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**PRELIMINARY HYDROLOGY/  
DRAINAGE STUDY**

FOR

**PETER RIOS ESTATES  
APARTMENT COMPLEX**

County of San Diego

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Dated: August 20, 2014

Prepared By:

***Snipes-Dye Associates***  
***civil engineers and land surveyors***

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**SDC PDS RCVD 05-27-15**

**STP14-022**

## **DECLARATION OF RESPONSIBLE CHARGE**

I, HEREBY DECLARE THAT I AM THE CIVIL ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

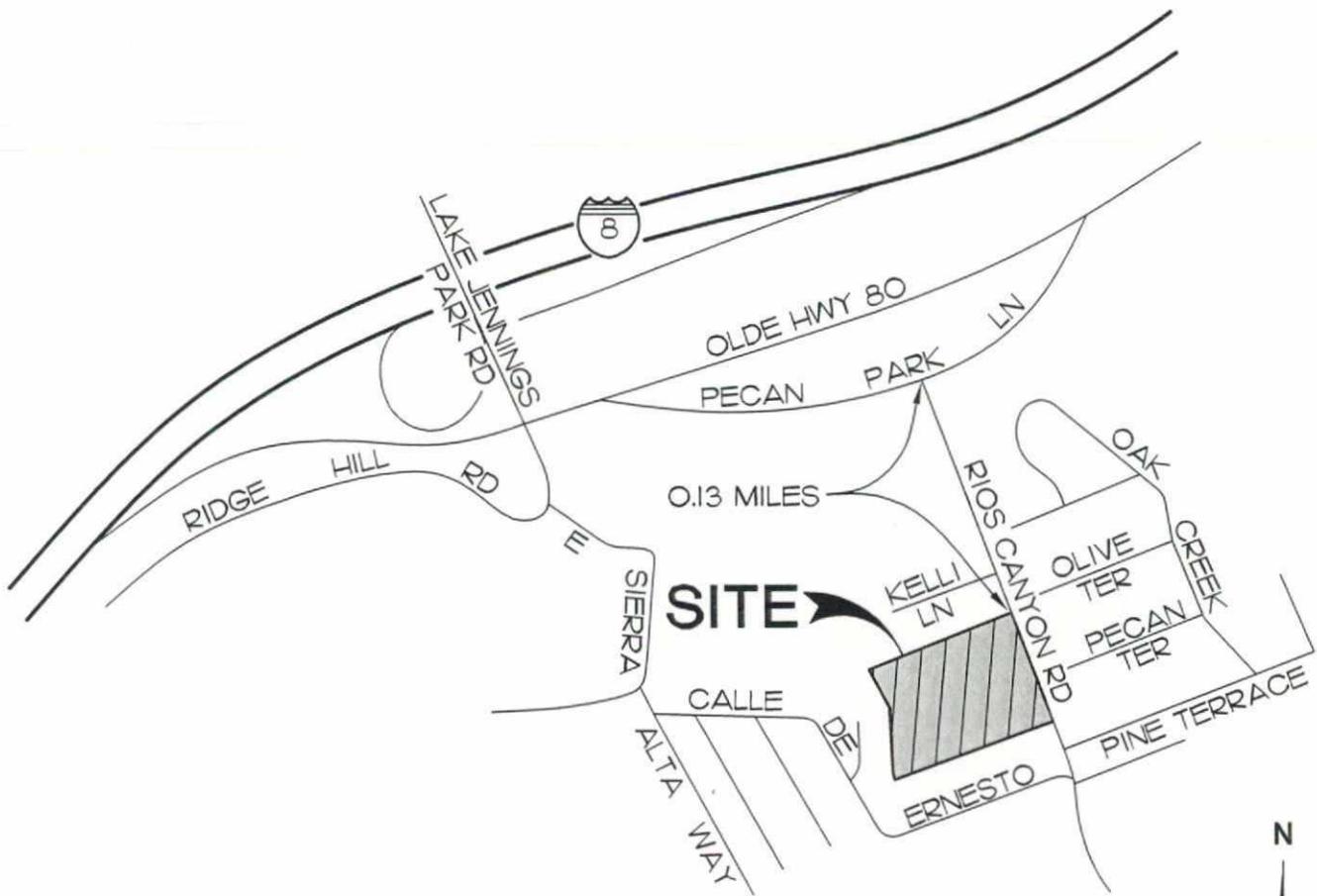
I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITY FOR PROJECT DESIGN.

---

WILLIAM A. SNIPES  
R.C.E. 50477  
EXP. 06-30-15

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DATE



**VICINITY MAP**  
 NO SCALE

CEQA PRELIMINARY HYDROLOGY/DRAINAGE STUDY  
FOR  
**PETER RIOS ESTATES (APARTMENT COMPLEX)**

**INTRODUCTION:** The project is located at 14265 Rios Canyon Road, in Lakeside. It is on the west side of Rios Canyon Road between Kelli Lane and Calle De Ernesto. The project proposes the construction of an eight apartment building complex on a 3.2-acre parcel as well as a private driveway connecting to Rios Canyon Road. Existing residence with detached garage will be demolished.

**PRE-DEVELOPMENT CONDITIONS:** The site topography slopes from an elevation of approximately 730 at the southeasterly corner of the site to an elevation of approximately 679 at the top of the easterly bank of a natural drainage creek near the northwesterly corner of the site. Excepting the flat pads of the existing home and detached garage, the site topography consists of moderate slope land. It is approximately 10.5% average slope gradient, sloping from southeast to northwest across the site. The natural drainage creek is located along the westerly boundary where it terminated at Los Coches Creek located approximately 300 feet north from the northerly boundary. Runoff conveyed within Rios Canyon Road does not contribute to the onsite runoff; it flows northerly along Rios Canyon Road and discharges into Los Coches Creek. The onsite runoff is surface flow westerly and discharges into the westerly natural drainage creek. The site hydrologic soil group is combined of Groups B and C, based on the USDA Web Soil Survey. Approximately 8.2% of the site is covered with impervious surface.

**POST-DEVELOPMENT CONDITIONS:** The proposed development consists of the construction of an 8 apartment building complex, sidewalks, and a private driveway. Based on the preliminary grading plan, the site is divided into two drainage sub-basins. The northerly sub-basin consists of building pads 7 and 8, and the northerly portion of the proposed driveway. The southerly sub-basin consists of the southerly portion of the proposed driveway and building pads 1 through 6. The remainder portion of the site located along the northerly boundary is draining northerly and collected in the existing concrete brow ditch and conveyed westerly and discharging to the drainage creek at the northwesterly corner of the site. The runoff from the northerly basin and the southerly basin is collected in a private storm drain system where it is conveyed westerly and discharged into the drainage creek west of the site. Runoff from the proposed driveway and the areas fronting buildings 7 and 8 will infiltrate into the pervious driveway pavement and into a subsurface sand filter trench which is sized to meet the post-development treatment and flow control requirements, in accordance to the County of San Diego Standard Urban Stormwater Mitigation Plan (SUSMP). The limit of area subject to the 100-year flood was calculated and shown on the preliminary grading plan. The proposed development is not within the floodplain. For comparing the peak 100-year storm outflow from the

project site, see the discharge summary table below and the attached calculations.

***The Peak 100-year, 6-hour Storm Event Discharges Summary Table:***

| Pre-development | Post-development    |             |                    |
|-----------------|---------------------|-------------|--------------------|
|                 | Q before mitigation | Q detention | Q after mitigation |
| 1,927 cfs       | 1,928 cfs           | 2.2 cfs     | 1,925.8 cfs        |

CONCLUSION: Post-development site drainage is collected and discharged off-site in a similar manner as pre-development. The outfall from the site in pre-development and post-development site is in the natural drainage creek at the northwesterly corner of the site. With the proposed infiltration basins on the lower portion of the site, the project has mitigated the increase runoff of the development.

1. The post-development including the construction two energy dissipater rock rip rap outfalls will prevent the potential erosion on-site or off-site.
2. The post-development site does not substantially alter the existing drainage pattern of the site or the course of an adjacent creek. The peak runoff discharge from the site outfall in the post-development is approximately the same as in the pre-development which will not create any flood to the on-site of off-site properties.
3. Any existing or planned storm water drainage systems downstream of the project site would not substantially affect by the development because the proposed development will retain the increase runoff to avoid the impact to the downstream systems.
4. The project site is not within a 100-year flood hazard area.
5. The project does not propose any grading or placing any structures within the 100-year flood hazard areas which would impede or redirect flood flows.
6. Any failure of the proposed subsurface sand filter trench would not expose people or structures to a significant risk, since the natural drainage creek has capacity to handle the runoff from the development if no subsurface sand filter trench was proposed.

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

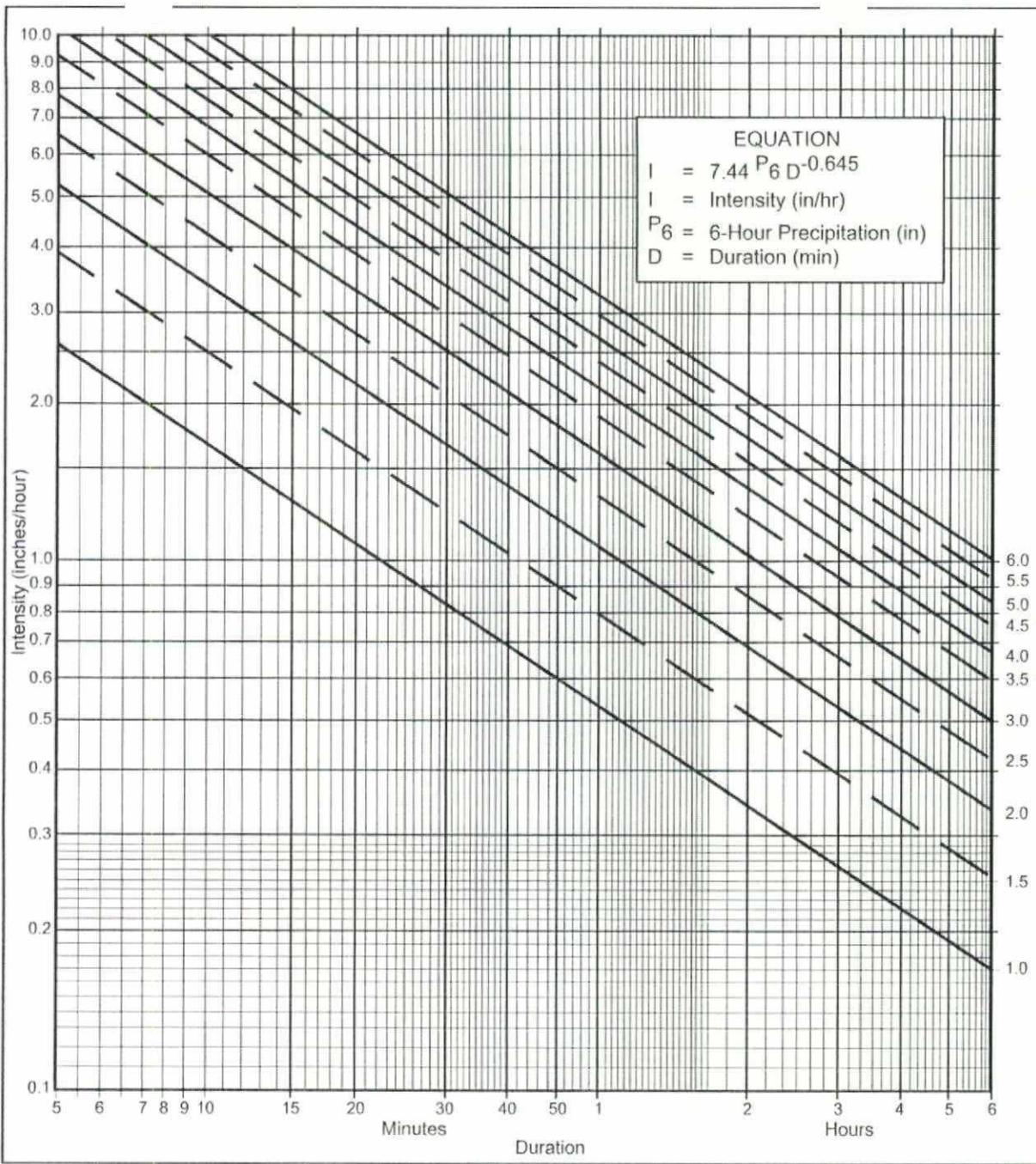
Table 3-2 provides limits of the length (Maximum Length ( $L_M$ )) of sheet flow to be used in hydrology studies. Initial  $T_i$  values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

**Table 3-2**

**MAXIMUM OVERLAND FLOW LENGTH ( $L_M$ )  
 & INITIAL TIME OF CONCENTRATION ( $T_i$ )**

| Element*   | DU/<br>Acre | .5%   |       | 1%    |       | 2%    |       | 3%    |       | 5%    |       | 10%   |       |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|            |             | $L_M$ | $T_i$ |
| Natural    |             | 50    | 13.2  | 70    | 12.5  | 85    | 10.9  | 100   | 10.3  | 100   | 8.7   | 100   | 6.9   |
| LDR        | 1           | 50    | 12.2  | 70    | 11.5  | 85    | 10.0  | 100   | 9.5   | 100   | 8.0   | 100   | 6.4   |
| LDR        | 2           | 50    | 11.3  | 70    | 10.5  | 85    | 9.2   | 100   | 8.8   | 100   | 7.4   | 100   | 5.8   |
| LDR        | 2.9         | 50    | 10.7  | 70    | 10.0  | 85    | 8.8   | 95    | 8.1   | 100   | 7.0   | 100   | 5.6   |
| MDR        | 4.3         | 50    | 10.2  | 70    | 9.6   | 80    | 8.1   | 95    | 7.8   | 100   | 6.7   | 100   | 5.3   |
| MDR        | 7.3         | 50    | 9.2   | 65    | 8.4   | 80    | 7.4   | 95    | 7.0   | 100   | 6.0   | 100   | 4.8   |
| MDR        | 10.9        | 50    | 8.7   | 65    | 7.9   | 80    | 6.9   | 90    | 6.4   | 100   | 5.7   | 100   | 4.5   |
| MDR        | 14.5        | 50    | 8.2   | 65    | 7.4   | 80    | 6.5   | 90    | 6.0   | 100   | 5.4   | 100   | 4.3   |
| HDR        | 24          | 50    | 6.7   | 65    | 6.1   | 75    | 5.1   | 90    | 4.9   | 95    | 4.3   | 100   | 3.5   |
| HDR        | 43          | 50    | 5.3   | 65    | 4.7   | 75    | 4.0   | 85    | 3.8   | 95    | 3.4   | 100   | 2.7   |
| N. Com     |             | 50    | 5.3   | 60    | 4.5   | 75    | 4.0   | 85    | 3.8   | 95    | 3.4   | 100   | 2.7   |
| G. Com     |             | 50    | 4.7   | 60    | 4.1   | 75    | 3.6   | 85    | 3.4   | 90    | 2.9   | 100   | 2.4   |
| O.P./Com   |             | 50    | 4.2   | 60    | 3.7   | 70    | 3.1   | 80    | 2.9   | 90    | 2.6   | 100   | 2.2   |
| Limited I. |             | 50    | 4.2   | 60    | 3.7   | 70    | 3.1   | 80    | 2.9   | 90    | 2.6   | 100   | 2.2   |
| General I. |             | 50    | 3.7   | 60    | 3.2   | 70    | 2.7   | 80    | 2.6   | 90    | 2.3   | 100   | 1.9   |

\*See Table 3-1 for more detailed description



**Directions for Application:**

- (1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).
- (2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).
- (3) Plot 6 hr precipitation on the right side of the chart.
- (4) Draw a line through the point parallel to the plotted lines.
- (5) This line is the intensity-duration curve for the location being analyzed.

**Application Form:**

- (a) Selected frequency \_\_\_\_\_ year
- (b)  $P_6 =$  \_\_\_\_\_ in.,  $P_{24} =$  \_\_\_\_\_,  $\frac{P_6}{P_{24}} =$  \_\_\_\_\_ %<sup>(2)</sup>
- (c) Adjusted  $P_6^{(2)} =$  \_\_\_\_\_ in.
- (d)  $t_x =$  \_\_\_\_\_ min.
- (e)  $I =$  \_\_\_\_\_ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

| P6       | 1    | 1.5  | 2    | 2.5  | 3    | 3.5  | 4     | 4.5   | 5     | 5.5   | 6     |
|----------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Duration | I    | I    | I    | I    | I    | I    | I     | I     | I     | I     | I     |
| 5        | 2.63 | 3.95 | 5.27 | 6.59 | 7.90 | 9.22 | 10.54 | 11.86 | 13.17 | 14.49 | 15.81 |
| 7        | 2.12 | 3.18 | 4.24 | 5.30 | 6.36 | 7.42 | 8.48  | 9.54  | 10.60 | 11.66 | 12.72 |
| 10       | 1.68 | 2.53 | 3.37 | 4.21 | 5.05 | 5.90 | 6.74  | 7.58  | 8.42  | 9.27  | 10.11 |
| 15       | 1.30 | 1.95 | 2.59 | 3.24 | 3.89 | 4.54 | 5.19  | 5.84  | 6.49  | 7.13  | 7.78  |
| 20       | 1.08 | 1.62 | 2.15 | 2.69 | 3.23 | 3.77 | 4.31  | 4.85  | 5.39  | 5.93  | 6.46  |
| 25       | 0.93 | 1.40 | 1.87 | 2.33 | 2.80 | 3.27 | 3.73  | 4.20  | 4.67  | 5.13  | 5.60  |
| 30       | 0.83 | 1.24 | 1.66 | 2.07 | 2.49 | 2.90 | 3.32  | 3.73  | 4.15  | 4.56  | 4.98  |
| 40       | 0.69 | 1.03 | 1.38 | 1.72 | 2.07 | 2.41 | 2.76  | 3.10  | 3.45  | 3.79  | 4.13  |
| 50       | 0.60 | 0.90 | 1.19 | 1.49 | 1.79 | 2.09 | 2.39  | 2.69  | 2.98  | 3.28  | 3.58  |
| 60       | 0.53 | 0.80 | 1.06 | 1.33 | 1.59 | 1.86 | 2.12  | 2.39  | 2.65  | 2.92  | 3.18  |
| 90       | 0.41 | 0.61 | 0.82 | 1.02 | 1.23 | 1.43 | 1.63  | 1.84  | 2.04  | 2.25  | 2.45  |
| 120      | 0.34 | 0.51 | 0.68 | 0.85 | 1.02 | 1.19 | 1.36  | 1.53  | 1.70  | 1.87  | 2.04  |
| 150      | 0.29 | 0.44 | 0.59 | 0.73 | 0.88 | 1.03 | 1.18  | 1.32  | 1.47  | 1.62  | 1.76  |
| 180      | 0.26 | 0.39 | 0.52 | 0.65 | 0.78 | 0.91 | 1.04  | 1.18  | 1.31  | 1.44  | 1.57  |
| 240      | 0.22 | 0.33 | 0.43 | 0.54 | 0.65 | 0.76 | 0.87  | 0.98  | 1.08  | 1.19  | 1.30  |
| 300      | 0.19 | 0.28 | 0.38 | 0.47 | 0.56 | 0.66 | 0.75  | 0.85  | 0.94  | 1.03  | 1.13  |
| 360      | 0.17 | 0.25 | 0.33 | 0.42 | 0.50 | 0.58 | 0.67  | 0.75  | 0.84  | 0.92  | 1.00  |

Intensity-Duration Design Chart - Template

FIGURE

3-1



# County of San Diego Hydrology Manual



Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

6.2 Isopluvial (inches)

RIOS CANYON ROAD

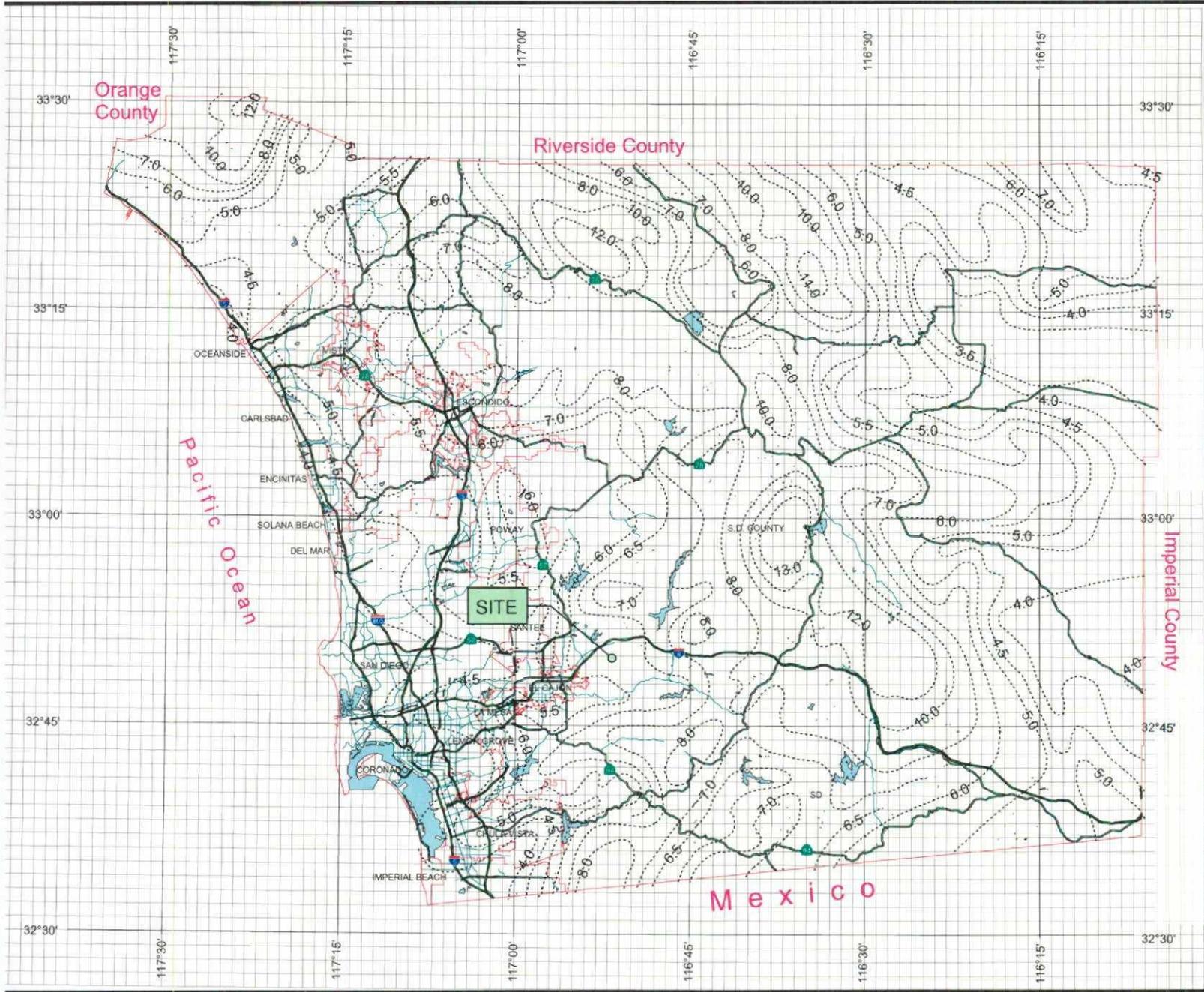


3 0 3 Miles

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Legend

- A
- B
- C
- D
- n/a

BMP Sizing

Showing HYDRO SOIL GROUP



Map showing hydro soil groups with a legend and navigation tools.

Legend

- A
- B
- C
- D
- n/a

BMP Sizing

Showing HYDRO SOIL GROUP

Zoom to

|                    |                 |
|--------------------|-----------------|
| HYDRO UNIT NAME    | SAN DIEGO       |
| HYDRO AREA NAME    | Lower San Diego |
| HYDRO SUBAREA      | Coches          |
| NAME               |                 |
| HYDRO BASIN        | 907.14          |
| NUMBER             |                 |
| HYDRO SOIL GROUP   | C               |
| LAKE WOLFORD BASIN |                 |
| Basin              |                 |

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Hydrologic Soil Group—San Diego County Area, California  
(14265 Rios Canyon Road)



Map Scale: 1:1,160 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Diego County Area, California  
 Survey Area Data: Version 7, Nov 15, 2013

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

Date(s) aerial images were photographed: May 2, 2010—May 6, 2010

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

## Hydrologic Soil Group

| Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638) |   |        |              |                |
|--|---|--------|--------------|----------------|
| Map unit symbol  | Map unit name   | Rating | Acres in AOI | Percent of AOI |
| LpD2   | Las Posas fine sandy loam, 9 to 15 percent slopes, eroded | C      | 1.9          | 64.7%          |
| VaB  | Visalia sandy loam, 2 to 5 percent slopes                 | A      | 1.0          | 35.3%          |
| <b>Totals for Area of Interest</b>   |   |        | <b>3.0</b>   | <b>100.0%</b>  |

### Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

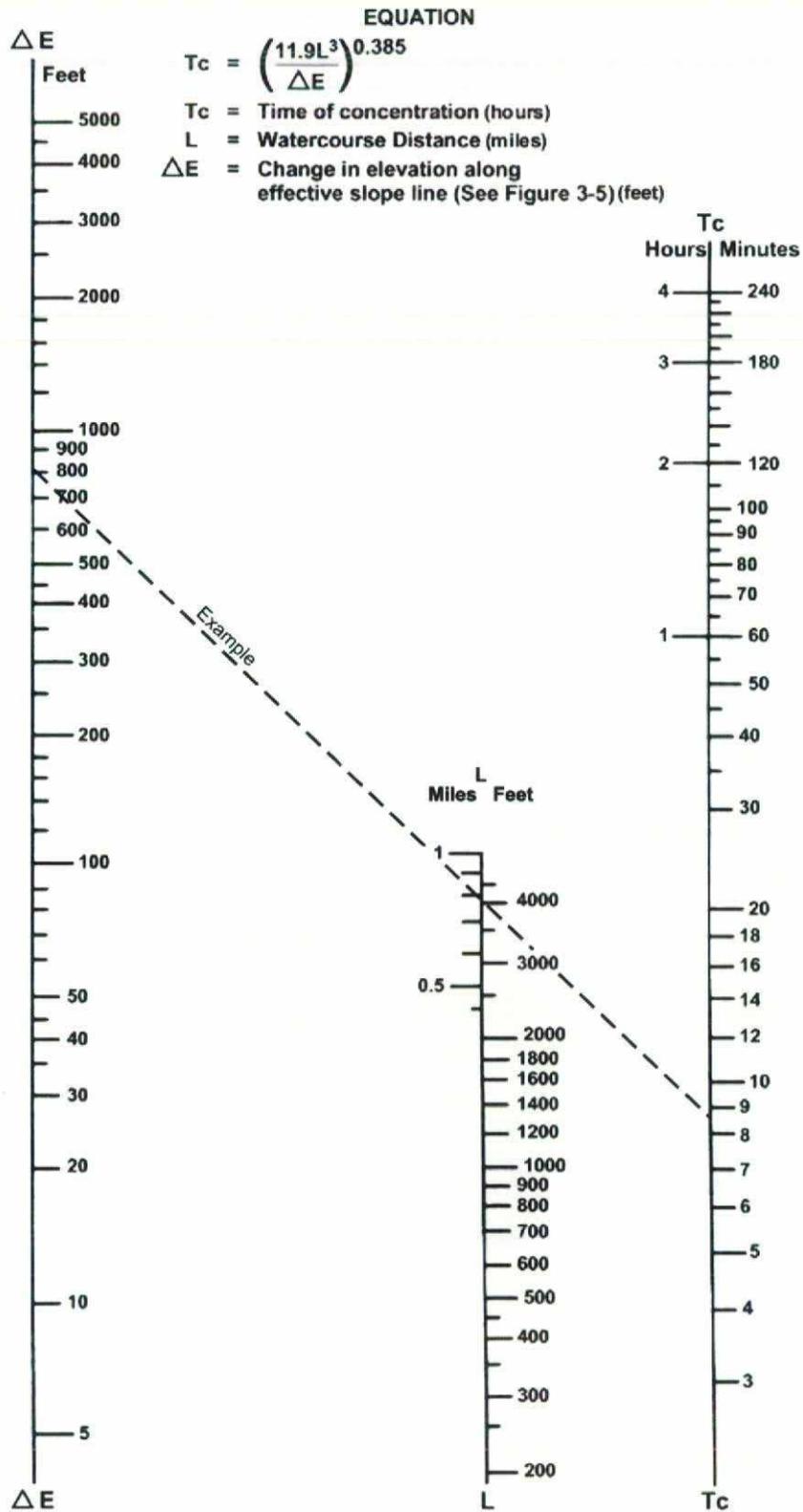
**Table 3-1  
RUNOFF COEFFICIENTS FOR URBAN AREAS**

| Land Use                              |                                | Runoff Coefficient "C" |           |      |      |      |
|---------------------------------------|--------------------------------|------------------------|-----------|------|------|------|
| NRCS Elements                         | County Elements                | % IMPER.               | Soil Type |      |      |      |
|                                       |                                |                        | A         | B    | C    | D    |
| Undisturbed Natural Terrain (Natural) | Permanent Open Space           | 0*                     | 0.20      | 0.25 | 0.30 | 0.35 |
| Low Density Residential (LDR)         | Residential, 1.0 DU/A or less  | 10                     | 0.27      | 0.32 | 0.36 | 0.41 |
| Low Density Residential (LDR)         | Residential, 2.0 DU/A or less  | 20                     | 0.34      | 0.38 | 0.42 | 0.46 |
| Low Density Residential (LDR)         | Residential, 2.9 DU/A or less  | 25                     | 0.38      | 0.41 | 0.45 | 0.49 |
| Medium Density Residential (MDR)      | Residential, 4.3 DU/A or less  | 30                     | 0.41      | 0.45 | 0.48 | 0.52 |
| Medium Density Residential (MDR)      | Residential, 7.3 DU/A or less  | 40                     | 0.48      | 0.51 | 0.54 | 0.57 |
| Medium Density Residential (MDR)      | Residential, 10.9 DU/A or less | 45                     | 0.52      | 0.54 | 0.57 | 0.60 |
| Medium Density Residential (MDR)      | Residential, 14.5 DU/A or less | 50                     | 0.55      | 0.58 | 0.60 | 0.63 |
| High Density Residential (HDR)        | Residential, 24.0 DU/A or less | 65                     | 0.66      | 0.67 | 0.69 | 0.71 |
| High Density Residential (HDR)        | Residential, 43.0 DU/A or less | 80                     | 0.76      | 0.77 | 0.78 | 0.79 |
| Commercial/Industrial (N. Com)        | Neighborhood Commercial        | 80                     | 0.76      | 0.77 | 0.78 | 0.79 |
| Commercial/Industrial (G. Com)        | General Commercial             | 85                     | 0.80      | 0.80 | 0.81 | 0.82 |
| Commercial/Industrial (O.P. Com)      | Office Professional/Commercial | 90                     | 0.83      | 0.84 | 0.84 | 0.85 |
| Commercial/Industrial (Limited I.)    | Limited Industrial             | 90                     | 0.83      | 0.84 | 0.84 | 0.85 |
| Commercial/Industrial (General I.)    | General Industrial             | 95                     | 0.87      | 0.87 | 0.87 | 0.87 |

\*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient,  $C_p$ , for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).

DU/A = dwelling units per acre

NRCS = National Resources Conservation Service



SOURCE: California Division of Highways (1941) and Kirpich (1940)

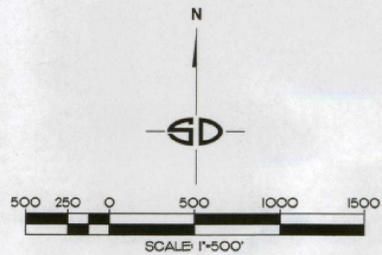
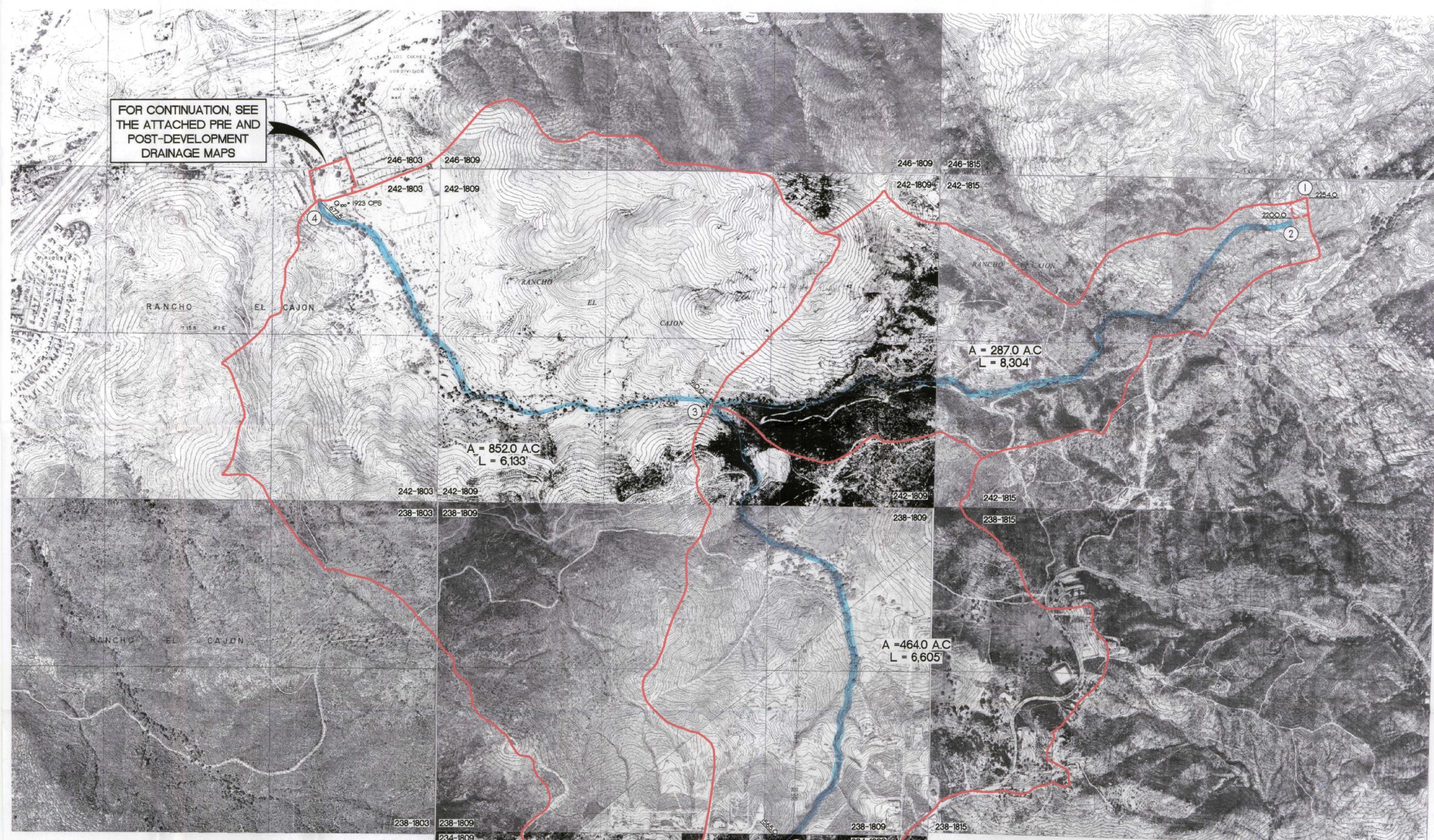
Nomograph for Determination of  
Time of Concentration ( $T_c$ ) or Travel Time ( $T_f$ ) for Natural Watersheds

FIGURE

**3-4**



FOR CONTINUATION, SEE  
THE ATTACHED PRE AND  
POST-DEVELOPMENT  
DRAINAGE MAPS



| ITEM      | SYMBOL |
|-----------|--------|
| BASIN     | —      |
| NODE      | Ⓜ      |
| FLOW PATH | —      |

RIOS CANYON ROAD  
TOPO DRAINAGE MAP







\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT  
2003,1985,1981 HYDROLOGY MANUAL  
(c) Copyright 1982-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1305

Analysis prepared by:

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Fax (619)460-2033 Phone (619)697-9234

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* PETER RIOS ESTATES (APARTMENT COMPLEX) \*  
\* POST-DEVELOPMENT WITHOUT MITIGATION \*  
\* \*  
\*\*\*\*\*

FILE NAME: FS0072.DAT  
TIME/DATE OF STUDY: 11:37 08/22/2014

-----  
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
-----

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
6-HOUR DURATION PRECIPITATION (INCHES) = 2.800  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 3.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95  
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD  
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

**POST-DEVELOPMENT WITHOUT MITIGATION:**

\*\*\*\*\*  
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21  
-----

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

=====

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4100  
SOIL CLASSIFICATION IS "D"  
S.C.S. CURVE NUMBER (AMC II) = 82  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00  
UPSTREAM ELEVATION(FEET) = 2254.00  
DOWNSTREAM ELEVATION(FEET) = 2200.00  
ELEVATION DIFFERENCE(FEET) = 54.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.765  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.730  
SUBAREA RUNOFF(CFS) = 2.76  
TOTAL AREA(ACRES) = 1.00 TOTAL RUNOFF(CFS) = 2.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51  
-----

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

=====

|   |         |                       |        |
|---|---------|-----------------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) =                        | 2200.00 | DOWNSTREAM(FEET) =    | 910.00 |
| CHANNEL LENGTH THRU SUBAREA(FEET) =                     | 8304.00 | CHANNEL SLOPE =       | 0.1553 |
| CHANNEL BASE(FEET) =                                    | 5.00    | "Z" FACTOR =          | 2.000  |
| MANNING'S FACTOR =                                      | 0.030   | MAXIMUM DEPTH(FEET) = | 10.00  |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =                | 4.057   |                       |        |
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT =     | .4100   |                       |        |
| SOIL CLASSIFICATION IS                                  | "D"     |                       |        |
| S.C.S. CURVE NUMBER (AMC II) =                          | 82      |                       |        |
| TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        | 252.00  |                       |        |
| TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = | 20.15   |                       |        |
| AVERAGE FLOW DEPTH(FEET) =                              | 1.55    | TRAVEL TIME(MIN.) =   | 6.87   |
| Tc(MIN.) =  | 12.64   |                       |        |
| SUBAREA AREA(ACRES) =                                   | 287.00  | SUBAREA RUNOFF(CFS) = | 477.39 |
| AREA-AVERAGE RUNOFF COEFFICIENT =                       | 0.410   |                       |        |
| TOTAL AREA(ACRES) =                                     | 288.0   | PEAK FLOW RATE(CFS) = | 479.05 |

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.15 FLOW VELOCITY(FEET/SEC.) = 24.01  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 8404.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1  
-----

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

=====

|  |        |
|--|--------|
| TOTAL NUMBER OF STREAMS =                            | 2      |
| CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE: |        |
| TIME OF CONCENTRATION(MIN.) =                        | 12.64  |
| RAINFALL INTENSITY(INCH/HR) =                        | 4.06   |
| TOTAL STREAM AREA(ACRES) =                           | 288.00 |
| PEAK FLOW RATE(CFS) AT CONFLUENCE =                  | 479.05 |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10.00 TO NODE 11.00 IS CODE = 21  
-----

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

=====

|   |         |
|---|---------|
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = | .3600   |
| SOIL CLASSIFICATION IS                              | "C"     |
| S.C.S. CURVE NUMBER (AMC II) =                      | 76      |
| INITIAL SUBAREA FLOW-LENGTH(FEET) =                 | 100.00  |
| UPSTREAM ELEVATION(FEET) =                          | 1598.00 |
| DOWNSTREAM ELEVATION(FEET) =                        | 1565.00 |
| ELEVATION DIFFERENCE(FEET) =                        | 33.00   |
| SUBAREA OVERLAND TIME OF FLOW(MIN.) =               | 6.183   |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =            | 6.433   |
| SUBAREA RUNOFF(CFS) =                               | 2.32    |
| TOTAL AREA(ACRES) =                                 | 1.00    |
| TOTAL RUNOFF(CFS) =                                 | 2.32    |

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 11.00 TO NODE 3.00 IS CODE = 51  
 -----

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1565.00 DOWNSTREAM(FEET) = 910.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 6605.00 CHANNEL SLOPE = 0.0992  
 CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.195  
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
 SOIL CLASSIFICATION IS "C"  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 364.06  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.93  
 AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 5.81  
 Tc(MIN.) = 12.00  
 SUBAREA AREA(ACRES) = 464.00 SUBAREA RUNOFF(CFS) = 700.69  
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360  
 TOTAL AREA(ACRES) = 465.0 PEAK FLOW RATE(CFS) = 702.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.89 FLOW VELOCITY(FEET/SEC.) = 22.56  
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 3.00 = 6705.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1  
 -----

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

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.00  
 RAINFALL INTENSITY(INCH/HR) = 4.19  
 TOTAL STREAM AREA(ACRES) = 465.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 702.20

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 479.05       | 12.64     | 4.057                 | 288.00      |
| 2             | 702.20       | 12.00     | 4.195                 | 465.00      |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1157.08      | 12.00     | 4.195                 |
| 2             | 1158.19      | 12.64     | 4.057                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1158.19 Tc(MIN.) = 12.64  
TOTAL AREA(ACRES) = 753.0  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 8404.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 910.00 DOWNSTREAM(FEET) = 677.50  
CHANNEL LENGTH THRU SUBAREA(FEET) = 6133.00 CHANNEL SLOPE = 0.0379  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.248  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1658.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 19.64  
AVERAGE FLOW DEPTH(FEET) = 5.37 TRAVEL TIME(MIN.) = 5.20  
Tc(MIN.) = 17.84  
SUBAREA AREA(ACRES) = 852.00 SUBAREA RUNOFF(CFS) = 996.19  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1605.0 PEAK FLOW RATE(CFS) = 1923.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.73 FLOW VELOCITY(FEET/SEC.) = 20.41  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 14537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 4.00 TO NODE 4.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.84  
RAINFALL INTENSITY(INCH/HR) = 3.25  
TOTAL STREAM AREA(ACRES) = 1605.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1923.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

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

=====

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 86.00  
UPSTREAM ELEVATION(FEET) = 730.50

DOWNSTREAM ELEVATION (FEET) = 720.00  
 ELEVATION DIFFERENCE (FEET) = 10.50  
 SUBAREA OVERLAND TIME OF FLOW (MIN.) = 5.734  
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.753  
 SUBAREA RUNOFF (CFS) = 0.17  
 TOTAL AREA (ACRES) = 0.07 TOTAL RUNOFF (CFS) = 0.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 91

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

UPSTREAM NODE ELEVATION (FEET) = 720.00  
 DOWNSTREAM NODE ELEVATION (FEET) = 686.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 218.00  
 "V" GUTTER WIDTH (FEET) = 3.00 GUTTER HIKE (FEET) = 0.500  
 PAVEMENT LIP (FEET) = 0.050 MANNING'S N = .0150  
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.05000  
 MAXIMUM DEPTH (FEET) = 1.00  
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.576  
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
 SOIL CLASSIFICATION IS "C"  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.75  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.99  
 AVERAGE FLOW DEPTH (FEET) = 0.50 FLOOD WIDTH (FEET) = 3.00  
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 0.24 Tc (MIN.) = 5.98  
 SUBAREA AREA (ACRES) = 0.49 SUBAREA RUNOFF (CFS) = 1.16  
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360  
 TOTAL AREA (ACRES) = 0.6 PEAK FLOW RATE (CFS) = 1.33

NOTE: TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH  
IN A FLOWING-FULL GUTTER (NORMAL DEPTH = GUTTER HIKE)

END OF SUBAREA "V" GUTTER HYDRAULICS:  
 DEPTH (FEET) = 0.50 FLOOD WIDTH (FEET) = 3.00  
 FLOW VELOCITY (FEET/SEC.) = 14.99 DEPTH\*VELOCITY (FT\*FT/SEC) = 7.49  
 LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 304.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 4.00 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.) = 5.98  
 RAINFALL INTENSITY (INCH/HR) = 6.58  
 TOTAL STREAM AREA (ACRES) = 0.56  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.33

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1923.39      | 17.84     | 3.248                 | 1605.00     |
| 2             | 1.33         | 5.98      | 6.576                 | 0.56        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 951.35       | 5.98      | 6.576                 |
| 2             | 1924.04      | 17.84     | 3.248                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1924.04 Tc (MIN.) = 17.84  
 TOTAL AREA (ACRES) = 1605.6  
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 14537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 4.00 TO NODE 5.00 IS CODE = 51

-----

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 677.50 DOWNSTREAM (FEET) = 676.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 115.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE (FEET) = 5.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 10.00  
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 3.232  
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
 SOIL CLASSIFICATION IS "C"  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1924.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.70  
 AVERAGE FLOW DEPTH (FEET) = 7.22 TRAVEL TIME (MIN.) = 0.14  
 Tc (MIN.) = 17.98  
 SUBAREA AREA (ACRES) = 0.37 SUBAREA RUNOFF (CFS) = 0.43  
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
 TOTAL AREA (ACRES) = 1605.9 PEAK FLOW RATE (CFS) = 1924.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 7.22 FLOW VELOCITY (FEET/SEC.) = 13.70  
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 5.00 = 14652.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 5.00 TO NODE 5.00 IS CODE = 10

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

=====

\*\*\*\*\*

FLOW PROCESS FROM NODE 109.00 TO NODE 110.00 IS CODE = 21

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

=====
\*USER SPECIFIED(SUBAREA):
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6400
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 58.00
UPSTREAM ELEVATION(FEET) = 705.50
DOWNSTREAM ELEVATION(FEET) = 704.92
ELEVATION DIFFERENCE(FEET) = 0.58
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.306
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.352
SUBAREA RUNOFF(CFS) = 0.57
TOTAL AREA(ACRES) = 0.14 TOTAL RUNOFF(CFS) = 0.57

\*\*\*\*\*
FLOW PROCESS FROM NODE 110.00 TO NODE 112.00 IS CODE = 41
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 704.92 DOWNSTREAM(FEET) = 704.00
FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 6.0 INCH PIPE IS 3.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.34
GIVEN PIPE DIAMETER(INCH) = 6.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.57
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 6.48
LONGEST FLOWPATH FROM NODE 109.00 TO NODE 112.00 = 103.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1
-----

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

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 6.48
RAINFALL INTENSITY(INCH/HR) = 6.24
TOTAL STREAM AREA(ACRES) = 0.14
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.57

\*\*\*\*\*
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21
-----

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

=====
\*USER SPECIFIED(SUBAREA):
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .7300
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 704.50
DOWNSTREAM ELEVATION(FEET) = 704.00
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.709

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 7.377  
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.  
 SUBAREA RUNOFF (CFS) = 0.70  
 TOTAL AREA (ACRES) = 0.13 TOTAL RUNOFF (CFS) = 0.70

\*\*\*\*\*

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

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

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 4.71  
 RAINFALL INTENSITY (INCH/HR) = 7.38  
 TOTAL STREAM AREA (ACRES) = 0.13  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 0.70

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 0.57         | 6.48      | 6.242                 | 0.14        |
| 2             | 0.70         | 4.71      | 7.377                 | 0.13        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1.11         | 4.71      | 7.377                 |
| 2             | 1.16         | 6.48      | 6.242                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1.16 Tc (MIN.) = 6.48  
 TOTAL AREA (ACRES) = 0.3  
 LONGEST FLOWPATH FROM NODE 109.00 TO NODE 112.00 = 103.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 41

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 704.00 DOWNSTREAM (FEET) = 696.30  
 FLOW LENGTH (FEET) = 135.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 6.0 INCH PIPE IS 4.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.50  
 GIVEN PIPE DIAMETER (INCH) = 6.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1.16  
 PIPE TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 6.78  
 LONGEST FLOWPATH FROM NODE 109.00 TO NODE 113.00 = 238.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.063

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .4000

S.C.S. CURVE NUMBER (AMC II) = 76

AREA-AVERAGE RUNOFF COEFFICIENT = 0.5866

SUBAREA AREA(ACRES) = 0.14 SUBAREA RUNOFF(CFS) = 0.34

TOTAL AREA(ACRES) = 0.4 TOTAL RUNOFF(CFS) = 1.46

TC(MIN.) = 6.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 696.30 DOWNSTREAM(FEET) = 692.36

FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 8.0 INCH PIPE IS 5.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.36

GIVEN PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.46

PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.12

LONGEST FLOWPATH FROM NODE 109.00 TO NODE 114.00 = 368.00 FEET.

\*\*\*\*\*

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

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.874

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000

S.C.S. CURVE NUMBER (AMC II) = 76

AREA-AVERAGE RUNOFF COEFFICIENT = 0.5670

SUBAREA AREA(ACRES) = 0.12 SUBAREA RUNOFF(CFS) = 0.35

TOTAL AREA(ACRES) = 0.5 TOTAL RUNOFF(CFS) = 1.77

TC(MIN.) = 7.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.36 DOWNSTREAM(FEET) = 690.70

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.35

GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.77

PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 7.43  
LONGEST FLOWPATH FROM NODE 109.00 TO NODE 115.00 = 468.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.714  
\*USER SPECIFIED(SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
S.C.S. CURVE NUMBER (AMC II) = 76  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5493  
SUBAREA AREA(ACRES) = 0.19 SUBAREA RUNOFF(CFS) = 0.54  
TOTAL AREA(ACRES) = 0.7 TOTAL RUNOFF(CFS) = 2.26  
TC(MIN.) = 7.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 41

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 690.70 DOWNSTREAM(FEET) = 690.20  
FLOW LENGTH(FEET) = 12.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.03  
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.26  
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 7.46  
LONGEST FLOWPATH FROM NODE 109.00 TO NODE 116.00 = 480.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 7.46  
RAINFALL INTENSITY(INCH/HR) = 5.70  
TOTAL STREAM AREA(ACRES) = 0.72  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.26

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

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

=====

\*USER SPECIFIED(SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 112.00  
UPSTREAM ELEVATION(FEET) = 706.00

DOWNSTREAM ELEVATION (FEET) = 704.85  
 ELEVATION DIFFERENCE (FEET) = 1.15  
 SUBAREA OVERLAND TIME OF FLOW (MIN.) = 8.657  
 100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 5.177  
 SUBAREA RUNOFF (CFS) = 0.41  
 TOTAL AREA (ACRES) = 0.16 TOTAL RUNOFF (CFS) = 0.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 41

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 704.85 DOWNSTREAM (FEET) = 703.62  
 FLOW LENGTH (FEET) = 123.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 6.0 INCH PIPE IS 3.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.07  
 GIVEN PIPE DIAMETER (INCH) = 6.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 0.41  
 PIPE TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 9.33  
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 106.00 = 235.00 FEET.

\*\*\*\*\*

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

-----

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

=====

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 4.935  
 \*USER SPECIFIED (SUBAREA):  
 RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5000  
 SUBAREA AREA (ACRES) = 0.25 SUBAREA RUNOFF (CFS) = 0.62  
 TOTAL AREA (ACRES) = 0.4 TOTAL RUNOFF (CFS) = 1.01  
 TC (MIN.) = 9.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 41

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 703.62 DOWNSTREAM (FEET) = 702.13  
 FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 8.0 INCH PIPE IS 5.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.78  
 GIVEN PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1.01  
 PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.99  
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 107.00 = 385.00 FEET.

\*\*\*\*\*

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

-----

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.722

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5600

S.C.S. CURVE NUMBER (AMC II) = 76

AREA-AVERAGE RUNOFF COEFFICIENT = 0.5243

SUBAREA AREA(ACRES) = 0.28 SUBAREA RUNOFF(CFS) = 0.74

TOTAL AREA(ACRES) = 0.7 TOTAL RUNOFF(CFS) = 1.71

TC(MIN.) = 9.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 41

-----

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 702.13 DOWNSTREAM(FEET) = 691.00

FLOW LENGTH(FEET) = 24.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 18.29

GIVEN PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.71

PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 10.01

LONGEST FLOWPATH FROM NODE 104.00 TO NODE 108.00 = 409.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 108.00 TO NODE 116.00 IS CODE = 41

-----

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 691.00 DOWNSTREAM(FEET) = 690.20

FLOW LENGTH(FEET) = 75.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.51

GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.71

PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 10.29

LONGEST FLOWPATH FROM NODE 104.00 TO NODE 116.00 = 484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

-----

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.29

RAINFALL INTENSITY(INCH/HR) = 4.63

TOTAL STREAM AREA(ACRES) = 0.69

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.71

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 2.26         | 7.46      | 5.702                 | 0.72        |
| 2             | 1.71         | 10.29     | 4.633                 | 0.69        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 3.50         | 7.46      | 5.702                 |
| 2             | 3.54         | 10.29     | 4.633                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 3.54 Tc (MIN.) = 10.29  
 TOTAL AREA (ACRES) = 1.4  
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 116.00 = 484.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 116.00 TO NODE 5.00 IS CODE = 11  
 -----  
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 3.54         | 10.29     | 4.633                 | 1.41        |

LONGEST FLOWPATH FROM NODE 104.00 TO NODE 5.00 = 484.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1924.04      | 17.98     | 3.232                 | 1605.93     |

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 5.00 = 14652.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1104.30      | 10.29     | 4.633                 |
| 2             | 1926.52      | 17.98     | 3.232                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1926.52 Tc (MIN.) = 17.98  
 TOTAL AREA (ACRES) = 1607.3

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 5.00 TO NODE 6.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 676.00 DOWNSTREAM(FEET) = 667.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 155.00 CHANNEL SLOPE = 0.0581  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.219  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1926.72  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 23.94  
AVERAGE FLOW DEPTH(FEET) = 5.22 TRAVEL TIME(MIN.) = 0.11  
Tc(MIN.) = 18.09  
SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.42  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1607.7 PEAK FLOW RATE(CFS) = 1926.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.22 FLOW VELOCITY(FEET/SEC.) = 23.94  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 6.00 = 14807.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 6.00 TO NODE 7.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 667.00 DOWNSTREAM(FEET) = 663.50  
CHANNEL LENGTH THRU SUBAREA(FEET) = 75.00 CHANNEL SLOPE = 0.0467  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.213  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1926.63  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 22.06  
AVERAGE FLOW DEPTH(FEET) = 5.48 TRAVEL TIME(MIN.) = 0.06  
Tc(MIN.) = 18.14  
SUBAREA AREA(ACRES) = 0.19 SUBAREA RUNOFF(CFS) = 0.22  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1607.9 PEAK FLOW RATE(CFS) = 1926.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.48 FLOW VELOCITY(FEET/SEC.) = 22.06  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 7.00 = 14882.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 7.00 TO NODE 7.00 IS CODE = 10

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

\*\*\*\*\*

FLOW PROCESS FROM NODE 201.00 TO NODE 207.00 IS CODE = 21

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

=====

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
UPSTREAM ELEVATION(FEET) = 710.00  
DOWNSTREAM ELEVATION(FEET) = 695.00  
ELEVATION DIFFERENCE(FEET) = 15.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.446  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.263  
SUBAREA RUNOFF(CFS) = 1.50  
TOTAL AREA(ACRES) = 0.48 TOTAL RUNOFF(CFS) = 1.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 207.00 TO NODE 210.00 IS CODE = 41

-----

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.00 DOWNSTREAM(FEET) = 683.50  
FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.86  
GIVEN PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.50  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 6.45  
LONGEST FLOWPATH FROM NODE 201.00 TO NODE 210.00 = 340.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 210.00 TO NODE 210.00 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.) = 6.45  
RAINFALL INTENSITY(INCH/HR) = 6.26  
TOTAL STREAM AREA(ACRES) = 0.48  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 21

-----

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

=====

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .7400  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 58.00  
UPSTREAM ELEVATION(FEET) = 704.00  
DOWNSTREAM ELEVATION(FEET) = 703.00  
ELEVATION DIFFERENCE(FEET) = 1.00

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.116  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.377  
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.  
SUBAREA RUNOFF(CFS) = 0.38  
TOTAL AREA(ACRES) = 0.07 TOTAL RUNOFF(CFS) = 0.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 41

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

|                                |                  |            |                  |              |        |
|--------------------------------|------------------|------------|------------------|--------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) | =                | 703.00     | DOWNSTREAM(FEET) | =            | 701.45 |
| FLOW LENGTH(FEET)              | =                | 110.00     | MANNING'S N      | =            | 0.013  |
| DEPTH OF FLOW IN               | 6.0 INCH PIPE IS | 3.3 INCHES |                  |              |        |
| PIPE-FLOW VELOCITY(FEET/SEC.)  | =                | 3.42       |                  |              |        |
| GIVEN PIPE DIAMETER(INCH)      | =                | 6.00       | NUMBER OF PIPES  | =            | 1      |
| PIPE-FLOW(CFS)                 | =                | 0.38       |                  |              |        |
| PIPE TRAVEL TIME(MIN.)         | =                | 0.54       | Tc(MIN.)         | =            | 4.65   |
| LONGEST FLOWPATH FROM NODE     | 202.00 TO NODE   | 204.00     | =                | 168.00 FEET. |        |

\*\*\*\*\*

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

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

=====

|   |   |           |                     |   |      |
|---|---|-----------|---------------------|---|------|
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR)              | = | 7.377     |                     |   |      |
| NOTE: RAINFALL INTENSITY IS BASED ON Tc             | = | 5-MINUTE. |                     |   |      |
| *USER SPECIFIED(SUBAREA):                           |   |           |                     |   |      |
| RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT | = | .6800     |                     |   |      |
| S.C.S. CURVE NUMBER (AMC II)                        | = | 76        |                     |   |      |
| AREA-AVERAGE RUNOFF COEFFICIENT                     | = | 0.7062    |                     |   |      |
| SUBAREA AREA(ACRES)                                 | = | 0.09      | SUBAREA RUNOFF(CFS) | = | 0.45 |
| TOTAL AREA(ACRES)                                   | = | 0.2       | TOTAL RUNOFF(CFS)   | = | 0.83 |
| TC(MIN.)  | = | 4.65      |                     |   |      |

\*\*\*\*\*

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 41

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

|                                |                  |            |                  |              |        |
|--------------------------------|------------------|------------|------------------|--------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) | =                | 701.45     | DOWNSTREAM(FEET) | =            | 695.00 |
| FLOW LENGTH(FEET)              | =                | 22.00      | MANNING'S N      | =            | 0.013  |
| DEPTH OF FLOW IN               | 6.0 INCH PIPE IS | 2.2 INCHES |                  |              |        |
| PIPE-FLOW VELOCITY(FEET/SEC.)  | =                | 13.00      |                  |              |        |
| GIVEN PIPE DIAMETER(INCH)      | =                | 6.00       | NUMBER OF PIPES  | =            | 1      |
| PIPE-FLOW(CFS)                 | =                | 0.83       |                  |              |        |
| PIPE TRAVEL TIME(MIN.)         | =                | 0.03       | Tc(MIN.)         | =            | 4.68   |
| LONGEST FLOWPATH FROM NODE     | 202.00 TO NODE   | 205.00     | =                | 190.00 FEET. |        |

\*\*\*\*\*

FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 41

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

|                                |                  |            |                  |              |        |
|--------------------------------|------------------|------------|------------------|--------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) | =                | 695.00     | DOWNSTREAM(FEET) | =            | 694.00 |
| FLOW LENGTH(FEET)              | =                | 44.00      | MANNING'S N      | =            | 0.013  |
| DEPTH OF FLOW IN               | 8.0 INCH PIPE IS | 3.9 INCHES |                  |              |        |
| PIPE-FLOW VELOCITY(FEET/SEC.)  | =                | 5.01       |                  |              |        |
| GIVEN PIPE DIAMETER(INCH)      | =                | 8.00       | NUMBER OF PIPES  | =            | 1      |
| PIPE-FLOW(CFS)                 | =                | 0.83       |                  |              |        |
| PIPE TRAVEL TIME(MIN.)         | =                | 0.15       | Tc(MIN.)         | =            | 4.83   |
| LONGEST FLOWPATH FROM NODE     | 202.00 TO NODE   | 206.00     | =                | 234.00 FEET. |        |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81  
-----

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

=====

|   |   |           |                     |   |      |
|---|---|-----------|---------------------|---|------|
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR)              | = | 7.377     |                     |   |      |
| NOTE: RAINFALL INTENSITY IS BASED ON Tc             | = | 5-MINUTE. |                     |   |      |
| *USER SPECIFIED(SUBAREA):                           |   |           |                     |   |      |
| RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT | = | .3600     |                     |   |      |
| S.C.S. CURVE NUMBER (AMC II)                        | = | 76        |                     |   |      |
| AREA-AVERAGE RUNOFF COEFFICIENT                     | = | 0.5510    |                     |   |      |
| SUBAREA AREA(ACRES)                                 | = | 0.13      | SUBAREA RUNOFF(CFS) | = | 0.35 |
| TOTAL AREA(ACRES)                                   | = | 0.3       | TOTAL RUNOFF(CFS)   | = | 1.18 |
| TC(MIN.)  | = | 4.83      |                     |   |      |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 206.00 TO NODE 210.00 IS CODE = 41  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

|                                |                  |            |                  |              |        |
|--------------------------------|------------------|------------|------------------|--------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) | =                | 694.00     | DOWNSTREAM(FEET) | =            | 683.50 |
| FLOW LENGTH(FEET)              | =                | 60.00      | MANNING'S N      | =            | 0.013  |
| DEPTH OF FLOW IN               | 8.0 INCH PIPE IS | 2.7 INCHES |                  |              |        |
| PIPE-FLOW VELOCITY(FEET/SEC.)  | =                | 11.61      |                  |              |        |
| GIVEN PIPE DIAMETER(INCH)      | =                | 8.00       | NUMBER OF PIPES  | =            | 1      |
| PIPE-FLOW(CFS)                 | =                | 1.18       |                  |              |        |
| PIPE TRAVEL TIME(MIN.)         | =                | 0.09       | Tc(MIN.)         | =            | 4.91   |
| LONGEST FLOWPATH FROM NODE     | 202.00 TO NODE   | 210.00     | =                | 294.00 FEET. |        |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 210.00 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.)                   | =      | 4.91 |
| RAINFALL INTENSITY(INCH/HR)                   | =      | 7.38 |
| TOTAL STREAM AREA(ACRES)                      | =      | 0.29 |
| PEAK FLOW RATE(CFS) AT CONFLUENCE             | =      | 1.18 |

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1.50         | 6.45      | 6.258                 | 0.48        |
| 2             | 1.18         | 4.91      | 7.377                 | 0.29        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 2.32         | 4.91      | 7.377                 |
| 2             | 2.50         | 6.45      | 6.258                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2.50 Tc (MIN.) = 6.45  
 TOTAL AREA (ACRES) = 0.8  
 LONGEST FLOWPATH FROM NODE 201.00 TO NODE 210.00 = 340.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 41

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 683.50 DOWNSTREAM (FEET) = 680.00  
 FLOW LENGTH (FEET) = 20.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 8.0 INCH PIPE IS 4.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.16  
 GIVEN PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 2.50  
 PIPE TRAVEL TIME (MIN.) = 0.02 Tc (MIN.) = 6.48  
 LONGEST FLOWPATH FROM NODE 201.00 TO NODE 211.00 = 360.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 211.00 TO NODE 211.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 6.48  
 RAINFALL INTENSITY (INCH/HR) = 6.24  
 TOTAL STREAM AREA (ACRES) = 0.77  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 21

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

=====

\*USER SPECIFIED (SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00  
 UPSTREAM ELEVATION(FEET) = 692.00  
 DOWNSTREAM ELEVATION(FEET) = 684.00  
 ELEVATION DIFFERENCE(FEET) = 8.00  
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.660  
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.132  
 SUBAREA RUNOFF(CFS) = 0.20  
 TOTAL AREA(ACRES) = 0.09 TOTAL RUNOFF(CFS) = 0.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 209.00 TO NODE 211.00 IS CODE = 41  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 681.00 DOWNSTREAM(FEET) = 680.00  
 FLOW LENGTH(FEET) = 12.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 6.0 INCH PIPE IS 1.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.45  
 GIVEN PIPE DIAMETER(INCH) = 6.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 0.20  
 PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 6.70  
 LONGEST FLOWPATH FROM NODE 208.00 TO NODE 211.00 = 112.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 211.00 TO NODE 211.00 IS CODE = 1  
 -----

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

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 6.70  
 RAINFALL INTENSITY(INCH/HR) = 6.11  
 TOTAL STREAM AREA(ACRES) = 0.09  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.20

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 2.50         | 6.48      | 6.243                 | 0.77        |
| 2             | 0.20         | 6.70      | 6.110                 | 0.09        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 2.70         | 6.48      | 6.243                 |
| 2             | 2.65         | 6.70      | 6.110                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 2.70 Tc(MIN.) = 6.48  
TOTAL AREA(ACRES) = 0.9  
LONGEST FLOWPATH FROM NODE 201.00 TO NODE 211.00 = 360.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 211.00 TO NODE 7.00 IS CODE = 11

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

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 2.70         | 6.48      | 6.243                 | 0.86        |

LONGEST FLOWPATH FROM NODE 201.00 TO NODE 7.00 = 360.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1926.52      | 18.14     | 3.213                 | 1607.89     |

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 7.00 = 14882.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 690.42       | 6.48      | 6.243                 |
| 2             | 1927.90      | 18.14     | 3.213                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1927.90 Tc(MIN.) = 18.14  
TOTAL AREA(ACRES) = 1608.8

\*\*\*\*\*

FLOW PROCESS FROM NODE 7.00 TO NODE 7.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21

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

\*\*\*\*\*  
\*USER SPECIFIED(SUBAREA) :

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 400.00  
UPSTREAM ELEVATION(FEET) = 707.00  
DOWNSTREAM ELEVATION(FEET) = 679.00  
ELEVATION DIFFERENCE(FEET) = 28.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.964  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.958  
SUBAREA RUNOFF(CFS) = 0.24

TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 302.00 TO NODE 7.00 IS CODE = 11

=====  
>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<  
=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 0.24         | 6.96      | 5.958                 | 0.11        |

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 7.00 = 400.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1927.90      | 18.14     | 3.213                 | 1608.75     |

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 7.00 = 14882.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 740.18       | 6.96      | 5.958                 |
| 2             | 1928.03      | 18.14     | 3.213                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1928.03 Tc(MIN.) = 18.14  
TOTAL AREA(ACRES) = 1608.9

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1608.9 TC(MIN.) = 18.14  
**PEAK FLOW RATE(CFS) = 1928.03**

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT  
2003,1985,1981 HYDROLOGY MANUAL  
(c) Copyright 1982-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1305

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* PETER RIOS ESTATES (APARTMENT COMPLEX) \*  
\* POST-DEVELOPMENT WITH MITIGATION \*  
\* \*  
\*\*\*\*\*

FILE NAME: FSM0072.DAT  
TIME/DATE OF STUDY: 13:59 08/22/2014

-----  
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
-----

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
6-HOUR DURATION PRECIPITATION (INCHES) = 2.800  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 3.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95  
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD  
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

**POST-DEVELOPMENT WITH MITIGATION:**

\*\*\*\*\*  
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21  
-----

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

=====

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4100  
SOIL CLASSIFICATION IS "D"  
S.C.S. CURVE NUMBER (AMC II) = 82  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00  
UPSTREAM ELEVATION(FEET) = 2254.00  
DOWNSTREAM ELEVATION(FEET) = 2200.00  
ELEVATION DIFFERENCE(FEET) = 54.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.765  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.730  
SUBAREA RUNOFF(CFS) = 2.76  
TOTAL AREA(ACRES) = 1.00 TOTAL RUNOFF(CFS) = 2.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

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

=====

|   |         |                       |        |
|---|---------|-----------------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) =                        | 2200.00 | DOWNSTREAM(FEET) =    | 910.00 |
| CHANNEL LENGTH THRU SUBAREA(FEET) =                     | 8304.00 | CHANNEL SLOPE =       | 0.1553 |
| CHANNEL BASE(FEET) =                                    | 5.00    | "Z" FACTOR =          | 2.000  |
| MANNING'S FACTOR =                                      | 0.030   | MAXIMUM DEPTH(FEET) = | 10.00  |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =                | 4.057   |                       |        |
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT =     | .4100   |                       |        |
| SOIL CLASSIFICATION IS                                  | "D"     |                       |        |
| S.C.S. CURVE NUMBER (AMC II) =                          | 82      |                       |        |
| TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        | 252.00  |                       |        |
| TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = | 20.15   |                       |        |
| AVERAGE FLOW DEPTH(FEET) =                              | 1.55    | TRAVEL TIME(MIN.) =   | 6.87   |
| Tc(MIN.) =  | 12.64   |                       |        |
| SUBAREA AREA(ACRES) =                                   | 287.00  | SUBAREA RUNOFF(CFS) = | 477.39 |
| AREA-AVERAGE RUNOFF COEFFICIENT =                       | 0.410   |                       |        |
| TOTAL AREA(ACRES) =                                     | 288.0   | PEAK FLOW RATE(CFS) = | 479.05 |

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.15 FLOW VELOCITY(FEET/SEC.) = 24.01  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 8404.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1

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

=====

|  |        |
|--|--------|
| TOTAL NUMBER OF STREAMS =                            | 2      |
| CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE: |        |
| TIME OF CONCENTRATION(MIN.) =                        | 12.64  |
| RAINFALL INTENSITY(INCH/HR) =                        | 4.06   |
| TOTAL STREAM AREA(ACRES) =                           | 288.00 |
| PEAK FLOW RATE(CFS) AT CONFLUENCE =                  | 479.05 |

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

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

=====

|   |         |                     |      |
|---|---------|---------------------|------|
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = | .3600   |                     |      |
| SOIL CLASSIFICATION IS                              | "C"     |                     |      |
| S.C.S. CURVE NUMBER (AMC II) =                      | 76      |                     |      |
| INITIAL SUBAREA FLOW-LENGTH(FEET) =                 | 100.00  |                     |      |
| UPSTREAM ELEVATION(FEET) =                          | 1598.00 |                     |      |
| DOWNSTREAM ELEVATION(FEET) =                        | 1565.00 |                     |      |
| ELEVATION DIFFERENCE(FEET) =                        | 33.00   |                     |      |
| SUBAREA OVERLAND TIME OF FLOW(MIN.) =               | 6.183   |                     |      |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =            | 6.433   |                     |      |
| SUBAREA RUNOFF(CFS) =                               | 2.32    |                     |      |
| TOTAL AREA(ACRES) =                                 | 1.00    | TOTAL RUNOFF(CFS) = | 2.32 |

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 11.00 TO NODE 3.00 IS CODE = 51  
 -----

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1565.00 DOWNSTREAM(FEET) = 910.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 6605.00 CHANNEL SLOPE = 0.0992  
 CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.195  
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
 SOIL CLASSIFICATION IS "C"  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 364.06  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.93  
 AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 5.81  
 Tc(MIN.) = 12.00  
 SUBAREA AREA(ACRES) = 464.00 SUBAREA RUNOFF(CFS) = 700.69  
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360  
 TOTAL AREA(ACRES) = 465.0 PEAK FLOW RATE(CFS) = 702.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.89 FLOW VELOCITY(FEET/SEC.) = 22.56  
 LONGEST FLOWPATH FROM NODE 10.00 TO NODE 3.00 = 6705.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1  
 -----

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

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.00  
 RAINFALL INTENSITY(INCH/HR) = 4.19  
 TOTAL STREAM AREA(ACRES) = 465.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 702.20

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 479.05       | 12.64     | 4.057                 | 288.00      |
| 2             | 702.20       | 12.00     | 4.195                 | 465.00      |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1157.08      | 12.00     | 4.195                 |
| 2             | 1158.19      | 12.64     | 4.057                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1158.19 Tc(MIN.) = 12.64  
TOTAL AREA(ACRES) = 753.0  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 8404.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 910.00 DOWNSTREAM(FEET) = 677.50  
CHANNEL LENGTH THRU SUBAREA(FEET) = 6133.00 CHANNEL SLOPE = 0.0379  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.248  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1658.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 19.64  
AVERAGE FLOW DEPTH(FEET) = 5.37 TRAVEL TIME(MIN.) = 5.20  
Tc(MIN.) = 17.84  
SUBAREA AREA(ACRES) = 852.00 SUBAREA RUNOFF(CFS) = 996.19  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1605.0 PEAK FLOW RATE(CFS) = 1923.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.73 FLOW VELOCITY(FEET/SEC.) = 20.41  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 14537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 4.00 TO NODE 4.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.84  
RAINFALL INTENSITY(INCH/HR) = 3.25  
TOTAL STREAM AREA(ACRES) = 1605.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1923.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

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

=====

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 86.00  
UPSTREAM ELEVATION(FEET) = 730.50

DOWNSTREAM ELEVATION(FEET) = 720.00  
ELEVATION DIFFERENCE(FEET) = 10.50  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.734  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.753  
SUBAREA RUNOFF(CFS) = 0.17  
TOTAL AREA(ACRES) = 0.07 TOTAL RUNOFF(CFS) = 0.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 91

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

=====

UPSTREAM NODE ELEVATION(FEET) = 720.00  
DOWNSTREAM NODE ELEVATION(FEET) = 686.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 218.00  
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.500  
PAVEMENT LIP(FEET) = 0.050 MANNING'S N = .0150  
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.05000  
MAXIMUM DEPTH(FEET) = 1.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.576  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.99  
AVERAGE FLOW DEPTH(FEET) = 0.50 FLOOD WIDTH(FEET) = 3.00  
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 5.98  
SUBAREA AREA(ACRES) = 0.49 SUBAREA RUNOFF(CFS) = 1.16  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.33

NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH  
IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)

END OF SUBAREA "V" GUTTER HYDRAULICS:

DEPTH(FEET) = 0.50 FLOOD WIDTH(FEET) = 3.00  
FLOW VELOCITY(FEET/SEC.) = 14.99 DEPTH\*VELOCITY(FT\*FT/SEC) = 7.49  
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 304.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 4.00 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.) = 5.98  
RAINFALL INTENSITY(INCH/HR) = 6.58  
TOTAL STREAM AREA(ACRES) = 0.56  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.33

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1923.39      | 17.84     | 3.248                 | 1605.00     |
| 2             | 1.33         | 5.98      | 6.576                 | 0.56        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 951.35       | 5.98      | 6.576                 |
| 2             | 1924.04      | 17.84     | 3.248                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1924.04 Tc(MIN.) = 17.84  
TOTAL AREA(ACRES) = 1605.6  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 14537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 4.00 TO NODE 5.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 677.50 DOWNSTREAM(FEET) = 676.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.0130  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.232  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1924.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.70  
AVERAGE FLOW DEPTH(FEET) = 7.22 TRAVEL TIME(MIN.) = 0.14  
Tc(MIN.) = 17.98  
SUBAREA AREA(ACRES) = 0.37 SUBAREA RUNOFF(CFS) = 0.43  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1605.9 PEAK FLOW RATE(CFS) = 1924.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 7.22 FLOW VELOCITY(FEET/SEC.) = 13.70  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 5.00 = 14652.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 5.00 TO NODE 5.00 IS CODE = 10

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

\*\*\*\*\*

FLOW PROCESS FROM NODE 109.00 TO NODE 110.00 IS CODE = 21

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

=====

\*USER SPECIFIED (SUBAREA) :

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6400  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 58.00  
UPSTREAM ELEVATION (FEET) = 705.50  
DOWNSTREAM ELEVATION (FEET) = 704.92  
ELEVATION DIFFERENCE (FEET) = 0.58  
SUBAREA OVERLAND TIME OF FLOW (MIN.) = 6.306  
100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.352  
SUBAREA RUNOFF (CFS) = 0.57  
TOTAL AREA (ACRES) = 0.14 TOTAL RUNOFF (CFS) = 0.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 110.00 TO NODE 112.00 IS CODE = 41

-----

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 704.92 DOWNSTREAM (FEET) = 704.00  
FLOW LENGTH (FEET) = 45.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 6.0 INCH PIPE IS 3.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.34  
GIVEN PIPE DIAMETER (INCH) = 6.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 0.57  
PIPE TRAVEL TIME (MIN.) = 0.17 Tc (MIN.) = 6.48  
LONGEST FLOWPATH FROM NODE 109.00 TO NODE 112.00 = 103.00 FEET.

\*\*\*\*\*

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

-----

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 6.48  
RAINFALL INTENSITY (INCH/HR) = 6.24  
TOTAL STREAM AREA (ACRES) = 0.14  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 0.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 21

-----

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

=====

\*USER SPECIFIED (SUBAREA) :

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .7300  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 50.00  
UPSTREAM ELEVATION (FEET) = 704.50  
DOWNSTREAM ELEVATION (FEET) = 704.00  
ELEVATION DIFFERENCE (FEET) = 0.50  
SUBAREA OVERLAND TIME OF FLOW (MIN.) = 4.709

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 7.377  
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.  
 SUBAREA RUNOFF (CFS) = 0.70  
 TOTAL AREA (ACRES) = 0.13 TOTAL RUNOFF (CFS) = 0.70

\*\*\*\*\*

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

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

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 4.71  
 RAINFALL INTENSITY (INCH/HR) = 7.38  
 TOTAL STREAM AREA (ACRES) = 0.13  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 0.70

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 0.57         | 6.48      | 6.242                 | 0.14        |
| 2             | 0.70         | 4.71      | 7.377                 | 0.13        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1.11         | 4.71      | 7.377                 |
| 2             | 1.16         | 6.48      | 6.242                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1.16 Tc (MIN.) = 6.48  
 TOTAL AREA (ACRES) = 0.3  
 LONGEST FLOWPATH FROM NODE 109.00 TO NODE 112.00 = 103.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 41

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 704.00 DOWNSTREAM (FEET) = 696.30  
 FLOW LENGTH (FEET) = 135.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 6.0 INCH PIPE IS 4.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.50  
 GIVEN PIPE DIAMETER (INCH) = 6.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1.16  
 PIPE TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 6.78  
 LONGEST FLOWPATH FROM NODE 109.00 TO NODE 113.00 = 238.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.063

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .4000

S.C.S. CURVE NUMBER (AMC II) = 76

AREA-AVERAGE RUNOFF COEFFICIENT = 0.5866

SUBAREA AREA(ACRES) = 0.14 SUBAREA RUNOFF(CFS) = 0.34

TOTAL AREA(ACRES) = 0.4 TOTAL RUNOFF(CFS) = 1.46

TC(MIN.) = 6.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 696.30 DOWNSTREAM(FEET) = 692.36

FLOW LENGTH(FEET) = 130.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 8.0 INCH PIPE IS 5.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.36

GIVEN PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.46

PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.12

LONGEST FLOWPATH FROM NODE 109.00 TO NODE 114.00 = 368.00 FEET.

\*\*\*\*\*

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

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.874

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000

S.C.S. CURVE NUMBER (AMC II) = 76

AREA-AVERAGE RUNOFF COEFFICIENT = 0.5670

SUBAREA AREA(ACRES) = 0.12 SUBAREA RUNOFF(CFS) = 0.35

TOTAL AREA(ACRES) = 0.5 TOTAL RUNOFF(CFS) = 1.77

TC(MIN.) = 7.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.36 DOWNSTREAM(FEET) = 690.70

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.35

GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.77

PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 7.43  
LONGEST FLOWPATH FROM NODE 109.00 TO NODE 115.00 = 468.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.714  
\*USER SPECIFIED(SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
S.C.S. CURVE NUMBER (AMC II) = 76  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5493  
SUBAREA AREA(ACRES) = 0.19 SUBAREA RUNOFF(CFS) = 0.54  
TOTAL AREA(ACRES) = 0.7 TOTAL RUNOFF(CFS) = 2.26  
TC(MIN.) = 7.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 115.00 TO NODE 116.00 IS CODE = 41

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 690.70 DOWNSTREAM(FEET) = 690.20  
FLOW LENGTH(FEET) = 12.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.03  
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.26  
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 7.46  
LONGEST FLOWPATH FROM NODE 109.00 TO NODE 116.00 = 480.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 7.46  
RAINFALL INTENSITY(INCH/HR) = 5.70  
TOTAL STREAM AREA(ACRES) = 0.72  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.26

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

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

=====

\*USER SPECIFIED(SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 112.00  
UPSTREAM ELEVATION(FEET) = 706.00

DOWNSTREAM ELEVATION (FEET) = 704.85  
ELEVATION DIFFERENCE (FEET) = 1.15  
SUBAREA OVERLAND TIME OF FLOW (MIN.) = 8.657  
100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 5.177  
SUBAREA RUNOFF (CFS) = 0.41  
TOTAL AREA (ACRES) = 0.16 TOTAL RUNOFF (CFS) = 0.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 41  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 704.85 DOWNSTREAM (FEET) = 703.62  
FLOW LENGTH (FEET) = 123.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 6.0 INCH PIPE IS 3.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.07  
GIVEN PIPE DIAMETER (INCH) = 6.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 0.41  
PIPE TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 9.33  
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 106.00 = 235.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81  
-----

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

=====

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 4.935  
\*USER SPECIFIED (SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000  
S.C.S. CURVE NUMBER (AMC II) = 76  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5000  
SUBAREA AREA (ACRES) = 0.25 SUBAREA RUNOFF (CFS) = 0.62  
TOTAL AREA (ACRES) = 0.4 TOTAL RUNOFF (CFS) = 1.01  
TC (MIN.) = 9.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 41  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 703.62 DOWNSTREAM (FEET) = 702.13  
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 8.0 INCH PIPE IS 5.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.78  
GIVEN PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 1.01  
PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.99  
LONGEST FLOWPATH FROM NODE 104.00 TO NODE 107.00 = 385.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81  
-----

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

=====

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 4.722

\*USER SPECIFIED (SUBAREA) :

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5600

S.C.S. CURVE NUMBER (AMC II) = 76

AREA-AVERAGE RUNOFF COEFFICIENT = 0.5243

SUBAREA AREA (ACRES) = 0.28 SUBAREA RUNOFF (CFS) = 0.74

TOTAL AREA (ACRES) = 0.7 TOTAL RUNOFF (CFS) = 1.71

TC (MIN.) = 9.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 702.13 DOWNSTREAM (FEET) = 691.00

FLOW LENGTH (FEET) = 24.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 18.29

GIVEN PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 1.71

PIPE TRAVEL TIME (MIN.) = 0.02 Tc (MIN.) = 10.01

LONGEST FLOWPATH FROM NODE 104.00 TO NODE 108.00 = 409.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 108.00 TO NODE 116.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 691.00 DOWNSTREAM (FEET) = 690.20

FLOW LENGTH (FEET) = 75.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 12.0 INCH PIPE IS 5.8 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.51

GIVEN PIPE DIAMETER (INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 1.71

PIPE TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 10.29

LONGEST FLOWPATH FROM NODE 104.00 TO NODE 116.00 = 484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 10.29

RAINFALL INTENSITY (INCH/HR) = 4.63

TOTAL STREAM AREA (ACRES) = 0.69

PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.71

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 2.26         | 7.46      | 5.702                 | 0.72        |
| 2             | 1.71         | 10.29     | 4.633                 | 0.69        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 3.50         | 7.46      | 5.702                 |
| 2             | 3.54         | 10.29     | 4.633                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 3.54 Tc (MIN.) = 10.29  
 TOTAL AREA (ACRES) = 1.4  
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 116.00 = 484.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 116.00 TO NODE 116.00 IS CODE = 7

>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

=====

USER-SPECIFIED VALUES ARE AS FOLLOWS:

TC (MIN) = 10.29 RAIN INTENSITY (INCH/HOUR) = 4.63  
 TOTAL AREA (ACRES) = 1.41 TOTAL RUNOFF (CFS) = 1.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 116.00 TO NODE 5.00 IS CODE = 11

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

\*\* MAIN STREAM CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1.23         | 10.29     | 4.632                 | 1.41        |

LONGEST FLOWPATH FROM NODE 104.00 TO NODE 5.00 = 484.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1924.04      | 17.98     | 3.232                 | 1605.93     |

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 5.00 = 14652.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1102.44      | 10.29     | 4.632                 |
| 2             | 1924.90      | 17.98     | 3.232                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1924.90 Tc(MIN.) = 17.98  
TOTAL AREA(ACRES) = 1607.3

\*\*\*\*\*

FLOW PROCESS FROM NODE 5.00 TO NODE 6.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 676.00 DOWNSTREAM(FEET) = 667.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 155.00 CHANNEL SLOPE = 0.0581  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.219  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1925.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 23.93  
AVERAGE FLOW DEPTH(FEET) = 5.21 TRAVEL TIME(MIN.) = 0.11  
Tc(MIN.) = 18.09  
SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.42  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1607.7 PEAK FLOW RATE(CFS) = 1924.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.21 FLOW VELOCITY(FEET/SEC.) = 23.93  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 6.00 = 14807.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 6.00 TO NODE 7.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 667.00 DOWNSTREAM(FEET) = 663.50  
CHANNEL LENGTH THRU SUBAREA(FEET) = 75.00 CHANNEL SLOPE = 0.0467  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.213  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1925.01  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 22.06  
AVERAGE FLOW DEPTH(FEET) = 5.47 TRAVEL TIME(MIN.) = 0.06  
Tc(MIN.) = 18.14  
SUBAREA AREA(ACRES) = 0.19 SUBAREA RUNOFF(CFS) = 0.22  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1607.9 PEAK FLOW RATE(CFS) = 1924.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.47 FLOW VELOCITY(FEET/SEC.) = 22.06  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 7.00 = 14882.00 FEET.

```

*****
FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
=====

*****
FLOW PROCESS FROM NODE      201.00 TO NODE     207.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
UPSTREAM ELEVATION(FEET) = 710.00
DOWNSTREAM ELEVATION(FEET) = 695.00
ELEVATION DIFFERENCE(FEET) = 15.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.446
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.263
SUBAREA RUNOFF(CFS) = 1.50
TOTAL AREA(ACRES) = 0.48 TOTAL RUNOFF(CFS) = 1.50

*****
FLOW PROCESS FROM NODE      207.00 TO NODE     210.00 IS CODE = 41
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 692.00 DOWNSTREAM(FEET) = 683.50
FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.86
GIVEN PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.50
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 6.45
LONGEST FLOWPATH FROM NODE 201.00 TO NODE 210.00 = 340.00 FEET.

*****
FLOW PROCESS FROM NODE      210.00 TO NODE     210.00 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.) = 6.45
RAINFALL INTENSITY(INCH/HR) = 6.26
TOTAL STREAM AREA(ACRES) = 0.48
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.50

*****
FLOW PROCESS FROM NODE      202.00 TO NODE     203.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

\*USER SPECIFIED(SUBAREA):

RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .7400  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 58.00  
UPSTREAM ELEVATION(FEET) = 704.00  
DOWNSTREAM ELEVATION(FEET) = 703.00  
ELEVATION DIFFERENCE(FEET) = 1.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.116  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.377  
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.  
SUBAREA RUNOFF(CFS) = 0.38  
TOTAL AREA(ACRES) = 0.07 TOTAL RUNOFF(CFS) = 0.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 41

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 703.00 DOWNSTREAM(FEET) = 701.45  
FLOW LENGTH(FEET) = 110.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 6.0 INCH PIPE IS 3.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.42  
GIVEN PIPE DIAMETER(INCH) = 6.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.38  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 4.65  
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 204.00 = 168.00 FEET.

\*\*\*\*\*

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

-----

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

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.377  
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.  
\*USER SPECIFIED(SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6800  
S.C.S. CURVE NUMBER (AMC II) = 76  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.7062  
SUBAREA AREA(ACRES) = 0.09 SUBAREA RUNOFF(CFS) = 0.45  
TOTAL AREA(ACRES) = 0.2 TOTAL RUNOFF(CFS) = 0.83  
TC(MIN.) = 4.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 41

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 701.45 DOWNSTREAM(FEET) = 695.00  
FLOW LENGTH(FEET) = 22.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 6.0 INCH PIPE IS 2.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.00  
GIVEN PIPE DIAMETER (INCH) = 6.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 0.83  
PIPE TRAVEL TIME (MIN.) = 0.03 Tc (MIN.) = 4.68  
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 205.00 = 190.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 41  
-----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 695.00 DOWNSTREAM (FEET) = 694.00  
FLOW LENGTH (FEET) = 44.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 8.0 INCH PIPE IS 3.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.01  
GIVEN PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 0.83  
PIPE TRAVEL TIME (MIN.) = 0.15 Tc (MIN.) = 4.83  
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 206.00 = 234.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81  
-----

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

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 7.377  
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.  
\*USER SPECIFIED (SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
S.C.S. CURVE NUMBER (AMC II) = 76  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.5510  
SUBAREA AREA (ACRES) = 0.13 SUBAREA RUNOFF (CFS) = 0.35  
TOTAL AREA (ACRES) = 0.3 TOTAL RUNOFF (CFS) = 1.18  
TC (MIN.) = 4.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 206.00 TO NODE 210.00 IS CODE = 41  
-----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT) <<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 694.00 DOWNSTREAM (FEET) = 683.50  
FLOW LENGTH (FEET) = 60.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.61  
GIVEN PIPE DIAMETER (INCH) = 8.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 1.18  
PIPE TRAVEL TIME (MIN.) = 0.09 Tc (MIN.) = 4.91  
LONGEST FLOWPATH FROM NODE 202.00 TO NODE 210.00 = 294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 210.00 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.) = 4.91  
RAINFALL INTENSITY(INCH/HR) = 7.38  
TOTAL STREAM AREA(ACRES) = 0.29  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.18

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1.50         | 6.45      | 6.258                 | 0.48        |
| 2             | 1.18         | 4.91      | 7.377                 | 0.29        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 2.32         | 4.91      | 7.377                 |
| 2             | 2.50         | 6.45      | 6.258                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 2.50 Tc(MIN.) = 6.45  
TOTAL AREA(ACRES) = 0.8  
LONGEST FLOWPATH FROM NODE 201.00 TO NODE 210.00 = 340.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 210.00 IS CODE = 7

-----  
>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

=====

USER-SPECIFIED VALUES ARE AS FOLLOWS:

TC(MIN) = 6.45 RAIN INTENSITY(INCH/HOUR) = 6.26  
TOTAL AREA(ACRES) = 0.77 TOTAL RUNOFF(CFS) = 1.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 41

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

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 683.50 DOWNSTREAM(FEET) = 680.00  
FLOW LENGTH(FEET) = 20.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 8.0 INCH PIPE IS 2.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.88  
GIVEN PIPE DIAMETER(INCH) = 8.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.28  
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 6.48  
LONGEST FLOWPATH FROM NODE 201.00 TO NODE 211.00 = 360.00 FEET.

```

*****
FLOW PROCESS FROM NODE      211.00 TO NODE      211.00 IS CODE =   1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    6.48
RAINFALL INTENSITY(INCH/HR) =    6.24
TOTAL STREAM AREA(ACRES) =    0.77
PEAK FLOW RATE(CFS) AT CONFLUENCE =    1.28

*****
FLOW PROCESS FROM NODE      208.00 TO NODE      209.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
*USER SPECIFIED(SUBAREA):
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
S.C.S. CURVE NUMBER (AMC II) =  76
INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
UPSTREAM ELEVATION(FEET) =    692.00
DOWNSTREAM ELEVATION(FEET) =    684.00
ELEVATION DIFFERENCE(FEET) =    8.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.660
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.132
SUBAREA RUNOFF(CFS) =    0.20
TOTAL AREA(ACRES) =    0.09  TOTAL RUNOFF(CFS) =    0.20

*****
FLOW PROCESS FROM NODE      209.00 TO NODE      211.00 IS CODE =  41
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  681.00  DOWNSTREAM(FEET) =  680.00
FLOW LENGTH(FEET) =  12.00  MANNING'S N =  0.013
DEPTH OF FLOW IN  6.0 INCH PIPE IS  1.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  5.45
GIVEN PIPE DIAMETER(INCH) =  6.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =    0.20
PIPE TRAVEL TIME(MIN.) =  0.04  Tc(MIN.) =  6.70
LONGEST FLOWPATH FROM NODE      208.00 TO NODE      211.00 =  112.00 FEET.

*****
FLOW PROCESS FROM NODE      211.00 TO NODE      211.00 IS CODE =   1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    6.70
RAINFALL INTENSITY(INCH/HR) =    6.11

```

TOTAL STREAM AREA (ACRES) = 0.09  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 0.20

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1.28         | 6.48      | 6.242                 | 0.77        |
| 2             | 0.20         | 6.70      | 6.110                 | 0.09        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1.47         | 6.48      | 6.242                 |
| 2             | 1.45         | 6.70      | 6.110                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1.47 Tc (MIN.) = 6.48  
TOTAL AREA (ACRES) = 0.9  
LONGEST FLOWPATH FROM NODE 201.00 TO NODE 211.00 = 360.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 7.00 IS CODE = 11

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

\*\* MAIN STREAM CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1.47         | 6.48      | 6.242                 | 0.86        |

LONGEST FLOWPATH FROM NODE 201.00 TO NODE 7.00 = 360.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1924.90      | 18.14     | 3.213                 | 1607.89     |

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 7.00 = 14882.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 688.75       | 6.48      | 6.242                 |
| 2             | 1925.66      | 18.14     | 3.213                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1925.66 Tc (MIN.) = 18.14  
TOTAL AREA (ACRES) = 1608.8

\*\*\*\*\*  
FLOW PROCESS FROM NODE 7.00 TO NODE 7.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21

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

=====

\*USER SPECIFIED(SUBAREA):  
RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 400.00  
UPSTREAM ELEVATION(FEET) = 707.00  
DOWNSTREAM ELEVATION(FEET) = 679.00  
ELEVATION DIFFERENCE(FEET) = 28.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.964  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.958  
SUBAREA RUNOFF(CFS) = 0.24  
TOTAL AREA(ACRES) = 0.11 TOTAL RUNOFF(CFS) = 0.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 302.00 TO NODE 7.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<

=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 0.24         | 6.96      | 5.958                 | 0.11        |

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 7.00 = 400.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1925.66      | 18.14     | 3.213                 | 1608.75     |

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 7.00 = 14882.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 739.32       | 6.96      | 5.958                 |
| 2             | 1925.79      | 18.14     | 3.213                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

**PEAK FLOW RATE (CFS) = 1925.79** Tc(MIN.) = 18.14  
TOTAL AREA(ACRES) = 1608.9

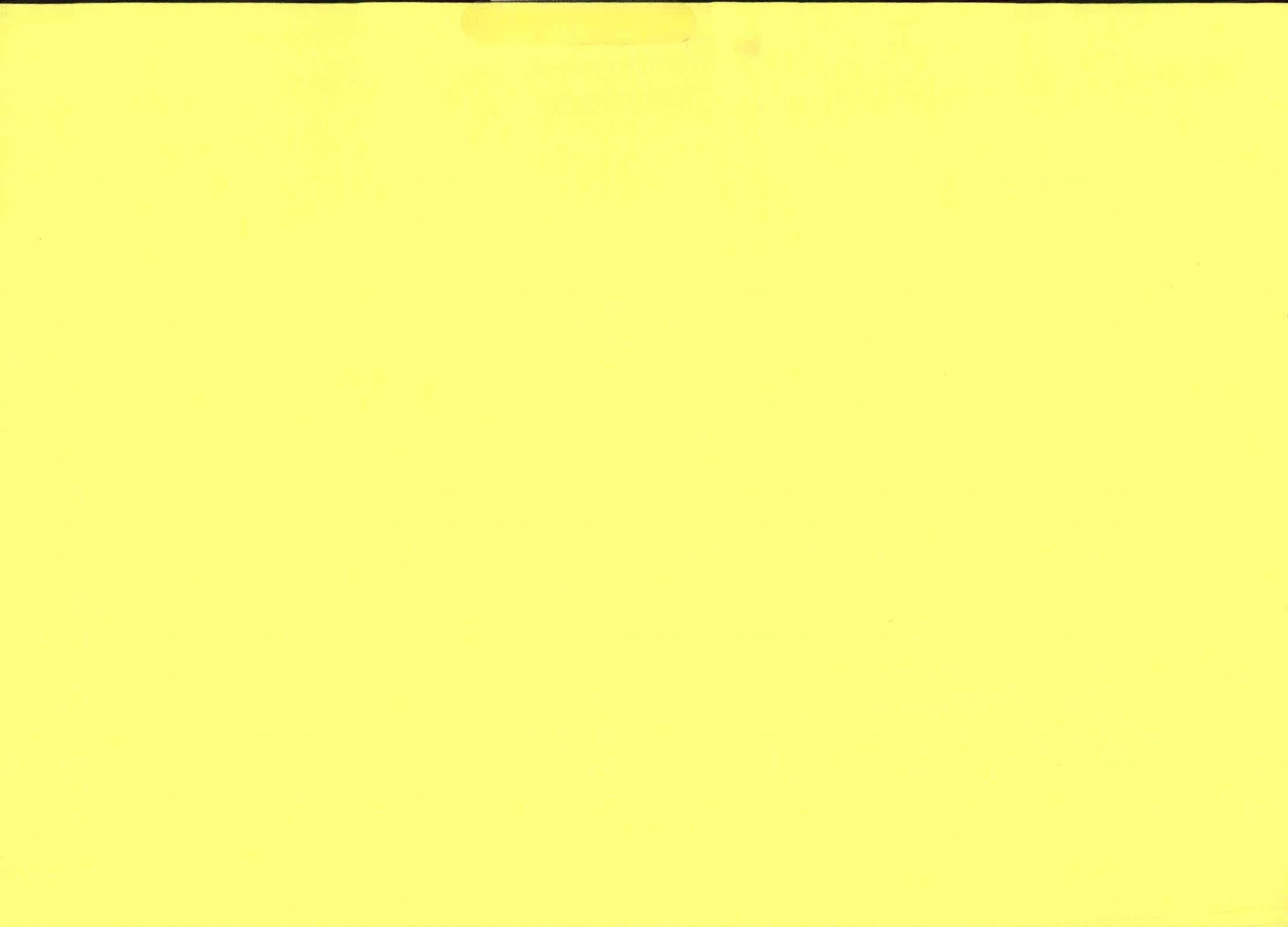
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1608.9 TC(MIN.) = 18.14  
PEAK FLOW RATE(CFS) = 1925.79

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT  
2003,1985,1981 HYDROLOGY MANUAL  
(c) Copyright 1982-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1305

Analysis prepared by:

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

\* PETER RIOS ESTATES (APARTMENT COMPLEX) \*  
\* PRE-DEVELOPMENT \*  
\*

\*\*\*\*\*

FILE NAME: FS0071X.DAT  
TIME/DATE OF STUDY: 08:35 08/25/2014

-----  
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
-----

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
6-HOUR DURATION PRECIPITATION (INCHES) = 2.800  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 3.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95  
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD  
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

**PRE-DEVELOPMENT:**

\*\*\*\*\*

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
=====

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4100  
SOIL CLASSIFICATION IS "D"  
S.C.S. CURVE NUMBER (AMC II) = 82  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00  
UPSTREAM ELEVATION(FEET) = 2254.00  
DOWNSTREAM ELEVATION(FEET) = 2200.00  
ELEVATION DIFFERENCE(FEET) = 54.00  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.765  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.730  
SUBAREA RUNOFF(CFS) = 2.76  
TOTAL AREA(ACRES) = 1.00 TOTAL RUNOFF(CFS) = 2.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51  
-----

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

=====

|   |         |                       |        |
|---|---------|-----------------------|--------|
| ELEVATION DATA: UPSTREAM(FEET) =                        | 2200.00 | DOWNSTREAM(FEET) =    | 910.00 |
| CHANNEL LENGTH THRU SUBAREA(FEET) =                     | 8304.00 | CHANNEL SLOPE =       | 0.1553 |
| CHANNEL BASE(FEET) =                                    | 5.00    | "Z" FACTOR =          | 2.000  |
| MANNING'S FACTOR =                                      | 0.030   | MAXIMUM DEPTH(FEET) = | 10.00  |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =                | 4.057   |                       |        |
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT =     | .4100   |                       |        |
| SOIL CLASSIFICATION IS                                  | "D"     |                       |        |
| S.C.S. CURVE NUMBER (AMC II) =                          | 82      |                       |        |
| TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        | 252.00  |                       |        |
| TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = | 20.15   |                       |        |
| AVERAGE FLOW DEPTH(FEET) =                              | 1.55    | TRAVEL TIME(MIN.) =   | 6.87   |
| Tc(MIN.) =  | 12.64   |                       |        |
| SUBAREA AREA(ACRES) =                                   | 287.00  | SUBAREA RUNOFF(CFS) = | 477.39 |
| AREA-AVERAGE RUNOFF COEFFICIENT =                       | 0.410   |                       |        |
| TOTAL AREA(ACRES) =                                     | 288.0   | PEAK FLOW RATE(CFS) = | 479.05 |

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.15 FLOW VELOCITY(FEET/SEC.) = 24.01  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 8404.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1  
-----

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

=====

|  |        |
|--|--------|
| TOTAL NUMBER OF STREAMS =                            | 2      |
| CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE: |        |
| TIME OF CONCENTRATION(MIN.) =                        | 12.64  |
| RAINFALL INTENSITY(INCH/HR) =                        | 4.06   |
| TOTAL STREAM AREA(ACRES) =                           | 288.00 |
| PEAK FLOW RATE(CFS) AT CONFLUENCE =                  | 479.05 |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10.00 TO NODE 11.00 IS CODE = 21  
-----

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

=====

|   |         |
|---|---------|
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = | .3600   |
| SOIL CLASSIFICATION IS                              | "C"     |
| S.C.S. CURVE NUMBER (AMC II) =                      | 76      |
| INITIAL SUBAREA FLOW-LENGTH(FEET) =                 | 100.00  |
| UPSTREAM ELEVATION(FEET) =                          | 1598.00 |
| DOWNSTREAM ELEVATION(FEET) =                        | 1565.00 |
| ELEVATION DIFFERENCE(FEET) =                        | 33.00   |
| SUBAREA OVERLAND TIME OF FLOW(MIN.) =               | 6.183   |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =            | 6.433   |
| SUBAREA RUNOFF(CFS) =                               | 2.32    |
| TOTAL AREA(ACRES) =                                 | 1.00    |
| TOTAL RUNOFF(CFS) =                                 | 2.32    |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 11.00 TO NODE 3.00 IS CODE = 51  
-----

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 1565.00 DOWNSTREAM(FEET) = 910.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 6605.00 CHANNEL SLOPE = 0.0992  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.195  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 364.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.93  
AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 5.81  
Tc(MIN.) = 12.00  
SUBAREA AREA(ACRES) = 464.00 SUBAREA RUNOFF(CFS) = 700.69  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360  
TOTAL AREA(ACRES) = 465.0 PEAK FLOW RATE(CFS) = 702.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.89 FLOW VELOCITY(FEET/SEC.) = 22.56  
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 3.00 = 6705.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1  
-----

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 12.00  
RAINFALL INTENSITY(INCH/HR) = 4.19  
TOTAL STREAM AREA(ACRES) = 465.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 702.20

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 479.05       | 12.64     | 4.057                 | 288.00      |
| 2             | 702.20       | 12.00     | 4.195                 | 465.00      |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 1157.08      | 12.00     | 4.195                 |
| 2             | 1158.19      | 12.64     | 4.057                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1158.19 Tc(MIN.) = 12.64  
TOTAL AREA(ACRES) = 753.0  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 8404.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 3.00 TO NODE 4.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 910.00 DOWNSTREAM(FEET) = 677.50  
CHANNEL LENGTH THRU SUBAREA(FEET) = 6133.00 CHANNEL SLOPE = 0.0379  
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.248  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1658.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 19.64  
AVERAGE FLOW DEPTH(FEET) = 5.37 TRAVEL TIME(MIN.) = 5.20  
Tc(MIN.) = 17.84  
SUBAREA AREA(ACRES) = 852.00 SUBAREA RUNOFF(CFS) = 996.19  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
TOTAL AREA(ACRES) = 1605.0 PEAK FLOW RATE(CFS) = 1923.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.73 FLOW VELOCITY(FEET/SEC.) = 20.41  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 14537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 4.00 TO NODE 4.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.84  
RAINFALL INTENSITY(INCH/HR) = 3.25  
TOTAL STREAM AREA(ACRES) = 1605.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1923.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

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

=====

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 86.00  
UPSTREAM ELEVATION(FEET) = 730.50

DOWNSTREAM ELEVATION (FEET) = 720.00  
ELEVATION DIFFERENCE (FEET) = 10.50  
SUBAREA OVERLAND TIME OF FLOW (MIN.) = 5.734  
100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.753  
SUBAREA RUNOFF (CFS) = 0.17  
TOTAL AREA (ACRES) = 0.07 TOTAL RUNOFF (CFS) = 0.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 91

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

=====

UPSTREAM NODE ELEVATION (FEET) = 720.00  
DOWNSTREAM NODE ELEVATION (FEET) = 686.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 218.00  
"V" GUTTER WIDTH (FEET) = 3.00 GUTTER HIKE (FEET) = 0.500  
PAVEMENT LIP (FEET) = 0.050 MANNING'S N = .0150  
PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.05000  
MAXIMUM DEPTH (FEET) = 1.00  
100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 6.576  
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.99  
AVERAGE FLOW DEPTH (FEET) = 0.50 FLOOD WIDTH (FEET) = 3.00  
"V" GUTTER FLOW TRAVEL TIME (MIN.) = 0.24 Tc (MIN.) = 5.98  
SUBAREA AREA (ACRES) = 0.49 SUBAREA RUNOFF (CFS) = 1.16  
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360  
TOTAL AREA (ACRES) = 0.6 PEAK FLOW RATE (CFS) = 1.33

NOTE: TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH  
IN A FLOWING-FULL GUTTER (NORMAL DEPTH = GUTTER HIKE)

END OF SUBAREA "V" GUTTER HYDRAULICS:

DEPTH (FEET) = 0.50 FLOOD WIDTH (FEET) = 3.00  
FLOW VELOCITY (FEET/SEC.) = 14.99 DEPTH\*VELOCITY (FT\*FT/SEC) = 7.49  
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 304.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 4.00 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.) = 5.98  
RAINFALL INTENSITY (INCH/HR) = 6.58  
TOTAL STREAM AREA (ACRES) = 0.56  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.33

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1923.39      | 17.84     | 3.248                 | 1605.00     |
| 2             | 1.33         | 5.98      | 6.576                 | 0.56        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
| 1             | 951.35       | 5.98      | 6.576                 |
| 2             | 1924.04      | 17.84     | 3.248                 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1924.04 Tc(MIN.) = 17.84  
 TOTAL AREA(ACRES) = 1605.6  
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 4.00 = 14537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 4.00 TO NODE 5.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 677.50 DOWNSTREAM(FEET) = 676.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 335.00 CHANNEL SLOPE = 0.0045  
 CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 10.00  
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.178  
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
 SOIL CLASSIFICATION IS "C"  
 S.C.S. CURVE NUMBER (AMC II) = 76  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1924.31  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.17  
 AVERAGE FLOW DEPTH(FEET) = 9.07 TRAVEL TIME(MIN.) = 0.61  
 Tc(MIN.) = 18.45  
 SUBAREA AREA(ACRES) = 0.47 SUBAREA RUNOFF(CFS) = 0.54  
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.369  
 TOTAL AREA(ACRES) = 1606.0 PEAK FLOW RATE(CFS) = 1924.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 9.07 FLOW VELOCITY(FEET/SEC.) = 9.17  
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 5.00 = 14872.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 5.00 TO NODE 5.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 3  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.45  
 RAINFALL INTENSITY(INCH/HR) = 3.18

TOTAL STREAM AREA(ACRES) = 1606.03  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1924.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

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

=====

|   |        |
|---|--------|
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = | .3600  |
| SOIL CLASSIFICATION IS "C"                          |        |
| S.C.S. CURVE NUMBER (AMC II) =                      | 76     |
| INITIAL SUBAREA FLOW-LENGTH(FEET) =                 | 194.00 |
| UPSTREAM ELEVATION(FEET) =                          | 714.50 |
| DOWNSTREAM ELEVATION(FEET) =                        | 697.00 |
| ELEVATION DIFFERENCE(FEET) =                        | 17.50  |
| SUBAREA OVERLAND TIME OF FLOW(MIN.) =               | 6.399  |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =            | 6.292  |
| SUBAREA RUNOFF(CFS) =                               | 0.29   |
| TOTAL AREA(ACRES) =                                 | 0.13   |
| TOTAL RUNOFF(CFS) =                                 | 0.29   |

\*\*\*\*\*  
FLOW PROCESS FROM NODE 22.00 TO NODE 23.00 IS CODE = 91

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

=====

|   |         |
|---|---------|
| UPSTREAM NODE ELEVATION(FEET) =                         | 697.00  |
| DOWNSTREAM NODE ELEVATION(FEET) =                       | 679.00  |
| CHANNEL LENGTH THRU SUBAREA(FEET) =                     | 285.00  |
| "V" GUTTER WIDTH(FEET) =                                | 3.00    |
| GUTTER HIKE(FEET) =                                     | 0.500   |
| PAVEMENT LIP(FEET) =                                    | 0.050   |
| MANNING'S N =   | .0150   |
| PAVEMENT CROSSFALL(DECIMAL NOTATION) =                  | 0.05000 |
| MAXIMUM DEPTH(FEET) =                                   | 1.00    |
| 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =                | 5.995   |
| RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT =     | .3600   |
| SOIL CLASSIFICATION IS "C"                              |         |
| S.C.S. CURVE NUMBER (AMC II) =                          | 76      |
| TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        | 1.13    |
| TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = | 9.54    |
| AVERAGE FLOW DEPTH(FEET) =                              | 0.50    |
| FLOOD WIDTH(FEET) =                                     | 3.00    |
| "V" GUTTER FLOW TRAVEL TIME(MIN.) =                     | 0.50    |
| Tc(MIN.) =  | 6.90    |
| SUBAREA AREA(ACRES) =                                   | 0.77    |
| SUBAREA RUNOFF(CFS) =                                   | 1.66    |
| AREA-AVERAGE RUNOFF COEFFICIENT =                       | 0.360   |
| TOTAL AREA(ACRES) =                                     | 0.9     |
| PEAK FLOW RATE(CFS) =                                   | 1.94    |

NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH  
IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)

END OF SUBAREA "V" GUTTER HYDRAULICS:

|                            |               |                             |              |
|----------------------------|---------------|-----------------------------|--------------|
| DEPTH(FEET) =              | 0.50          | FLOOD WIDTH(FEET) =         | 3.00         |
| FLOW VELOCITY(FEET/SEC.) = | 9.54          | DEPTH*VELOCITY(FT*FT/SEC) = | 4.77         |
| LONGEST FLOWPATH FROM NODE | 21.00 TO NODE | 23.00 =                     | 479.00 FEET. |

\*\*\*\*\*

FLOW PROCESS FROM NODE 23.00 TO NODE 5.00 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.) = 6.90  
RAINFALL INTENSITY(INCH/HR) = 6.00  
TOTAL STREAM AREA(ACRES) = 0.90  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 31.00 TO NODE 32.00 IS CODE = 21

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

RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600  
SOIL CLASSIFICATION IS "C"  
S.C.S. CURVE NUMBER (AMC II) = 76  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 480.00  
UPSTREAM ELEVATION(FEET) = 729.00  
DOWNSTREAM ELEVATION(FEET) = 678.49  
ELEVATION DIFFERENCE(FEET) = 50.51  
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.183  
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.433  
SUBAREA RUNOFF(CFS) = 4.63  
TOTAL AREA(ACRES) = 2.00 TOTAL RUNOFF(CFS) = 4.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 32.00 TO NODE 32.00 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.) = 6.18  
RAINFALL INTENSITY(INCH/HR) = 6.43  
TOTAL STREAM AREA(ACRES) = 2.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.63

\*\* CONFLUENCE DATA \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) | AREA (ACRE) |
|---------------|--------------|-----------|-----------------------|-------------|
| 1             | 1924.04      | 18.45     | 3.178                 | 1606.03     |
| 2             | 1.94         | 6.90      | 5.995                 | 0.90        |
| 3             | 4.63         | 6.18      | 6.433                 | 2.00        |

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

\*\* PEAK FLOW RATE TABLE \*\*

| STREAM NUMBER | RUNOFF (CFS) | Tc (MIN.) | INTENSITY (INCH/HOUR) |
|---------------|--------------|-----------|-----------------------|
|---------------|--------------|-----------|-----------------------|

|   |         |       |       |
|---|---------|-------|-------|
| 1 | 957.01  | 6.18  | 6.433 |
| 2 | 1026.32 | 6.90  | 5.995 |
| 3 | 1927.36 | 18.45 | 3.178 |

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1927.36 Tc(MIN.) = 18.45

TOTAL AREA(ACRES) = 1608.9

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 32.00 = 14872.00 FEET.

=====

END OF STUDY SUMMARY:

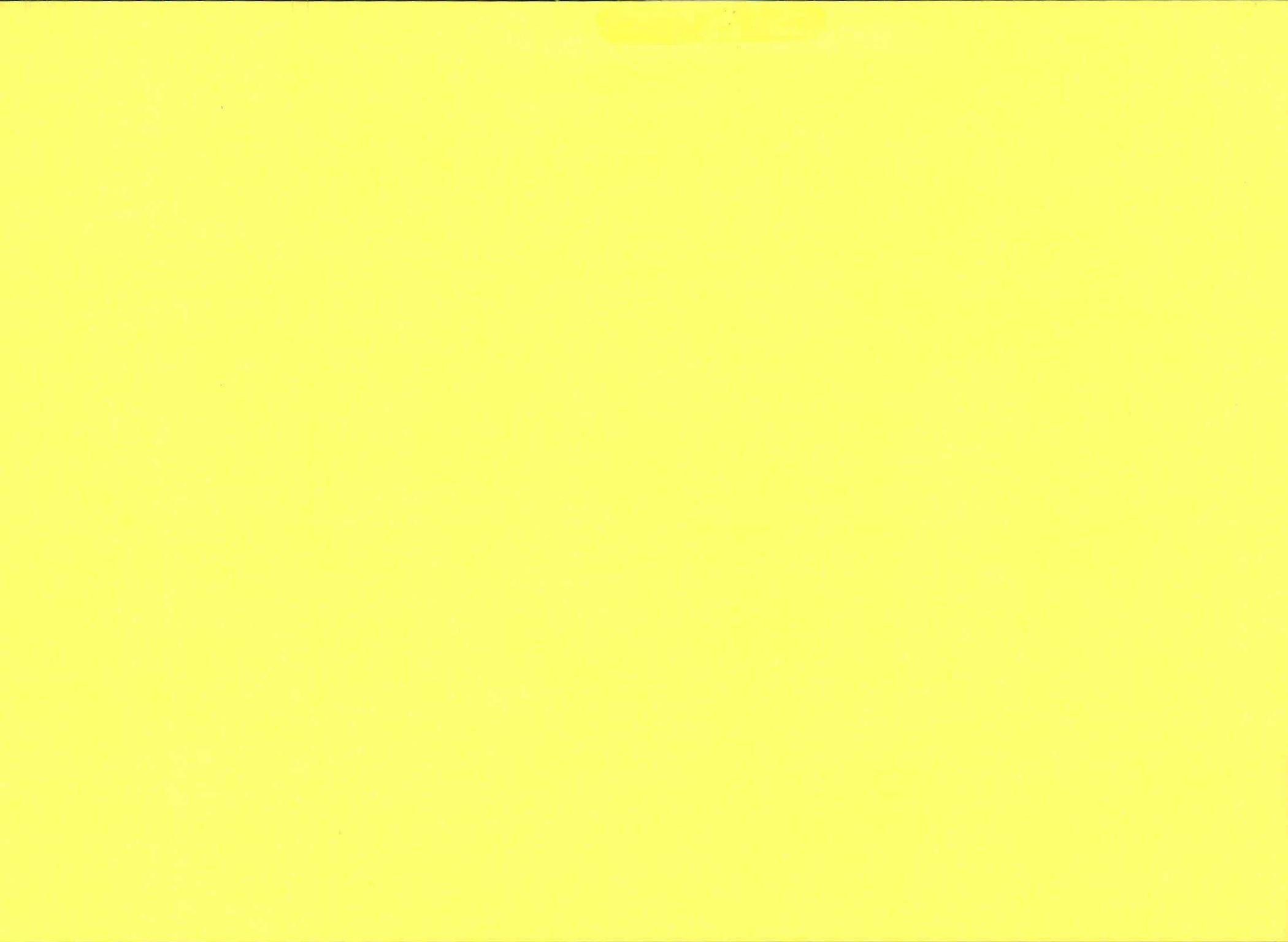
TOTAL AREA(ACRES) = 1608.9 TC(MIN.) = 18.45

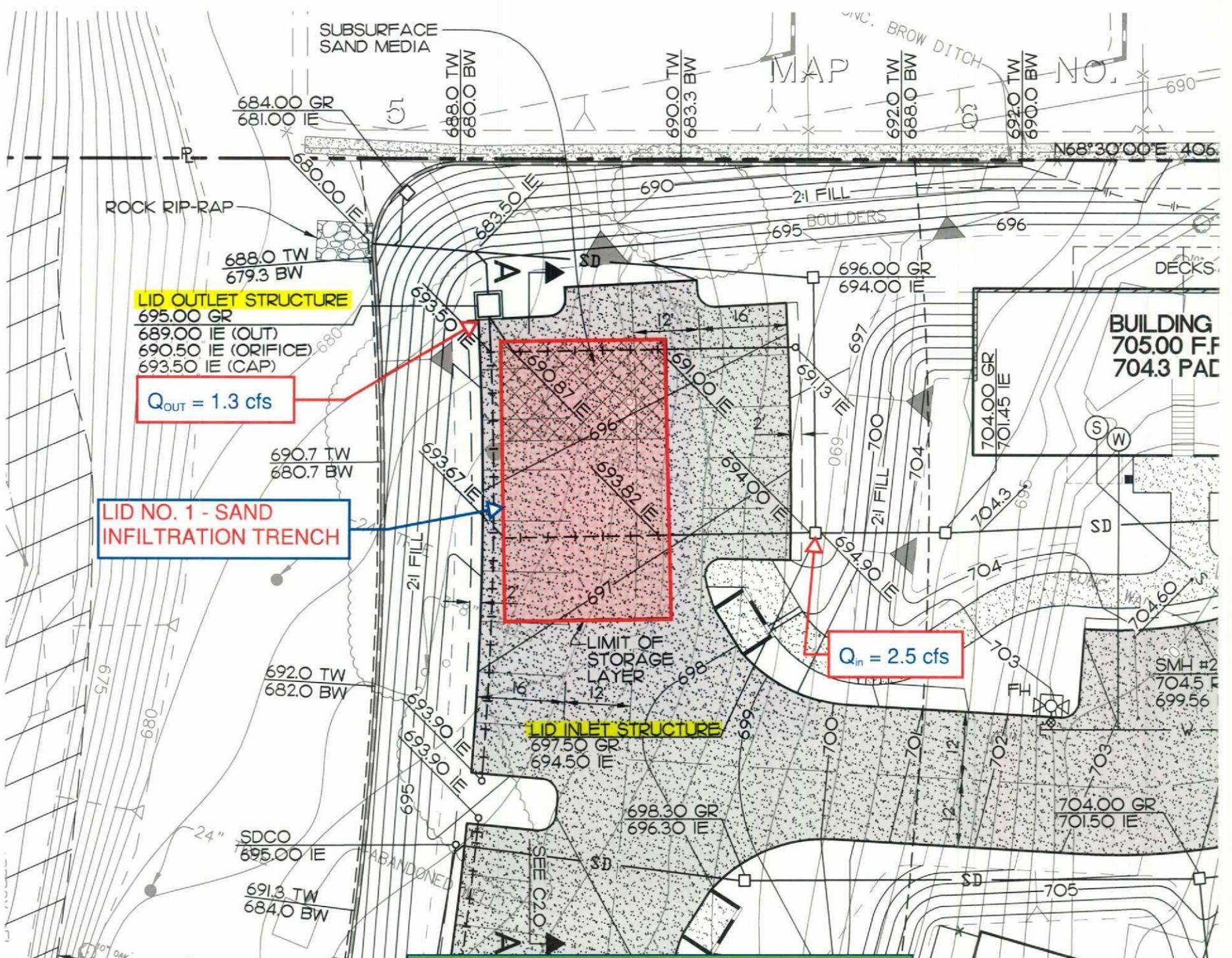
**PEAK FLOW RATE(CFS) = 1927.36**

=====

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END OF RATIONAL METHOD ANALYSIS





**LID OUTLET STRUCTURE**

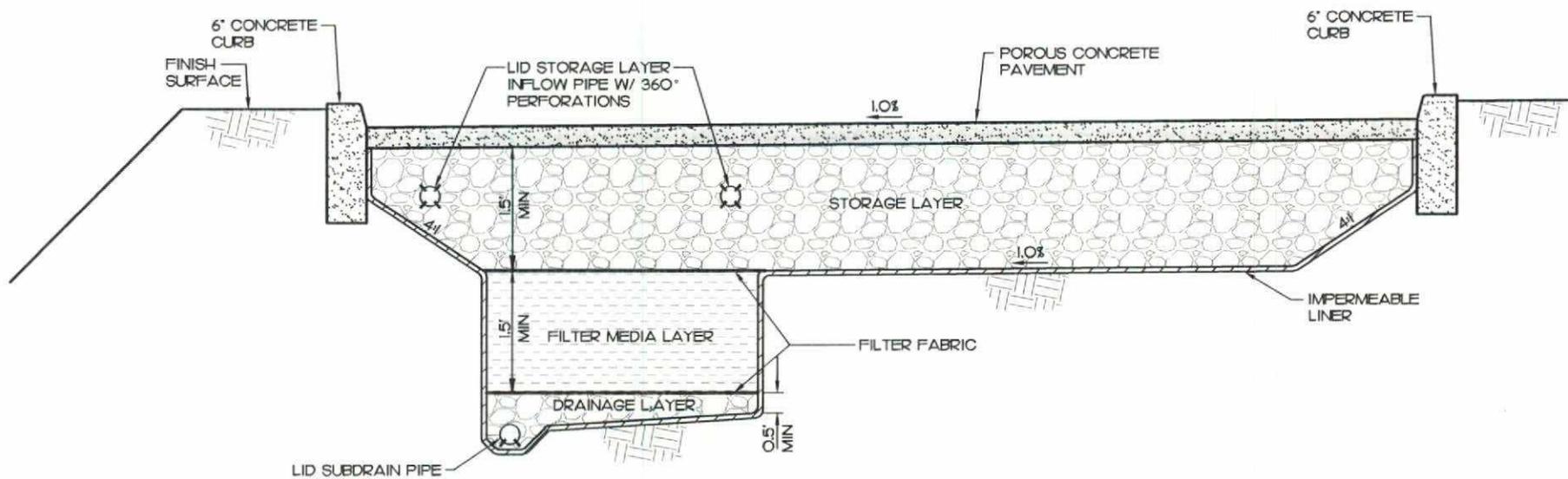
695.00 GR  
 689.00 IE (OUT)  
 690.50 IE (ORIFICE)  
 693.50 IE (CAP)

$Q_{OUT} = 1.3 \text{ cfs}$

**LID NO. 1 - SAND INFILTRATION TRENCH**

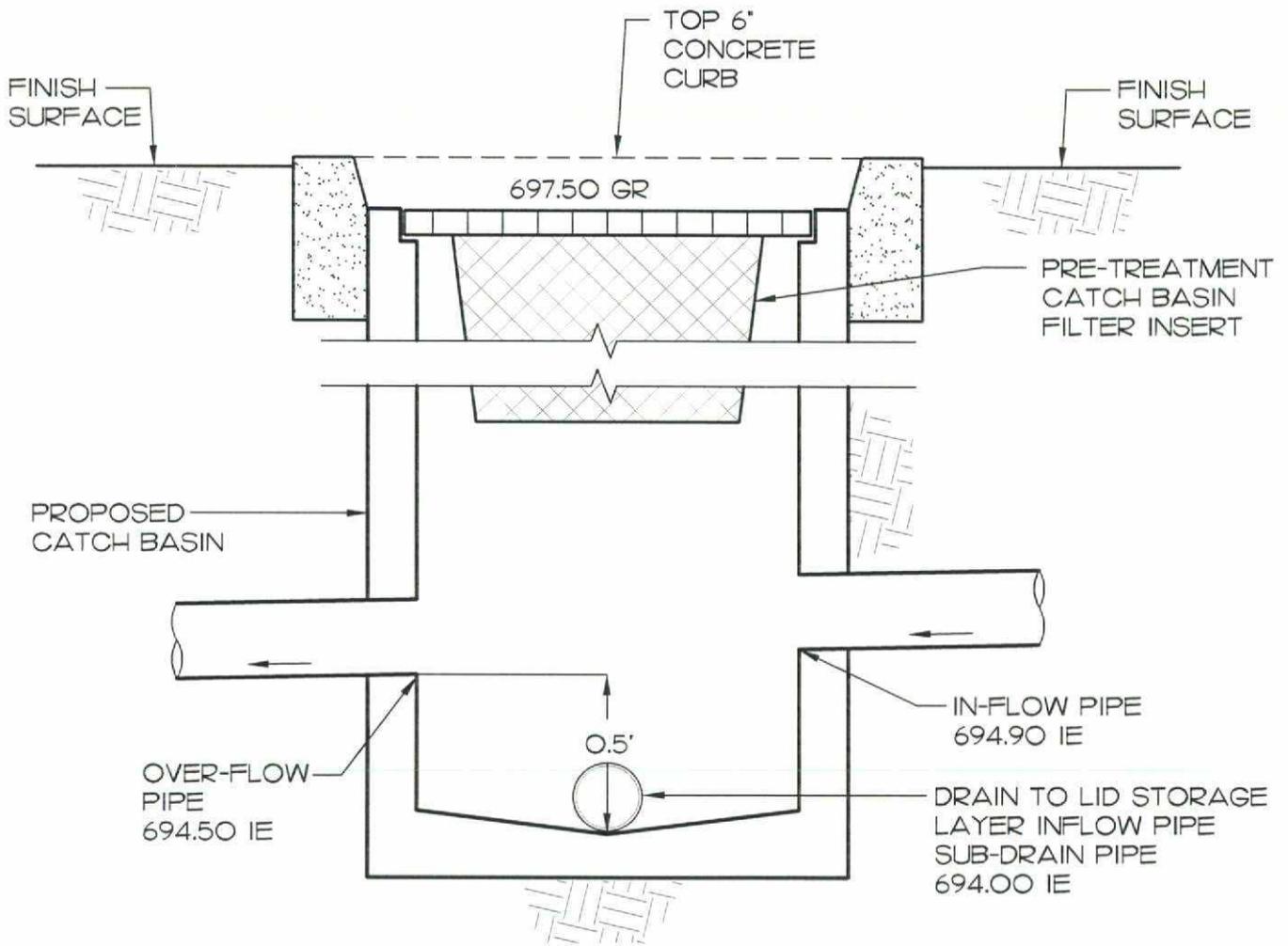
$Q_{in} = 2.5 \text{ cfs}$

**LID NO. 1 - SAND INFILTRATION TRENCH**



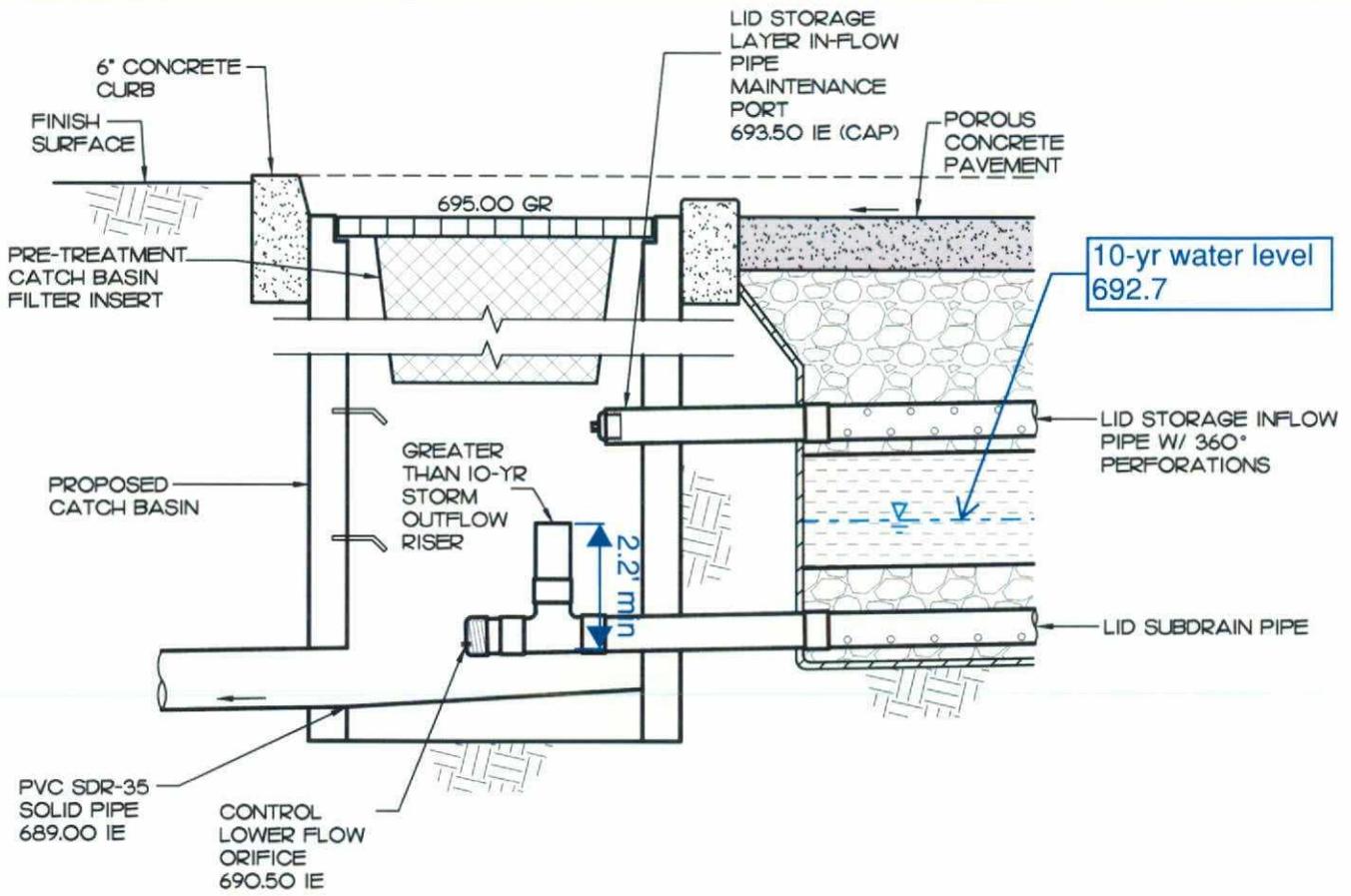
**TYPICAL SECTION A-A: SAND FILTRATION TRENCH**

NO SCALE



## LID NO. 1 INLET STRUCTURE

NO SCALE



**LID NO. 1 OUTLET STRUCTURE**

NO SCALE

# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

## Hyd. No. 2

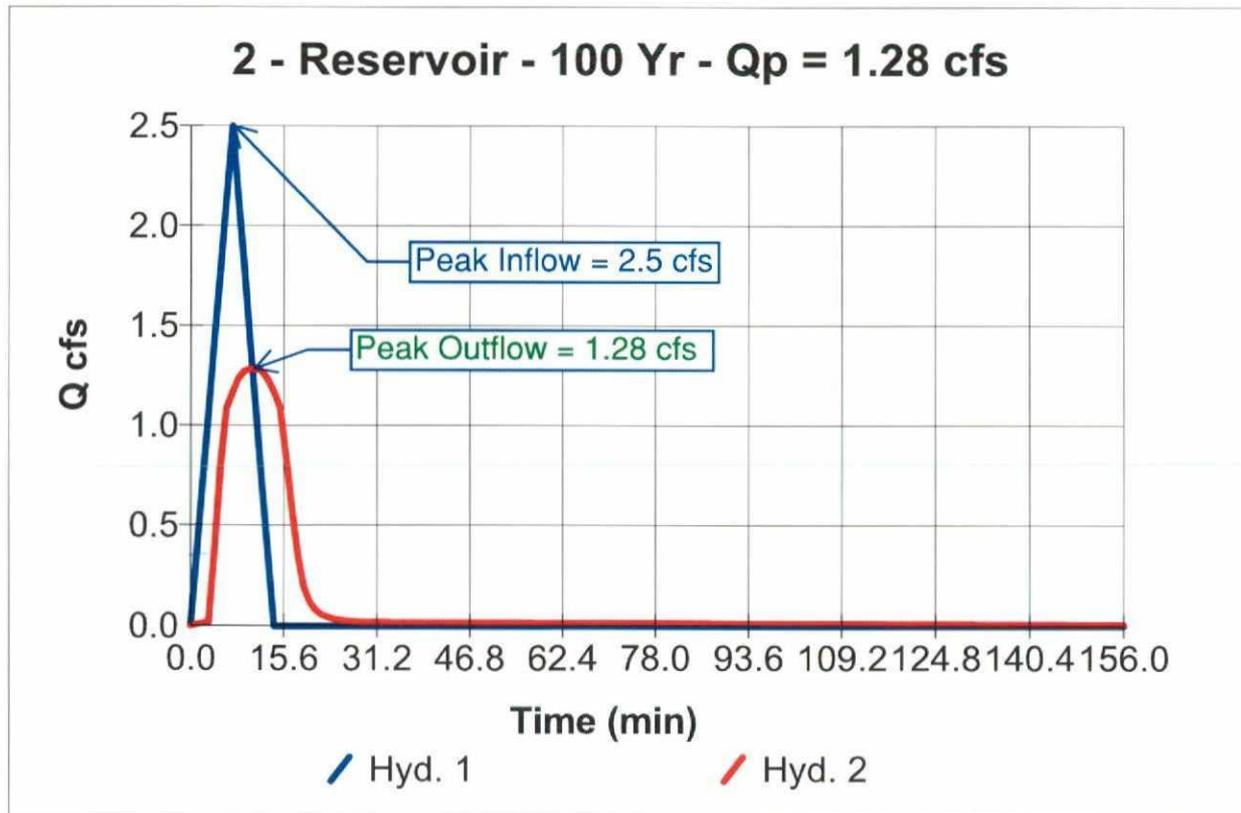
### LID 1 STORAGE LAYER

Hydrograph type = Reservoir  
Storm frequency = 100 yrs  
Inflow hyd. No. = 1  
Max. Elevation = 693.54 ft

Peak discharge = 1.28 cfs  
Time interval = 1 min  
Reservoir name = LID 1  
Max. Storage = 482 cuft

Storage Indication method used.

Hydrograph Volume = 1,048 cuft



# Hydrograph Report

## Hyd. No. 2

### LID 1 STORAGE LAYER

Hydrograph type = Reservoir  
 Storm frequency = 100 yrs  
 Inflow hyd. No. = 1  
 Max. Elevation = 693.54 ft

Peak discharge = 1.28 cfs  
 Time interval = 1 min  
 Reservoir name = LID 1  
 Max. Storage = 482 cuft

Storage Indication method used.

Outflow hydrograph volume = 1,048 cuft

### Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 3          | 1.07       | 691.45       | 0.02      | ---       | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 4          | 1.43       | 691.92       | 0.02      | 0.35      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.37        |
| 5          | 1.78       | 692.46       | 0.02      | 0.78      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.80        |
| 6          | 2.14       | 693.04       | 0.03      | 1.06      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.09        |
| 7          | 2.50 <<    | 693.23       | 0.03      | 1.14      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.16        |
| 8          | 2.14       | 693.41       | 0.03      | 1.21      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.23        |
| 9          | 1.78       | 693.51       | 0.03      | 1.24      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.27        |
| 10         | 1.43       | 693.54 <<    | 0.03      | 1.25      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.28 <<     |
| 11         | 1.07       | 693.54       | 0.03      | 1.25      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.28        |
| 12         | 0.71       | 693.50       | 0.03      | 1.24      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.27        |
| 13         | 0.36       | 693.39       | 0.03      | 1.20      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.23        |
| 14         | 0.00       | 693.23       | 0.03      | 1.14      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.17        |
| 15         | 0.00       | 693.05       | 0.03      | 1.06      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 1.09        |
| 16         | 0.00       | 692.54       | 0.02      | 0.82      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.85        |
| 17         | 0.00       | 692.14       | 0.02      | 0.57      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.59        |
| 18         | 0.00       | 691.91       | 0.02      | 0.33      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.35        |
| 19         | 0.00       | 691.78       | 0.02      | 0.17      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.19        |
| 20         | 0.00       | 691.72       | 0.02      | 0.10      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.12        |
| 21         | 0.00       | 691.67       | 0.02      | 0.06      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.08        |
| 22         | 0.00       | 691.64       | 0.02      | 0.04      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.06        |
| 23         | 0.00       | 691.62       | 0.02      | 0.03      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.04        |
| 24         | 0.00       | 691.60       | 0.02      | 0.02      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.03        |
| 25         | 0.00       | 691.59       | 0.02      | 0.01      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.03        |
| 26         | 0.00       | 691.58       | 0.02      | 0.01      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.03        |
| 27         | 0.00       | 691.57       | 0.02      | 0.01      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 28         | 0.00       | 691.56       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 29         | 0.00       | 691.55       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 30         | 0.00       | 691.54       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 31         | 0.00       | 691.53       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 32         | 0.00       | 691.52       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 33         | 0.00       | 691.52       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 34         | 0.00       | 691.51       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 35         | 0.00       | 691.50       | 0.02      | 0.00      | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 36         | 0.00       | 691.49       | 0.02      | ---       | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 37         | 0.00       | 691.49       | 0.02      | ---       | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 38         | 0.00       | 691.48       | 0.02      | ---       | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 39         | 0.00       | 691.47       | 0.02      | ---       | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |
| 40         | 0.00       | 691.47       | 0.02      | ---       | ---       | ---       | ---      | ---      | ---      | ---      | ---       | 0.02        |

Peak Inflow = 2.5 cfs

Peak Outflow = 1.28 cfs

Continues on next page...

## Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 41         | 0.00       | 691.46       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 42         | 0.00       | 691.45       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 43         | 0.00       | 691.44       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 44         | 0.00       | 691.44       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 45         | 0.00       | 691.43       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 46         | 0.00       | 691.42       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 47         | 0.00       | 691.42       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 48         | 0.00       | 691.41       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 49         | 0.00       | 691.40       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 50         | 0.00       | 691.39       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 51         | 0.00       | 691.39       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 52         | 0.00       | 691.38       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 53         | 0.00       | 691.37       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 54         | 0.00       | 691.37       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 55         | 0.00       | 691.36       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 56         | 0.00       | 691.35       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 57         | 0.00       | 691.35       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 58         | 0.00       | 691.34       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 59         | 0.00       | 691.33       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 60         | 0.00       | 691.33       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 61         | 0.00       | 691.32       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 62         | 0.00       | 691.31       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 63         | 0.00       | 691.31       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 64         | 0.00       | 691.30       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 65         | 0.00       | 691.29       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 66         | 0.00       | 691.29       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 67         | 0.00       | 691.28       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 68         | 0.00       | 691.27       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 69         | 0.00       | 691.27       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 70         | 0.00       | 691.26       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 71         | 0.00       | 691.26       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 72         | 0.00       | 691.25       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 73         | 0.00       | 691.24       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 74         | 0.00       | 691.24       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 75         | 0.00       | 691.23       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 76         | 0.00       | 691.22       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 77         | 0.00       | 691.22       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 78         | 0.00       | 691.21       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 79         | 0.00       | 691.21       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 80         | 0.00       | 691.20       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 81         | 0.00       | 691.19       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 82         | 0.00       | 691.19       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 83         | 0.00       | 691.18       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 84         | 0.00       | 691.18       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 85         | 0.00       | 691.17       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 86         | 0.00       | 691.16       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 87         | 0.00       | 691.16       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 88         | 0.00       | 691.15       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 89         | 0.00       | 691.15       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 90         | 0.00       | 691.14       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 91         | 0.00       | 691.13       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |

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**Hydrograph Discharge Table**

| Time<br>(min) | Inflow<br>cfs | Elevation<br>ft | Clv A<br>cfs | Clv B<br>cfs | Clv C<br>cfs | Clv D<br>cfs | Wr A<br>cfs | Wr B<br>cfs | Wr C<br>cfs | Wr D<br>cfs | Exfil<br>cfs | Outflow<br>cfs |
|---------------|---------------|-----------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|--------------|----------------|
| 92            | 0.00          | 691.13          | 0.01         | ----         | ----         | ----         | ----        | ----        | ----        | ----        | ----         | 0.01           |
| 93            | 0.00          | 691.12          | 0.01         | ----         | ----         | ----         | ----        | ----        | ----        | ----        | ----         | 0.01           |
| 94            | 0.00          | 691.12          | 0.01         | ----         | ----         | ----         | ----        | ----        | ----        | ----        | ----         | 0.01           |

*...End*

# Reservoir Report

Reservoir No. 1 - LID 1

Hydraflow Hydrographs by Intelisolve

## pond Data

pond storage is based on known contour areas. Average end area method used.

## Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00       | 690.50         | 00                  | 0                    | 0                    |
| 0.50       | 691.00         | 135                 | 34                   | 34                   |
| 1.00       | 691.50         | 135                 | 68                   | 101                  |
| 1.50       | 692.00         | 135                 | 68                   | 169                  |
| 2.00       | 692.50         | 86                  | 55                   | 224                  |
| 2.50       | 693.00         | 86                  | 43                   | 267                  |
| 3.00       | 693.50         | 663                 | 187                  | 454                  |
| 3.50       | 694.00         | 779                 | 361                  | 815                  |
| 4.00       | 694.50         | 903                 | 421                  | 1,235                |
| 4.50       | 695.00         | 1,035               | 485                  | 1,720                |
| 5.00       | 695.50         | 4,140               | 1,294                | 3,014                |

## Culvert / Orifice Structures

|               | [A]      | [B]    | [C]  | [D]  |
|---------------|----------|--------|------|------|
| Rise in       | = 0.8    | 6.0    | 0.0  | 0.0  |
| Span in       | = 0.8    | 6.0    | 0.0  | 0.0  |
| No. Barrels   | = 1      | 1      | 0    | 0    |
| Invert El. ft | = 690.50 | 691.53 | 0.00 | 0.00 |
| Length ft     | = 0.0    | 0.0    | 0.0  | 0.0  |
| Slope %       | = 0.00   | 0.00   | 0.00 | 0.00 |
| N-Value       | = .013   | .013   | .013 | .000 |
| Orif. Coeff.  | = 0.60   | 0.60   | 0.60 | 0.00 |
| Multi-Stage   | = n/a    | No     | No   | No   |

## Weir Structures

|              | [A]      | [B]  | [C]  | [D]  |
|--------------|----------|------|------|------|
| Crest Len ft | = 1.50   | 0.00 | 0.00 | 0.00 |
| Crest El. ft | = 695.25 | 0.00 | 0.00 | 0.00 |
| Weir Coeff.  | = 3.33   | 3.33 | 0.00 | 0.00 |
| Weir Type    | = Rect   | ---  | ---  | ---  |
| Multi-Stage  | = No     | No   | No   | No   |

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

## Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Civ A cfs | Civ B cfs | Civ C cfs | Civ D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Total cfs |
|----------|--------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-----------|
| 0.00     | 0            | 690.50       | 0.00      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.00      |
| 0.50     | 34           | 691.00       | 0.01      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.01      |
| 1.00     | 101          | 691.50       | 0.02      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.02      |
| 1.50     | 169          | 692.00       | 0.02      | 0.45      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.47      |
| 2.00     | 224          | 692.50       | 0.02      | 0.80      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.83      |
| 2.50     | 267          | 693.00       | 0.03      | 1.04      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.07      |
| 3.00     | 454          | 693.50       | 0.03      | 1.24      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.27      |
| 3.50     | 815          | 694.00       | 0.03      | 1.41      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.44      |
| 4.00     | 1,235        | 694.50       | 0.03      | 1.56      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.59      |
| 4.50     | 1,720        | 695.00       | 0.04      | 1.70      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.73      |
| 5.00     | 3,014        | 695.50       | 0.04      | 1.82      | ---       | ---       | 0.62     | ---      | ---      | ---      | ---       | 2.49      |

# Hydrograph Plot

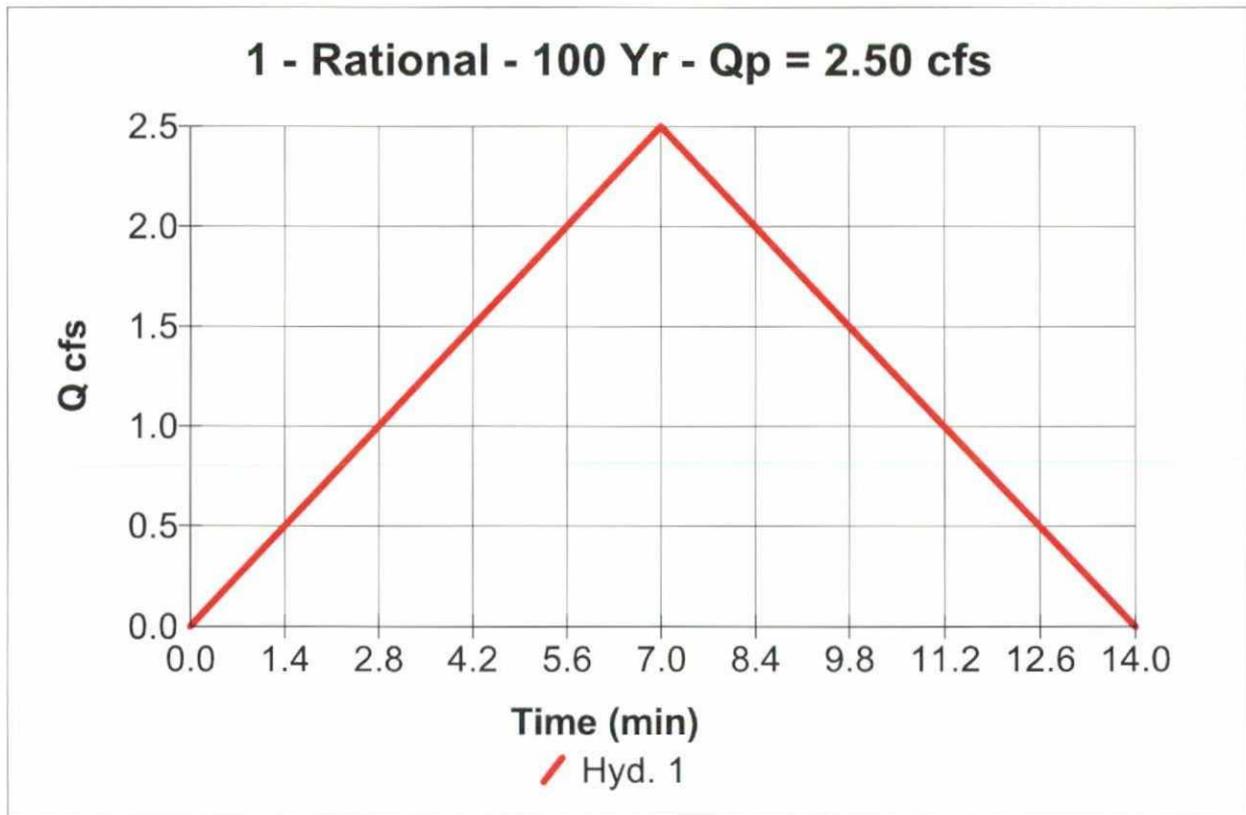
Hydraflow Hydrographs by Intelisolve

## Hyd. No. 1

Tributary Area to Basin 1

|                 |                         |                    |            |
|-----------------|-------------------------|--------------------|------------|
| Hydrograph type | = Rational              | Peak discharge     | = 2.50 cfs |
| Storm frequency | = 100 yrs               | Time interval      | = 1 min    |
| Drainage area   | = 0.8 ac                | Runoff coeff.      | = 0.43     |
| Intensity       | = 7.546 in/hr           | Time of conc. (Tc) | = 7 min    |
| IDF Curve       | = Rios Canyon Rd TM.idf | Asc/Rec limb fact  | = 1/1      |

Hydrograph Volume = 1,049 cuft



# Hydrograph Report

## Hyd. No. 1

Tributary Area to Basin 1

|                 |                         |                    |            |
|-----------------|-------------------------|--------------------|------------|
| Hydrograph type | = Rational              | Peak discharge     | = 2.50 cfs |
| Storm frequency | = 100 yrs               | Time interval      | = 1 min    |
| Drainage area   | = 0.8 ac                | Runoff coeff.      | = 0.43     |
| Intensity       | = 7.546 in/hr           | Time of conc. (Tc) | = 7 min    |
| IDF Curve       | = Rios Canyon Rd TM.idf | Asc/Rec limb fact  | = 1/1      |

Hydrograph Volume = 1,049 cuft

## Hydrograph Discharge Table

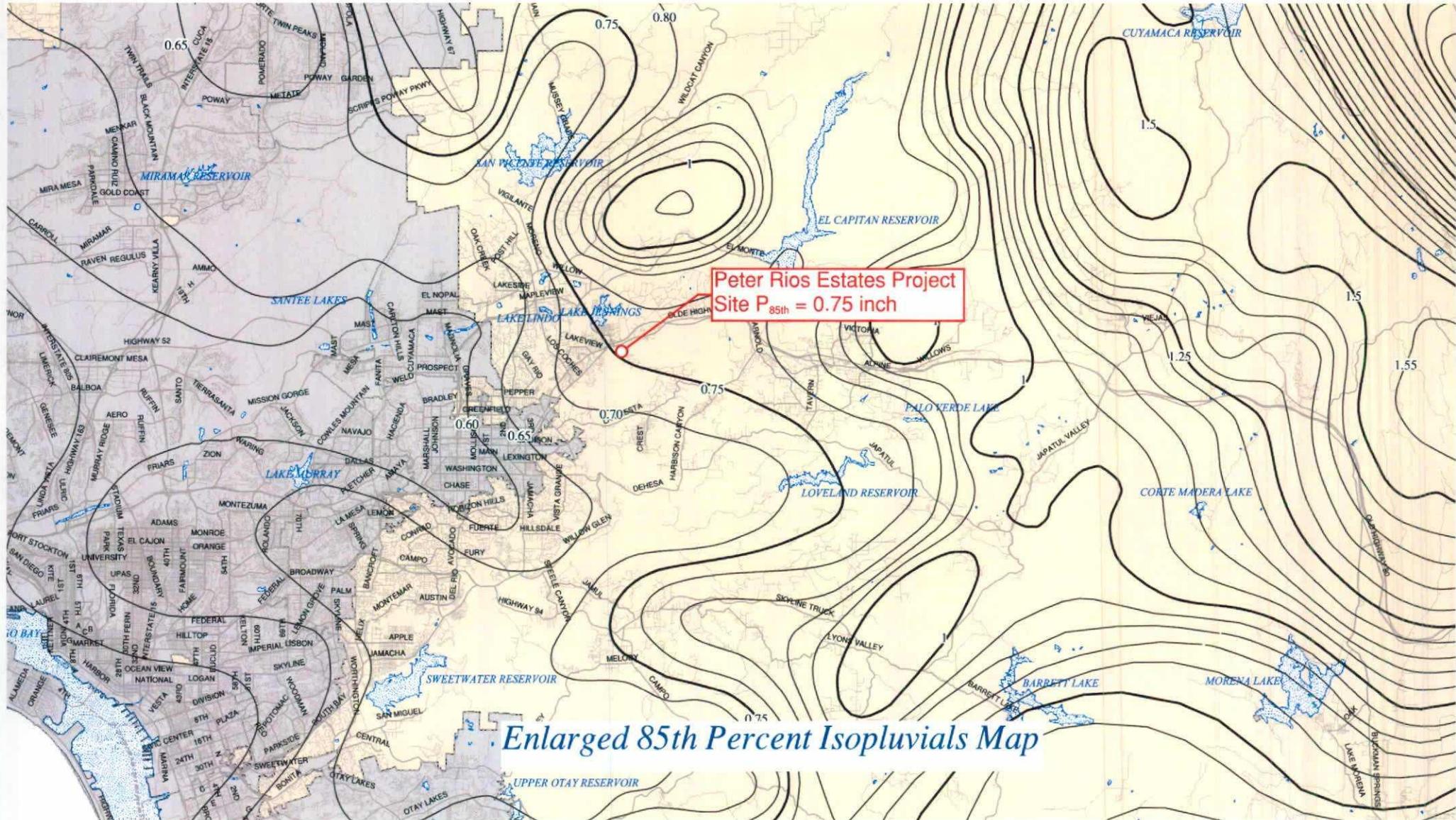
Time -- Outflow  
(min      cfs)

|    |         |
|----|---------|
| 1  | 0.36    |
| 2  | 0.71    |
| 3  | 1.07    |
| 4  | 1.43    |
| 5  | 1.78    |
| 6  | 2.14    |
| 7  | 2.50 << |
| 8  | 2.14    |
| 9  | 1.78    |
| 10 | 1.43    |
| 11 | 1.07    |
| 12 | 0.71    |
| 13 | 0.36    |

...End

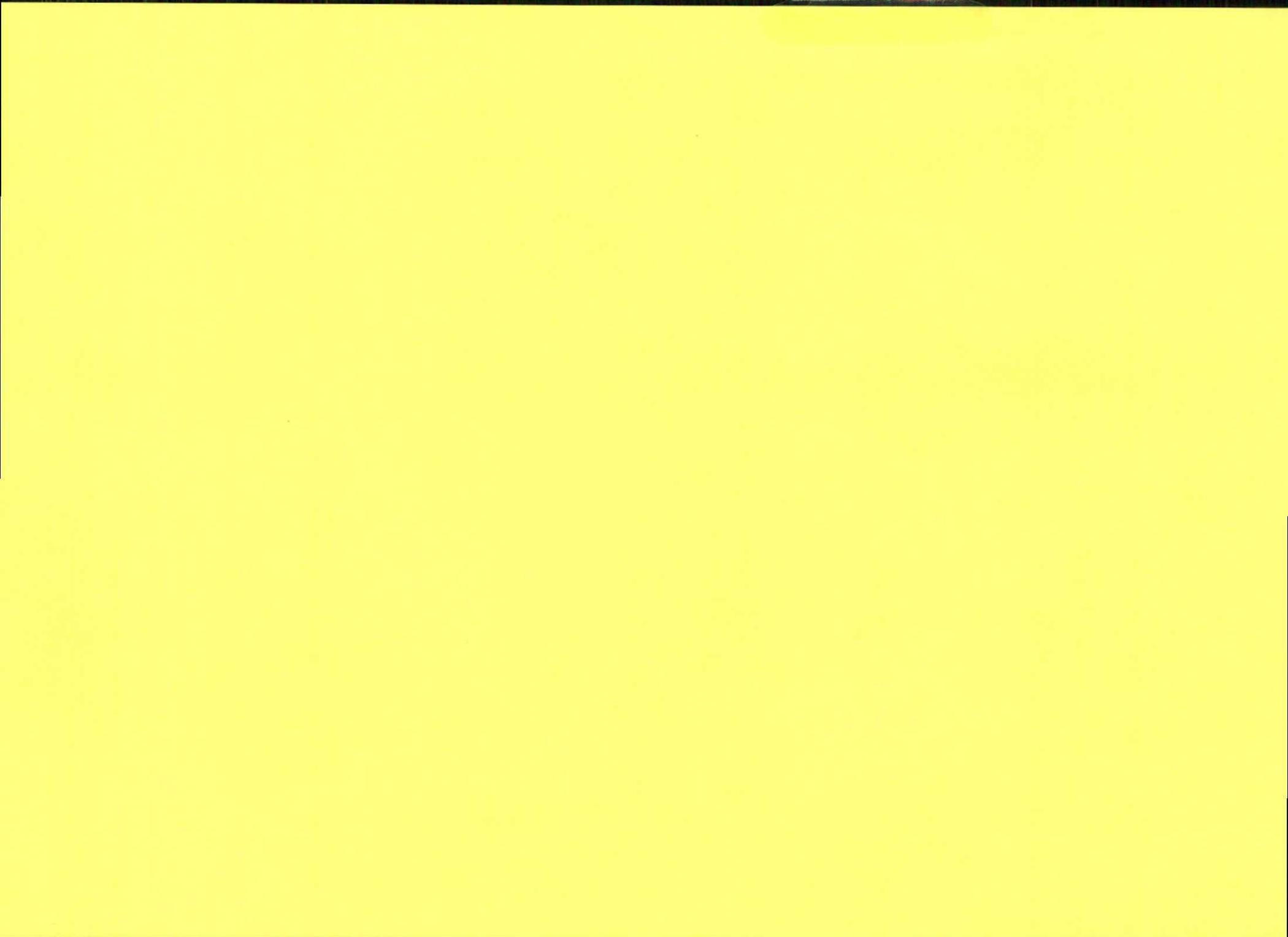
### LID NO. 1 - SAND FILTRATION TRENCH

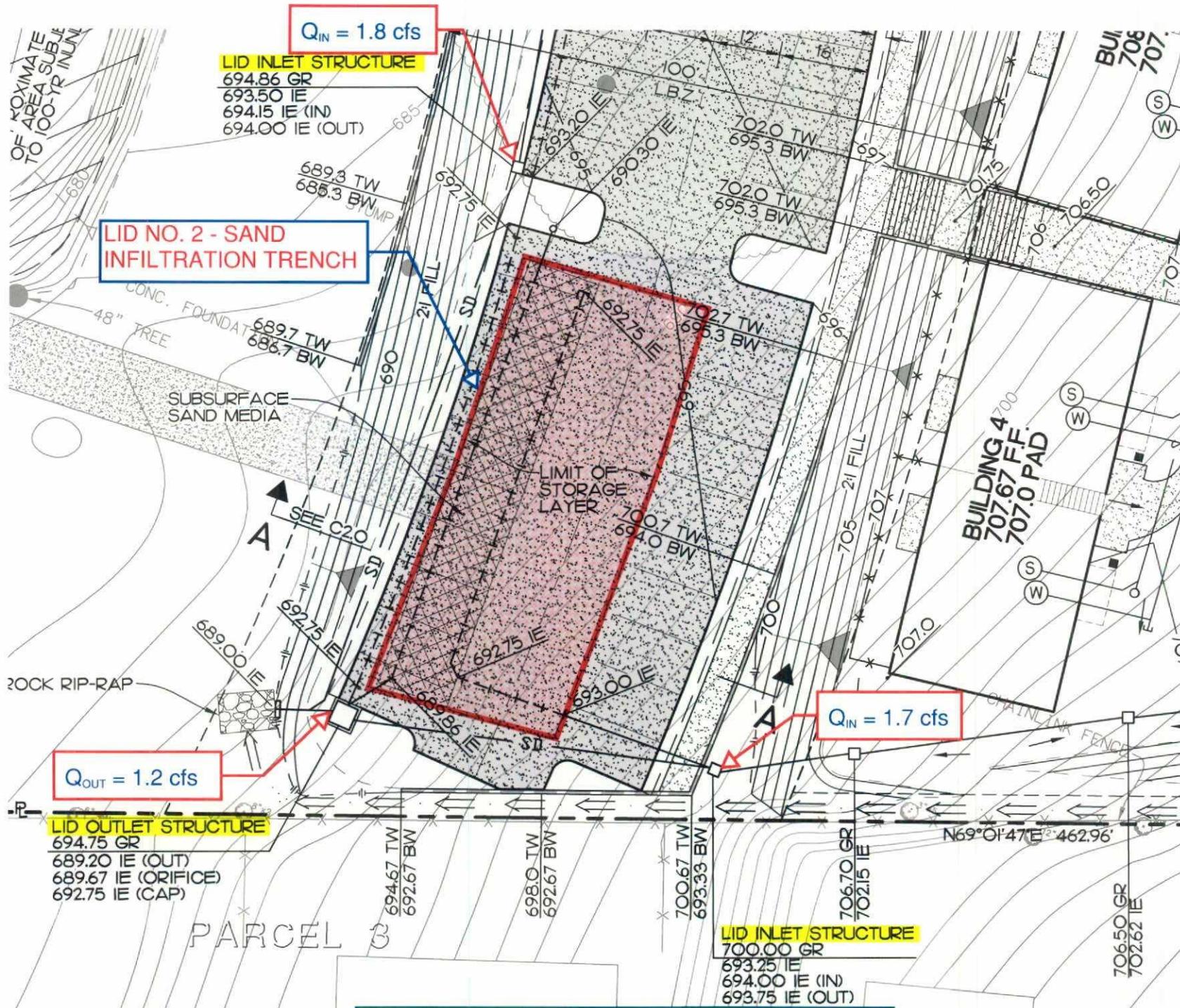
| DMA name     | DMA Area (acres) | DMA Area (sf) | Post-project surface type | DMA runoff factor | DMA area x runoff factor (CA) | Utilized County of San Diego's 85th Percentile Isopluvial Map ( $P_{85th} = 0.75 \text{ inch} = 0.0625 \text{ ft}$ ) |                    |                    |                                  |  |                                  |
|--------------|------------------|---------------|---------------------------|-------------------|-------------------------------|--|--------------------|--------------------|----------------------------------|--|----------------------------------|
| DMA 1        | 0.24             | 10,465        | impervious                | 1.00              | 10,465                        | IMP Name: Sand Filtration Trench (Water Quality Only)  |                    |                    |                                  |  |                                  |
| DMA 2        | 0.01             | 351           | impervious                | 1.00              | 351                           |  |                    |                    |                                  |  |                                  |
| DMA 3        | 0.16             | 6,912         | pervious                  | 0.10              | 691                           |  |                    |                    |                                  |  |                                  |
| DMA 4        | 0.11             | 4,671         | pervious                  | 0.10              | 467                           |  |                    |                    |                                  |  |                                  |
| DMA 5        | 0.22             | 9,777         | landscape                 | 0.10              | 978                           |  |                    |                    |                                  |  |                                  |
| DMA 6        | 0.05             | 1,988         | landscape                 | 0.10              | 199                           | IMP Area Sizing Factor (Water Quality Only)  | Min. IMP Area (sf) | Proposed Area (sf) | IMP Surface Volume Sizing Factor | Min. IMP Surface Volume $V_{wq} = P_{85th}(CA)$ (cf) | Proposed IMP Surface Volume (cf) |
| <b>TOTAL</b> |                  |               |                           |                   | <b>13,151</b>                 | <b>0.040</b>   | <b>526</b>         | <b>540</b>         | <b>0.0625</b>                    | <b>822</b>   | <b>1,231</b>                     |



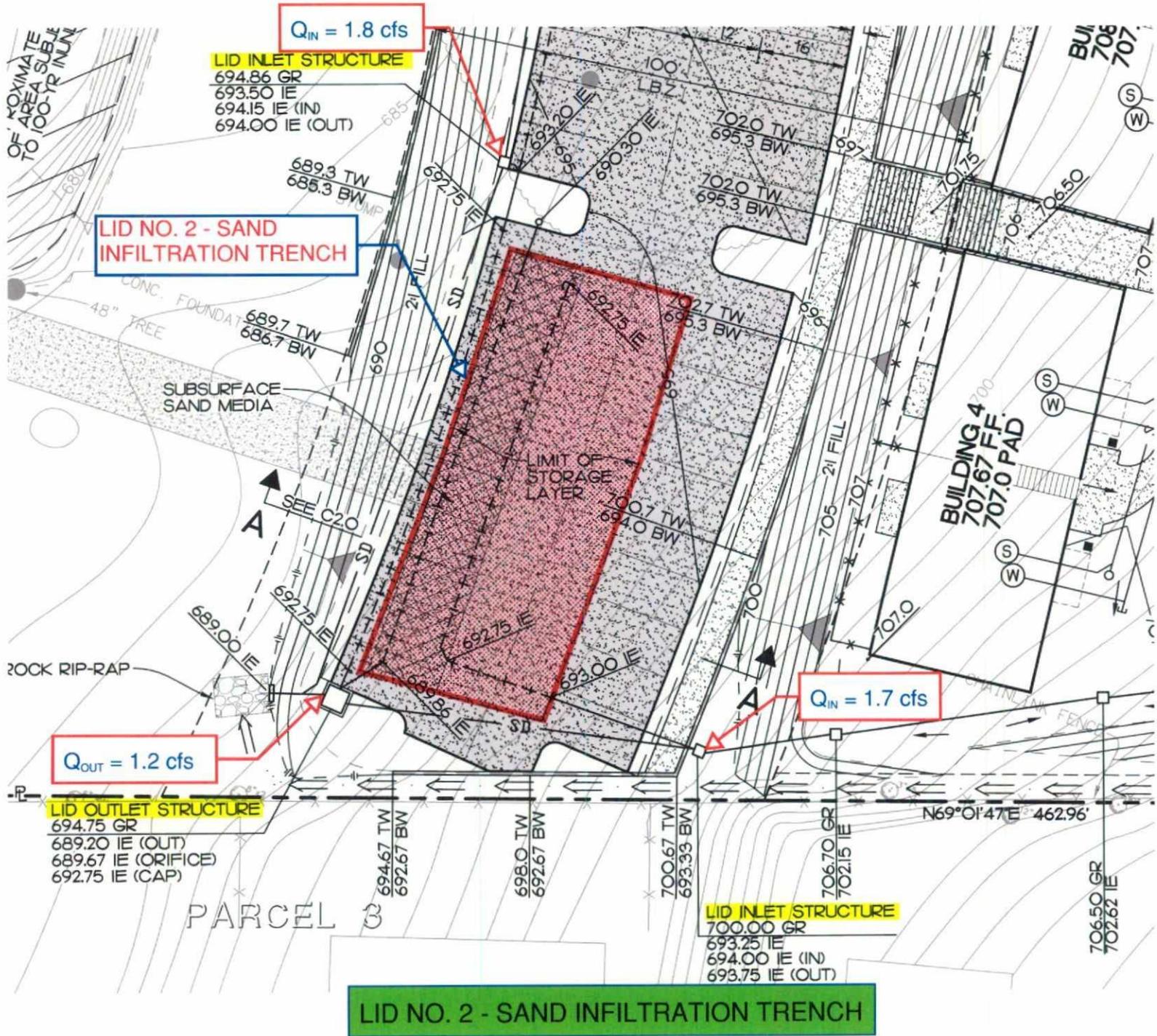
Peter Rios Estates Project  
Site P<sub>85th</sub> = 0.75 inch

Enlarged 85th Percent Isopluvials Map

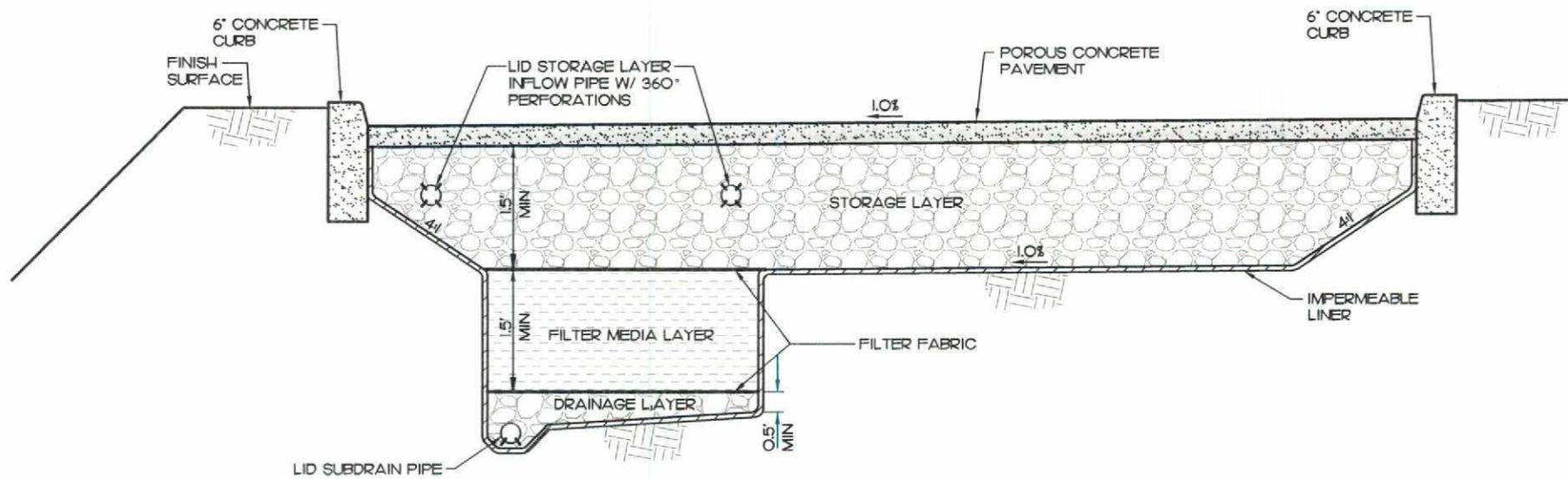




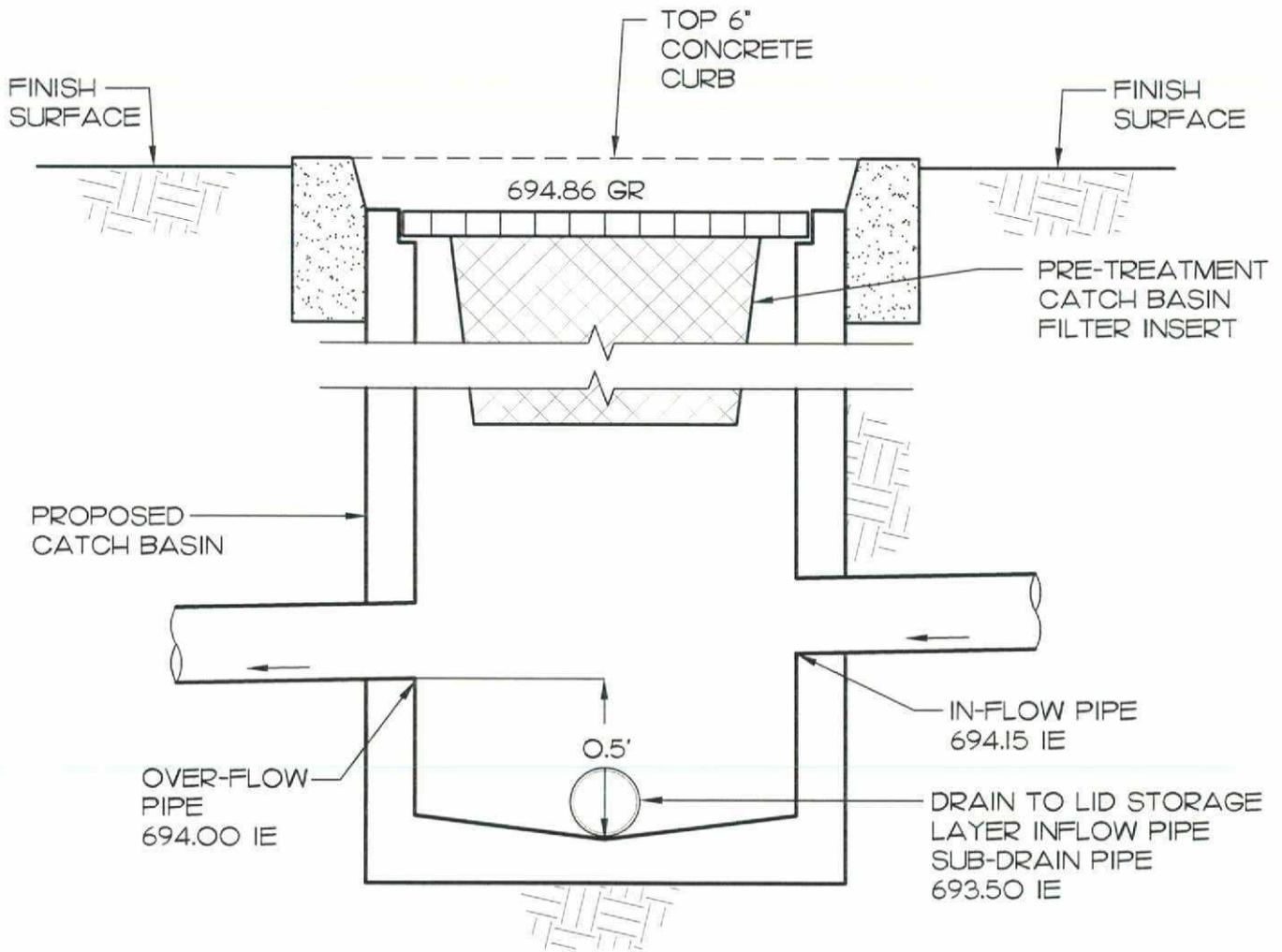
**LID NO. 2 - SAND INFILTRATION TRENCH**



LID NO. 2 - SAND INFILTRATION TRENCH

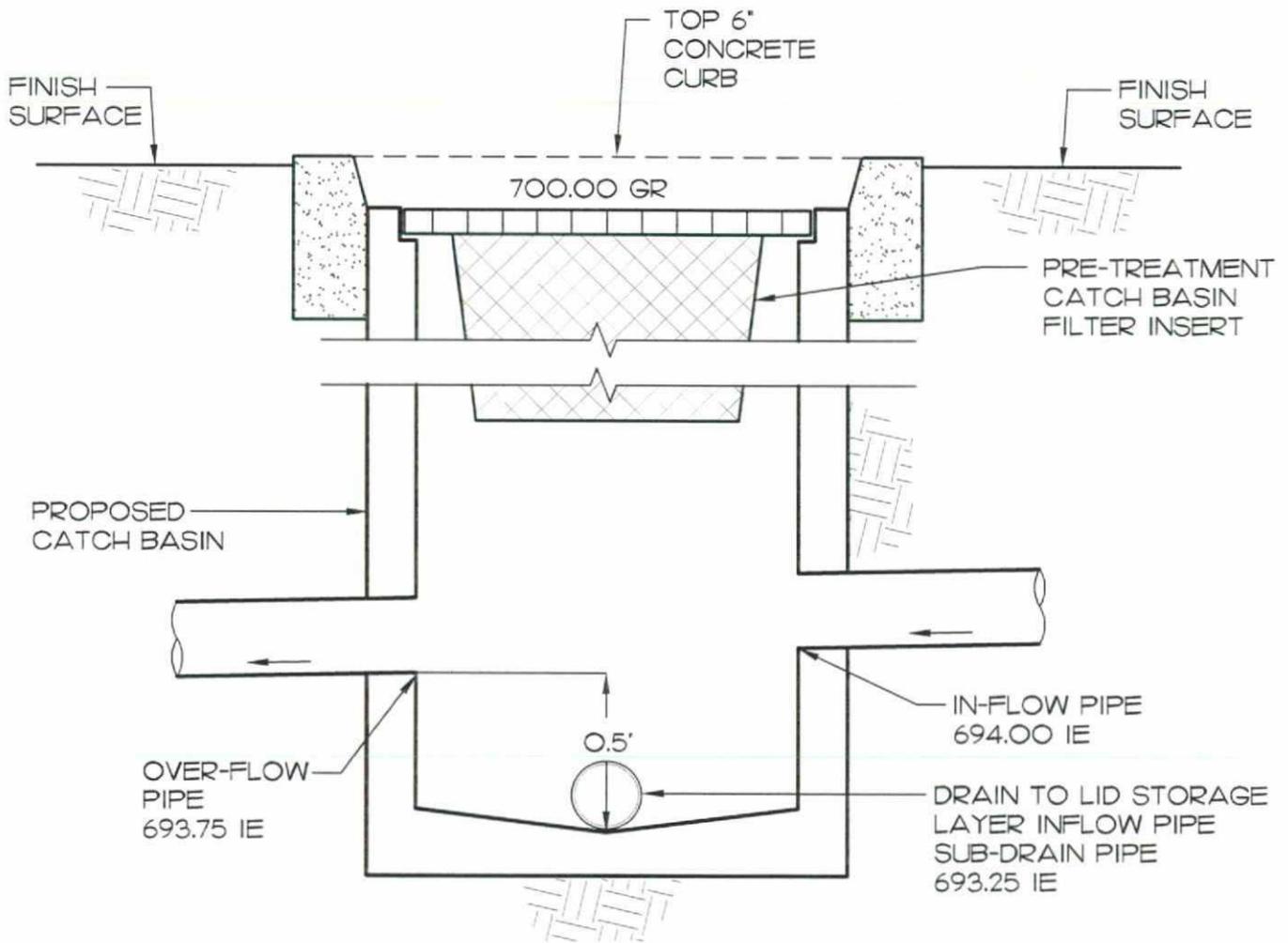


**TYPICAL SECTION A-A: SAND FILTRATION TRENCH**  
NO SCALE



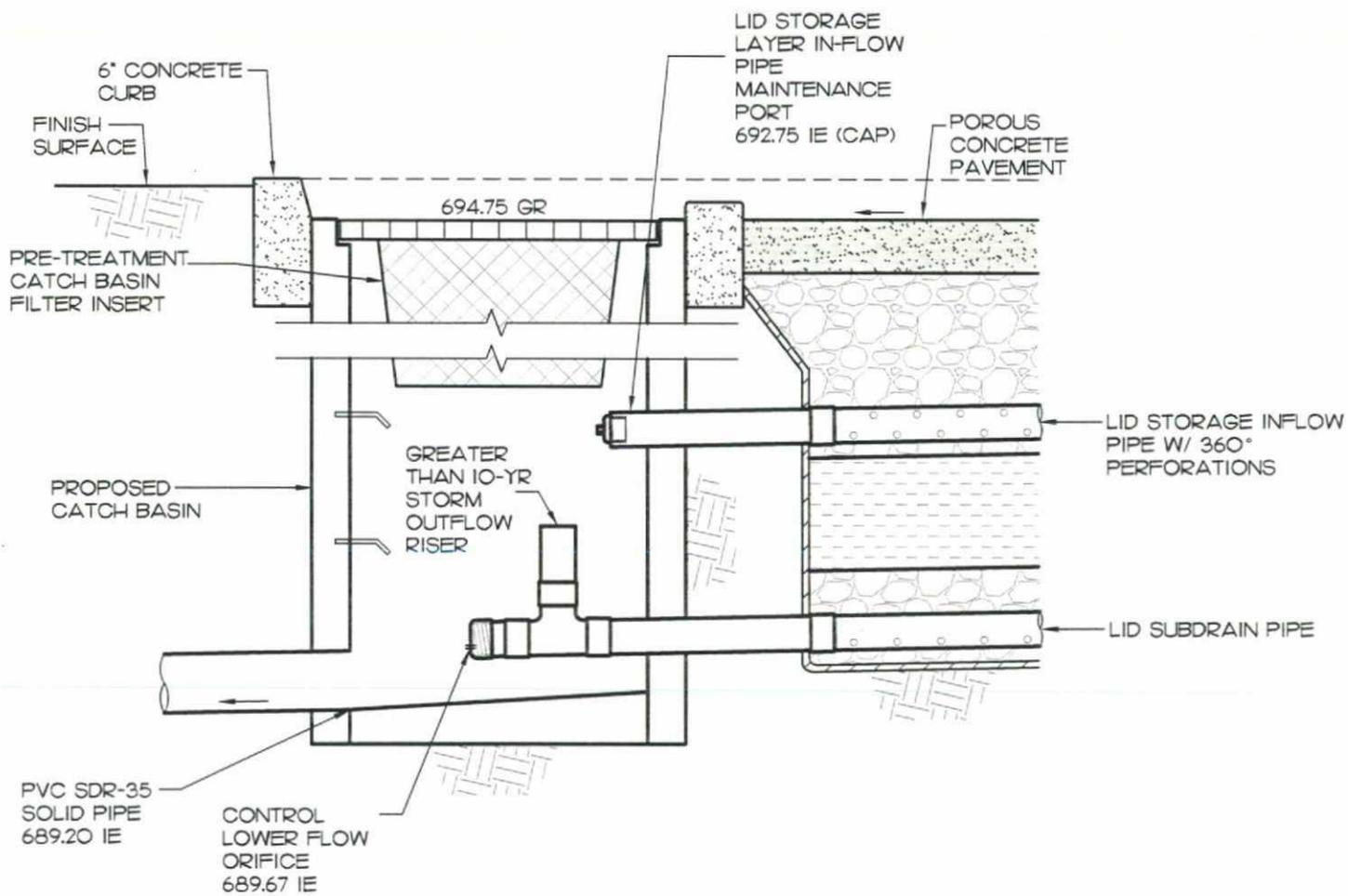
## LID NO. 2 INLET STRUCTURE - NORTH

NO SCALE



## LID NO. 2 INLET STRUCTURE - SOUTH

NO SCALE



**LID NO. 2 OUTLET STRUCTURE**

NO SCALE

# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

## Hyd. No. 4

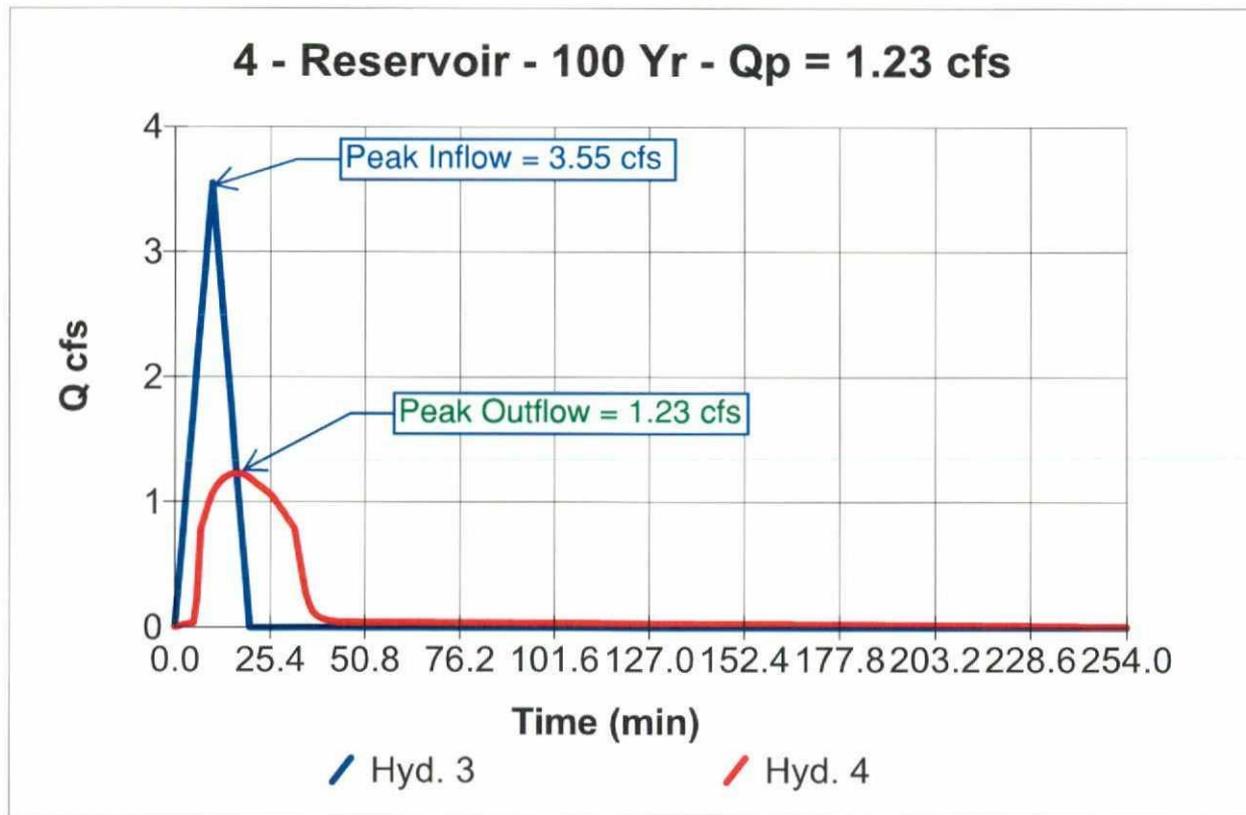
### LID 2 STORAGE LAYER

Hydrograph type = Reservoir  
Storm frequency = 100 yrs  
Inflow hyd. No. = 3  
Max. Elevation = 693.19 ft

Peak discharge = 1.23 cfs  
Time interval = 1 min  
Reservoir name = LID 2 STORAGE L  
Max. Storage = 1,326 cuft

Storage Indication method used.

Hydrograph Volume = 2,128 cuft



# Hydrograph Report

## Hyd. No. 4

### LID 2 STORAGE LAYER

Hydrograph type = Reservoir  
 Storm frequency = 100 yrs  
 Inflow hyd. No. = 3  
 Max. Elevation = 693.19 ft

Peak discharge = 1.23 cfs  
 Time interval = 1 min  
 Reservoir name = LID 2 STORAGE LAY  
 Max. Storage = 1,326 cuft

Storage Indication method used.

Outflow hydrograph volume = 2,128 cuft

### Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 2          | 0.71       | 690.07       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 3          | 1.07       | 690.36       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 4          | 1.42       | 690.64       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 5          | 1.78       | 691.06       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 6          | 2.13       | 691.66       | 0.04      | 0.18      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.23        |
| 7          | 2.49       | 692.27       | 0.05      | 0.74      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.79        |
| 8          | 2.84       | 692.43       | 0.05      | 0.84      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.89        |
| 9          | 3.20       | 692.62       | 0.05      | 0.93      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.99        |
| 10         | 3.55 <<    | 692.80       | 0.06      | 1.01      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.07        |
| 11         | 3.20       | 692.91       | 0.06      | 1.06      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.12        |
| 12         | 2.84       | 693.00       | 0.06      | 1.10      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.16        |
| 13         | 2.49       | 693.08       | 0.06      | 1.13      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.19        |
| 14         | 2.13       | 693.13       | 0.06      | 1.15      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.21        |
| 15         | 1.78       | 693.17       | 0.06      | 1.16      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.22        |
| 16         | 1.42       | 693.19       | 0.06      | 1.17      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.23        |
| 17         | 1.07       | 693.19 <<    | 0.06      | 1.17      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.23 <<     |
| 18         | 0.71       | 693.17       | 0.06      | 1.17      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.22        |
| 19         | 0.36       | 693.14       | 0.06      | 1.15      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.21        |
| 20         | 0.00       | 693.09       | 0.06      | 1.13      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.19        |
| 21         | 0.00       | 693.03       | 0.06      | 1.11      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.17        |
| 22         | 0.00       | 692.97       | 0.06      | 1.09      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.14        |
| 23         | 0.00       | 692.92       | 0.06      | 1.06      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.12        |
| 24         | 0.00       | 692.86       | 0.06      | 1.04      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.10        |
| 25         | 0.00       | 692.81       | 0.06      | 1.02      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.07        |
| 26         | 0.00       | 692.75       | 0.05      | 0.99      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.05        |
| 27         | 0.00       | 692.66       | 0.05      | 0.95      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 1.01        |
| 28         | 0.00       | 692.57       | 0.05      | 0.91      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.96        |
| 29         | 0.00       | 692.49       | 0.05      | 0.87      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.92        |
| 30         | 0.00       | 692.41       | 0.05      | 0.82      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.87        |
| 31         | 0.00       | 692.33       | 0.05      | 0.78      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.83        |
| 32         | 0.00       | 692.25       | 0.05      | 0.73      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.78        |
| 33         | 0.00       | 692.01       | 0.05      | 0.57      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.62        |
| 34         | 0.00       | 691.82       | 0.05      | 0.39      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.44        |
| 35         | 0.00       | 691.70       | 0.04      | 0.22      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.27        |
| 36         | 0.00       | 691.62       | 0.04      | 0.13      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.17        |
| 37         | 0.00       | 691.56       | 0.04      | 0.08      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.12        |
| 38         | 0.00       | 691.53       | 0.04      | 0.05      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.09        |
| 39         | 0.00       | 691.50       | 0.04      | 0.03      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.07        |

Peak Inflow = 3.55 cfs

Peak Outflow = 1.23 cfs

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## Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 40         | 0.00       | 691.47       | 0.04      | 0.02      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.06        |
| 41         | 0.00       | 691.45       | 0.04      | 0.01      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.05        |
| 42         | 0.00       | 691.44       | 0.04      | 0.01      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.05        |
| 43         | 0.00       | 691.42       | 0.04      | 0.00      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 44         | 0.00       | 691.40       | 0.04      | 0.00      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 45         | 0.00       | 691.39       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 46         | 0.00       | 691.38       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 47         | 0.00       | 691.36       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 48         | 0.00       | 691.35       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 49         | 0.00       | 691.33       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 50         | 0.00       | 691.32       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 51         | 0.00       | 691.30       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 52         | 0.00       | 691.29       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 53         | 0.00       | 691.28       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 54         | 0.00       | 691.26       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 55         | 0.00       | 691.25       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 56         | 0.00       | 691.24       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 57         | 0.00       | 691.23       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 58         | 0.00       | 691.22       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 59         | 0.00       | 691.21       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 60         | 0.00       | 691.20       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 61         | 0.00       | 691.18       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 62         | 0.00       | 691.17       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 63         | 0.00       | 691.16       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 64         | 0.00       | 691.15       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 65         | 0.00       | 691.14       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 66         | 0.00       | 691.13       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 67         | 0.00       | 691.12       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 68         | 0.00       | 691.11       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 69         | 0.00       | 691.10       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 70         | 0.00       | 691.09       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 71         | 0.00       | 691.08       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 72         | 0.00       | 691.07       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 73         | 0.00       | 691.06       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 74         | 0.00       | 691.05       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 75         | 0.00       | 691.04       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 76         | 0.00       | 691.03       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 77         | 0.00       | 691.02       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 78         | 0.00       | 691.01       | 0.04      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.04        |
| 79         | 0.00       | 691.00       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 80         | 0.00       | 690.99       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 81         | 0.00       | 690.98       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 82         | 0.00       | 690.97       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 83         | 0.00       | 690.96       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 84         | 0.00       | 690.95       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 85         | 0.00       | 690.94       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 86         | 0.00       | 690.93       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 87         | 0.00       | 690.92       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 88         | 0.00       | 690.91       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 89         | 0.00       | 690.90       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 90         | 0.00       | 690.90       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |

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## Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 91         | 0.00       | 690.89       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 92         | 0.00       | 690.88       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 93         | 0.00       | 690.87       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 94         | 0.00       | 690.86       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 95         | 0.00       | 690.85       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 96         | 0.00       | 690.84       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 97         | 0.00       | 690.83       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 98         | 0.00       | 690.82       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 99         | 0.00       | 690.81       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 100        | 0.00       | 690.80       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 101        | 0.00       | 690.79       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 102        | 0.00       | 690.79       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 103        | 0.00       | 690.78       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 104        | 0.00       | 690.77       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 105        | 0.00       | 690.76       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 106        | 0.00       | 690.75       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 107        | 0.00       | 690.74       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 108        | 0.00       | 690.74       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 109        | 0.00       | 690.73       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 110        | 0.00       | 690.72       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 111        | 0.00       | 690.71       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 112        | 0.00       | 690.71       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 113        | 0.00       | 690.70       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 114        | 0.00       | 690.69       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 115        | 0.00       | 690.69       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 116        | 0.00       | 690.68       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 117        | 0.00       | 690.67       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 118        | 0.00       | 690.67       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 119        | 0.00       | 690.66       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 120        | 0.00       | 690.65       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 121        | 0.00       | 690.65       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 122        | 0.00       | 690.64       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 123        | 0.00       | 690.63       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 124        | 0.00       | 690.63       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 125        | 0.00       | 690.62       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 126        | 0.00       | 690.61       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 127        | 0.00       | 690.61       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 128        | 0.00       | 690.60       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 129        | 0.00       | 690.59       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 130        | 0.00       | 690.59       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 131        | 0.00       | 690.58       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 132        | 0.00       | 690.57       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 133        | 0.00       | 690.57       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 134        | 0.00       | 690.56       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 135        | 0.00       | 690.55       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 136        | 0.00       | 690.55       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 137        | 0.00       | 690.54       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 138        | 0.00       | 690.53       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 139        | 0.00       | 690.53       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 140        | 0.00       | 690.52       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 141        | 0.00       | 690.52       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |

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## Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 142        | 0.00       | 690.51       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 143        | 0.00       | 690.50       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 144        | 0.00       | 690.50       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 145        | 0.00       | 690.49       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 146        | 0.00       | 690.49       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 147        | 0.00       | 690.48       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 148        | 0.00       | 690.47       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 149        | 0.00       | 690.47       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 150        | 0.00       | 690.46       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 151        | 0.00       | 690.46       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 152        | 0.00       | 690.45       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 153        | 0.00       | 690.44       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 154        | 0.00       | 690.44       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 155        | 0.00       | 690.43       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 156        | 0.00       | 690.43       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 157        | 0.00       | 690.42       | 0.03      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.03        |
| 158        | 0.00       | 690.41       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 159        | 0.00       | 690.41       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 160        | 0.00       | 690.40       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 161        | 0.00       | 690.40       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 162        | 0.00       | 690.39       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 163        | 0.00       | 690.39       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 164        | 0.00       | 690.38       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 165        | 0.00       | 690.37       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 166        | 0.00       | 690.37       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 167        | 0.00       | 690.36       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 168        | 0.00       | 690.36       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 169        | 0.00       | 690.35       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 170        | 0.00       | 690.35       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 171        | 0.00       | 690.34       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 172        | 0.00       | 690.34       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 173        | 0.00       | 690.33       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 174        | 0.00       | 690.33       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 175        | 0.00       | 690.32       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 176        | 0.00       | 690.31       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 177        | 0.00       | 690.31       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 178        | 0.00       | 690.30       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 179        | 0.00       | 690.30       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 180        | 0.00       | 690.29       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 181        | 0.00       | 690.29       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 182        | 0.00       | 690.28       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 183        | 0.00       | 690.28       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 184        | 0.00       | 690.27       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 185        | 0.00       | 690.27       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 186        | 0.00       | 690.26       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 187        | 0.00       | 690.26       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 188        | 0.00       | 690.25       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 189        | 0.00       | 690.25       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 190        | 0.00       | 690.24       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 191        | 0.00       | 690.23       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 192        | 0.00       | 690.22       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |

Continues on next page...

### Hydrograph Discharge Table

| Time (min) | Inflow cfs | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | Clv D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Outflow cfs |
|------------|------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-------------|
| 193        | 0.00       | 690.21       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 194        | 0.00       | 690.20       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 195        | 0.00       | 690.19       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 196        | 0.00       | 690.18       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 197        | 0.00       | 690.17       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 198        | 0.00       | 690.16       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 199        | 0.00       | 690.15       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 200        | 0.00       | 690.15       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 201        | 0.00       | 690.14       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 202        | 0.00       | 690.13       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 203        | 0.00       | 690.12       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 204        | 0.00       | 690.11       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 205        | 0.00       | 690.10       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 206        | 0.00       | 690.10       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 207        | 0.00       | 690.09       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 208        | 0.00       | 690.08       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 209        | 0.00       | 690.07       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 210        | 0.00       | 690.06       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 211        | 0.00       | 690.06       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 212        | 0.00       | 690.05       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 213        | 0.00       | 690.04       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 214        | 0.00       | 690.03       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 215        | 0.00       | 690.03       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 216        | 0.00       | 690.02       | 0.02      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.02        |
| 217        | 0.00       | 690.01       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 218        | 0.00       | 690.01       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 219        | 0.00       | 690.00       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 220        | 0.00       | 689.99       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 221        | 0.00       | 689.99       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 222        | 0.00       | 689.98       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 223        | 0.00       | 689.97       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 224        | 0.00       | 689.97       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 225        | 0.00       | 689.96       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 226        | 0.00       | 689.96       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |
| 227        | 0.00       | 689.95       | 0.01      | ----      | ----      | ----      | ----     | ----     | ----     | ----     | ----      | 0.01        |

...End

# Reservoir Report

## Reservoir No. 2 - LID 2 STORAGE LAYER

Hydraflow Hydrographs by Intelisolve

### pond Data

pond storage is based on known contour areas. Average end area method used.

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00       | 689.75         | 00                  | 0                    | 0                    |
| 0.50       | 690.25         | 260                 | 65                   | 65                   |
| 1.00       | 690.75         | 260                 | 130                  | 195                  |
| 1.50       | 691.25         | 166                 | 107                  | 302                  |
| 2.00       | 691.75         | 166                 | 83                   | 385                  |
| 2.50       | 692.25         | 166                 | 83                   | 468                  |
| 3.00       | 692.75         | 1,144               | 328                  | 795                  |
| 3.50       | 693.25         | 1,288               | 608                  | 1,403                |
| 4.00       | 693.75         | 1,440               | 682                  | 2,085                |
| 4.50       | 694.25         | 1,600               | 760                  | 2,845                |
| 5.00       | 694.75         | 3,200               | 1,200                | 4,045                |

### Culvert / Orifice Structures

|               | [A]      | [B]    | [C]  | [D]  |
|---------------|----------|--------|------|------|
| Rise in       | = 1.1    | 6.0    | 0.0  | 0.0  |
| Span in       | = 1.1    | 6.0    | 0.0  | 0.0  |
| No. Barrels   | = 1      | 1      | 0    | 0    |
| Invert El. ft | = 689.75 | 691.40 | 0.00 | 0.00 |
| Length ft     | = 0.0    | 0.0    | 0.0  | 0.0  |
| Slope %       | = 0.00   | 0.00   | 0.00 | 0.00 |
| N-Value       | = .013   | .013   | .013 | .000 |
| Orif. Coeff.  | = 0.60   | 0.60   | 0.60 | 0.00 |
| ulti-Stage    | = n/a    | No     | No   | No   |

### Weir Structures

|              | [A]      | [B]  | [C]  | [D]  |
|--------------|----------|------|------|------|
| Crest Len ft | = 1.50   | 0.00 | 0.00 | 0.00 |
| Crest El. ft | = 694.50 | 0.00 | 0.00 | 0.00 |
| Weir Coeff.  | = 3.33   | 3.33 | 0.00 | 0.00 |
| Weir Type    | = Rect   | ---  | ---  | ---  |
| Multi-Stage  | = No     | No   | No   | No   |

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Civ A cfs | Civ B cfs | Civ C cfs | Civ D cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | Total cfs |
|----------|--------------|--------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|-----------|
| 0.00     | 0            | 689.75       | 0.00      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.00      |
| 0.50     | 65           | 690.25       | 0.02      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.02      |
| 1.00     | 195          | 690.75       | 0.03      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.03      |
| 1.50     | 302          | 691.25       | 0.04      | 0.00      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.04      |
| 2.00     | 385          | 691.75       | 0.04      | 0.30      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.34      |
| 2.50     | 468          | 692.25       | 0.05      | 0.73      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 0.78      |
| 3.00     | 795          | 692.75       | 0.05      | 0.99      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.05      |
| 3.50     | 1,403        | 693.25       | 0.06      | 1.20      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.25      |
| 4.00     | 2,085        | 693.75       | 0.06      | 1.37      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.43      |
| 4.50     | 2,845        | 694.25       | 0.07      | 1.52      | ---       | ---       | 0.00     | ---      | ---      | ---      | ---       | 1.59      |
| 5.00     | 4,045        | 694.75       | 0.07      | 1.66      | ---       | ---       | 0.62     | ---      | ---      | ---      | ---       | 2.36      |

# Hydrograph Plot

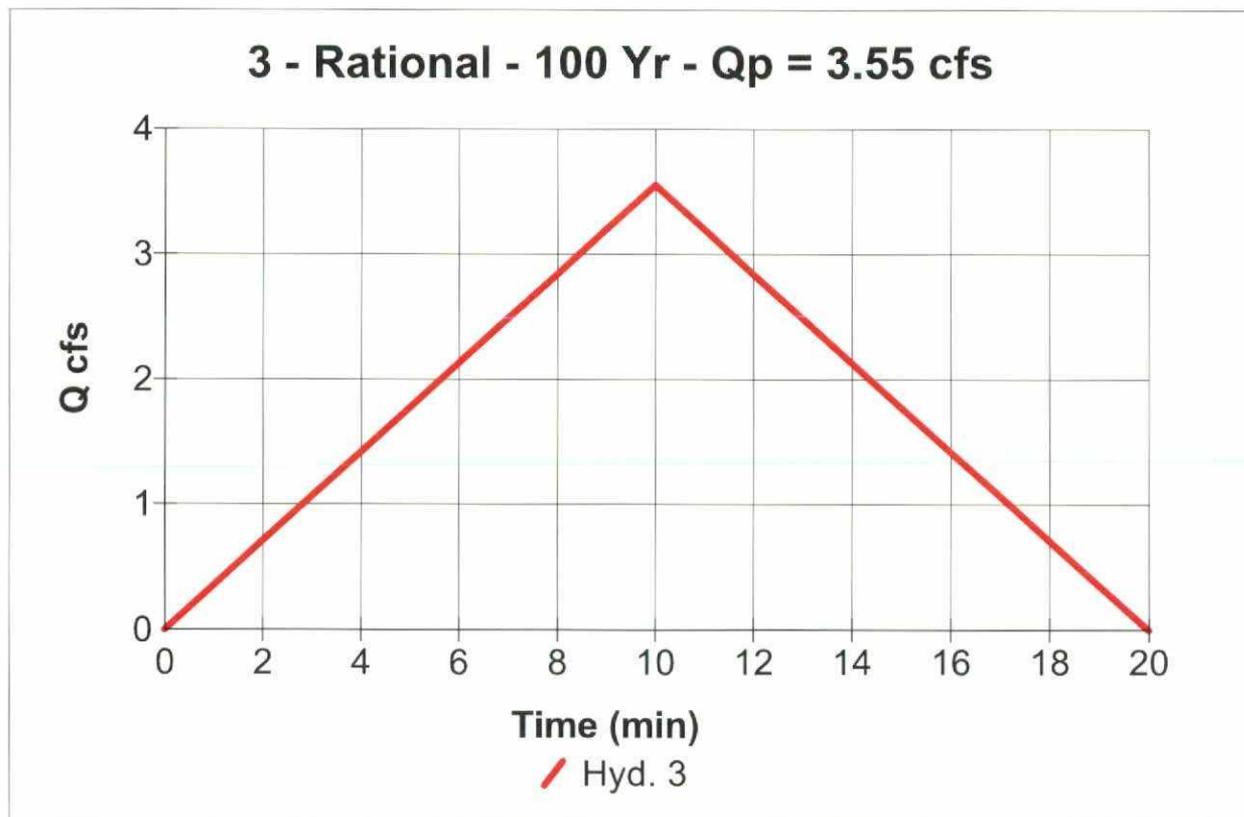
Hydraflow Hydrographs by Intelisolve

## Hyd. No. 3

Tributary Area to Basin 2

|                 |                         |                    |            |
|-----------------|-------------------------|--------------------|------------|
| Hydrograph type | = Rational              | Peak discharge     | = 3.55 cfs |
| Storm frequency | = 100 yrs               | Time interval      | = 1 min    |
| Drainage area   | = 1.4 ac                | Runoff coeff.      | = 0.38     |
| Intensity       | = 6.628 in/hr           | Time of conc. (Tc) | = 10 min   |
| IDF Curve       | = Rios Canyon Rd TM.idf | Asc/Rec limb fact  | = 1/1      |

Hydrograph Volume = 2,131 cuft



# Hydrograph Report

## lyd. No. 3

Tributary Area to Basin 2

|                 |                         |                    |            |
|-----------------|-------------------------|--------------------|------------|
| Hydrograph type | = Rational              | Peak discharge     | = 3.55 cfs |
| Storm frequency | = 100 yrs               | Time interval      | = 1 min    |
| Drainage area   | = 1.4 ac                | Runoff coeff.      | = 0.38     |
| Intensity       | = 6.628 in/hr           | Time of conc. (Tc) | = 10 min   |
| IDF Curve       | = Rios Canyon Rd TM.idf | Asc/Rec limb fact  | = 1/1      |

Hydrograph Volume = 2,131 cuft

## Hydrograph Discharge Table

**Time -- Outflow**  
**(min      cfs)**

|    |         |
|----|---------|
| 1  | 0.36    |
| 2  | 0.71    |
| 3  | 1.07    |
| 4  | 1.42    |
| 5  | 1.78    |
| 6  | 2.13    |
| 7  | 2.49    |
| 8  | 2.84    |
| 9  | 3.20    |
| 10 | 3.55 << |
| 11 | 3.20    |
| 12 | 2.84    |
| 13 | 2.49    |
| 14 | 2.13    |
| 15 | 1.78    |
| 16 | 1.42    |
| 17 | 1.07    |
| 18 | 0.71    |
| 19 | 0.36    |

...End

LID NO. 2 - SAND FILTRATION TRENCH

| DMA name     | DMA Area (acres) | DMA Area (sf) | Post-project surface type | DMA runoff factor | DMA area x runoff factor (CA) | Utilized County of San Diego's 85th Percentile Isopluvial Map ( $P_{85th} = 0.75$ inch = 0.0625 ft) |                    |                    |                                  |  |                                  |              |
|--------------|------------------|---------------|---------------------------|-------------------|-------------------------------|---|--------------------|--------------------|----------------------------------|--|----------------------------------|--------------|
| DMA 7        | 0.48             | 21,025        | impervious                | 1.00              | 21,025                        | IMP Name: Sand Filtration Trench (Water Quality Only)   |                    |                    |                                  |  |                                  |              |
| DMA 8        | 0.00             | 147           | impervious                | 1.00              | 147                           |   |                    |                    |                                  |  |                                  |              |
| DMA 9        | 0.02             | 869           | pervious pavement         | 0.10              | 87                            |   |                    |                    |                                  |  |                                  |              |
| DMA 10       | 0.24             | 10,406        | pervious pavement         | 0.10              | 1,041                         |   |                    |                    |                                  |  |                                  |              |
| DMA 11       | 0.62             | 26,933        | landscape                 | 0.10              | 2,693                         |   |                    |                    |                                  |  |                                  |              |
| DMA 12       | 0.01             | 310           | landscape                 | 0.10              | 31                            | IMP Area Sizing Factor (Water Quality Only)   | Min. IMP Area (sf) | Proposed Area (sf) | IMP Surface Volume Sizing Factor | Min. IMP Surface Volume $V_{wq} = P_{85th}(CA)$ (cf) | Proposed IMP Surface Volume (cf) |              |
| <b>TOTAL</b> |                  |               |                           |                   |                               | <b>25,024</b>   | <b>0.040</b>       | <b>1,001</b>       | <b>1,040</b>                     | <b>0.0625</b>  | <b>1,564</b>                     | <b>2,123</b> |

San Diego County  
85th Percentile Isopluvials  
Draft 8/7/2003

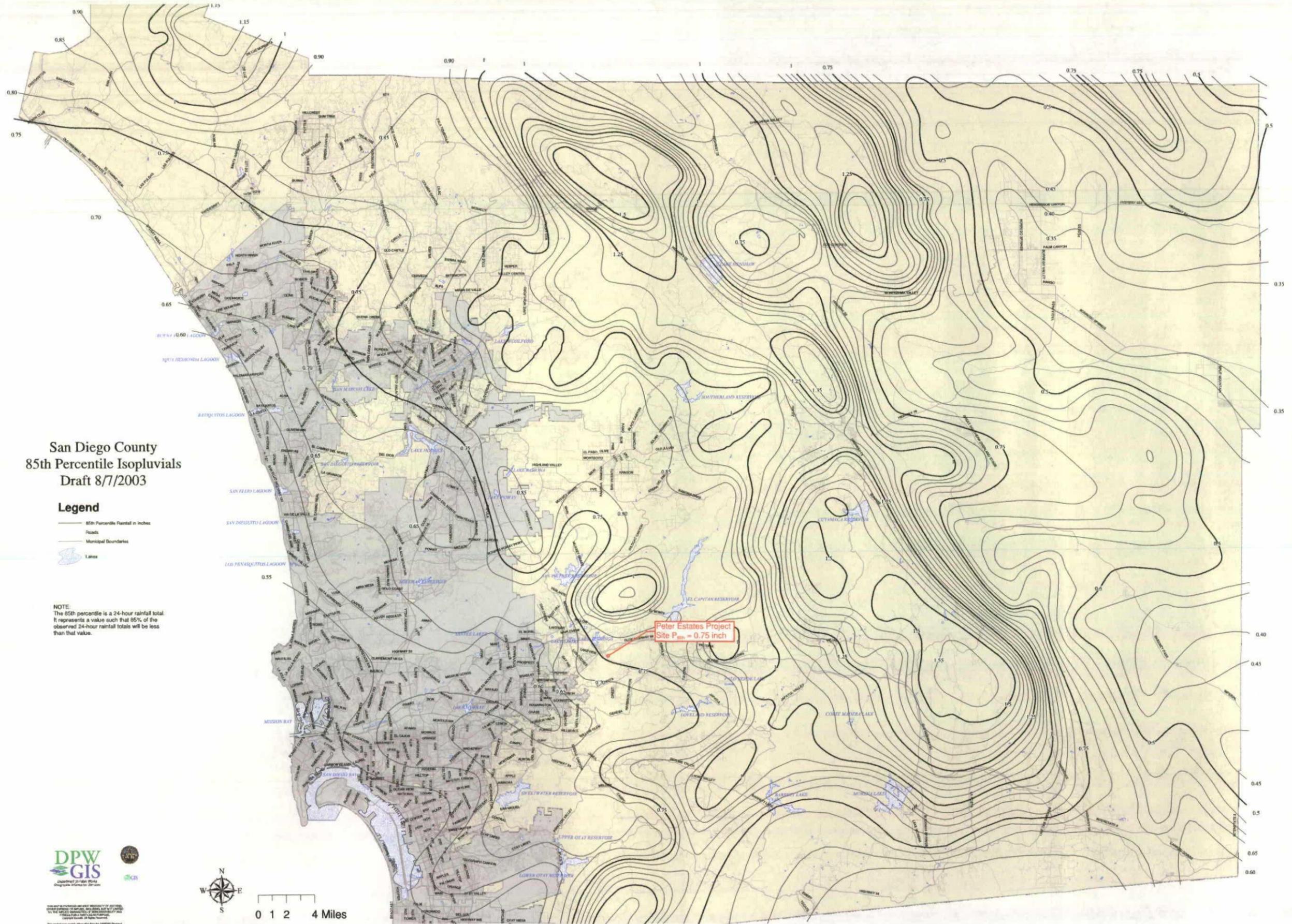
Legend

- 85th Percentile Rainfall in inches
- Roads
- Municipal Boundaries
- Lakes

NOTE:  
The 85th percentile is a 24-hour rainfall total.  
It represents a value such that 85% of the  
observed 24-hour rainfall totals will be less  
than that value.



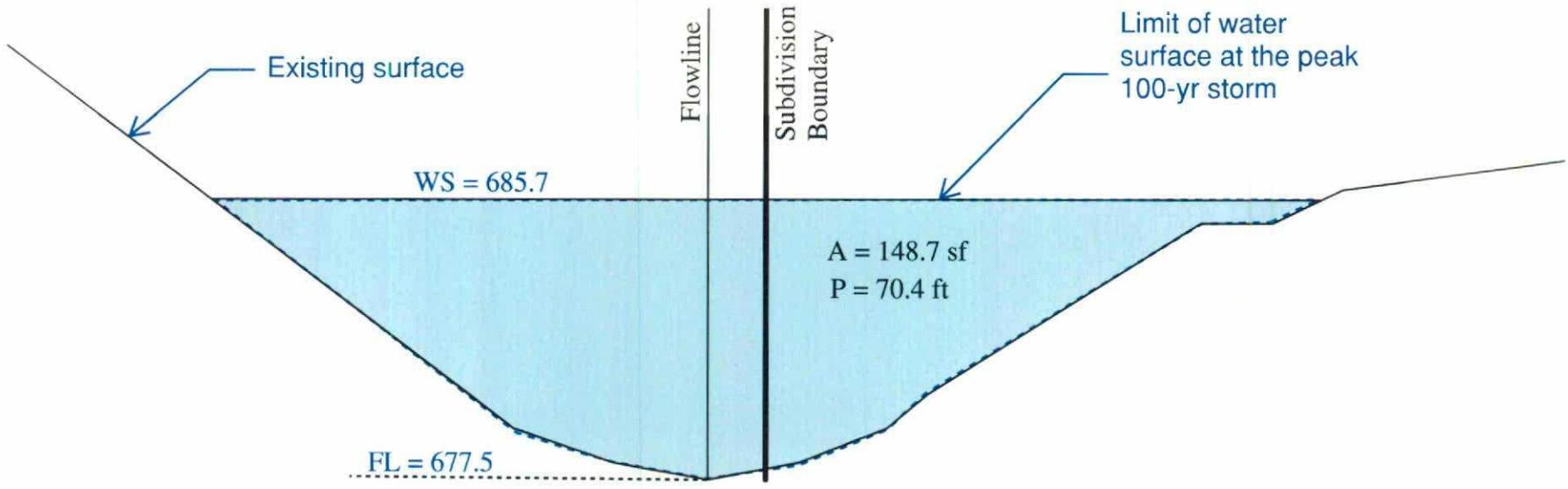
0 1 2 4 Miles





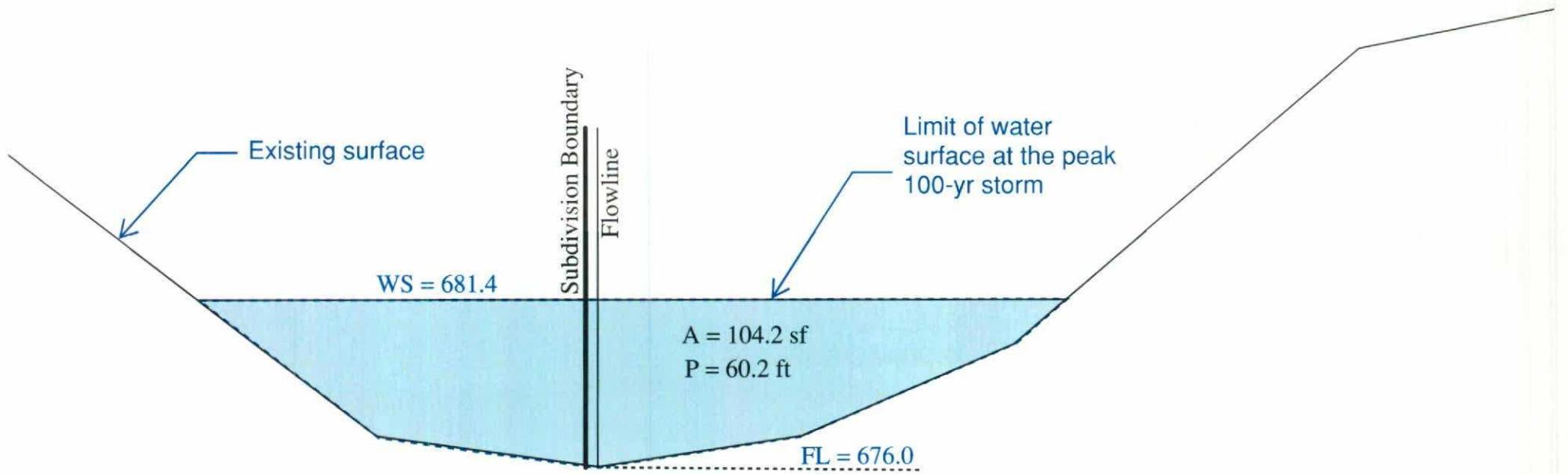
| NATURAL CHANNEL |                    |                         |                   |                         |                                 |                  |                   |                  |                           |   |   |
|-----------------|--------------------|-------------------------|-------------------|-------------------------|---------------------------------|------------------|-------------------|------------------|---------------------------|---|---|
| SECTION         | Flowline Elevation | Water Surface Elevation | WATER AREA (A) SF | WETTED PERIMETER (P) FT | HYDRAULIC RADIUS ( R ) = A/P FT | R <sup>2/3</sup> | CHANNEL SLOPE (S) | S <sup>1/2</sup> | ROUGHNESS COEFFICIENT (n) | CHANNEL CAPACITY (Q)=((1.49A(R <sup>2/3</sup> ))/n)S <sup>1/2</sup> | Q approach (See hydrology calculations) |
| A-A             | 677.5              | 685.670                 | 148.73            | 70.37                   | 2.11                            | 1.65             | 0.025             | 0.16             | 0.030                     | 1923.53   | = 1923.39 cfs                           |
| B-B             | 676.0              | 681.416                 | 104.24            | 60.22                   | 1.73                            | 1.44             | 0.067             | 0.26             | 0.030                     | 1932.03   | > 1924.90 cfs                           |
| C-C             | 667.0              | 672.146                 | 133.61            | 93.12                   | 1.43                            | 1.27             | 0.052             | 0.23             | 0.030                     | 1924.96   | > 1924.90 cfs                           |
| D-D             | 663.5              | 669.649                 | 162.34            | 107.22                  | 1.51                            | 1.32             | 0.033             | 0.18             | 0.030                     | 1931.28   | > 1925.79 cfs                           |





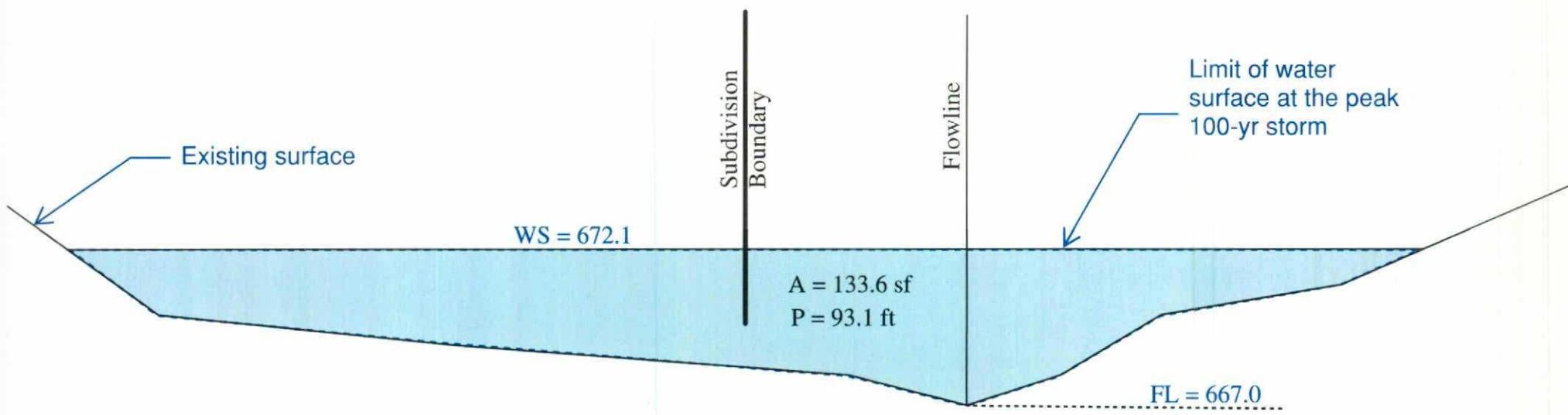
# SECTION A-A

Scale 1" = 5'



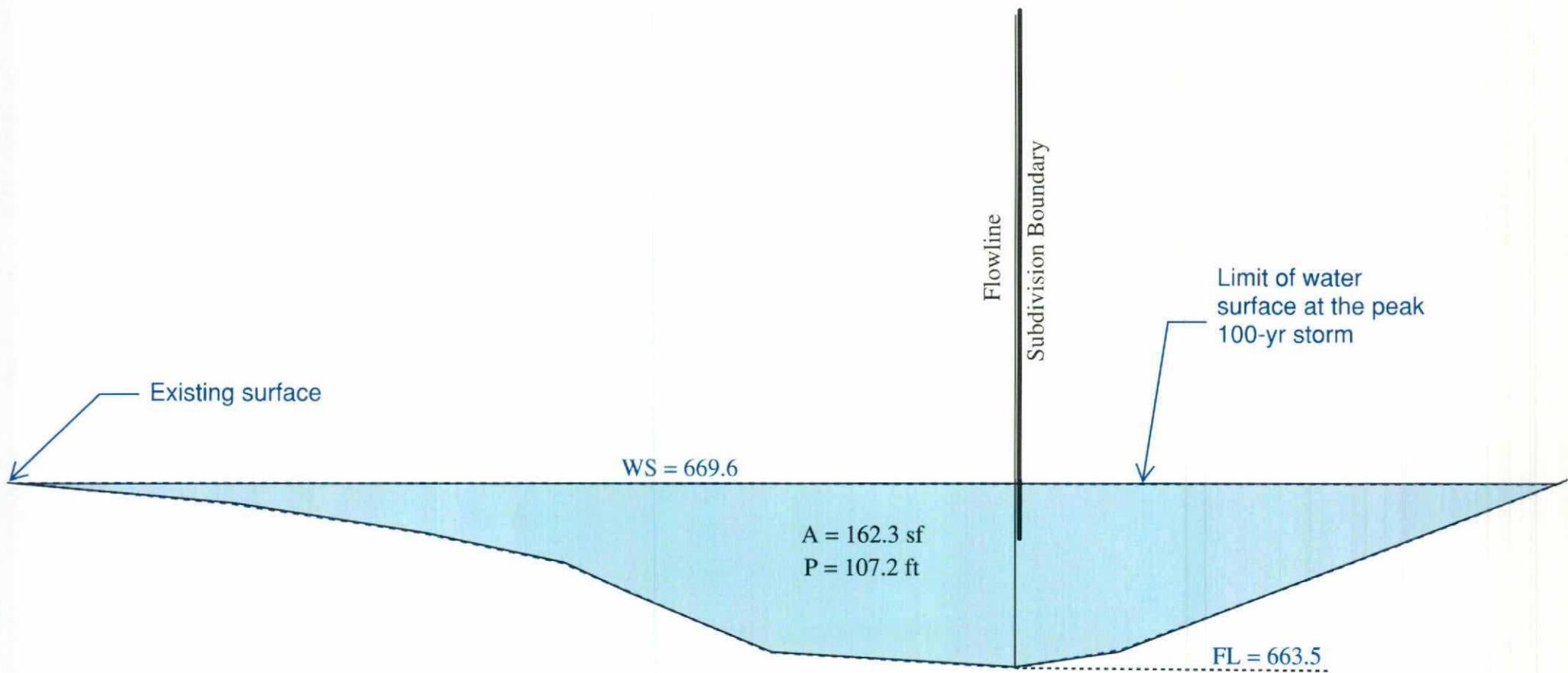
## SECTION B-B

Scale 1" = 5'



# SECTION C-C

Scale 1" = 5'



# SECTION D-D

Scale 1" = 5'