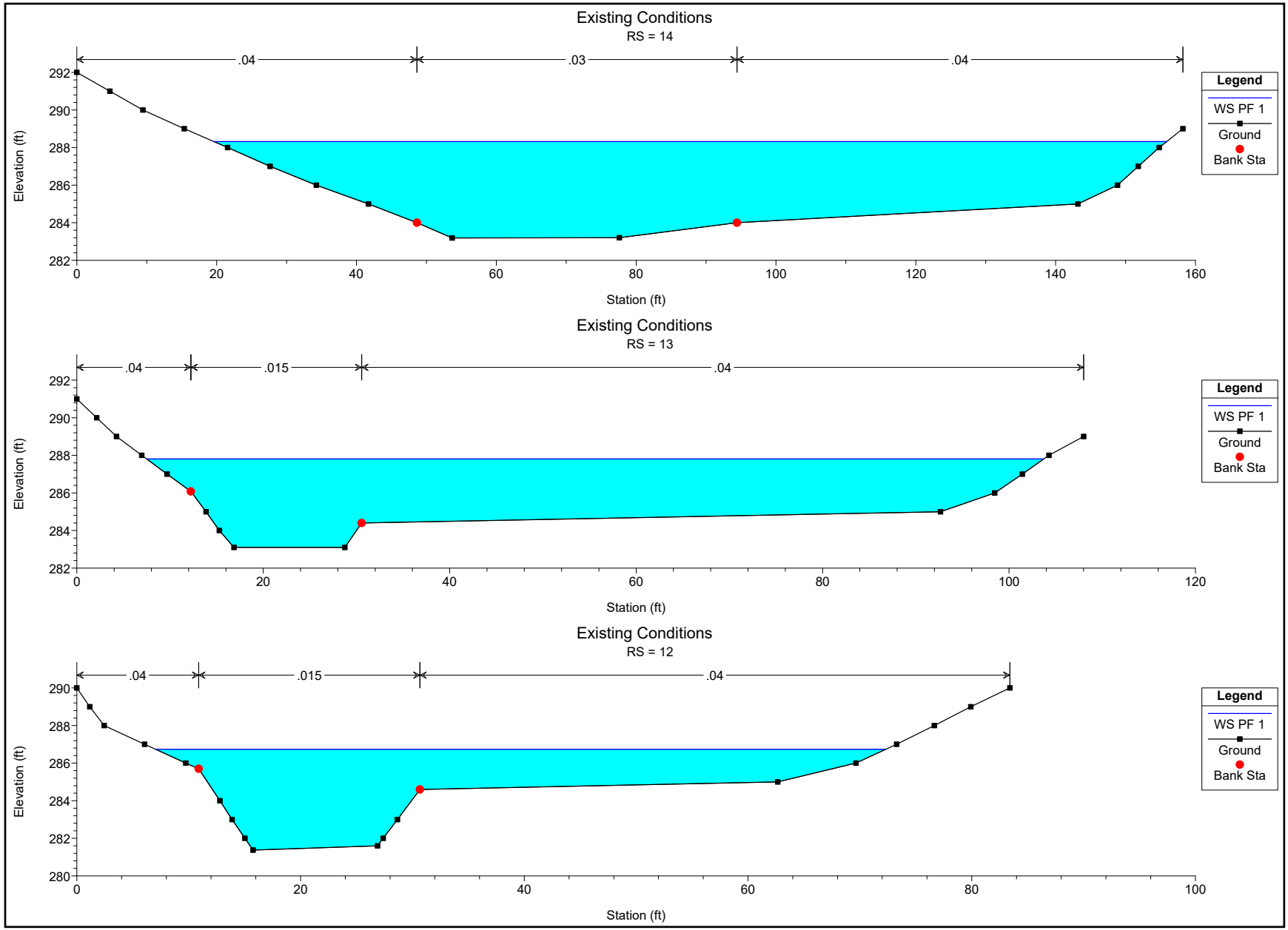
74-353



HEC-RAS WORK MAP

HEC-RAS Plan: Exist Cond River: RIVER-1 Reach: Reach-1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	14	PF 1	1090.00	283.19	288.31	5.12	285.71	288.41	0.000408	2.89	500.01	136.26	0.23
Reach-1	13	PF 1	1090.00	283.10	287.80	4.70		288.34	0.000944	7.66	293.38	96.24	0.65
Reach-1	12	PF 1	1090.00	281.37	286.74	5.37	286.74	288.21	0.001832	10.53	161.51	65.30	0.88
Reach-1	11	PF 1	1090.00	280.00	285.04	5.04	285.82	287.99	0.003370	13.91	82.65	31.05	1.19
Reach-1	10	PF 1	1090.00	279.00	282.42	3.42	284.06	287.61	0.008269	18.39	60.92	21.96	1.82
Reach-1	9	PF 1	1090.00	273.45	276.69	3.24	279.28	286.83	0.018841	25.87	44.10	18.50	2.74
Reach-1	8	PF 1	1090.00	268.82	271.97	3.15	275.13	285.66	0.029229	29.78	37.28	15.95	3.26
Reach-1	7	PF 1	1090.00	264.79	267.89	3.10	271.36	284.27	0.035553	32.56	34.10	14.76	3.57
Reach-1	6	PF 1	1090.00	260.90	263.83	2.93	267.16	282.73	0.038119	36.06	33.71	18.33	3.85
Reach-1	5	PF 1	1090.00	257.85	260.43	2.58	263.31	281.04	0.050181	37.46	32.79	26.50	4.37
Reach-1	4	PF 1	1090.00	256.10	258.03	1.93	260.88	278.90	0.297721	37.11	31.03	22.34	5.12
Reach-1	3	PF 1	1090.00	254.91	256.68	1.77	259.40	272.26	0.217235	31.76	34.97	23.12	4.35
Reach-1	2	PF 1	1090.00	254.39	256.74	2.35	258.71	264.51	0.151863	22.46	49.52	28.29	2.82
Reach-1	1	PF 1	1090.00	253.30	256.49	3.19	257.63	260.18	0.075402	16.33	72.53	34.11	1.71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288
286
284
282
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20
40
60
80
100
120
140
160
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
RS = 13
.04
.015
.04
Elevation (ft)
292
290
288
286
284
282
0
20
40
60
80
100
120
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
RS = 12
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.015
.04
Elevation (ft)
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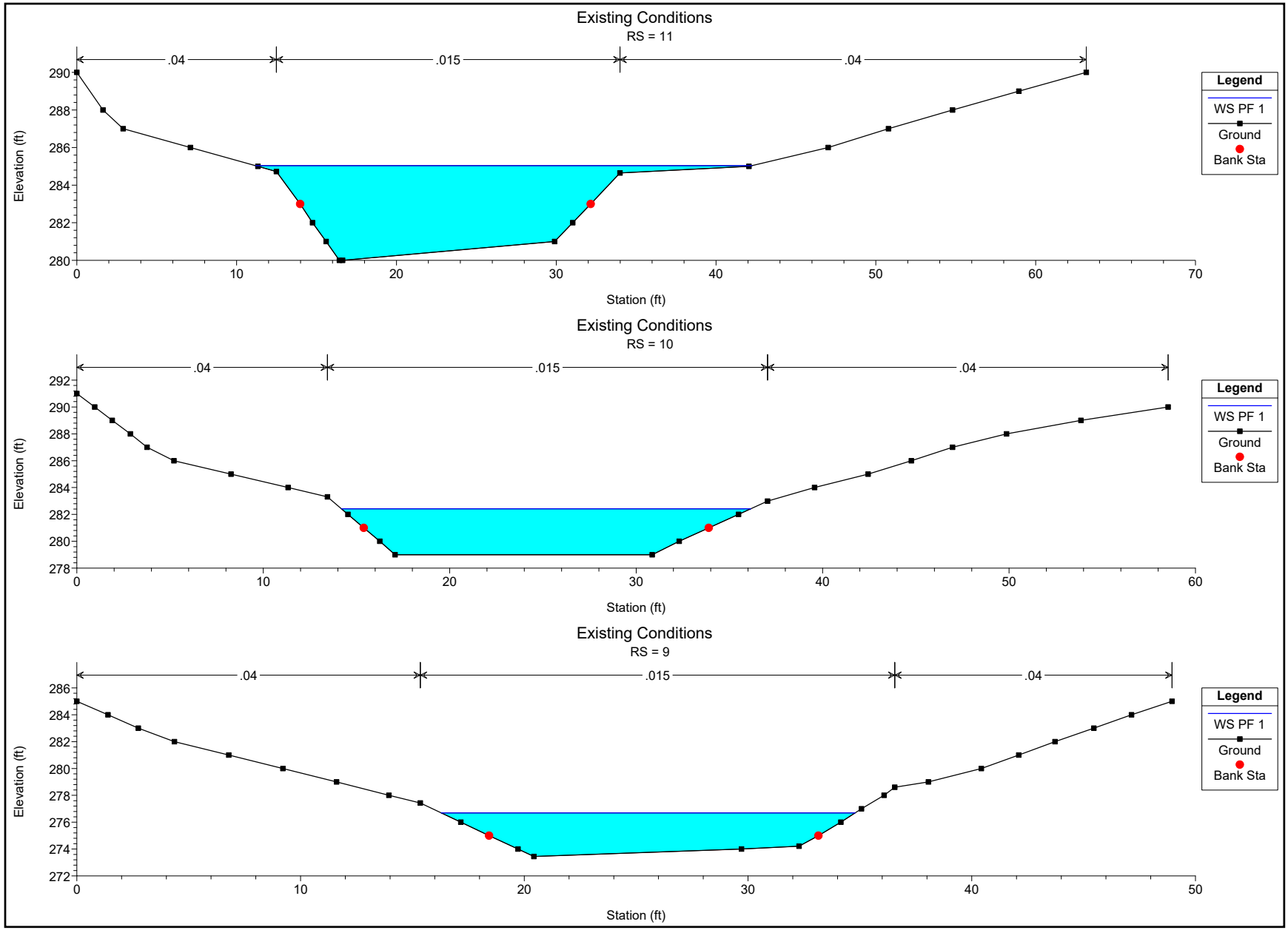
286
284
282
280
0
20
40
60
80
100
Station (ft)
Legend
WS PF 1
Ground
Bank Sta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286
284
282
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40
50
60
70
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
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.015
.04
Elevation (ft)
292
290
288
286
284
282
280
278
0
10
20
30
40
50
60
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
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.04
Elevation (ft)
286
284
282
280
278
276
274
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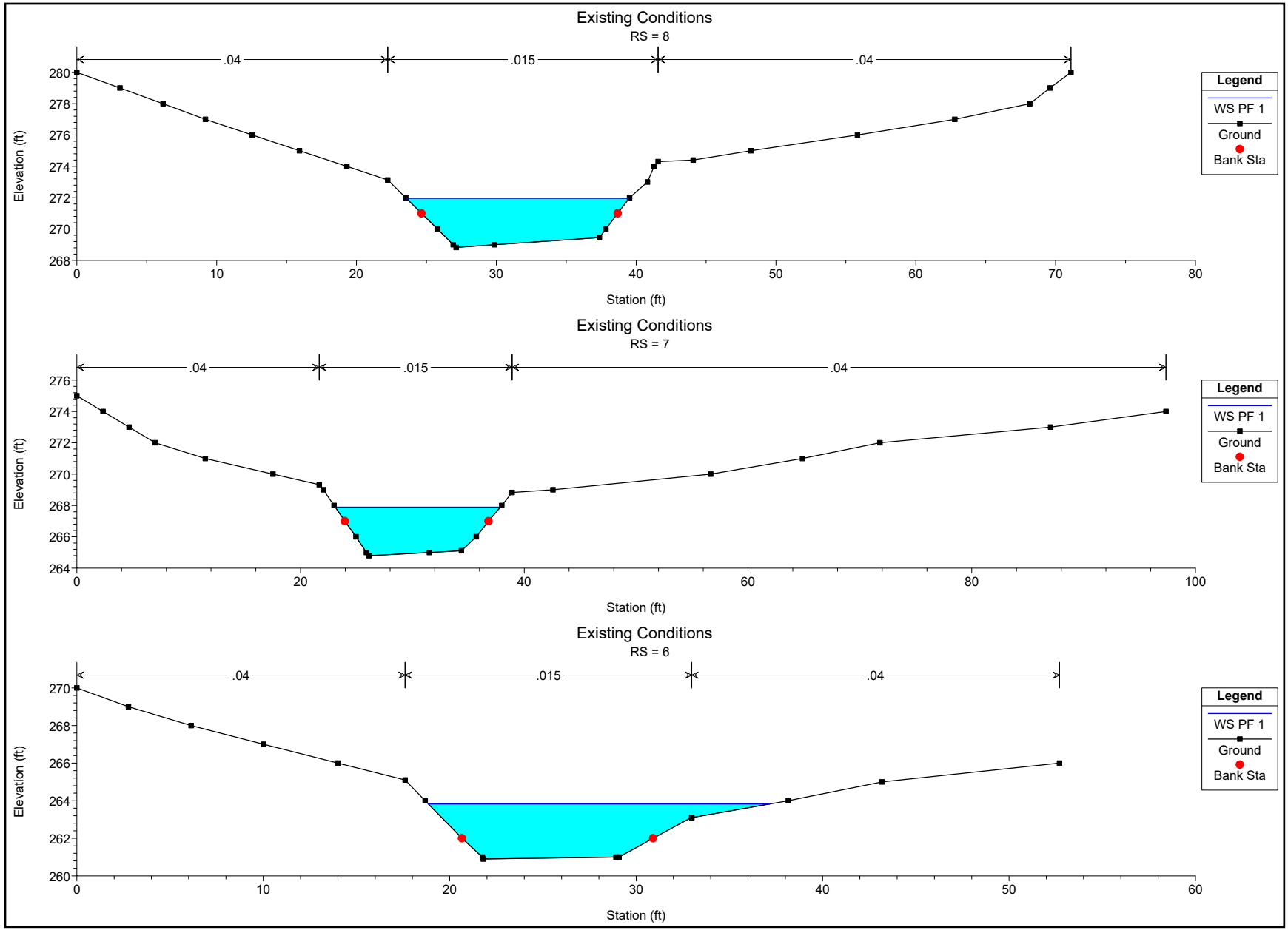
10
20
30
40
50
Station (ft)
Legend
WS PF 1
Ground
Bank Sta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Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
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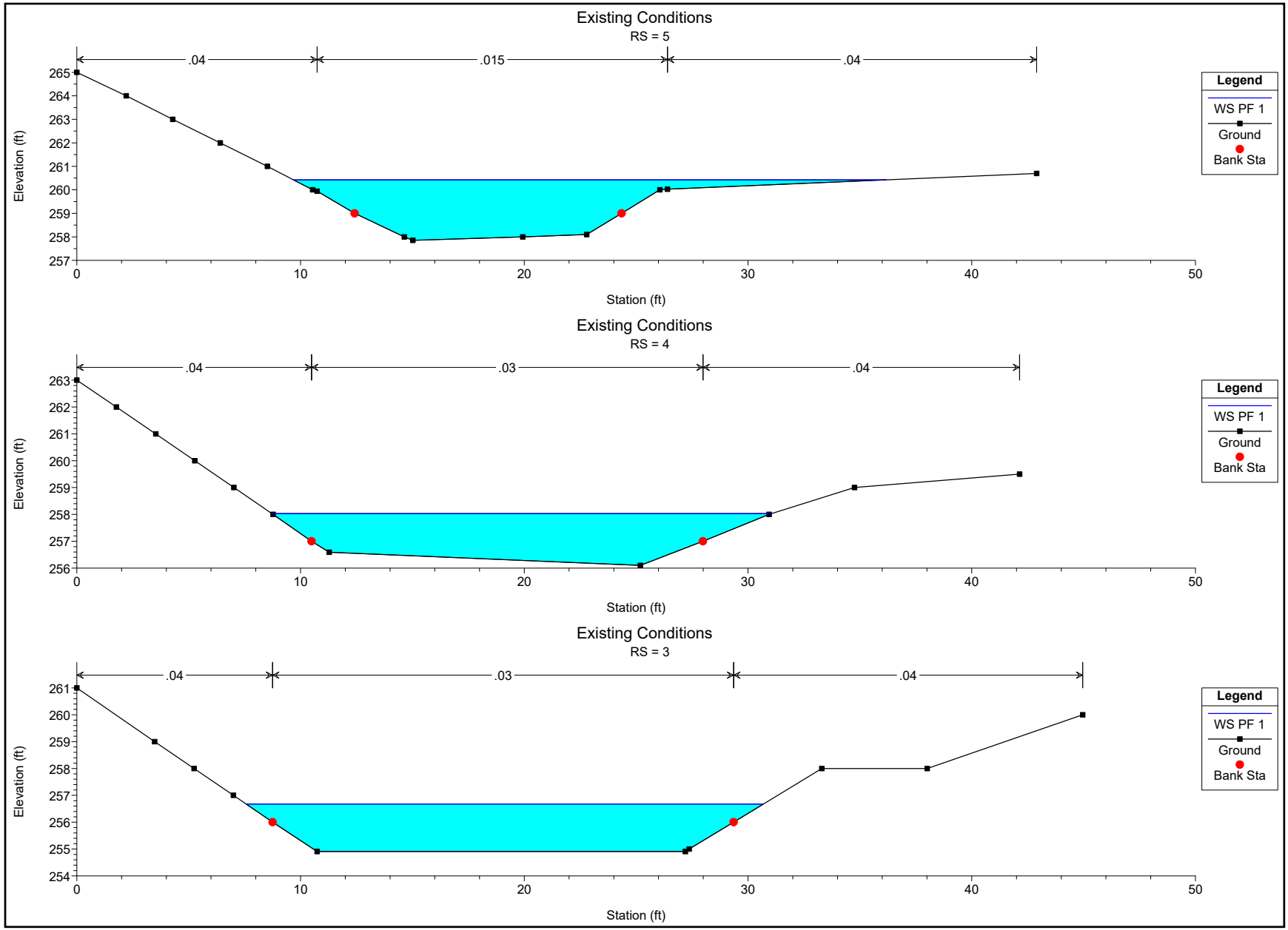
.04
.015
.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
RS = 6
.04
.015
.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta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.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
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.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
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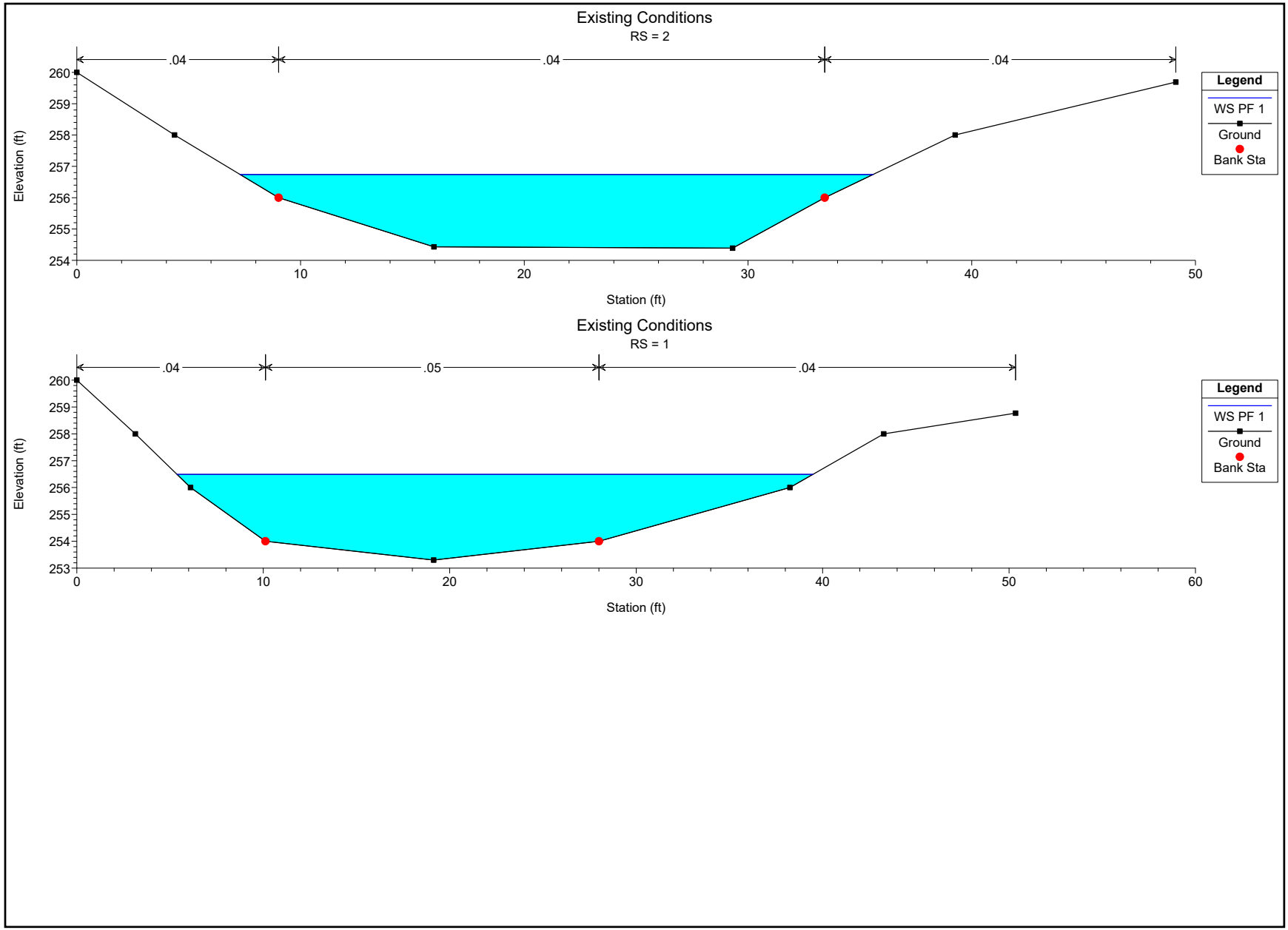
.03
.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta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.04
.04
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258
257
256
255
254
0
10
20
30
40
50
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Existing Conditions
RS = 1
.04
.05
.04
Elevation (ft)
260
259
258
257
256
255
254
253
0
10
20
30
40
50
60
Station (ft)
Legend
WS PF 1
Ground
Bank Sta

Appendix 11

HYDRAULIC ANALAYSIS OF PUBLIC STORM DRAIN