ATTACHMENT A - EX 1-A

APPENDIX F - HYDROLOGY/STORMWATER

On-Site Hydrology

For

Proposed Wal-Mart #3882-02
I-15 & Bundy Canyon Road
Wildomar, CA

Prepared For:

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2001 SE 10th Street
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May 9, 2014

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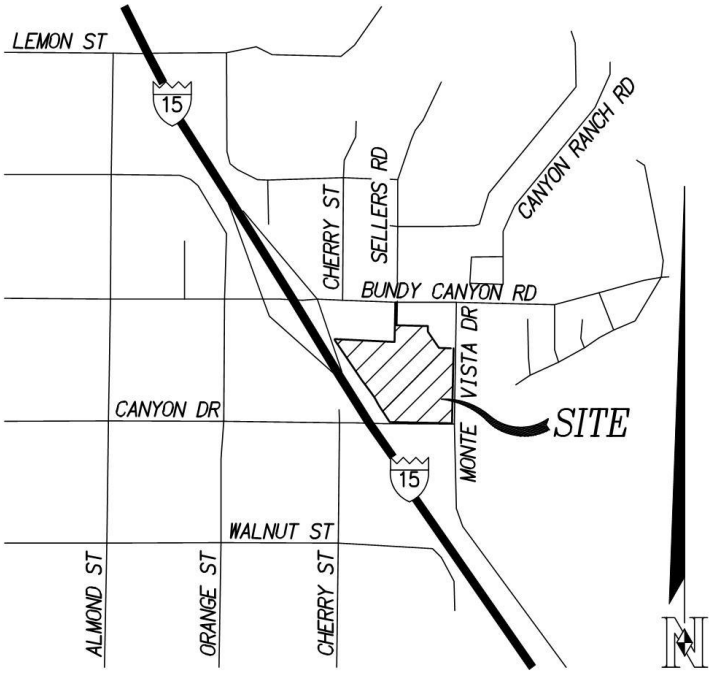
VICINITY MAP



VICINITY MAP
NO SCALE

PROJECT DESCRIPTION:

The project proposes an 185,992 square foot Wal-Mart along with an additional 7,800 square foot outparcel. In addition to the new retail stores, the project proposes a multiple porous landscape detention areas, an infiltration basin, and a sand filter basin. These storm water facilities are proposed in order to handle the increased runoff associated with transforming the undeveloped site to a commercial site with impervious areas. Existing drainage flows from the northeastern corner to the western side of the project site towards a 24" and 30" AP storm drain that runs underneath I-15. The site is located on the eastern side of Interstate 15 on the southwestern corner of the intersection of Bundy Canyon Road and Monte Vista Drive in the City of Wildomar within the County of Riverside, California (see Vicinity Map).

This Hydrology Study was prepared for this proposed project to correctly verify that the existing storm drain system will still be adequate after the construction of the proposed project. **The proposed facilities are designed for the flow and volume associated with a 100-year storm event.** Below is a summary of the above mentioned detailed Hydrology Study.

EXISTING DRAINAGE PATTERNS:

This site is currently undeveloped with all of its native soil exposed, which based on Riverside County Flood Control and Water Conservation District Plate C-1.51, can be classified as Type C soil group. The topography slopes downwards towards two inlets running underneath I-15, a 24" AP and a 30" AP. The 25 plus acres site can be divided into 3 major drainage basin areas, with only 2.5 acres (Basin 1) directed towards the 24" AP. Basins 2 and 3 cover the remainder of the site and have a conveyance points near the pipe inlet. Refer to Appendix A for supporting calculations and details for the existing conditions.

PROPOSED DRAINAGE SYSTEM:

In order to accurately analyze the proposed on-site drainage conditions, the site is broken down in to 12 sub-basins. Each basin has different drainage characteristics including: slope, percentage pervious, BMP features, and conveyance steps. Within Basins D-2, D-4, D-5, and D-6 are porous landscape detention (PLD) areas that are designed to treat runoff associated with 2-year and 10-year storms. Overflow inlets are included in each PLD in order to handle runoff from larger storm events, which are then conveyed via storm drain to an on-site infiltration basin for further storage and treatment. Refer to the *Water Quality Management Plan* (WQMP) for details.

Other drainage basins are directed to a sand-filter basin that treats runoff from small storm events as well. Both the infiltration basin and sand-filter basin include a 24"x24" catch basin, which are designed to limit the downstream runoff of large storm events, including the 100-year design storm. Overflow from both basins are routed via pipes towards the existing 30" AP inlet, which currently gathers over 90% of the existing sites drainage, at rates less than existing 100-year conditions. For complete analysis of the proposed drainage areas and storm drain pipe sizes refer to Appendix B.

METHODOLOGY:

For the hydrology analysis, the Advanced Engineering Software (AES) has been used, along with the Rational Method and Synthetic Unit Hydrograph Method outlined in the <u>County of Riverside Flood Control and Water Conservation District Hydrology Manual</u>, April 1978 edition. By using these resources the maximum on-site run-off value can be determined for pre- and post-construction conditions.

The 2-year, 10-year, 25-year, 50-year and 100-year storm runoffs for the basin inflows were calculated using the Rational Formula Method, per the Riverside County Hydrology Manual.

The peak flow rate formula (Q = CIA) was used to calculate the runoffs.

Q = Peak flow rate in cubic feet per second.
C = Runoff coefficient expressed as a percentage of rainfall which becomes runoff.

I = Average rainfall intensity in inches per hour for a storm duration equal to the time of concentration of the contributing drainage area.
Tc = Time of concentration – 5 minute minimum.
A = Area of basin in acres.

The runoff coefficient (C) was calculated using the formula listed on page D-3 of the Riverside County Hydrology Manual or Plate D-5.2:

$$C = 0.9[A_i + \left(I - \frac{F_p}{I}\right) A_p]$$

A_i is equal to the decimal percent of the impervious area of the basin.

A_p is equal to the decimal percent of pervious area or ($1-A_i$)

I is equal to the rainfall intensity, calculated as described below.

F_p is equal to the infiltration rate of the site soil, as calculated per Plates D-5.5 and D-5.7 by using Soil Type B, Open Brush Good Cover.

The rainfall intensity (I) was calculated for 2, 10, 25, 50, and 100-year storms by first finding the 2-Year-1-Hour Precipitation and 100-Year-1-Hour Precipitation by plotting the site location on Plates D-4.3 and D-4.4, respectively. This information was then plotted on Plate D-4.5 in order to interpolate the 25-Year-1-Hour and 50-Year-1-Hour Precipitation. The site location was then plotted onto Plate D-4.6 in order to find the slope of intensity-duration curve, which was then plotted on Plate D-4.7 in order to obtain the rainfall intensity for the 25, 50, and 100 year storms.

The time of concentration (Tc) was calculated by first defining the basin areas and their respective length of flow, elevation difference, and percent impervious. This data was then plotted onto Plate D-3 in order to obtain the time of concentration for each drainage basin, included in Appendix A (existing) and B (proposed). Certain basin areas were routed through pipes, in addition to sheet flow, to reach the final discharge point so additional time needed to be taken into consideration. Outputs from AES 2008 were referenced in determining the required pipe sizes. In situations where these pipes are joined together with others, an equation was required to find the resulting time of concentration and flow of the combination. This equation was presented within the Advanced Engineering Software (AES) programming:

If $Q_B > Q_A$:

$T_{post} = T_B$

$$Q_{post} = Q_B + Q_A(T_B/T_A)$$

Results of this process are presented in the "Calculation" section, which demonstrate the maximum flow rates directed to the existing inlets running underneath I-15 and the maximum flow rates entering each of the basins. Each basin is required, by storm water quality standards, to discharge runoff produced by any event greater than a 10-year storm, so grated inlets are necessary to convey runoff to the existing 30" AP inlet. Appendix D includes flow rates for the proposed catch basin at increasing water surface elevations. These values and other basin characteristics are then inputted into AES to provide outfall flows for the entire proposed

hydrologic system. Hydrographs for 100-year 1-hour, 3-hour, 6-hour, and 24-hours are also included in the AES analysis.

SUMMARY OF RESULTS:

SUMMARY OF RESULTS FOR EXISTING CONDITIONS

Discharge Point #1 (24" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	3.79	3.43
Q_{50} (cfs)	4.55	4.08
Q_{100} (cfs)	4.87	4.66

Discharge Point #2 (30" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	22.92	21.27
Q_{50} (cfs)	27.55	25.52
Q_{100} (cfs)	30.72	29.26

SUMMARY OF RESULTS FOR PROPOSED CONDITIONS

Discharge Point #1 (Infiltration Basin):

Discharge Flow Rate	Basin Inflow (Rational Method)	Basin Inflow (AES)	Basin Discharge (AES)
Q_{25} (cfs)	37.75	38.09	-
Q_{50} (cfs)	43.32	43.99	-
Q_{100} (cfs)	46.86	49.10	8.30

Discharge Point #2 (Extended Detention Basin):

Discharge Flow Rate	Basin Inflow (Rational Method)	Basin Inflow (AES)	Basin Discharge (AES)
Q_{25} (cfs)	25.54	21.64	-
Q_{50} (cfs)	29.30	25.08	-
Q_{100} (cfs)	31.37	28.08	7.43

Note: Basin discharge values are the maximum discharge of the 100 year – 1hr, 3hr, 6hr, or 24hr storm event.

CALCULATIONS:

Site Characteristics and Assumptions:

- Hydrologic Soil Group C – See Geotechnical Report in the Water Quality Management Plan and Plate C-1.51.
- Existing Percent Impervious = 0%
- Proposed Percent Impervious = Approximately 90%
- See Attached Hydrology Maps for Basin Location and properties.
- Assume T_c = 5.00 minutes minimum if T_c is less than 5.00 minutes.

Hydrology - Existing Conditions					
Variable	**Basin 1**	**Basin 2**	**Basin 3**	**24" AP**	**30" AP**
A_{sf}	110,882	687,910	316,120	110,882	1,004,030
A_{ac}	2.546	15.792	7.257	2.55	23.05
A_p	110882	687910	316120	110,882	1,004,030
A_i	0	0	0	0	0
$A_{\%i}$	0.00	0.00	0.00	0.00	0.00
L	355	1440	1190	355	N/A
H	9	45	13	9	N/A
T_c	15.5	26	34	16	30.00
V	0.38	0.92	0.58	0.38	0.75
I_2	1.20	0.90	0.80	1.00	N/A
I_{10}	1.95	1.50	1.35	1.40	N/A
I_{25}	2.40	1.85	1.60	2.05	N/A
I_{50}	2.75	2.10	1.85	2.75	N/A
I_{100}	2.90	2.30	2.00	2.90	N/A
C_2	0.48	0.42	0.39	0.48	N/A
C_{10}	0.58	0.53	0.5	0.58	N/A
C_{25}	0.62	0.57	0.54	0.62	N/A
C_{50}	0.65	0.60	0.57	0.65	N/A
C_{100}	0.66	0.61	0.59	0.66	N/A
Q_2	**1.47**	**5.97**	**2.26**	**1.47**	**8.23**
Q_{10}	**2.88**	**12.55**	**4.90**	**2.88**	**17.45**
Q_{25}	**3.79**	**16.65**	**6.27**	**3.79**	**22.92**
Q_{50}	**4.55**	**19.90**	**7.65**	**4.55**	**27.55**
Q_{100}	**4.87**	**22.16**	**8.56**	**4.87**	**30.72**

A_{sf}	Area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Existing Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	Q_{XX}=C_{XX} x I_{XX} x A_{ac}

Hydrology - Proposed Conditions - Drainage to Western Infiltration Basin							
Variable	**D-1 and D-2**	**D-3 and D-4**	**D-5**	**D-6**	**D-7**	**D-8**	**Total**
A_{sf}	130,768	173,100	29,300	67,951	88,200	124,000	613,319
A_{ac}	3.002	3.974	0.673	1.560	2.025	2.847	14
A_p	31680	12450	0	10343	88200	0	142,673
A_i	99,088	160,650	29,300	57,608	0	124,000	470,646
$A_{\%i}$	0.76	0.93	1.00	0.85	0.00	1.00	N/A
L	240	235	240	315	0	450	N/A
H	31	10	3.5	4	0	6	N/A
T_c	6.49	7.37	7.26	8.18	5	8	N/A
V	0.62	0.53	0.55	0.64	0.00	0.94	N/A
I_2	1.80	1.75	1.75	1.75	2.05	1.65	N/A
I_{10}	2.55	2.80	2.80	2.8	3.3	2.65	N/A
I_{25}	3.7	3.4	3.4	3.4	4.1	3.2	N/A
I_{50}	4.2	3.9	3.9	3.9	4.6	3.7	N/A
I_{100}	4.55	4.2	4.2	4.2	4.9	4	N/A
C_2	0.85	0.88	0.90	0.86	0.65	0.90	N/A
C_{10}	0.87	0.89	0.90	0.87	0.74	0.90	N/A
C_{25}	0.88	0.89	0.90	0.88	0.77	0.90	N/A
C_{50}	0.88	0.89	0.90	0.88	0.79	0.90	N/A
C_{100}	0.88	0.89	0.90	0.88	0.80	0.90	N/A
Q_2	**4.60**	**6.11**	**1.06**	**2.34**	**2.70**	**4.23**	**18.85**
Q_{10}	**6.63**	**9.87**	**1.70**	**3.81**	**4.97**	**6.79**	**29.50**
Q_{25}	**9.73**	**12.01**	**2.06**	**4.65**	**6.43**	**8.20**	**37.75**
Q_{50}	**11.09**	**13.80**	**2.36**	**5.35**	**7.34**	**9.48**	**43.32**
Q_{100}	**12.03**	**14.87**	**2.54**	**5.77**	**7.89**	**10.25**	**46.82**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

*Total Runnof Rate is determined from calculations of conveyance, not summation of peak runoff rates.

Hydrology - Proposed Conditions - Drainage to Southern Sand-Filter Basin						
Variable	**D-9**	**D-10**	**D-11**	**D-12**	**D-13**	**Totals**
A_{sf}	91,475	91,475	68,900	50,588	68,420	370,858
A_{ac}	2.10	2.10	1.58	1.16	1.57	8.5
A_p	0	0	0	6100	68,420	74,520
A_i	91,475	91,475	68,900	44,488	0	296,338
$A_{\%i}$	1.00	1.00	1.00	0.88	0.00	0.80
T_c	9.63	8.68	9.73	8.14	5.00	N/A
I_2	1.75	1.75	1.55	1.7	2.05	N/A
I_{10}	2.80	2.80	2.5	2.7	3.3	N/A
I_{25}	3.4	3.4	3	3.35	4.1	N/A
I_{50}	3.9	3.9	3.45	3.85	4.6	N/A
I_{100}	4.2	4.2	3.7	4	4.9	N/A
C_2	0.90	0.90	0.90	0.86	0.65	N/A
C_{10}	0.90	0.90	0.90	0.88	0.74	N/A
C_{25}	0.90	0.90	0.90	0.88	0.77	N/A
C_{50}	0.90	0.90	0.90	0.88	0.79	N/A
C_{100}	0.90	0.90	0.90	0.88	0.80	N/A
Q_2	**3.31**	**3.31**	**2.21**	**1.71**	**2.09**	**12.62**
Q_{10}	**5.29**	**5.29**	**3.56**	**2.75**	**3.86**	**20.75**
Q_{25}	**6.43**	**6.43**	**4.27**	**3.43**	**4.99**	**25.54**
Q_{50}	**7.37**	**7.37**	**4.91**	**3.95**	**5.70**	**29.30**
Q_{100}	**7.94**	**7.94**	**5.27**	**4.11**	**6.12**	**31.37**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

CONCLUSION:

The proposed expansion creates a significant increase in the downstream runoff due to the fact that the project site is being transformed from a completely undeveloped area to a developed-commercial site, but in order to minimize the downstream flow rates multiple basins and treatment BMPs are incorporated.

These elements include porous landscape detention (PLD) areas throughout the parking lot, an infiltration basin, and sand-filter basin. Proper sizing of these treatment control BMPs are included within the *Water Quality Management Plan*, which proves the PLDs are capable of treating the runoff and volume associated with 2-year and 10-year storm events.

The infiltration basin is capable of handling the runoff and volume of a 100-year storm, which is shown below in Table A. This basin collects a large portion of drainage from the parking lot area and has storage of 1145.76 CY at a depth of 1 foot, which is larger than the required peak volume of approximately 1000 CY.

Table A: Volume Capacity of Infiltration Basin

WSE (ft)	1391	1391.25	1391.50	1391.75	1392	1392.25	1392.50
Basin Depth (ft)	0	0.25	0.5	0.75	1	1.25	1.5
Surface Area (SF)	29,500	30,200	30,900	31,675	32,425	33,200	33,950
Volume (CY)	0	276.16	559.13	848.98	1145.76	1449.53	1760.36

The sand-filter basin towards the southern limits of the project site treats 2-year and 10-year 24-hour storms events, as described in the *Water Quality Management Plan*. Table B shows the basin is capable of containing the 100-year storm event, peak volume of 667 CY.

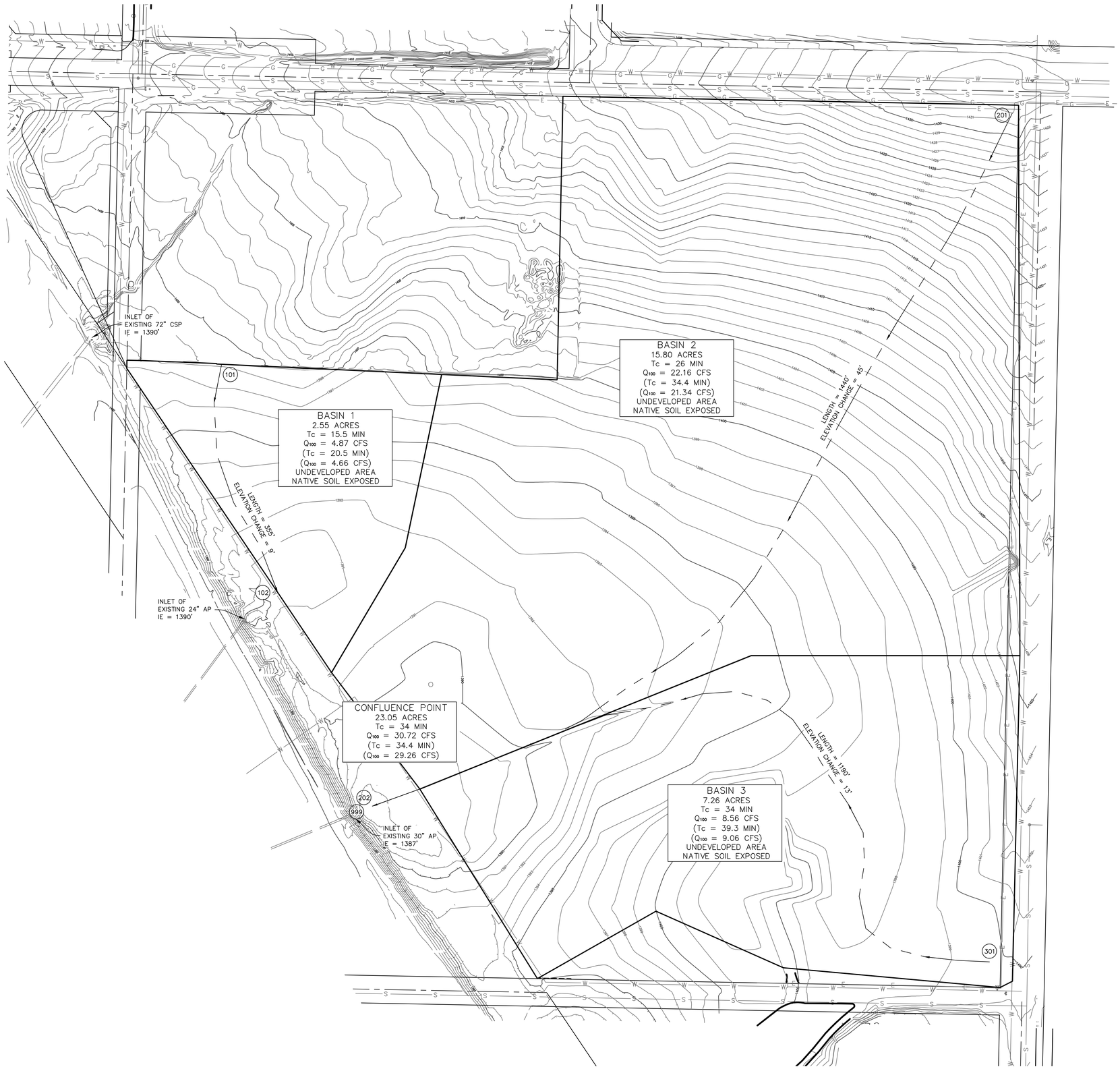
Table B: Volume Capacity of Sand-Filter Basin

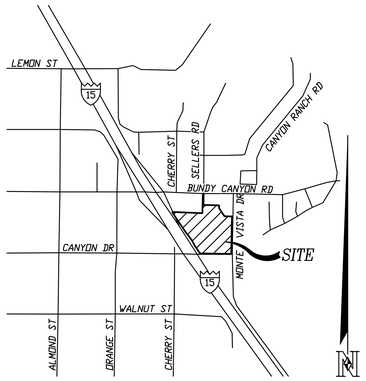
WSE (ft)	1394.00	1394.50	1395.00	1395.50	1396.00	1396.50	1397.00	1397.50	1398.00
Basin Depth (ft)	0	0.5	1	1.5	2	2.5	3	3.5	4
Surface Area (SF)	4,025	4,765	5,530	6,325	7,140	7,980	8,850	9,740	10,660
Volume (CY)	0	81.11	176.09	285.39	409.43	548.68	703.56	874.61	1062.34

Additionally, both basins include a 24”x24” catch basin to limit the downstream flow rates to below existing conditions, which is proven by the AES outputs and in the above section - “Summary of Results”.

APPENDIX A

EXISTING BASIN CONDITIONS
25, 50, 100 YEAR EVENTS





VICINITY MAP

NO SCALE

LEGEND:

Tc = 8.0 MIN
Q_{100} = 20 CFS — RATIONAL METHOD HAND CALCULATION

(Tc = 7.0 MIN)
(Q_{100} = 18 CFS) — AES CALCULATION

(101) — AES RELATED NODE NUMBER

N

DRAINAGE MANAGEMENT AREAS FOR EXISTING CONDITIONS

60 0 60 120 180 240

SCALE 1" = 60'

REVISIONS BY

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#3882-02 WILDOMAR, CA WALMART
CITY WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA
WALMART STORES, INC.
BENTONVILLE, AR

DRAWN	SH
CHECKED	PR
DATE	05/07/2014
SCALE	AS SHOWN
JOB No.	310-040.1
SHEET	EX-01

1 OF 2 SHEET

RATIONAL METHOD CALCULATIONS:

Hydrology - Existing Conditions					
Variable	**Basin 1**	**Basin 2**	**Basin 3**	**24" AP**	**30" AP**
A_{sf}	110,882	687,910	316,120	110,882	1,004,030
A_{ac}	2.546	15.792	7.257	2.55	23.05
A_p	110882	687910	316120	110,882	1,004,030
A_i	0	0	0	0	0
$A_{\%i}$	0.00	0.00	0.00	0.00	0.00
L	355	1440	1190	355	N/A
H	9	45	13	9	N/A
T_c	15.5	26	34	16	30.00
V	0.38	0.92	0.58	0.38	0.75
I_2	1.20	0.90	0.80	1.00	N/A
I_{10}	1.95	1.50	1.35	1.40	N/A
I_{25}	2.40	1.85	1.60	2.05	N/A
I_{50}	2.75	2.10	1.85	2.75	N/A
I_{100}	2.90	2.30	2.00	2.90	N/A
C_2	0.48	0.42	0.39	0.48	N/A
C_{10}	0.58	0.53	0.5	0.58	N/A
C_{25}	0.62	0.57	0.54	0.62	N/A
C_{50}	0.65	0.60	0.57	0.65	N/A
C_{100}	0.66	0.61	0.59	0.66	N/A
Q_2	**1.47**	**5.97**	**2.26**	**1.47**	**8.23**
Q_{10}	**2.88**	**12.55**	**4.90**	**2.88**	**17.45**
Q_{25}	**3.79**	**16.65**	**6.27**	**3.79**	**22.92**
Q_{50}	**4.55**	**19.90**	**7.65**	**4.55**	**27.55**
Q_{100}	**4.87**	**22.16**	**8.56**	**4.87**	**30.72**

A_{sf}	Area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Existing Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	Q_{XX}=C_{XX} x I_{XX} x A_{ac}

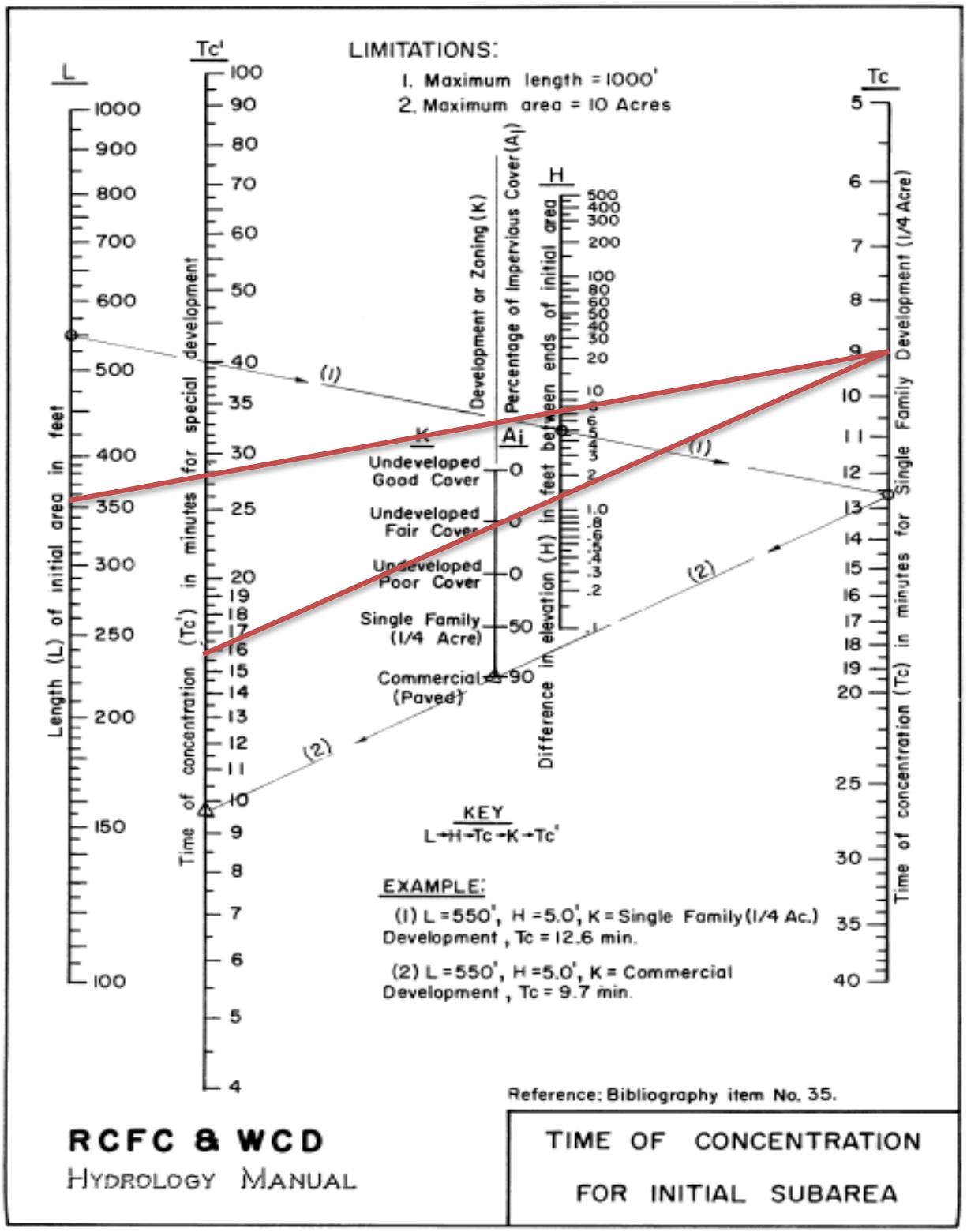

PLATE D-3

BASIN 1

ADVANCED ENGINEERING SOFTWARE (AES) SUMMARY AND OUTPUT

Discharge Point #1 (24" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	3.79	3.43
Q_{50} (cfs)	4.55	4.08
Q_{100} (cfs)	4.87	4.66

Discharge Point #2 (30" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	22.92	21.27
Q_{50} (cfs)	27.55	25.52
Q_{100} (cfs)	30.72	29.26

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                        BASIN 1 - 25 YEAR STORM EVENT

----------------------------------------------------------------------------
  FILE NAME: EXIST25.DAT
  TIME/DATE OF STUDY: 14:22 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  UPSTREAM ELEVATION(FEET) =   1399.00
  DOWNSTREAM ELEVATION(FEET) =   1390.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  TC = 0.937*[(  355.00**3)/(     9.00)]**.2 =   20.475
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.952
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6886
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      2.55   TOTAL RUNOFF(CFS) =      3.43
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     20.47
  PEAK FLOW RATE(CFS)   =       3.43
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
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                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                        BASIN 1 - 50 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST50.DAT
  TIME/DATE OF STUDY: 14:23 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  UPSTREAM ELEVATION(FEET) =   1399.00
  DOWNSTREAM ELEVATION(FEET) =   1390.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  TC = 0.937*[(  355.00**3)/(     9.00)]**.2 =   20.475
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.252
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7109
```

```
****************************************************************************
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                  Release Date: 04/01/2008  License ID 1421

                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                       BASIN 1 - 100 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST100.DAT
  TIME/DATE OF STUDY: 14:23 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  UPSTREAM ELEVATION(FEET) =   1399.00
  DOWNSTREAM ELEVATION(FEET) =   1390.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  TC = 0.937*[(  355.00**3)/(     9.00)]**.2 =   20.475
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.513
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7268
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.66
  TOTAL AREA(ACRES) =      2.55   TOTAL RUNOFF(CFS) =      4.66
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     20.47
  PEAK FLOW RATE(CFS)   =       4.66
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.08
  TOTAL AREA(ACRES) =      2.55   TOTAL RUNOFF(CFS) =      4.08
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     20.47
  PEAK FLOW RATE(CFS)   =       4.08
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

               BASIN 2 AND 3 CONVEYANCE - 25 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST2-25.DAT
  TIME/DATE OF STUDY: 14:32 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1440.00
  UPSTREAM ELEVATION(FEET) =   1432.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.937*[( 1440.00**3)/(    45.00)]**.2 =   34.380
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.522
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6458
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     15.53
  TOTAL AREA(ACRES) =     15.80   TOTAL RUNOFF(CFS) =     15.53

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 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.) =   34.38
  RAINFALL INTENSITY(INCH/HR) =   1.52
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.53

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1400.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.937*[( 1190.00**3)/(    13.00)]**.2 =   39.307
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.427
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6339
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.57
  TOTAL AREA(ACRES) =      7.26   TOTAL RUNOFF(CFS) =      6.57

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    203.00 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.) =   39.31
  RAINFALL INTENSITY(INCH/HR) =   1.43
  TOTAL STREAM AREA(ACRES) =     7.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.57

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.53    34.38        1.522         15.80
      2        6.57    39.31        1.427          7.26

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.27    34.38       1.522
      2       21.13    39.31       1.427
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.27   Tc(MIN.) =   34.38
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       23.1  TC(MIN.) =     34.38
  PEAK FLOW RATE(CFS)   =      21.27
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       21.27      34.38
  2       21.13      39.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                BASIN 2 AND 3 CONVEYANCE - 50 YEAR STORM EVENT

----------------------------------------------------------------------------
  FILE NAME: EXIST2-50.DAT
  TIME/DATE OF STUDY: 14:33 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1440.00
  UPSTREAM ELEVATION(FEET) =   1432.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.937*[( 1440.00**3)/(    45.00)]**.2 =   34.380
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.756
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6711
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =     18.62
  TOTAL AREA(ACRES) =     15.80   TOTAL RUNOFF(CFS) =     18.62

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 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.) =   34.38
  RAINFALL INTENSITY(INCH/HR) =   1.76
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.62

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1400.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.937*[( 1190.00**3)/(    13.00)]**.2 =   39.307
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.647
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6599
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.89
  TOTAL AREA(ACRES) =      7.26   TOTAL RUNOFF(CFS) =      7.89

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    203.00 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.) =   39.31
  RAINFALL INTENSITY(INCH/HR) =   1.65
  TOTAL STREAM AREA(ACRES) =     7.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.62    34.38        1.756         15.80
      2        7.89    39.31        1.647          7.26

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       25.52    34.38       1.756
      2       25.35    39.31       1.647

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.52   Tc(MIN.) =   34.38
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       23.1  TC(MIN.) =     34.38
  PEAK FLOW RATE(CFS)   =      25.52
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       25.52      34.38
  2       25.35      39.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

               BASIN 2 AND 3 CONVEYANCE - 100 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST2-100.DAT
  TIME/DATE OF STUDY: 14:34 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1440.00
  UPSTREAM ELEVATION(FEET) =   1432.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.937*[( 1440.00**3)/(    45.00)]**.2 =   34.380
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.960
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6893
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     21.34
  TOTAL AREA(ACRES) =     15.80   TOTAL RUNOFF(CFS) =     21.34

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 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.) =   34.38
  RAINFALL INTENSITY(INCH/HR) =   1.96
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.34

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1400.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.937*[( 1190.00**3)/(    13.00)]**.2 =   39.307
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.838
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6787
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      9.06
  TOTAL AREA(ACRES) =      7.26   TOTAL RUNOFF(CFS) =      9.06

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    203.00 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.) =   39.31
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =     7.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.06

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.34    34.38        1.960         15.80
      2        9.06    39.31        1.838          7.26

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       29.26    34.38       1.960
      2       29.07    39.31       1.838
```

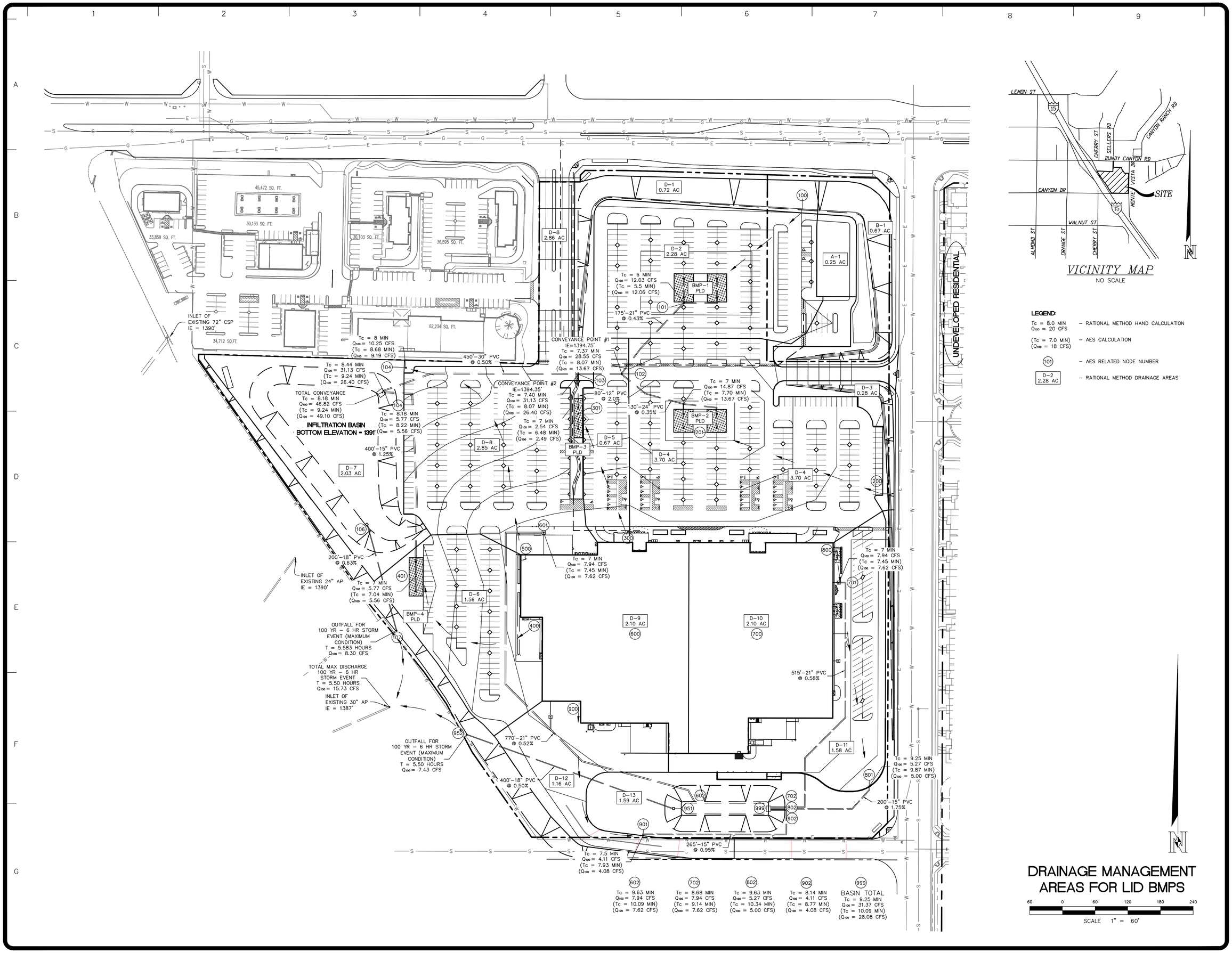
```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.26   Tc(MIN.) =   34.38
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       23.1  TC(MIN.) =     34.38
  PEAK FLOW RATE(CFS)   =      29.26
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       29.26      34.38
  2       29.07      39.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

APPENDIX B

PROPOSED BASIN CONDITIONS
25, 50, 100 YEAR EVENTS

RESULTS FROM ADVANCED ENGINEERING SOFTWARE (AES) OUTPUTS AND HAND CALCULATED RATIONAL METHOD ANALYSIS



REVISIONS	BY

NASLAND ENGINEERING
CIVIL ENGINEERING • SURVEYING • LAND PLANNING
4740 Ruffner Street, San Diego, California, 92111 • 858-292-7770

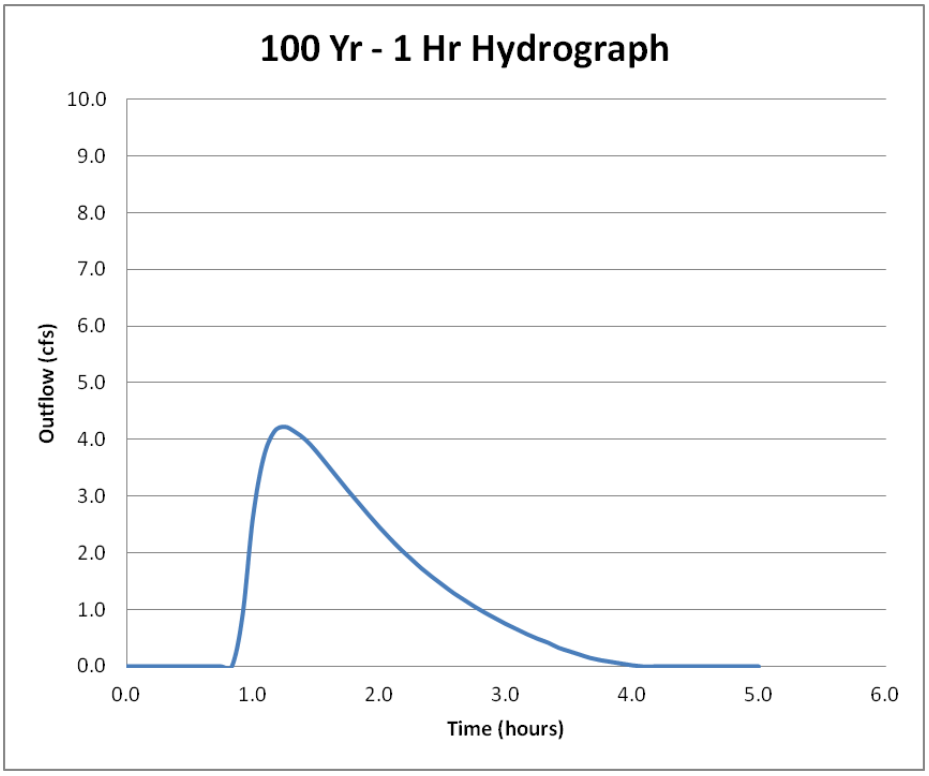
#3882-02 WILDOMAR, CA WALMART
CITY WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA
WALMART STORES, INC.
BENTONVILLE, AR

DRAWN	SH
CHECKED	PR
DATE	05/09/2014
SCALE	AS SHOWN
JOB No.	310-040.1
SHEET	EX-02

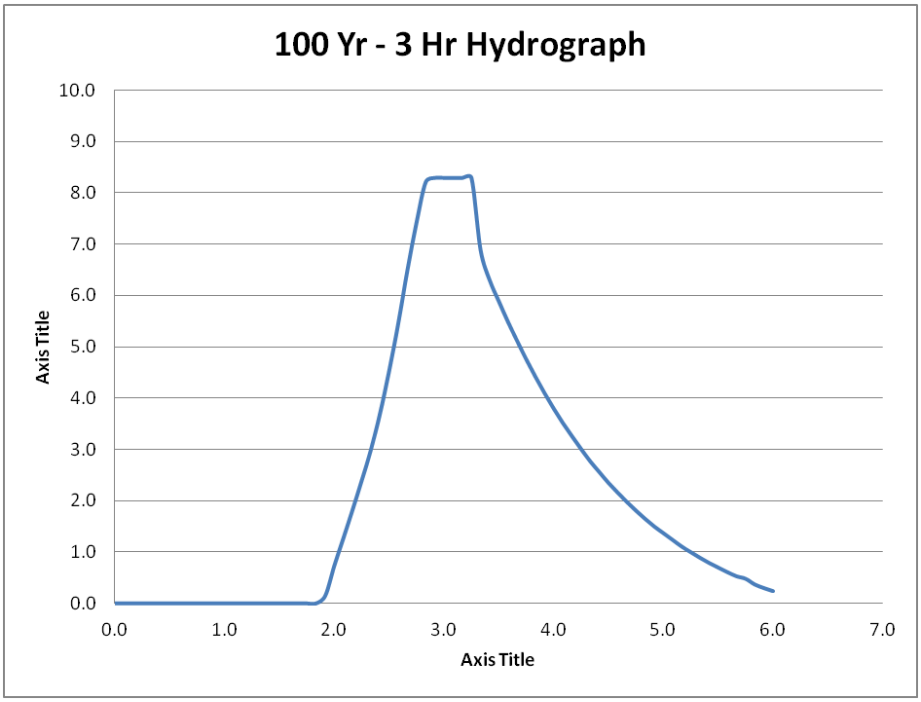
2 OF 2 SHEET

INFILTRATION BASIN DISCHARGE HYDROGRAPHS:

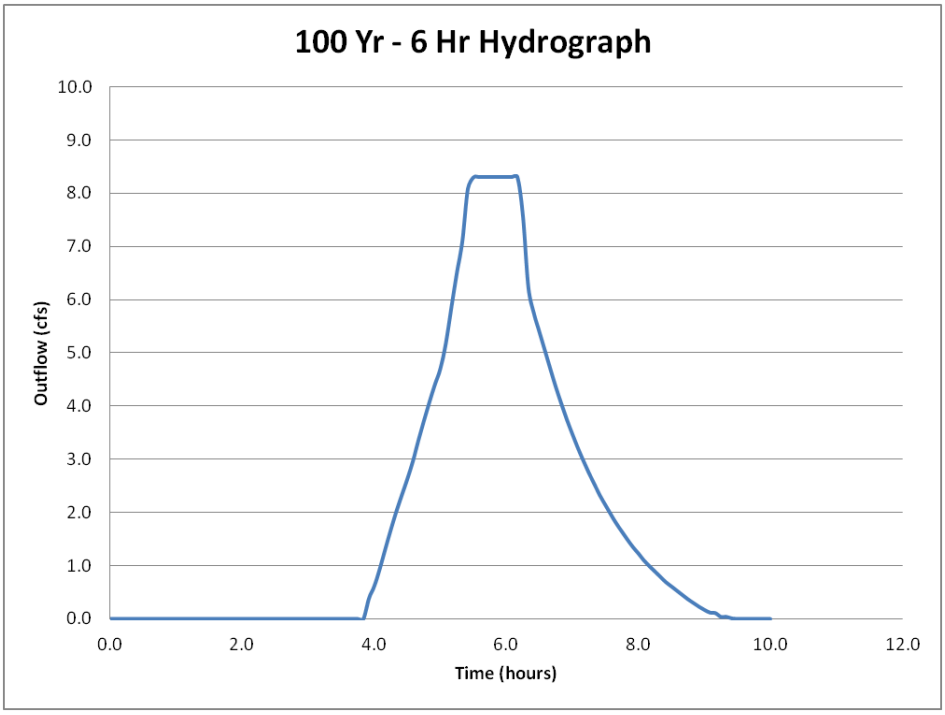
100 YR – 1 HR STORM EVENT: MAX Q = 4.23 CFS AT 1.250 HOURS



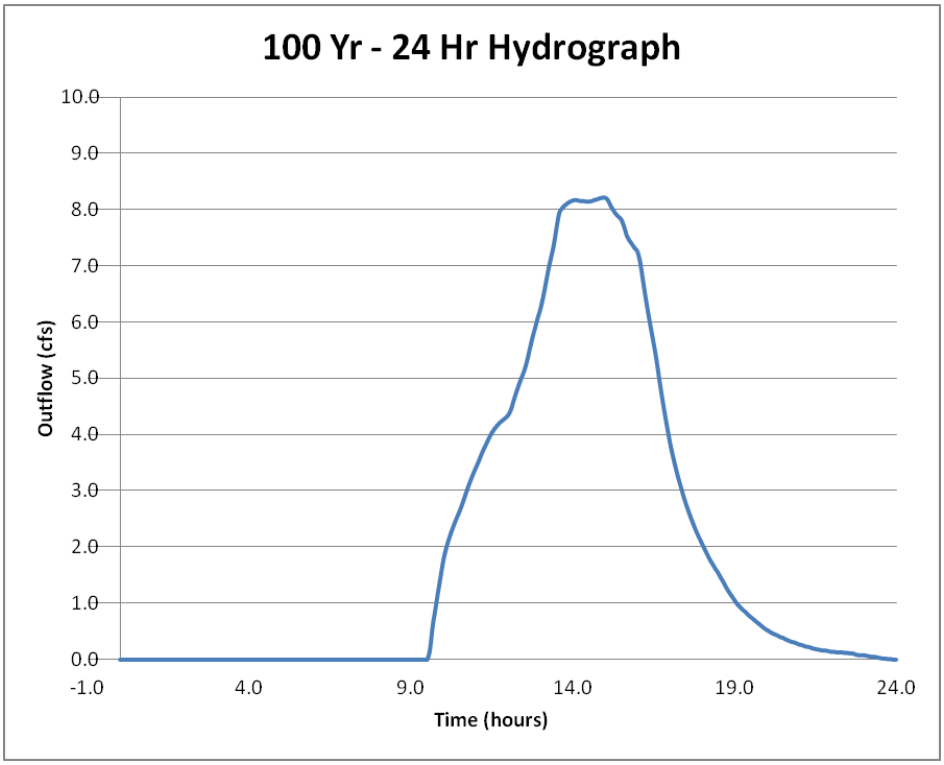
100 YR – 3 HR STORM EVENT: MAX Q = 8.30 CFS AT 3.00 HOURS



100 YR – 6 HR STORM EVENT: MAX Q = 8.30 CFS AT 5.583 HOURS



100 YR – 24 HR STORM EVENT: MAX Q = 8.22 CFS AT 15.000 HOURS



DRAINAGE AREAS DIRECTED TOWARDS INFILTRATION BASIN ON WESTERN LIMITS OF PROJECT SITE (RATIONAL METHOD):

Hydrology - Proposed Conditions - Drainage to Western Infiltration Basin							
Variable	**D-1 and D-2**	**D-3 and D-4**	**D-5**	**D-6**	**D-7**	**D-8**	**Total**
A_{sf}	130,768	173,100	29,300	67,951	88,200	124,000	613,319
A_{ac}	3.002	3.974	0.673	1.560	2.025	2.847	14
A_p	31680	12450	0	10343	88200	0	142,673
A_i	99,088	160,650	29,300	57,608	0	124,000	470,646
$A_{\%i}$	0.76	0.93	1.00	0.85	0.00	1.00	N/A
L	240	235	240	315	0	450	N/A
H	31	10	3.5	4	0	6	N/A
T_c	6.49	7.37	7.26	8.18	5	8	N/A
V	0.62	0.53	0.55	0.64	0.00	0.94	N/A
I_2	1.80	1.75	1.75	1.75	2.05	1.65	N/A
I_{10}	2.55	2.80	2.80	2.8	3.3	2.65	N/A
I_{25}	3.7	3.4	3.4	3.4	4.1	3.2	N/A
I_{50}	4.2	3.9	3.9	3.9	4.6	3.7	N/A
I_{100}	4.55	4.2	4.2	4.2	4.9	4	N/A
C_2	0.85	0.88	0.90	0.86	0.65	0.90	N/A
C_{10}	0.87	0.89	0.90	0.87	0.74	0.90	N/A
C_{25}	0.88	0.89	0.90	0.88	0.77	0.90	N/A
C_{50}	0.88	0.89	0.90	0.88	0.79	0.90	N/A
C_{100}	0.88	0.89	0.90	0.88	0.80	0.90	N/A
Q_2	**4.60**	**6.11**	**1.06**	**2.34**	**2.70**	**4.23**	**18.85**
Q_{10}	**6.63**	**9.87**	**1.70**	**3.81**	**4.97**	**6.79**	**29.50**
Q_{25}	**9.73**	**12.01**	**2.06**	**4.65**	**6.43**	**8.20**	**37.75**
Q_{50}	**11.09**	**13.80**	**2.36**	**5.35**	**7.34**	**9.48**	**43.32**
Q_{100}	**12.03**	**14.87**	**2.54**	**5.77**	**7.89**	**10.25**	**46.82**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

*Total Runnof Rate is determined from calculations of conveyance, not summation of peak runoff rates.

NOTE: Total flow quantities represent discharge into the basin area. Hydrographs in above pages show the maximum flow rate discharged from the basin into the existing downstream system.

TIME OF CONCENTRATION ADJUSTMENTS FOR SHEET AND PIPE FLOW:

Sheet Flow					
Basin	Description	L (ft)	Delta (ft)	Slope (%)	Ti (min)
D-1 / 2	Pavement/Land	180	3	1.67	6
D-3 / 4	Pavement/Land	305	5	1.64	7
D-5	Pavement	240	3.5	1.46	7
D-6	Pavement	315	5	1.27	7
D-7*	Landscape	-	-	-	5
D-8	Pavement	450	6	1.33	8

*D-7 time of concrentation assumed as minimum of 5 minutes.

Channelized Flow					
Basin	Description	L (ft)	Slope (%)	V (fps)	Ti (min)
D-1 / 2	Pipe Flow (21")	175	0.43	6.01	0.49
D-3 / 4	Pipe Flow (24")	130	0.35	5.81	0.37
D-5	Pipe Flow (12")	80	2	5.14	0.26
Convey #2	Pipe Flow (30")	400	0.5	6.38	1.04
D-6	Pipe Flow (15")	400	1.25	5.66	1.18

ADJUSTMENTS FOR CONVEYANCE OF SEPARATE STREAMS:

Conveyance Calculations for 100-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	12.03	14.87	7.37292	28.55
2	Above and D-5	7.259403	7.37292	2.54	28.55	7.37292	31.13
3	Add D-6	8.18	7.37292	5.77	31.13	8.177856	36.34
4	Add D-8	8	8.177856	10.25	36.34	8.177856	46.82

Conveyance Calculations for 50-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	11.09	13.80	7.37292	26.40
2	Above and D-5	7.259403	7.37292	2.36	26.40	7.37292	28.80
3	Add D-6	8.18	7.37292	5.35	28.80	8.177856	33.63
4	Add D-8	8	8.177856	9.48	33.63	8.177856	43.32

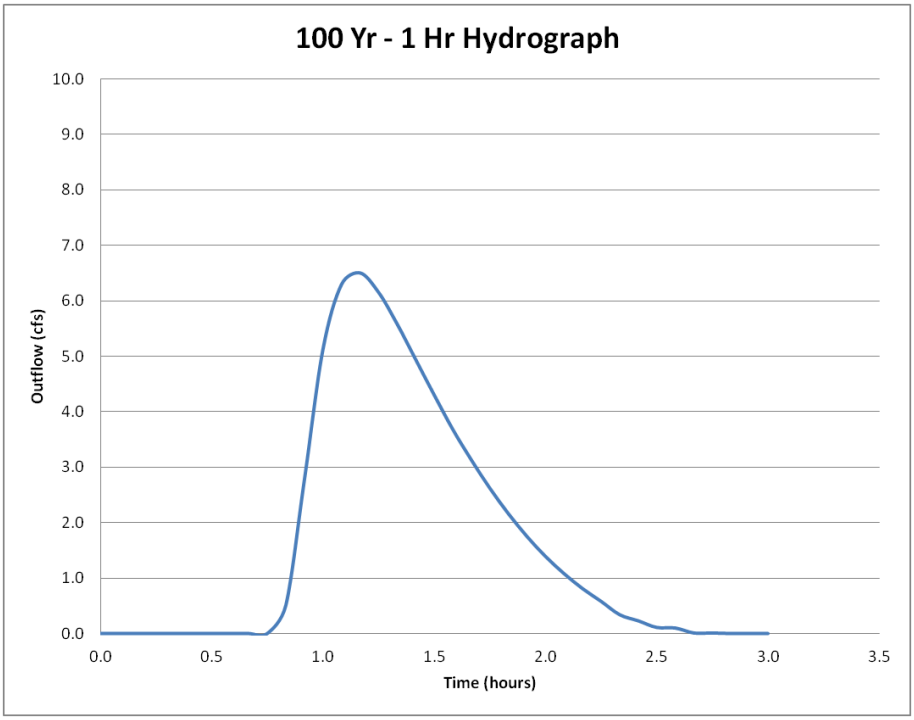
Conveyance Calculations for 25-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	9.73	12.01	7.37292	23.08
2	Above and D-5	7.259403	7.37292	2.06	23.08	7.37292	25.17
3	Add D-6	8.18	7.37292	4.65	25.17	8.177856	29.36
4	Add D-8	8	8.177856	8.20	29.36	8.177856	37.75

Conveyance Calculations for 10-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	6.63	9.87	7.37292	17.40
2	Above and D-5	7.259403	7.37292	1.70	17.40	7.37292	19.12
3	Add D-6	8.18	7.37292	3.81	19.12	8.177856	22.56
4	Add D-8	8	8.177856	6.79	22.56	8.177856	29.50

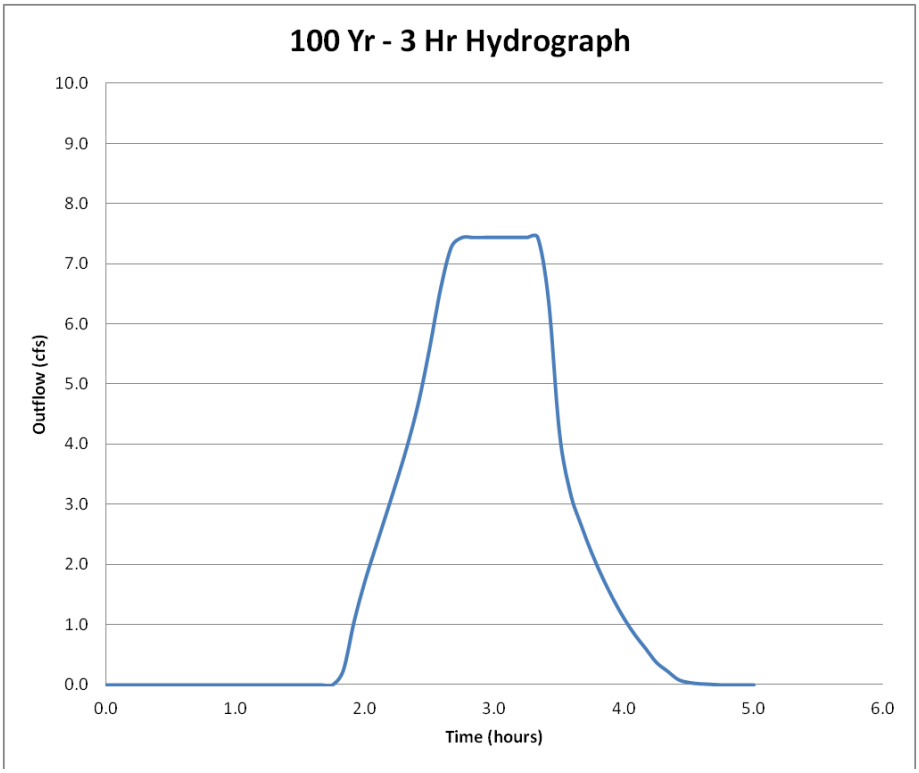
Conveyance Calculations for 2-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	4.60	6.11	7.37292	11.34
2	Above and D-5	7.259403	7.37292	1.06	11.34	7.37292	12.42
3	Add D-6	8.18	7.37292	2.34	12.42	8.177856	14.52
4	Add D-8	8	8.177856	4.23	14.52	8.177856	18.85

SAND-FILTER BASIN DISCHARGE HYDROGRAPHS:

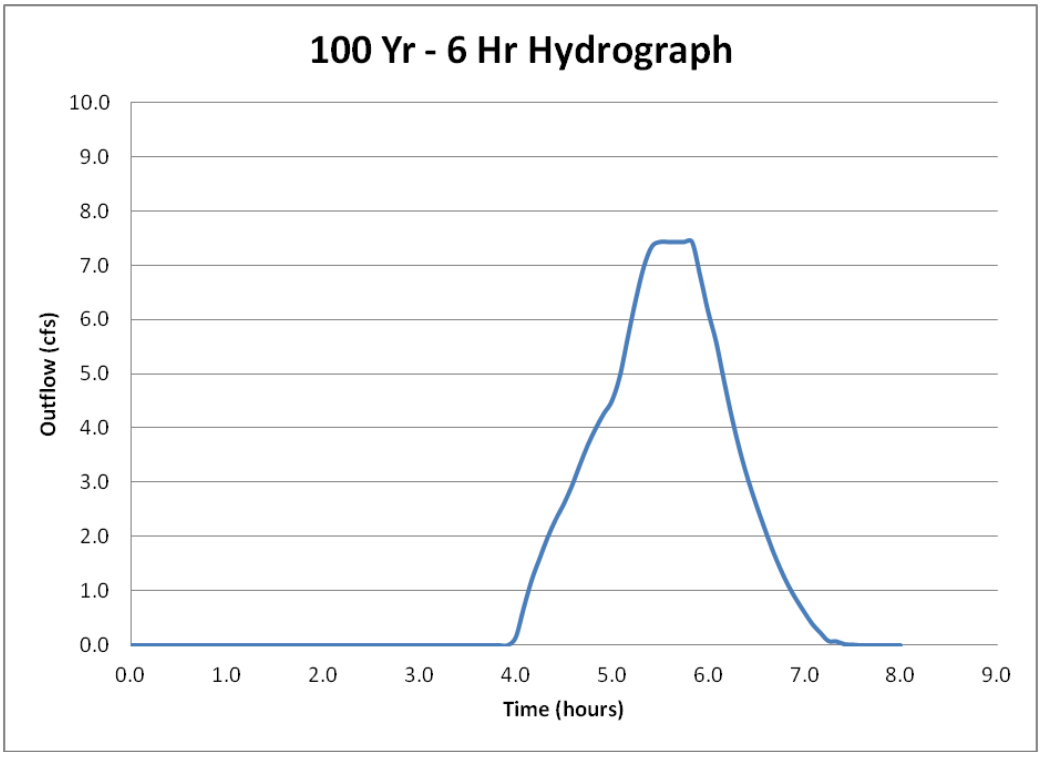
100 YR – 1 HR STORM EVENT: MAX Q = 6.50 CFS AT 1.167 HOURS



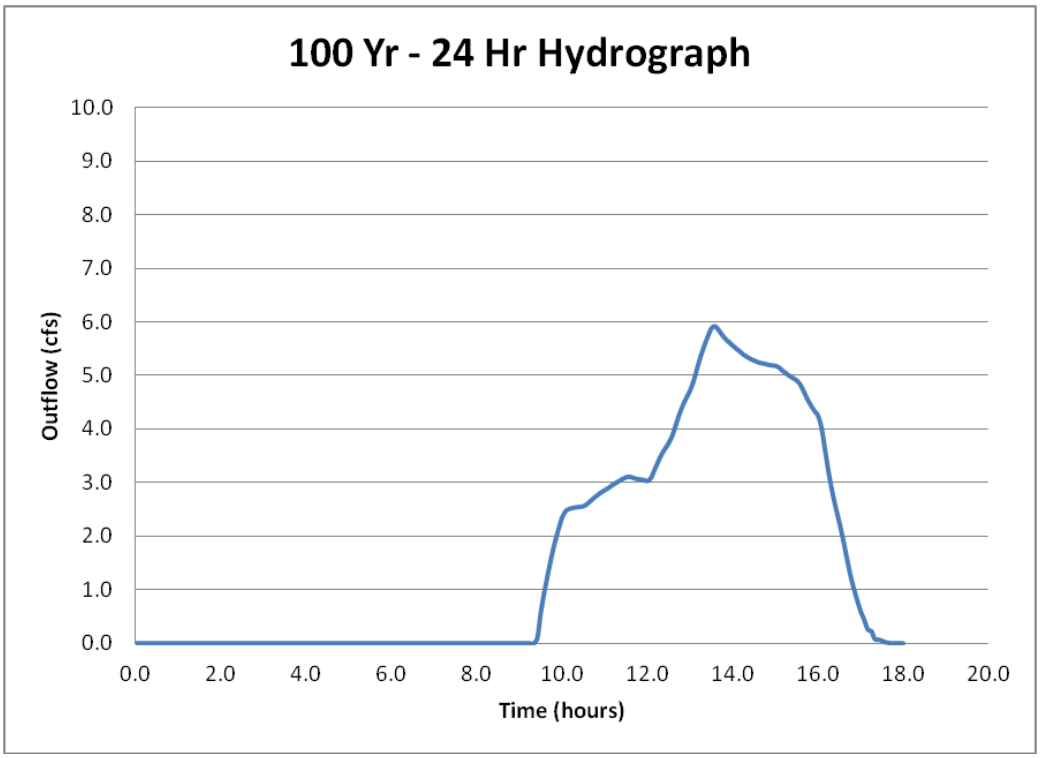
100 YR – 3 HR STORM EVENT: MAX Q = 7.43 CFS AT 2.750 HOURS



100 YR – 6 HR STORM EVENT: MAX Q = 7.43 CFS AT 5.500 HOURS



100 YR – 24 HR STORM EVENT: MAX Q = 5.92 CFS AT 13.583 HOURS



DRAINAGE AREAS DIRECTED TOWARDS SAND-FILTER BASIN ON SOUTHERN LIMITS OF PROJECT SITE (RATIONAL METHOD):

Hydrology - Proposed Conditions - Drainage to Southern Sand-Filter Basin						
Variable	**D-9**	**D-10**	**D-11**	**D-12**	**D-13**	**Totals**
A_{sf}	91,475	91,475	68,900	50,588	68,420	370,858
A_{ac}	2.10	2.10	1.58	1.16	1.57	8.5
A_p	0	0	0	6100	68,420	74,520
A_i	91,475	91,475	68,900	44,488	0	296,338
$A_{\%i}$	1.00	1.00	1.00	0.88	0.00	0.80
T_c	9.63	8.68	9.73	8.14	5.00	N/A
I_2	1.75	1.75	1.55	1.7	2.05	N/A
I_{10}	2.80	2.80	2.5	2.7	3.3	N/A
I_{25}	3.4	3.4	3	3.35	4.1	N/A
I_{50}	3.9	3.9	3.45	3.85	4.6	N/A
I_{100}	4.2	4.2	3.7	4	4.9	N/A
C_2	0.90	0.90	0.90	0.86	0.65	N/A
C_{10}	0.90	0.90	0.90	0.88	0.74	N/A
C_{25}	0.90	0.90	0.90	0.88	0.77	N/A
C_{50}	0.90	0.90	0.90	0.88	0.79	N/A
C_{100}	0.90	0.90	0.90	0.88	0.80	N/A
Q_2	**3.31**	**3.31**	**2.21**	**1.71**	**2.09**	**12.62**
Q_{10}	**5.29**	**5.29**	**3.56**	**2.75**	**3.86**	**20.75**
Q_{25}	**6.43**	**6.43**	**4.27**	**3.43**	**4.99**	**25.54**
Q_{50}	**7.37**	**7.37**	**4.91**	**3.95**	**5.70**	**29.30**
Q_{100}	**7.94**	**7.94**	**5.27**	**4.11**	**6.12**	**31.37**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

NOTE: Total flow quantities represent discharge into the basin area. Hydrographs in above pages show the maximum flow rate discharged from the basin into the existing downstream system.

TIME OF CONCENTRATION ADJUSTMENTS FOR SHEET AND PIPE FLOW:

Sheet Flow					
Basin	Description	L (ft)	Delta (ft)	Slope (%)	Ti (min)
D-9	Roof	300	3	1.00	7
D-10	Roof	300	3	1.00	7
D-11	Pavement	450	3.5	0.78	9.25
D-12	Pavement	350	3.5	1.00	7.5
D-13	Landscaping	-	-	-	5

*D-10 time of concrentation assumed as minimum of 5 minutes.

Channelized Flow					
Basin	Description	L (ft)	Slope (%)	Velocity (f	Ti (min)
D-9	Pipe Flow (21")	770	0.52	4.88	2.6297814
D-10	Pipe Flow (21")	515	0.58	5.1	1.6830065
D-11	Pipe Flow (15")	200	1.75	6.95	0.4796163
D-12	Pipe Flow (15")	265	1.75	6.95	0.6354916

TIME OF CONCENTRATION FOR INDIVIDUAL BASIN AREAS

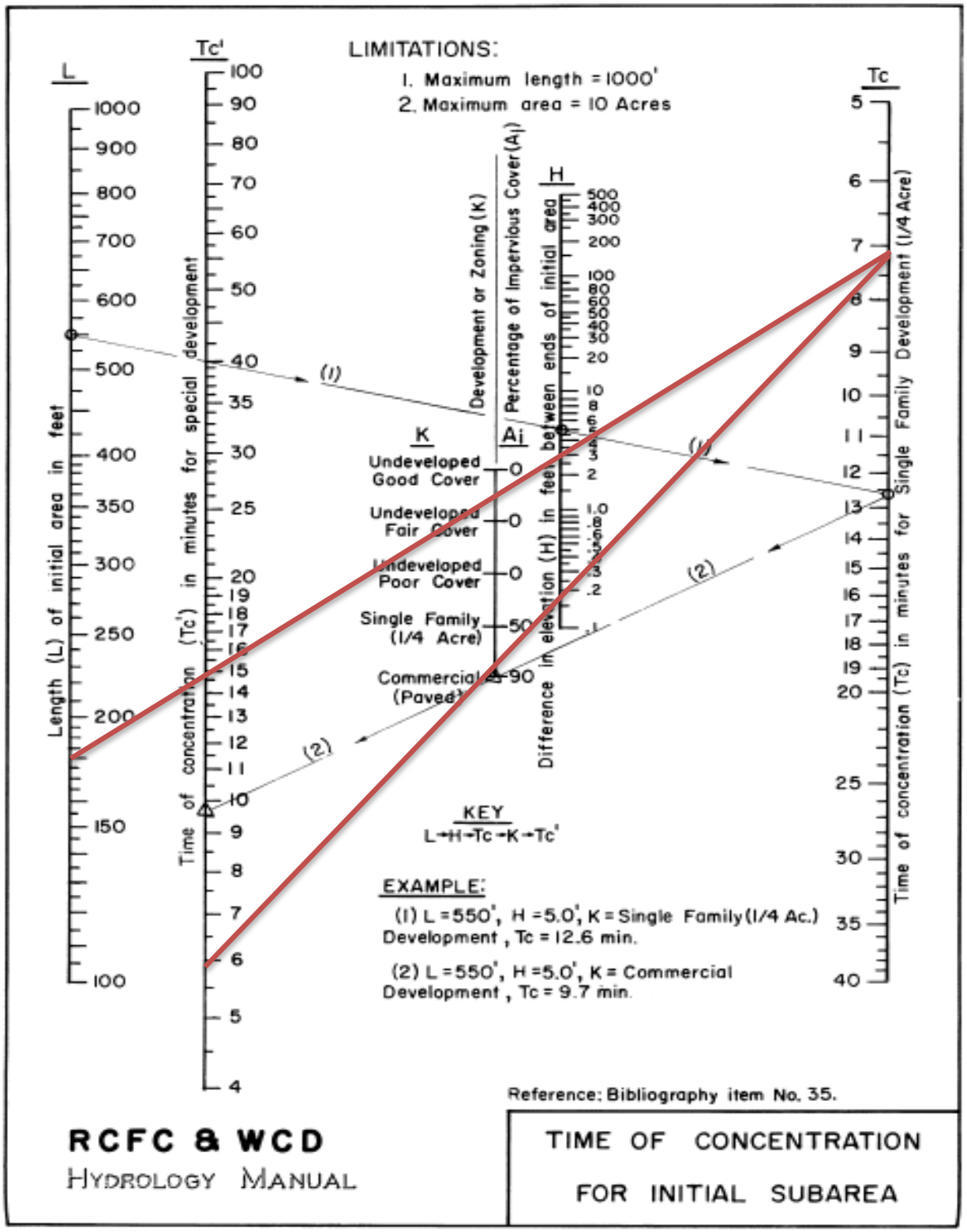


PLATE D-3

BASIN D-1 AND D-2

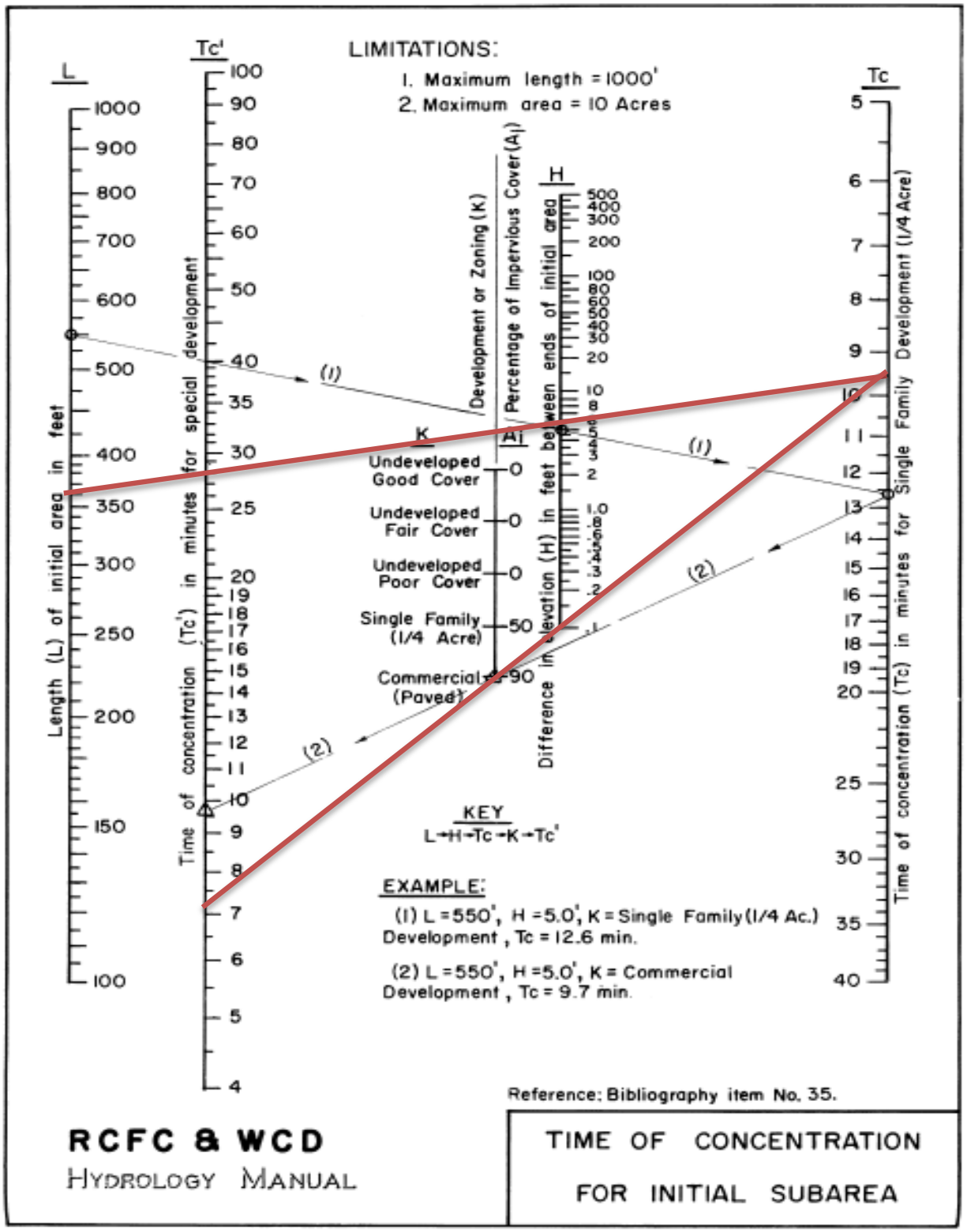


PLATE D-3

BASIN D-3 AND D-4

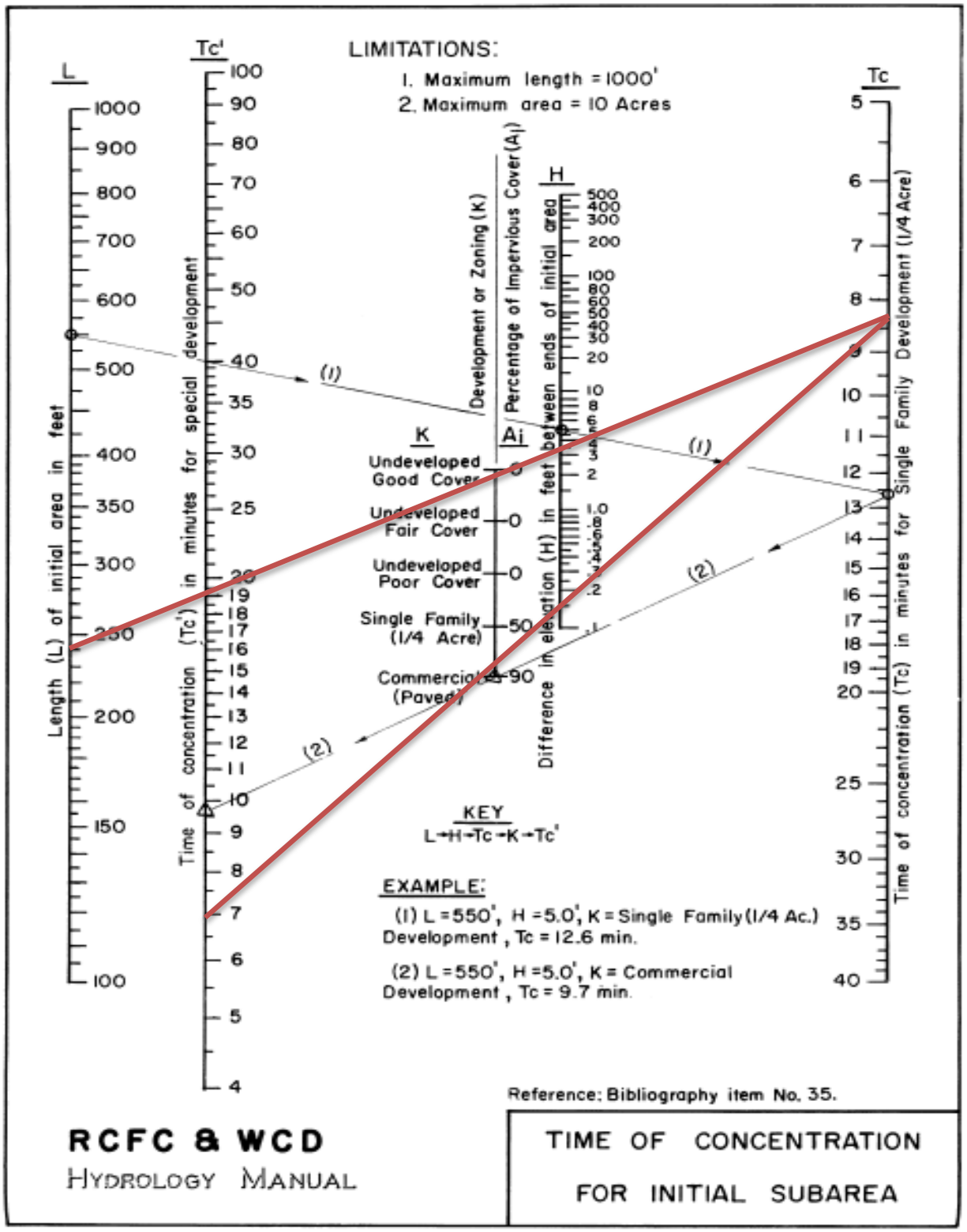


PLATE D-3

BASIN D-5

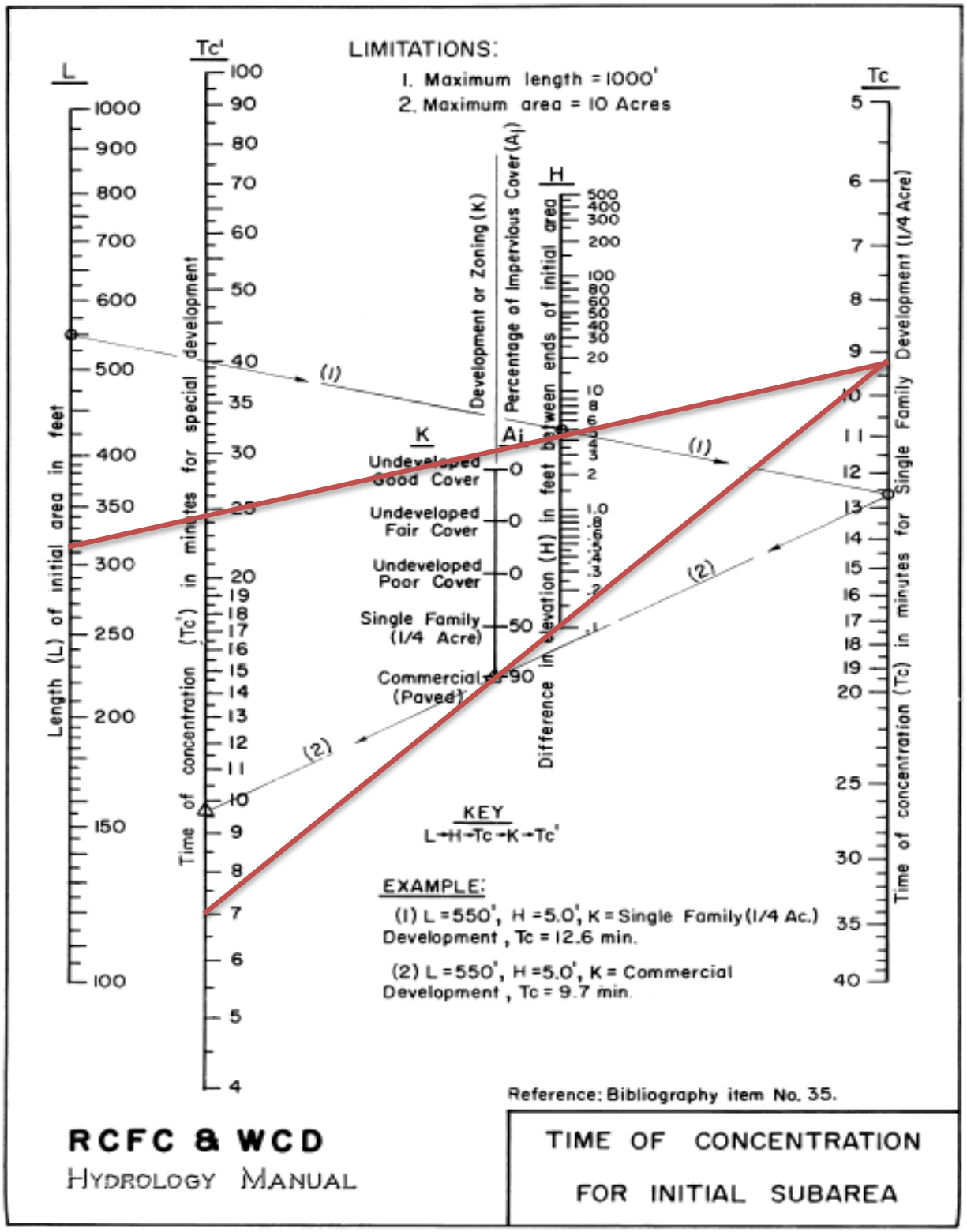


PLATE D-3

BASIN D-6

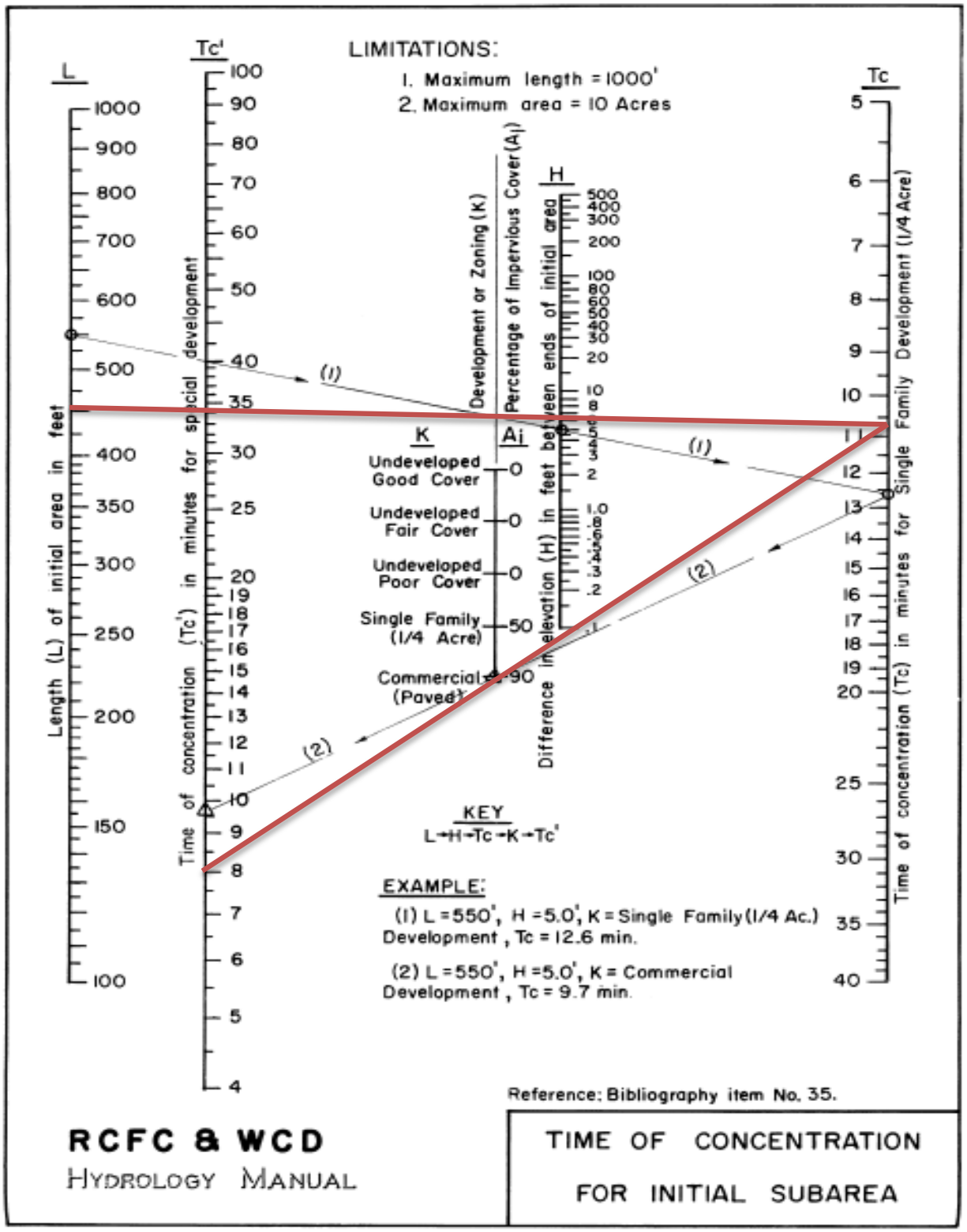


PLATE D-3

BASIN D-8

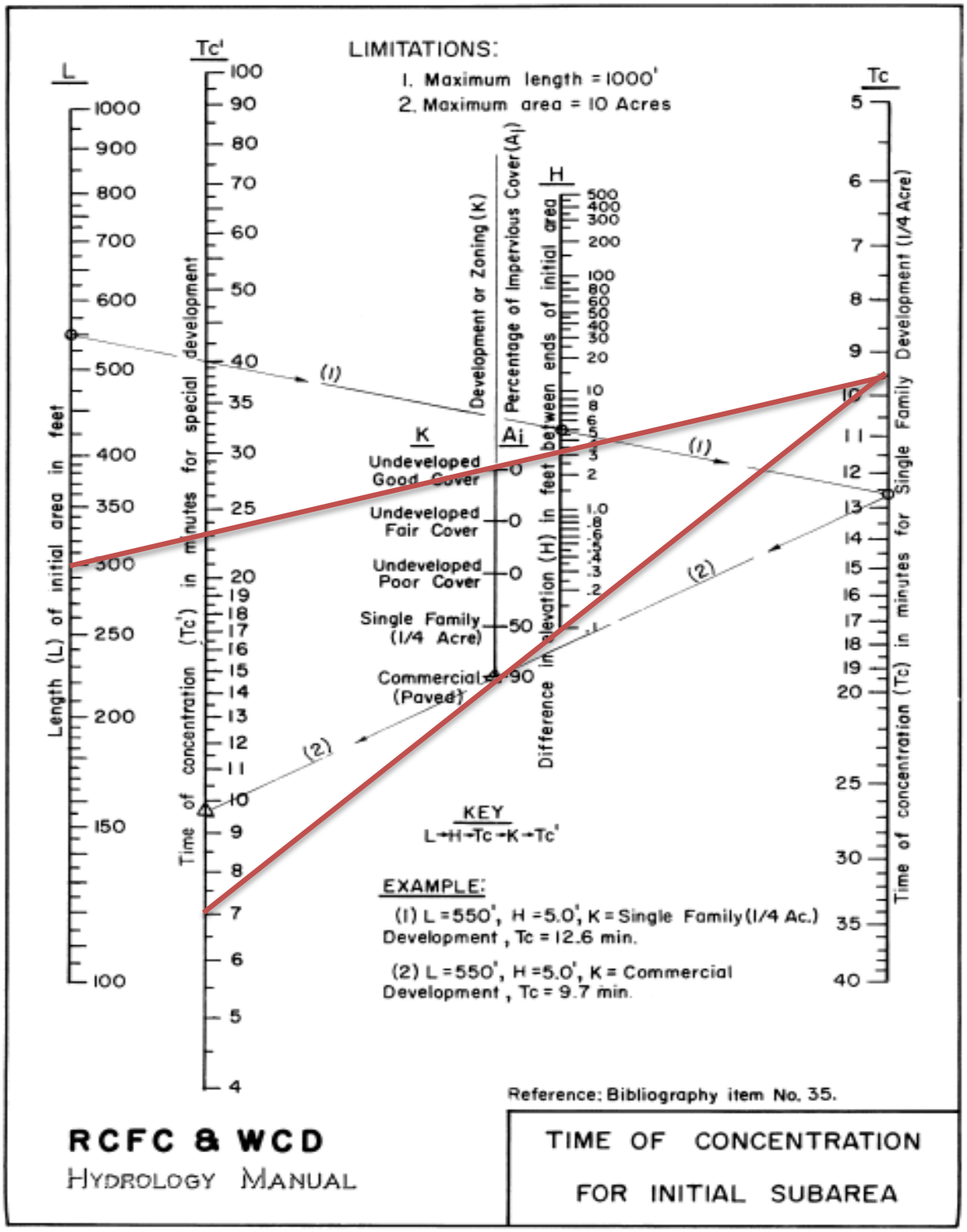


PLATE D-3

BASIN D-9 AND D-10

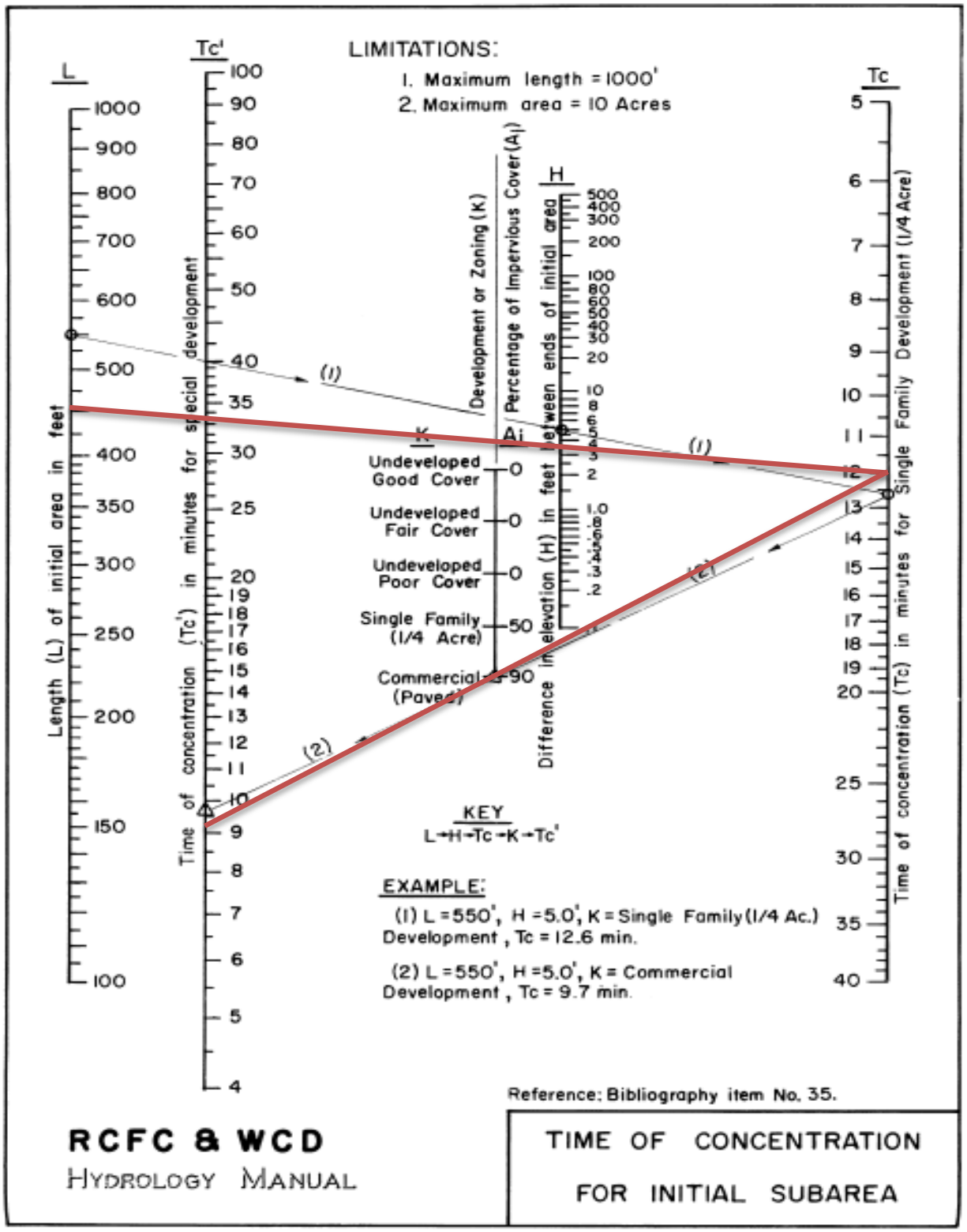


PLATE D-3

BASIN D-11

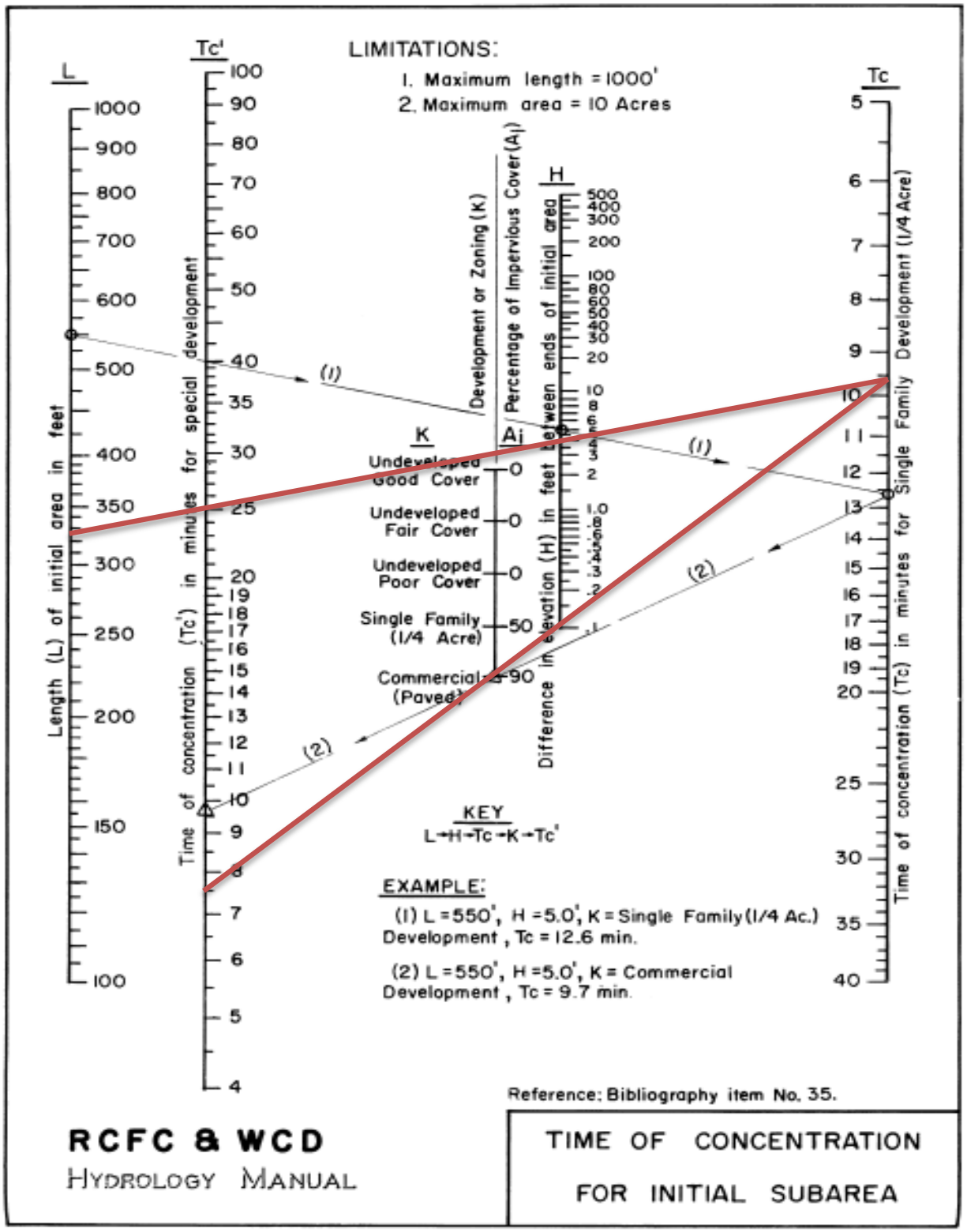


PLATE D-3

BASIN D-12

ADVANCED ENGINEERING SOFTWARE (AES) SUMMARY AND OUTPUT

INFILTRATION BASIN ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO INFILTRATION BASIN - 25 YEAR STORM


----------------------------------------------------------------------------
  FILE NAME: AREA1.DAT
  TIME/DATE OF STUDY: 15:04 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.850
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  UPSTREAM ELEVATION(FEET) =   1402.00
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  180.00**3)/(     3.00)]**.2 =    5.487
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.672
  *USER SPECIFIED(GLOBAL):
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      9.36
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =      9.36

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.36
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    5.99
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 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.) =    5.99
  RAINFALL INTENSITY(INCH/HR) =   3.52
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.36

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   375.00
  UPSTREAM ELEVATION(FEET) =   1403.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  375.00**3)/(     5.00)]**.2 =    7.695
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.122
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     10.61
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     10.61

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1395.50  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.10
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   3.05
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.61

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  250.00**3)/(     3.50)]**.2 =    6.479
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.391
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      1.93
  TOTAL AREA(ACRES) =      0.67   TOTAL RUNOFF(CFS) =      1.93

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.93
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   3.31
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.93

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.36     5.99        3.520          3.00
      2       10.61     8.10        3.047          4.00
      3        1.93     6.82        3.307          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.91     5.99       3.520
      2       19.67     6.82       3.307
      3       20.50     8.10       3.047

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.50   Tc(MIN.) =    8.10
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1394.75  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.50
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   2.84
  TOTAL STREAM AREA(ACRES) =     7.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.50

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  300.00**3)/(     4.00)]**.2 =    7.038
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.259
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
```

```
  SUBAREA RUNOFF(CFS) =      4.32
  TOTAL AREA(ACRES) =      1.56   TOTAL RUNOFF(CFS) =      4.32

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.50  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.32
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =    8.27
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    104.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.27
  RAINFALL INTENSITY(INCH/HR) =   3.02
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.32

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1396.00
  ELEVATION DIFFERENCE(FEET) =      6.50
  TC = 0.303*[(  500.00**3)/(     6.50)]**.2 =    8.677
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.947
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      7.14
  TOTAL AREA(ACRES) =      2.85   TOTAL RUNOFF(CFS) =      7.14

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   2.95
  TOTAL STREAM AREA(ACRES) =     2.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.14

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.91     7.26        3.211          7.67
      1       19.67     8.09        3.049          7.67
      1       20.50     9.36        2.842          7.67
      2        4.32     8.27        3.016          1.56
      3        7.14     8.68        2.947          2.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.68     7.26       3.211
      2       30.55     8.09       3.049
      3       30.59     8.27       3.016
      4       30.38     8.68       2.947
      5       31.46     9.36       2.842

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.46   Tc(MIN.) =    9.36
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    555.00 TO NODE    103.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.840
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      6.63
  TOTAL AREA(ACRES) =      2.03   TOTAL RUNOFF(CFS) =      6.63
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       6.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO INFILTRATION BASIN - 50 YEAR STORM


----------------------------------------------------------------------------
  FILE NAME: AREA1.DAT
  TIME/DATE OF STUDY: 15:04 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.850
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  UPSTREAM ELEVATION(FEET) =   1402.00
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  180.00**3)/(     3.00)]**.2 =    5.487
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.237
  *USER SPECIFIED(GLOBAL):
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     10.80
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =     10.80

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.80
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.98
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 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.) =    5.98
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.80

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   375.00
  UPSTREAM ELEVATION(FEET) =   1403.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  375.00**3)/(     5.00)]**.2 =    7.695
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.602
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     12.25
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     12.25

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1395.50  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.25
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    8.08
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   3.52
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.25

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  250.00**3)/(     3.50)]**.2 =    6.479
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.912
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.67   TOTAL RUNOFF(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.81
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    6.81
  RAINFALL INTENSITY(INCH/HR) =   3.82
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.23

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.80     5.98        4.066          3.00
      2       12.25     8.08        3.520          4.00
      3        2.23     6.81        3.819          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.83     5.98       4.066
      2       22.71     6.81       3.819
      3       23.65     8.08       3.520

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.65   Tc(MIN.) =    8.08
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1394.75  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.65
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    9.27
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.27
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =     7.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.65

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  300.00**3)/(     4.00)]**.2 =    7.038
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.760
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
```

```
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.56   TOTAL RUNOFF(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.50  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    104.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.24
  RAINFALL INTENSITY(INCH/HR) =   3.49
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1396.00
  ELEVATION DIFFERENCE(FEET) =      6.50
  TC = 0.303*[(  500.00**3)/(     6.50)]**.2 =    8.677
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.400
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      8.24
  TOTAL AREA(ACRES) =      2.85   TOTAL RUNOFF(CFS) =      8.24

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   3.40
  TOTAL STREAM AREA(ACRES) =     2.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.24

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.83     7.18        3.723          7.67
      1       22.71     8.01        3.533          7.67
      1       23.65     9.27        3.295          7.67
      2        4.99     8.24        3.486          1.56
      3        8.24     8.68        3.400          2.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       33.00     7.18       3.723
      2       35.16     8.01       3.533
      3       35.21     8.24       3.486
      4       35.25     8.68       3.400
      5       36.35     9.27       3.295

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.35   Tc(MIN.) =    9.27
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    555.00 TO NODE    103.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.430
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      7.64
  TOTAL AREA(ACRES) =      2.03   TOTAL RUNOFF(CFS) =      7.64
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       7.64
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO INFILTRATION BASIN - 100 YEAR STORM


----------------------------------------------------------------------------
  FILE NAME: AREA1.DAT
  TIME/DATE OF STUDY: 09:41 04/29/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.850
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  UPSTREAM ELEVATION(FEET) =   1402.00
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  180.00**3)/(     3.00)]**.2 =    5.487
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.729
  *USER SPECIFIED(GLOBAL):
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     12.06
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =     12.06

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.06
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.97
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 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.) =    5.97
  RAINFALL INTENSITY(INCH/HR) =   4.54
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.06

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   375.00
  UPSTREAM ELEVATION(FEET) =   1403.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  375.00**3)/(     5.00)]**.2 =    7.695
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.020
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     13.67
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     13.67

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1395.50  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.67
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    8.07
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.07
  RAINFALL INTENSITY(INCH/HR) =   3.93
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.67

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  250.00**3)/(     3.50)]**.2 =    6.479
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.366
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.67   TOTAL RUNOFF(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.49
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.80
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   4.26
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.06     5.97        4.540          3.00
      2       13.67     8.07        3.930          4.00
      3        2.49     6.80        4.265          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       24.36     5.97       4.540
      2       25.34     6.80       4.265
      3       26.40     8.07       3.930

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.40   Tc(MIN.) =    8.07
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1394.75  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.40
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   3.68
  TOTAL STREAM AREA(ACRES) =     7.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.40

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  300.00**3)/(     4.00)]**.2 =    7.038
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.196
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
```

```
  SUBAREA RUNOFF(CFS) =      5.56
  TOTAL AREA(ACRES) =      1.56   TOTAL RUNOFF(CFS) =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.50  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.56
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    104.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.22
  RAINFALL INTENSITY(INCH/HR) =   3.90
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1396.00
  ELEVATION DIFFERENCE(FEET) =      6.50
  TC = 0.303*[(  500.00**3)/(     6.50)]**.2 =    8.677
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.795
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      9.19
  TOTAL AREA(ACRES) =      2.85   TOTAL RUNOFF(CFS) =      9.19

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =     2.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.19

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.36     7.16        4.162          7.67
      1       25.34     7.98        3.950          7.67
      1       26.40     9.24        3.681          7.67
      2        5.56     8.22        3.896          1.56
      3        9.19     8.68        3.795          2.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       36.79     7.16       4.162
      2       39.20     7.98       3.950
      3       39.26     8.22       3.896
      4       39.39     8.68       3.795
      5       40.57     9.24       3.681

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.57   Tc(MIN.) =    9.24
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    555.00 TO NODE    103.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.944
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      8.53
  TOTAL AREA(ACRES) =      2.03   TOTAL RUNOFF(CFS) =      8.53
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       8.53
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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****************************************************************************

              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-1HR


----------------------------------------------------------------------------
  FILE NAME: TRIAL101.DAT
  TIME/DATE OF STUDY: 07:53 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  1.50 INCHES
         RCFC&WCD 1-Hour Storm (5-Minute period) SELECTED
         (SLOPE OF INTENSITY-DURATION CURVE = 0.48)
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  83.333


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                13.994                 20.309
        2                59.664                 66.279
        3                78.792                 27.760
        4                86.766                 11.572
```

5	91.428	6.766
6	94.514	4.479
7	96.650	3.099
8	98.044	2.024
9	98.699	0.950
10	99.289	0.857
11	99.716	0.619
12	99.929	0.310
13	100.000	0.103

♀
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0669	0.0083	0.0586
2	0.0707	0.0083	0.0624
3	0.0751	0.0083	0.0668
4	0.0829	0.0083	0.0745
5	0.0874	0.0083	0.0791
6	0.0994	0.0083	0.0911
7	0.1167	0.0083	0.1084
8	0.1282	0.0083	0.1199
9	0.1929	0.0083	0.1846
10	0.3979	0.0083	0.3896
11	0.1079	0.0083	0.0996
12	0.0739	0.0083	0.0656

TOTAL STORM RAINFALL(INCHES) = 1.50
TOTAL SOIL-LOSS(INCHES) = 0.10
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.40

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.1000
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.3993

♀
==========

1 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 10.0 20.0 30.0 40.0
0.083	0.0082	1.19	VQ . . . .
0.167	0.0437	5.15	.V Q . . . .
0.250	0.0927	7.12	. V Q . . . .
0.333	0.1502	8.35	. V Q . . . .
0.417	0.2157	9.52	. V Q. . . .
0.500	0.2889	10.62	. V Q . . .
0.583	0.3729	12.21	. V Q . . .
0.667	0.4706	14.17	. . VQ . . .
0.750	0.5877	17.01	. . VQ . . .
0.833	0.7680	26.17	. . .V Q . .
0.917	1.0162	36.04	. . . V. Q .
1.000	1.1733	22.81	. . . Q . V .
1.083	1.2706	14.13	. . Q . . V .

```
   1.167      1.3206      7.25  .      Q  .         .         .      V  .
   1.250      1.3499      4.25  .   Q     .         .         .       V .
   1.333      1.3689      2.77  . Q       .         .         .        V.
   1.417      1.3811      1.77  .Q        .         .         .        V.
   1.500      1.3883      1.05  .Q        .         .         .        V.
   1.583      1.3933      0.72  Q         .         .         .        V.
   1.667      1.3965      0.46  Q         .         .         .        V.
   1.750      1.3983      0.26  Q         .         .         .        V.
   1.833      1.3990      0.11  Q         .         .         .        V.
   1.917      1.3992      0.03  Q         .         .         .        V.
   2.000      1.3993      0.01  Q         .         .         .         V
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   =======================                 =========
             0%                              120.0
            10%                               70.0
            20%                               55.0
            30%                               35.0
            40%                               20.0
            50%                               15.0
            60%                               15.0
            70%                               10.0
            80%                                5.0
            90%                                5.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ==============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                  -----------             |   (and volume)
                 |           |    |       |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                        |         |  dead   |   basin outlet
                        V         | storage |
                     OUTFLOW       ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.721
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.70
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.20	1.091

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.003	1.19	0.70	0.00	0.0	0.000
0.167	0.034	5.15	0.70	0.00	0.0	0.000
0.250	0.078	7.12	0.70	0.00	0.0	0.000
0.333	0.131	8.35	0.70	0.00	0.0	0.000
0.417	0.192	9.52	0.70	0.00	0.0	0.000
0.500	0.260	10.62	0.70	0.00	0.0	0.000
0.583	0.339	12.21	0.70	0.00	0.0	0.000
0.667	0.432	14.17	0.70	0.00	0.0	0.000
0.750	0.544	17.01	0.70	0.00	0.0	0.000
0.833	0.720	26.17	0.70	0.00	0.0	0.000
DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) =					0.9 (less LOSS)	
REMAINING UNIT FLOW IS		35.2 CFS.				
0.917	0.721	36.04	0.70	0.04	1.1	0.235
1.000	0.721	22.81	0.70	0.05	2.8	0.367
1.083	0.721	14.13	0.70	0.06	3.8	0.434
1.167	0.721	7.25	0.70	0.07	4.2	0.450
1.250	0.721	4.25	0.70	0.07	4.2	0.445
1.333	0.721	2.77	0.70	0.06	4.1	0.431
1.417	0.721	1.77	0.70	0.06	4.0	0.411
1.500	0.721	1.05	0.70	0.06	3.8	0.387
1.583	0.721	0.72	0.70	0.05	3.5	0.363
1.667	0.721	0.46	0.70	0.05	3.3	0.339
1.750	0.721	0.26	0.70	0.05	3.1	0.314
1.833	0.721	0.11	0.70	0.04	2.9	0.291
1.917	0.721	0.03	0.70	0.04	2.6	0.268
2.000	0.721	0.01	0.70	0.04	2.4	0.246
2.083	0.721	0.00	0.70	0.03	2.2	0.226
2.167	0.721	0.00	0.70	0.03	2.0	0.207
2.250	0.721	0.00	0.70	0.03	1.9	0.189
2.333	0.721	0.00	0.70	0.03	1.7	0.173
2.417	0.721	0.00	0.70	0.02	1.6	0.157
2.500	0.721	0.00	0.70	0.02	1.4	0.143
2.583	0.721	0.00	0.70	0.02	1.3	0.129
2.667	0.721	0.00	0.70	0.02	1.2	0.116
2.750	0.721	0.00	0.70	0.02	1.0	0.104
2.833	0.721	0.00	0.70	0.01	0.9	0.093
2.917	0.721	0.00	0.70	0.01	0.8	0.082
3.000	0.721	0.00	0.70	0.01	0.7	0.073
3.083	0.721	0.00	0.70	0.01	0.6	0.063
3.167	0.721	0.00	0.70	0.01	0.6	0.055
3.250	0.721	0.00	0.70	0.01	0.5	0.047
3.333	0.721	0.00	0.70	0.01	0.4	0.039

3.417	0.721	0.00	0.70	0.00	0.3	0.032
3.500	0.721	0.00	0.70	0.00	0.3	0.025
3.583	0.721	0.00	0.70	0.00	0.2	0.019
3.667	0.721	0.00	0.70	0.00	0.2	0.013
3.750	0.721	0.00	0.70	0.00	0.1	0.008
3.833	0.721	0.00	0.70	0.00	0.0	0.002
3.917	0.719	0.00	0.70	0.00	0.0	0.000
4.000	0.714	0.00	0.70	0.00	0.0	0.000
4.083	0.709	0.00	0.70	0.00	0.0	0.000
4.167	0.704	0.00	0.70	0.00	0.0	0.000
4.250	0.699	0.00	0.70	0.00	0.0	0.000
4.333	0.694	0.00	0.70	0.00	0.0	0.000
4.417	0.690	0.00	0.70	0.00	0.0	0.000
4.500	0.685	0.00	0.70	0.00	0.0	0.000
4.583	0.680	0.00	0.70	0.00	0.0	0.000
4.667	0.675	0.00	0.70	0.00	0.0	0.000
4.750	0.670	0.00	0.70	0.00	0.0	0.000
4.833	0.665	0.00	0.70	0.00	0.0	0.000
4.917	0.661	0.00	0.70	0.00	0.0	0.000
5.000	0.656	0.00	0.70	0.00	0.0	0.000
5.083	0.651	0.00	0.70	0.00	0.0	0.000
5.167	0.646	0.00	0.70	0.00	0.0	0.000
5.250	0.641	0.00	0.70	0.00	0.0	0.000
5.333	0.637	0.00	0.70	0.00	0.0	0.000
5.417	0.632	0.00	0.70	0.00	0.0	0.000
5.500	0.627	0.00	0.70	0.00	0.0	0.000
5.583	0.622	0.00	0.70	0.00	0.0	0.000
5.667	0.617	0.00	0.70	0.00	0.0	0.000
5.750	0.612	0.00	0.70	0.00	0.0	0.000
5.833	0.608	0.00	0.70	0.00	0.0	0.000
5.917	0.603	0.00	0.70	0.00	0.0	0.000

```
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =      1.399 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =      0.454 AF
    LOSS    VOLUME =      0.945 AF
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================
```

```
        MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
        STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
        VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
        EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
        OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
        UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
        (0.938)(DIAMETER):


        PIPELENGTH(FT) =     200.00     MANNINGS FACTOR = 0.013
        UPSTREAM ELEVATION(FT) =    1390.25
        DOWNSTREAM ELEVATION(FT) =    1389.00
        PIPE DIAMETER(FT) =   1.50



        NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:
```

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	1.11	3.23	0.88	0.000
1.000	2.84	4.26	2.63	0.000
1.083	3.79	4.57	3.68	0.000
1.167	4.18	4.71	4.14	0.000
1.250	4.23	4.72	4.23	0.000
1.333	4.14	4.70	4.15	0.000
1.417	3.98	4.64	4.00	0.000
1.500	3.77	4.57	3.80	0.000
1.583	3.55	4.50	3.57	0.000
1.667	3.32	4.44	3.34	0.000
1.750	3.09	4.35	3.11	0.000
1.833	2.86	4.27	2.89	0.000
1.917	2.64	4.19	2.67	0.000
2.000	2.43	4.10	2.46	0.000
2.083	2.23	4.00	2.26	0.000
2.167	2.05	3.89	2.07	0.000
2.250	1.87	3.79	1.90	0.000
2.333	1.71	3.70	1.73	0.000
2.417	1.56	3.59	1.58	0.000
2.500	1.42	3.49	1.44	0.000
2.583	1.28	3.39	1.30	0.000
2.667	1.16	3.28	1.18	0.000
2.750	1.04	3.16	1.06	0.000
2.833	0.93	3.06	0.95	0.000
2.917	0.83	2.96	0.85	0.000
3.000	0.73	2.84	0.75	0.000
3.083	0.64	2.73	0.66	0.000
3.167	0.56	2.62	0.57	0.000
3.250	0.48	2.52	0.49	0.000
3.333	0.40	2.38	0.42	0.000
3.417	0.33	1.97	0.33	0.000
3.500	0.27	1.59	0.27	0.000
3.583	0.21	1.23	0.21	0.000
3.667	0.15	0.89	0.15	0.000
3.750	0.10	0.57	0.11	0.000
3.833	0.05	0.50	0.08	0.000
3.917	0.01	0.50	0.05	0.000
4.000	0.00	0.00	0.02	0.000
4.083	0.00	0.00	0.00	0.000
4.167	0.00	0.00	0.00	0.000
4.250	0.00	0.00	0.00	0.000
4.333	0.00	0.00	0.00	0.000
4.417	0.00	0.00	0.00	0.000
4.500	0.00	0.00	0.00	0.000
4.583	0.00	0.00	0.00	0.000
4.667	0.00	0.00	0.00	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000

5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000

==========

END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-3HR


----------------------------------------------------------------------------
  FILE NAME: TRIAL103.DAT
  TIME/DATE OF STUDY: 07:37 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  2.55 INCHES
         RCFC&WCD 3-Hour Storm (10-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  10.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 166.667


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                36.829                26.724
        2                82.779                33.343
        3                92.971                 7.396
        4                97.347                 3.175
        5                98.994                 1.195
```

6	99.522	0.383
7	99.809	0.208
8	99.952	0.104
9	100.000	0.035

♀
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0663	0.0167	0.0496
2	0.0663	0.0167	0.0496
3	0.0841	0.0167	0.0675
4	0.0841	0.0167	0.0675
5	0.0841	0.0167	0.0675
6	0.0867	0.0167	0.0700
7	0.1122	0.0167	0.0955
8	0.1071	0.0167	0.0904
9	0.1351	0.0167	0.1185
10	0.1300	0.0167	0.1134
11	0.1632	0.0167	0.1465
12	0.1504	0.0167	0.1338
13	0.1861	0.0167	0.1695
14	0.2167	0.0167	0.2001
15	0.3595	0.0167	0.3429
16	0.3595	0.0167	0.3429
17	0.0969	0.0167	0.0802
18	0.0612	0.0167	0.0445

TOTAL STORM RAINFALL(INCHES) = 2.55
TOTAL SOIL-LOSS(INCHES) = 0.30
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.25

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.3000
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.2487

♀
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3 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 7.5 15.0 22.5 30.0
0.083	0.0091	1.33	VQ . . . .
0.167	0.0183	1.33	VQ . . . .
0.250	0.0388	2.98	V Q . . . .
0.333	0.0593	2.98	V Q . . . .
0.417	0.0857	3.83	.V Q . . . .
0.500	0.1120	3.83	.V Q . . . .
0.583	0.1435	4.58	. V Q . . . .
0.667	0.1751	4.58	. V Q . . . .
0.750	0.2079	4.77	. V Q . . . .
0.833	0.2408	4.77	. V Q . . . .
0.917	0.2746	4.91	. V Q . . . .
1.000	0.3084	4.91	. VQ . . . .

```
   1.083      0.3478      5.71  .     VQ  .         .         .         .
   1.167      0.3871      5.71  .     VQ  .         .         .         .
   1.250      0.4316      6.46  .      VQ .         .         .         .
   1.333      0.4760      6.46  .       Q .         .         .         .
   1.417      0.5259      7.24  .        Q.         .         .         .
   1.500      0.5757      7.24  .        QV         .         .         .
   1.583      0.6314      8.08  .         QV        .         .         .
   1.667      0.6871      8.08  .         Q V       .         .         .
   1.750      0.7492      9.02  .         . QV      .         .         .
   1.833      0.8114      9.02  .         . Q V     .         .         .
   1.917      0.8792      9.84  .         .  Q V    .         .         .
   2.000      0.9470      9.84  .         .  Q  V   .         .         .
   2.083      1.0202     10.64  .         .   Q   V .         .         .
   2.167      1.0935     10.64  .         .   Q    V.         .         .
   2.250      1.1807     12.66  .         .     Q   .V        .         .
   2.333      1.2679     12.66  .         .     Q   . V       .         .
   2.417      1.3903     17.77  .         .         .  QV     .         .
   2.500      1.5127     17.77  .         .         .  Q  V   .         .
   2.583      1.6702     22.87  .         .         .        VQ         .
   2.667      1.8277     22.87  .         .         .         Q V       .
   2.750      1.9451     17.05  .         .         . Q       .   V     .
   2.833      2.0625     17.05  .         .         . Q       .     V   .
   2.917      2.1165      7.84  .         Q         .         .      V  .
   3.000      2.1705      7.84  .         Q         .         .       V .
   3.083      2.1960      3.71  .   Q     .         .         .        V.
   3.167      2.2215      3.71  .   Q     .         .         .        V.
   3.250      2.2297      1.19  .Q        .         .         .        V.
   3.333      2.2379      1.19  .Q        .         .         .        V.
   3.417      2.2411      0.47  Q         .         .         .        V.
   3.500      2.2443      0.47  Q         .         .         .        V.
   3.583      2.2457      0.20  Q         .         .         .        V.
   3.667      2.2471      0.20  Q         .         .         .        V.
   3.750      2.2476      0.08  Q         .         .         .        V.
   3.833      2.2482      0.08  Q         .         .         .        V.
   3.917      2.2484      0.03  Q         .         .         .        V.
   4.000      2.2486      0.03  Q         .         .         .        V.
   4.083      2.2486      0.01  Q         .         .         .        V.
   4.167      2.2487      0.01  Q         .         .         .        V.
----------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ========================                =========
             0%                              250.0
            10%                              180.0
            20%                              150.0
            30%                              100.0
            40%                               60.0
            50%                               40.0
            60%                               30.0
            70%                               30.0
            80%                               10.0
            90%                               10.0


 ****************************************************************************
   FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
 ----------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ============================================================================
```

```
  INFLOW
(STREAM 1)
     |
     |
     V                 __effective depth
 -----------           |   (and volume)
|           |    |     |
|           |    |....V........
| detention |<-->|           outflow
|   basin   |    |.........______
 -----------     |    ^    |  \
     |           |  dead   |   basin outlet
     V           | storage |
  OUTFLOW         ---------
(STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.710
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.70

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.20	1.091

==========
MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.004	1.33	0.70	0.00	0.0	0.000
0.167	0.009	1.33	0.70	0.00	0.0	0.000
0.250	0.024	2.98	0.70	0.00	0.0	0.000
0.333	0.040	2.98	0.70	0.00	0.0	0.000
0.417	0.062	3.83	0.70	0.00	0.0	0.000
0.500	0.083	3.83	0.70	0.00	0.0	0.000
0.583	0.110	4.58	0.70	0.00	0.0	0.000
0.667	0.137	4.58	0.70	0.00	0.0	0.000
0.750	0.165	4.77	0.70	0.00	0.0	0.000
0.833	0.193	4.77	0.70	0.00	0.0	0.000
0.917	0.222	4.91	0.70	0.00	0.0	0.000
1.000	0.251	4.91	0.70	0.00	0.0	0.000
1.083	0.285	5.71	0.70	0.00	0.0	0.000
1.167	0.320	5.71	0.70	0.00	0.0	0.000
1.250	0.359	6.46	0.70	0.00	0.0	0.000

1.333	0.399	6.46	0.70	0.00	0.0	0.000
1.417	0.444	7.24	0.70	0.00	0.0	0.000
1.500	0.489	7.24	0.70	0.00	0.0	0.000
1.583	0.540	8.08	0.70	0.00	0.0	0.000
1.667	0.591	8.08	0.70	0.00	0.0	0.000
1.750	0.648	9.02	0.70	0.00	0.0	0.000
1.833	0.705	9.02	0.70	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 1.4 (less LOSS)
REMAINING UNIT FLOW IS 8.5 CFS.

1.917	0.710	9.84	0.70	0.01	0.3	0.056
2.000	0.710	9.84	0.70	0.02	0.8	0.114
2.083	0.710	10.64	0.70	0.03	1.4	0.173
2.167	0.710	10.64	0.70	0.04	1.9	0.228
2.250	0.710	12.66	0.70	0.05	2.5	0.294
2.333	0.710	12.66	0.70	0.06	3.1	0.355
2.417	0.710	17.77	0.70	0.07	3.8	0.447
2.500	0.710	17.77	0.70	0.08	4.6	0.532
2.583	0.710	22.87	0.70	0.10	5.6	0.647
2.667	0.710	22.87	0.70	0.12	6.6	0.754
2.750	0.710	17.05	0.70	0.14	7.5	0.814
2.833	0.710	17.05	0.70	0.21	8.8	0.866
2.917	0.710	7.84	0.70	0.19	9.4	0.850
3.000	0.710	7.84	0.70	0.17	8.9	0.838
3.083	0.710	3.71	0.70	0.12	8.2	0.803
3.167	0.710	3.71	0.70	0.12	7.4	0.772
3.250	0.710	1.19	0.70	0.11	7.1	0.727
3.333	0.710	1.19	0.70	0.11	6.7	0.684
3.417	0.710	0.47	0.70	0.10	6.3	0.639
3.500	0.710	0.47	0.70	0.09	5.8	0.597
3.583	0.710	0.20	0.70	0.09	5.5	0.556
3.667	0.710	0.20	0.70	0.08	5.1	0.518
3.750	0.710	0.08	0.70	0.07	4.7	0.481
3.833	0.710	0.08	0.70	0.07	4.4	0.447
3.917	0.710	0.03	0.70	0.06	4.1	0.414
4.000	0.710	0.03	0.70	0.06	3.8	0.384
4.083	0.710	0.01	0.70	0.06	3.5	0.355
4.167	0.710	0.01	0.70	0.05	3.2	0.328
4.250	0.710	0.00	0.70	0.05	3.0	0.302
4.333	0.710	0.00	0.70	0.04	2.7	0.279
4.417	0.710	0.00	0.70	0.04	2.5	0.256
4.500	0.710	0.00	0.70	0.04	2.3	0.236
4.583	0.710	0.00	0.70	0.03	2.1	0.216
4.667	0.710	0.00	0.70	0.03	2.0	0.198
4.750	0.710	0.00	0.70	0.03	1.8	0.181
4.833	0.710	0.00	0.70	0.03	1.6	0.165
4.917	0.710	0.00	0.70	0.02	1.5	0.150
5.000	0.710	0.00	0.70	0.02	1.3	0.135
5.083	0.710	0.00	0.70	0.02	1.2	0.122
5.167	0.710	0.00	0.70	0.02	1.1	0.110
5.250	0.710	0.00	0.70	0.02	1.0	0.098
5.333	0.710	0.00	0.70	0.01	0.9	0.087
5.417	0.710	0.00	0.70	0.01	0.8	0.077
5.500	0.710	0.00	0.70	0.01	0.7	0.068
5.583	0.710	0.00	0.70	0.01	0.6	0.059
5.667	0.710	0.00	0.70	0.01	0.5	0.050
5.750	0.710	0.00	0.70	0.01	0.4	0.043
5.833	0.710	0.00	0.70	0.01	0.4	0.035
5.917	0.710	0.00	0.70	0.00	0.3	0.028

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 2.249 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 1.172 AF

LOSS VOLUME = 1.076 AF

```
****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================
```

MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 200.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1390.25
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.27	1.57	0.15	0.000
2.000	0.81	2.93	0.74	0.000
2.083	1.36	3.44	1.28	0.000
2.167	1.90	3.80	1.83	0.000
2.250	2.47	4.12	2.40	0.000
2.333	3.07	4.35	3.00	0.000
2.417	3.79	4.58	3.71	0.000
2.500	4.63	4.83	4.54	0.000
2.583	5.57	5.02	5.47	0.000
2.667	6.62	5.21	6.51	0.000
2.750	7.53	5.31	7.44	0.000

2.833	8.81	5.36	8.22	0.004
2.917	9.42	5.36	8.30	0.011
3.000	8.95	5.36	8.30	0.016
3.083	8.16	5.36	8.30	0.015
3.167	7.44	5.36	8.30	0.009
3.250	7.08	5.36	8.30	0.000
3.333	6.67	5.22	6.89	0.000
3.417	6.25	5.15	6.30	0.000
3.500	5.85	5.08	5.89	0.000
3.583	5.45	4.99	5.49	0.000
3.667	5.08	4.93	5.12	0.000
3.750	4.72	4.85	4.76	0.000
3.833	4.39	4.77	4.42	0.000
3.917	4.07	4.67	4.10	0.000
4.000	3.77	4.57	3.80	0.000
4.083	3.49	4.49	3.52	0.000
4.167	3.23	4.41	3.26	0.000
4.250	2.98	4.31	3.01	0.000
4.333	2.75	4.23	2.77	0.000
4.417	2.53	4.15	2.56	0.000
4.500	2.33	4.05	2.35	0.000
4.583	2.14	3.94	2.16	0.000
4.667	1.96	3.84	1.98	0.000
4.750	1.79	3.74	1.81	0.000
4.833	1.63	3.64	1.65	0.000
4.917	1.48	3.54	1.50	0.000
5.000	1.35	3.43	1.37	0.000
5.083	1.22	3.33	1.24	0.000
5.167	1.10	3.22	1.11	0.000
5.250	0.98	3.11	1.00	0.000
5.333	0.88	3.01	0.89	0.000
5.417	0.78	2.90	0.79	0.000
5.500	0.68	2.78	0.70	0.000
5.583	0.60	2.67	0.61	0.000
5.667	0.52	2.57	0.53	0.000
5.750	0.44	2.47	0.45	0.000
5.833	0.37	2.16	0.37	0.000
5.917	0.30	1.77	0.30	0.000
6.000	0.24	1.39	0.24	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                           Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-6HR
----------------------------------------------------------------------------
  FILE NAME: TRIAL106.DAT
  TIME/DATE OF STUDY: 07:39 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  3.40 INCHES
         RCFC&WCD 6-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                17.139
        2                98.621                 6.715
        3                99.599                 0.236
        4                99.839                 0.058
        5                99.960                 0.029
        6               100.000                 0.010
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.1224	0.0500	0.0724
2	0.1462	0.0500	0.0962
3	0.1632	0.0500	0.1132
4	0.1666	0.0500	0.1166
5	0.1802	0.0500	0.1302
6	0.1972	0.0500	0.1472
7	0.2312	0.0500	0.1812
8	0.3060	0.0500	0.2560
9	0.3944	0.0500	0.3444
10	0.4896	0.0500	0.4396
11	0.8534	0.0500	0.8034
12	0.1496	0.0500	0.0996

TOTAL STORM RAINFALL(INCHES) = 3.40
TOTAL SOIL-LOSS(INCHES) = 0.60
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.80

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.6000
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.7984

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6 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0085	1.24	V Q . . . .
0.167	0.0171	1.24	V Q . . . .
0.250	0.0256	1.24	V Q . . . .
0.333	0.0342	1.24	V Q . . . .
0.417	0.0427	1.24	V Q . . . .
0.500	0.0513	1.24	V Q . . . .
0.583	0.0660	2.13	V Q . . . .
0.667	0.0807	2.13	V Q . . . .
0.750	0.0954	2.13	V Q . . . .
0.833	0.1101	2.13	V Q . . . .
0.917	0.1248	2.13	V Q . . . .
1.000	0.1395	2.13	V Q . . . .
1.083	0.1574	2.60	. V Q . . . .
1.167	0.1753	2.60	. V Q . . . .
1.250	0.1933	2.60	. V Q . . . .
1.333	0.2112	2.60	. V Q . . . .
1.417	0.2291	2.60	. V Q . . . .
1.500	0.2471	2.60	. V Q . . . .
1.583	0.2662	2.79	. V Q . . . .
1.667	0.2854	2.79	. VQ . . . .
1.750	0.3046	2.79	. VQ . . . .
1.833	0.3238	2.79	. VQ . . . .
1.917	0.3430	2.79	. VQ . . . .

```
2.000      0.3622      2.79  .    Q    .         .         .         .
2.083      0.3832      3.05  .    VQ   .         .         .         .
2.167      0.4041      3.05  .    VQ   .         .         .         .
2.250      0.4251      3.05  .     Q   .         .         .         .
2.333      0.4461      3.05  .     Q   .         .         .         .
2.417      0.4671      3.05  .     Q   .         .         .         .
2.500      0.4881      3.05  .     Q   .         .         .         .
2.583      0.5118      3.43  .     QV  .         .         .         .
2.667      0.5354      3.43  .     QV  .         .         .         .
2.750      0.5591      3.43  .     QV  .         .         .         .
2.833      0.5828      3.43  .     Q V .         .         .         .
2.917      0.6064      3.43  .     Q V .         .         .         .
3.000      0.6301      3.43  .     Q  V.         .         .         .
3.083      0.6585      4.14  .       QV.         .         .         .
3.167      0.6870      4.14  .       QV.         .         .         .
3.250      0.7155      4.14  .       Q V         .         .         .
3.333      0.7440      4.14  .       Q V         .         .         .
3.417      0.7725      4.14  .       Q  V        .         .         .
3.500      0.8010      4.14  .       Q  V        .         .         .
3.583      0.8399      5.65  .         .QV       .         .         .
3.667      0.8788      5.65  .         .QV       .         .         .
3.750      0.9177      5.65  .         .Q V      .         .         .
3.833      0.9566      5.65  .         .Q V      .         .         .
3.917      0.9956      5.65  .         .Q  V     .         .         .
4.000      1.0345      5.65  .         .Q  V     .         .         .
4.083      1.0874      7.68  .         .    Q    .         .         .
4.167      1.1402      7.68  .         .    QV   .         .         .
4.250      1.1931      7.68  .         .    Q V  .         .         .
4.333      1.2460      7.68  .         .    Q V  .         .         .
4.417      1.2989      7.68  .         .    Q  V .         .         .
4.500      1.3517      7.68  .         .    Q   V.         .         .
4.583      1.4201      9.92  .         .        QV         .         .
4.667      1.4884      9.92  .         .        Q V        .         .
4.750      1.5568      9.92  .         .        Q  V       .         .
4.833      1.6251      9.92  .         .        Q   V      .         .
4.917      1.6934      9.92  .         .        Q    V     .         .
5.000      1.7618      9.92  .         .        Q     V    .         .
5.083      1.8777     16.82  .         .         .     V   .  Q      .
5.167      1.9935     16.82  .         .         .       V .  Q      .
5.250      2.1094     16.82  .         .         .         V  Q      .
5.333      2.2253     16.82  .         .         .          V Q      .
5.417      2.3411     16.82  .         .         .            Q      .
5.500      2.4570     16.82  .         .         .            Q V    .
5.583      2.5068      7.23  .         .   Q     .         .    V    .
5.667      2.5566      7.23  .         .   Q     .         .     V   .
5.750      2.6065      7.23  .         .   Q     .         .      V  .
5.833      2.6563      7.23  .         .   Q     .         .      V  .
5.917      2.7061      7.23  .         .   Q     .         .       V .
6.000      2.7559      7.23  .         .   Q     .         .        V.
6.083      2.7621      0.90 .Q         .         .         .        V.
6.167      2.7683      0.90 .Q         .         .         .        V.
6.250      2.7745      0.90 .Q         .         .         .        V.
6.333      2.7806      0.90 .Q         .         .         .        V.
6.417      2.7868      0.90 .Q         .         .         .        V.
6.500      2.7930      0.90 .Q         .         .         .        V.
6.583      2.7936      0.09 Q          .         .         .        V.
6.667      2.7942      0.09 Q          .         .         .        V.
6.750      2.7948      0.09 Q          .         .         .        V.
6.833      2.7954      0.09 Q          .         .         .        V.
6.917      2.7960      0.09 Q          .         .         .        V.
7.000      2.7966      0.09 Q          .         .         .        V.
7.083      2.7968      0.03 Q          .         .         .        V.
7.167      2.7970      0.03 Q          .         .         .        V.
```

```
   7.250      2.7973      0.03  Q         .         .         .        V.
   7.333      2.7975      0.03  Q         .         .         .        V.
   7.417      2.7977      0.03  Q         .         .         .        V.
   7.500      2.7980      0.03  Q         .         .         .        V.
   7.583      2.7980      0.01  Q         .         .         .        V.
   7.667      2.7981      0.01  Q         .         .         .        V.
   7.750      2.7982      0.01  Q         .         .         .        V.
   7.833      2.7983      0.01  Q         .         .         .        V.
   7.917      2.7983      0.01  Q         .         .         .        V.
   8.000      2.7984      0.01  Q         .         .         .        V.
   8.083      2.7984      0.00  Q         .         .         .        V.
   8.167      2.7984      0.00  Q         .         .         .        V.
   8.250      2.7984      0.00  Q         .         .         .        V.
   8.333      2.7984      0.00  Q         .         .         .        V.
   8.417      2.7984      0.00  Q         .         .         .        V.
   8.500      2.7984      0.00  Q         .         .         .         V
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   =======================                 =========
             0%                              510.0
            10%                              330.0
            20%                              210.0
            30%                              150.0
            40%                              120.0
            50%                               60.0
            60%                               30.0
            70%                               30.0
            80%                               30.0
            90%                               30.0


 ****************************************************************************
   FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
 ----------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                  -----------             |   (and volume)
                 |           |    |    |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                        |         |  dead   |   basin outlet
                        V         | storage |
                     OUTFLOW       ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
```

DEAD STORAGE(AF) = 0.710
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.70

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.21	1.091

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.004	1.24	0.70	0.00	0.0	0.000
0.167	0.007	1.24	0.70	0.00	0.0	0.000
0.250	0.011	1.24	0.70	0.00	0.0	0.000
0.333	0.015	1.24	0.70	0.00	0.0	0.000
0.417	0.019	1.24	0.70	0.00	0.0	0.000
0.500	0.022	1.24	0.70	0.00	0.0	0.000
0.583	0.032	2.13	0.70	0.00	0.0	0.000
0.667	0.042	2.13	0.70	0.00	0.0	0.000
0.750	0.052	2.13	0.70	0.00	0.0	0.000
0.833	0.062	2.13	0.70	0.00	0.0	0.000
0.917	0.072	2.13	0.70	0.00	0.0	0.000
1.000	0.082	2.13	0.70	0.00	0.0	0.000
1.083	0.095	2.60	0.70	0.00	0.0	0.000
1.167	0.108	2.60	0.70	0.00	0.0	0.000
1.250	0.121	2.60	0.70	0.00	0.0	0.000
1.333	0.134	2.60	0.70	0.00	0.0	0.000
1.417	0.147	2.60	0.70	0.00	0.0	0.000
1.500	0.160	2.60	0.70	0.00	0.0	0.000
1.583	0.175	2.79	0.70	0.00	0.0	0.000
1.667	0.189	2.79	0.70	0.00	0.0	0.000
1.750	0.203	2.79	0.70	0.00	0.0	0.000
1.833	0.218	2.79	0.70	0.00	0.0	0.000
1.917	0.232	2.79	0.70	0.00	0.0	0.000
2.000	0.246	2.79	0.70	0.00	0.0	0.000
2.083	0.263	3.05	0.70	0.00	0.0	0.000
2.167	0.279	3.05	0.70	0.00	0.0	0.000
2.250	0.295	3.05	0.70	0.00	0.0	0.000
2.333	0.311	3.05	0.70	0.00	0.0	0.000
2.417	0.327	3.05	0.70	0.00	0.0	0.000
2.500	0.344	3.05	0.70	0.00	0.0	0.000
2.583	0.362	3.43	0.70	0.00	0.0	0.000
2.667	0.381	3.43	0.70	0.00	0.0	0.000
2.750	0.400	3.43	0.70	0.00	0.0	0.000
2.833	0.419	3.43	0.70	0.00	0.0	0.000
2.917	0.438	3.43	0.70	0.00	0.0	0.000
3.000	0.457	3.43	0.70	0.00	0.0	0.000
3.083	0.480	4.14	0.70	0.00	0.0	0.000

3.167	0.504	4.14	0.70	0.00	0.0	0.000
3.250	0.527	4.14	0.70	0.00	0.0	0.000
3.333	0.551	4.14	0.70	0.00	0.0	0.000
3.417	0.575	4.14	0.70	0.00	0.0	0.000
3.500	0.598	4.14	0.70	0.00	0.0	0.000
3.583	0.633	5.65	0.70	0.00	0.0	0.000
3.667	0.667	5.65	0.70	0.00	0.0	0.000
3.750	0.701	5.65	0.70	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 2.0 (less LOSS)
REMAINING UNIT FLOW IS 3.6 CFS.

3.833	0.710	5.65	0.70	0.00	0.1	0.024
3.917	0.710	5.65	0.70	0.01	0.4	0.056
4.000	0.710	5.65	0.70	0.01	0.7	0.085
4.083	0.710	7.68	0.70	0.02	1.0	0.126
4.167	0.710	7.68	0.70	0.03	1.4	0.165
4.250	0.710	7.68	0.70	0.03	1.7	0.201
4.333	0.710	7.68	0.70	0.04	2.1	0.235
4.417	0.710	7.68	0.70	0.04	2.4	0.267
4.500	0.710	7.68	0.70	0.05	2.7	0.296
4.583	0.710	9.92	0.70	0.05	3.0	0.339
4.667	0.710	9.92	0.70	0.06	3.4	0.379
4.750	0.710	9.92	0.70	0.06	3.8	0.417
4.833	0.710	9.92	0.70	0.07	4.1	0.452
4.917	0.710	9.92	0.70	0.08	4.4	0.485
5.000	0.710	9.92	0.70	0.08	4.7	0.516
5.083	0.710	16.82	0.70	0.09	5.2	0.591
5.167	0.710	16.82	0.70	0.10	5.9	0.661
5.250	0.710	16.82	0.70	0.11	6.6	0.727
5.333	0.710	16.82	0.70	0.12	7.2	0.789
5.417	0.710	16.82	0.70	0.18	8.2	0.844
5.500	0.710	16.82	0.70	0.24	9.7	0.888
5.583	0.710	7.23	0.70	0.20	10.0	0.864
5.667	0.710	7.23	0.70	0.18	9.3	0.845
5.750	0.710	7.23	0.70	0.16	8.7	0.830
5.833	0.710	7.23	0.70	0.14	8.3	0.818
5.917	0.710	7.23	0.70	0.13	7.9	0.809
6.000	0.710	7.23	0.70	0.12	7.7	0.801
6.083	0.710	0.90	0.70	0.12	7.3	0.752
6.167	0.710	0.90	0.70	0.11	6.9	0.706
6.250	0.710	0.90	0.70	0.10	6.5	0.662
6.333	0.710	0.90	0.70	0.10	6.1	0.622
6.417	0.710	0.90	0.70	0.09	5.7	0.584
6.500	0.710	0.90	0.70	0.09	5.4	0.549
6.583	0.710	0.09	0.70	0.08	5.0	0.510
6.667	0.710	0.09	0.70	0.07	4.6	0.474
6.750	0.710	0.09	0.70	0.07	4.3	0.440
6.833	0.710	0.09	0.70	0.06	4.0	0.408
6.917	0.710	0.09	0.70	0.06	3.7	0.378
7.000	0.710	0.09	0.70	0.05	3.4	0.350
7.083	0.710	0.03	0.70	0.05	3.2	0.324
7.167	0.710	0.03	0.70	0.05	2.9	0.299
7.250	0.710	0.03	0.70	0.04	2.7	0.275
7.333	0.710	0.03	0.70	0.04	2.5	0.254
7.417	0.710	0.03	0.70	0.04	2.3	0.233
7.500	0.710	0.03	0.70	0.03	2.1	0.214
7.583	0.710	0.01	0.70	0.03	1.9	0.196
7.667	0.710	0.01	0.70	0.03	1.8	0.179
7.750	0.710	0.01	0.70	0.03	1.6	0.163
7.833	0.710	0.01	0.70	0.02	1.5	0.148
7.917	0.710	0.01	0.70	0.02	1.3	0.134
8.000	0.710	0.01	0.70	0.02	1.2	0.121
8.083	0.710	0.00	0.70	0.02	1.1	0.109
8.167	0.710	0.00	0.70	0.02	1.0	0.097

8.250	0.710	0.00	0.70	0.01	0.9	0.087
8.333	0.710	0.00	0.70	0.01	0.8	0.076
8.417	0.710	0.00	0.70	0.01	0.7	0.067
8.500	0.710	0.00	0.70	0.01	0.6	0.058
8.583	0.710	0.00	0.70	0.01	0.5	0.050
8.667	0.710	0.00	0.70	0.01	0.4	0.042
8.750	0.710	0.00	0.70	0.01	0.4	0.035
8.833	0.710	0.00	0.70	0.00	0.3	0.028
8.917	0.710	0.00	0.70	0.00	0.2	0.021
9.000	0.710	0.00	0.70	0.00	0.2	0.015
9.083	0.710	0.00	0.70	0.00	0.1	0.010
9.167	0.710	0.00	0.70	0.00	0.1	0.004
9.250	0.709	0.00	0.70	0.00	0.0	0.000
9.333	0.705	0.00	0.70	0.00	0.0	0.000
9.417	0.700	0.00	0.70	0.00	0.0	0.000
9.500	0.695	0.00	0.70	0.00	0.0	0.000
9.583	0.690	0.00	0.70	0.00	0.0	0.000
9.667	0.685	0.00	0.70	0.00	0.0	0.000
9.750	0.681	0.00	0.70	0.00	0.0	0.000
9.833	0.676	0.00	0.70	0.00	0.0	0.000
9.917	0.671	0.00	0.70	0.00	0.0	0.000
10.000	0.666	0.00	0.70	0.00	0.0	0.000
10.083	0.661	0.00	0.70	0.00	0.0	0.000
10.167	0.656	0.00	0.70	0.00	0.0	0.000
10.250	0.652	0.00	0.70	0.00	0.0	0.000
10.333	0.647	0.00	0.70	0.00	0.0	0.000
10.417	0.642	0.00	0.70	0.00	0.0	0.000
10.500	0.637	0.00	0.70	0.00	0.0	0.000
10.583	0.632	0.00	0.70	0.00	0.0	0.000
10.667	0.628	0.00	0.70	0.00	0.0	0.000
10.750	0.623	0.00	0.70	0.00	0.0	0.000
10.833	0.618	0.00	0.70	0.00	0.0	0.000
10.917	0.613	0.00	0.70	0.00	0.0	0.000
11.000	0.608	0.00	0.70	0.00	0.0	0.000
11.083	0.603	0.00	0.70	0.00	0.0	0.000
11.167	0.599	0.00	0.70	0.00	0.0	0.000
11.250	0.594	0.00	0.70	0.00	0.0	0.000
11.333	0.589	0.00	0.70	0.00	0.0	0.000
11.417	0.584	0.00	0.70	0.00	0.0	0.000
11.500	0.579	0.00	0.70	0.00	0.0	0.000
11.583	0.574	0.00	0.70	0.00	0.0	0.000
11.667	0.570	0.00	0.70	0.00	0.0	0.000
11.750	0.565	0.00	0.70	0.00	0.0	0.000
11.833	0.560	0.00	0.70	0.00	0.0	0.000
11.917	0.555	0.00	0.70	0.00	0.0	0.000
12.000	0.550	0.00	0.70	0.00	0.0	0.000

```
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =      2.798 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =      1.554 AF
    LOSS    VOLUME =      1.245 AF


****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================


         MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
         STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
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VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 200.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1390.25
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000
3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000

3.833	0.11	0.67	0.00	0.000
3.917	0.38	2.22	0.38	0.000
4.000	0.67	2.75	0.62	0.000
4.083	1.00	3.12	0.95	0.000
4.167	1.38	3.46	1.32	0.000
4.250	1.73	3.71	1.68	0.000
4.333	2.06	3.90	2.02	0.000
4.417	2.37	4.07	2.33	0.000
4.500	2.66	4.20	2.63	0.000
4.583	3.00	4.32	2.96	0.000
4.667	3.40	4.46	3.35	0.000
4.750	3.76	4.57	3.72	0.000
4.833	4.11	4.68	4.07	0.000
4.917	4.43	4.78	4.40	0.000
5.000	4.73	4.85	4.70	0.000
5.083	5.23	4.95	5.18	0.000
5.167	5.92	5.09	5.85	0.000
5.250	6.56	5.20	6.50	0.000
5.333	7.17	5.28	7.10	0.000
5.417	8.19	5.35	8.08	0.000
5.500	9.67	5.36	8.29	0.009
5.583	10.01	5.36	8.30	0.021
5.667	9.29	5.36	8.30	0.028
5.750	8.72	5.36	8.30	0.031
5.833	8.27	5.36	8.30	0.031
5.917	7.91	5.36	8.30	0.028
6.000	7.66	5.36	8.30	0.023
6.083	7.34	5.36	8.30	0.017
6.167	6.89	5.36	8.30	0.007
6.250	6.47	5.31	7.58	0.000
6.333	6.07	5.12	6.22	0.000
6.417	5.70	5.05	5.74	0.000
6.500	5.35	4.97	5.39	0.000
6.583	5.00	4.91	5.04	0.000
6.667	4.65	4.84	4.69	0.000
6.750	4.32	4.75	4.35	0.000
6.833	4.01	4.65	4.04	0.000
6.917	3.71	4.55	3.74	0.000
7.000	3.44	4.47	3.47	0.000
7.083	3.18	4.39	3.21	0.000
7.167	2.94	4.30	2.97	0.000
7.250	2.71	4.22	2.74	0.000
7.333	2.50	4.14	2.53	0.000
7.417	2.30	4.03	2.32	0.000
7.500	2.11	3.93	2.14	0.000
7.583	1.94	3.83	1.96	0.000
7.667	1.77	3.73	1.79	0.000
7.750	1.62	3.63	1.64	0.000
7.833	1.47	3.53	1.49	0.000
7.917	1.34	3.43	1.35	0.000
8.000	1.21	3.32	1.23	0.000
8.083	1.09	3.21	1.10	0.000
8.167	0.98	3.10	0.99	0.000
8.250	0.87	3.00	0.89	0.000
8.333	0.77	2.89	0.79	0.000
8.417	0.68	2.77	0.69	0.000
8.500	0.59	2.66	0.61	0.000
8.583	0.51	2.56	0.53	0.000
8.667	0.43	2.47	0.45	0.000
8.750	0.36	2.13	0.37	0.000
8.833	0.30	1.74	0.30	0.000
8.917	0.23	1.37	0.23	0.000
9.000	0.17	1.02	0.17	0.000

9.083	0.12	0.70	0.12	0.000
9.167	0.07	0.50	0.11	0.000
9.250	0.02	0.50	0.04	0.000
9.333	0.00	0.00	0.04	0.000
9.417	0.00	0.00	0.01	0.000
9.500	0.00	0.00	0.00	0.000
9.583	0.00	0.00	0.00	0.000
9.667	0.00	0.00	0.00	0.000
9.750	0.00	0.00	0.00	0.000
9.833	0.00	0.00	0.00	0.000
9.917	0.00	0.00	0.00	0.000
10.000	0.00	0.00	0.00	0.000
10.083	0.00	0.00	0.00	0.000
10.167	0.00	0.00	0.00	0.000
10.250	0.00	0.00	0.00	0.000
10.333	0.00	0.00	0.00	0.000
10.417	0.00	0.00	0.00	0.000
10.500	0.00	0.00	0.00	0.000
10.583	0.00	0.00	0.00	0.000
10.667	0.00	0.00	0.00	0.000
10.750	0.00	0.00	0.00	0.000
10.833	0.00	0.00	0.00	0.000
10.917	0.00	0.00	0.00	0.000
11.000	0.00	0.00	0.00	0.000
11.083	0.00	0.00	0.00	0.000
11.167	0.00	0.00	0.00	0.000
11.250	0.00	0.00	0.00	0.000
11.333	0.00	0.00	0.00	0.000
11.417	0.00	0.00	0.00	0.000
11.500	0.00	0.00	0.00	0.000
11.583	0.00	0.00	0.00	0.000
11.667	0.00	0.00	0.00	0.000
11.750	0.00	0.00	0.00	0.000
11.833	0.00	0.00	0.00	0.000
11.917	0.00	0.00	0.00	0.000
12.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-24HR
----------------------------------------------------------------------------
  FILE NAME: TRIAL124.DAT
  TIME/DATE OF STUDY: 07:40 05/07/2014


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  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.010
         USER-ENTERED RAINFALL =  7.80 INCHES
         RCFC&WCD 24-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                17.139
        2                98.621                 6.715
        3                99.599                 0.236
        4                99.839                 0.058
        5                99.960                 0.029
        6               100.000                 0.010
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0390	0.0331	0.0058
2	0.0546	0.0464	0.0082
3	0.0468	0.0398	0.0070
4	0.0546	0.0464	0.0082
5	0.0624	0.0530	0.0094
6	0.0780	0.0663	0.0117
7	0.0780	0.0663	0.0117
8	0.0858	0.0729	0.0129
9	0.1014	0.0862	0.0152
10	0.1170	0.0866	0.0304
11	0.1014	0.0833	0.0181
12	0.1248	0.0801	0.0447
13	0.1404	0.0770	0.0634
14	0.1560	0.0738	0.0822
15	0.1638	0.0708	0.0930
16	0.1950	0.0678	0.1272
17	0.2340	0.0648	0.1692
18	0.2574	0.0619	0.1955
19	0.3042	0.0590	0.2452
20	0.3354	0.0562	0.2792
21	0.2340	0.0534	0.1806
22	0.3120	0.0507	0.2613
23	0.2964	0.0481	0.2483
24	0.2730	0.0455	0.2275
25	0.3978	0.0430	0.3548
26	0.4446	0.0405	0.4041
27	0.5304	0.0381	0.4923
28	0.3588	0.0357	0.3231
29	0.4134	0.0334	0.3800
30	0.3978	0.0312	0.3666
31	0.3666	0.0290	0.3376
32	0.2964	0.0269	0.2694
33	0.0624	0.0249	0.0375
34	0.0468	0.0230	0.0238
35	0.0780	0.0211	0.0569
36	0.0702	0.0193	0.0509
37	0.0624	0.0175	0.0449
38	0.0390	0.0159	0.0231
39	0.0546	0.0143	0.0403
40	0.0390	0.0128	0.0262
41	0.0468	0.0115	0.0353
42	0.0390	0.0102	0.0288
43	0.0390	0.0090	0.0300
44	0.0390	0.0079	0.0311
45	0.0390	0.0070	0.0320
46	0.0312	0.0062	0.0250
47	0.0312	0.0055	0.0257
48	0.0312	0.0051	0.0261

TOTAL STORM RAINFALL(INCHES) = 7.80
TOTAL SOIL-LOSS(INCHES) = 1.98
TOTAL EFFECTIVE RAINFALL(INCHES) = 5.82

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.9786

TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.8183

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0007	0.10	Q	.	.	.	.
0.167	0.0014	0.10	Q	.	.	.	.
0.250	0.0021	0.10	Q	.	.	.	.
0.333	0.0028	0.10	Q	.	.	.	.
0.417	0.0035	0.10	Q	.	.	.	.
0.500	0.0041	0.10	Q	.	.	.	.
0.583	0.0054	0.18	Q	.	.	.	.
0.667	0.0066	0.18	Q	.	.	.	.
0.750	0.0079	0.18	Q	.	.	.	.
0.833	0.0091	0.18	Q	.	.	.	.
0.917	0.0103	0.18	Q	.	.	.	.
1.000	0.0116	0.18	Q	.	.	.	.
1.083	0.0128	0.18	Q	.	.	.	.
1.167	0.0140	0.18	Q	.	.	.	.
1.250	0.0152	0.18	Q	.	.	.	.
1.333	0.0164	0.18	Q	.	.	.	.
1.417	0.0177	0.18	Q	.	.	.	.
1.500	0.0189	0.18	Q	.	.	.	.
1.583	0.0202	0.19	Q	.	.	.	.
1.667	0.0215	0.19	Q	.	.	.	.
1.750	0.0228	0.19	Q	.	.	.	.
1.833	0.0241	0.19	Q	.	.	.	.
1.917	0.0254	0.19	Q	.	.	.	.
2.000	0.0267	0.19	Q	.	.	.	.
2.083	0.0282	0.22	Q	.	.	.	.
2.167	0.0297	0.22	Q	.	.	.	.
2.250	0.0312	0.22	Q	.	.	.	.
2.333	0.0327	0.22	Q	.	.	.	.
2.417	0.0342	0.22	Q	.	.	.	.
2.500	0.0357	0.22	Q	.	.	.	.
2.583	0.0375	0.27	Q	.	.	.	.
2.667	0.0394	0.27	Q	.	.	.	.
2.750	0.0412	0.27	Q	.	.	.	.
2.833	0.0430	0.27	Q	.	.	.	.
2.917	0.0449	0.27	Q	.	.	.	.
3.000	0.0467	0.27	Q	.	.	.	.
3.083	0.0486	0.28	Q	.	.	.	.
3.167	0.0506	0.28	Q	.	.	.	.
3.250	0.0525	0.28	Q	.	.	.	.
3.333	0.0545	0.28	Q	.	.	.	.
3.417	0.0564	0.28	Q	.	.	.	.
3.500	0.0584	0.28	Q	.	.	.	.
3.583	0.0604	0.30	Q	.	.	.	.
3.667	0.0625	0.30	Q	.	.	.	.
3.750	0.0646	0.30	Q	.	.	.	.
3.833	0.0667	0.30	Q	.	.	.	.
3.917	0.0688	0.30	Q	.	.	.	.
4.000	0.0709	0.30	Q	.	.	.	.
4.083	0.0733	0.35	Q	.	.	.	.

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4.167      0.0757      0.35  Q          .          .          .          .
4.250      0.0781      0.35  Q          .          .          .          .
4.333      0.0805      0.35  Q          .          .          .          .
4.417      0.0829      0.35  Q          .          .          .          .
4.500      0.0854      0.35  Q          .          .          .          .
4.583      0.0897      0.63  VQ         .          .          .          .
4.667      0.0940      0.63  VQ         .          .          .          .
4.750      0.0983      0.63  VQ         .          .          .          .
4.833      0.1026      0.63  VQ         .          .          .          .
4.917      0.1070      0.63  VQ         .          .          .          .
5.000      0.1113      0.63  VQ         .          .          .          .
5.083      0.1149      0.52  VQ         .          .          .          .
5.167      0.1184      0.52  VQ         .          .          .          .
5.250      0.1220      0.52  VQ         .          .          .          .
5.333      0.1256      0.52  VQ         .          .          .          .
5.417      0.1291      0.52  VQ         .          .          .          .
5.500      0.1327      0.52  VQ         .          .          .          .
5.583      0.1389      0.90  VQ         .          .          .          .
5.667      0.1450      0.90  VQ         .          .          .          .
5.750      0.1512      0.90   Q         .          .          .          .
5.833      0.1574      0.90   Q         .          .          .          .
5.917      0.1635      0.90   Q         .          .          .          .
6.000      0.1697      0.90   Q         .          .          .          .
6.083      0.1793      1.39  .VQ        .          .          .          .
6.167      0.1889      1.39  .VQ        .          .          .          .
6.250      0.1985      1.39  .VQ        .          .          .          .
6.333      0.2081      1.39  .VQ        .          .          .          .
6.417      0.2177      1.39  .VQ        .          .          .          .
6.500      0.2273      1.39  .VQ        .          .          .          .
6.583      0.2400      1.85  .V Q       .          .          .          .
6.667      0.2527      1.85  .V Q       .          .          .          .
6.750      0.2655      1.85  .V Q       .          .          .          .
6.833      0.2782      1.85  .V Q       .          .          .          .
6.917      0.2909      1.85  .V Q       .          .          .          .
7.000      0.3036      1.85  . VQ       .          .          .          .
7.083      0.3185      2.16  . V Q      .          .          .          .
7.167      0.3334      2.16  . V Q      .          .          .          .
7.250      0.3483      2.16  . V Q      .          .          .          .
7.333      0.3632      2.16  . V Q      .          .          .          .
7.417      0.3782      2.16  . V Q      .          .          .          .
7.500      0.3931      2.16  . V Q      .          .          .          .
7.583      0.4126      2.83  . V  Q     .          .          .          .
7.667      0.4320      2.83  . V  Q     .          .          .          .
7.750      0.4515      2.83  .  V Q     .          .          .          .
7.833      0.4710      2.83  .  V Q     .          .          .          .
7.917      0.4905      2.83  .  V Q     .          .          .          .
8.000      0.5100      2.83  .  V Q     .          .          .          .
8.083      0.5361      3.78  .  V   Q   .          .          .          .
8.167      0.5621      3.78  .  V   Q   .          .          .          .
8.250      0.5882      3.78  .   V  Q   .          .          .          .
8.333      0.6142      3.78  .   V  Q   .          .          .          .
8.417      0.6403      3.78  .   V  Q   .          .          .          .
8.500      0.6664      3.78  .   V  Q   .          .          .          .
8.583      0.6975      4.53  .   V    Q.          .          .          .
8.667      0.7287      4.53  .    V   Q.          .          .          .
8.750      0.7599      4.53  .    V   Q.          .          .          .
8.833      0.7910      4.53  .    V   Q.          .          .          .
8.917      0.8222      4.53  .    V   Q.          .          .          .
9.000      0.8534      4.53  .    V   Q.          .          .          .
9.083      0.8917      5.57  .     V   .Q         .          .          .
9.167      0.9300      5.57  .     V   .Q         .          .          .
9.250      0.9684      5.57  .     V   .Q         .          .          .
9.333      1.0067      5.57  .     V   .Q         .          .          .
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 9.417      1.0450      5.57  .      V  .Q        .         .         .
 9.500      1.0834      5.57  .      V  .Q        .         .         .
 9.583      1.1281      6.49  .      V  . Q       .         .         .
 9.667      1.1728      6.49  .       V . Q       .         .         .
 9.750      1.2175      6.49  .       V . Q       .         .         .
 9.833      1.2622      6.49  .       V . Q       .         .         .
 9.917      1.3069      6.49  .       V . Q       .         .         .
10.000      1.3517      6.49  .        V. Q       .         .         .
10.083      1.3864      5.04  .        VQ         .         .         .
10.167      1.4211      5.04  .        VQ         .         .         .
10.250      1.4559      5.04  .         Q         .         .         .
10.333      1.4906      5.04  .         Q         .         .         .
10.417      1.5254      5.04  .         Q         .         .         .
10.500      1.5601      5.04  .         Q         .         .         .
10.583      1.5999      5.78  .         VQ        .         .         .
10.667      1.6397      5.78  .          Q        .         .         .
10.750      1.6795      5.78  .          Q        .         .         .
10.833      1.7193      5.78  .          Q        .         .         .
10.917      1.7591      5.78  .          QV       .         .         .
11.000      1.7989      5.78  .          QV       .         .         .
11.083      1.8407      6.08  .         . Q       .         .         .
11.167      1.8826      6.08  .         . Q       .         .         .
11.250      1.9244      6.08  .         . QV      .         .         .
11.333      1.9663      6.08  .         . QV      .         .         .
11.417      2.0082      6.08  .         . QV      .         .         .
11.500      2.0500      6.08  .         . Q V     .         .         .
11.583      2.0889      5.65  .         .Q  V     .         .         .
11.667      2.1278      5.65  .         .Q  V     .         .         .
11.750      2.1667      5.65  .         .Q  V     .         .         .
11.833      2.2057      5.65  .         .Q   V    .         .         .
11.917      2.2446      5.65  .         .Q   V    .         .         .
12.000      2.2835      5.65  .         .Q   V    .         .         .
12.083      2.3364      7.69  .         .    QV   .         .         .
12.167      2.3894      7.69  .         .    QV   .         .         .
12.250      2.4424      7.69  .         .    QV   .         .         .
12.333      2.4953      7.69  .         .    Q V  .         .         .
12.417      2.5483      7.69  .         .    Q V  .         .         .
12.500      2.6013      7.69  .         .    Q V  .         .         .
12.583      2.6659      9.39  .         .       Q .         .         .
12.667      2.7306      9.39  .         .       Q .         .         .
12.750      2.7952      9.39  .         .       QV.         .         .
12.833      2.8598      9.39  .         .       QV.         .         .
12.917      2.9245      9.39  .         .       Q V         .         .
13.000      2.9891      9.39  .         .       Q V         .         .
13.083      3.0667     11.26  .         .         .VQ       .         .
13.167      3.1442     11.26  .         .         .VQ       .         .
13.250      3.2217     11.26  .         .         . Q       .         .
13.333      3.2993     11.26  .         .         . Q       .         .
13.417      3.3768     11.26  .         .         . QV      .         .
13.500      3.4543     11.26  .         .         . QV      .         .
13.583      3.5161      8.97  .         .      Q  .   V     .         .
13.667      3.5779      8.97  .         .      Q  .   V     .         .
13.750      3.6396      8.97  .         .      Q  .    V    .         .
13.833      3.7014      8.97  .         .      Q  .    V    .         .
13.917      3.7632      8.97  .         .      Q  .    V    .         .
14.000      3.8249      8.97  .         .      Q  .     V   .         .
14.083      3.8858      8.83  .         .      Q  .     V   .         .
14.167      3.9466      8.83  .         .      Q  .      V  .         .
14.250      4.0075      8.83  .         .      Q  .      V  .         .
14.333      4.0683      8.83  .         .      Q  .      V  .         .
14.417      4.1291      8.83  .         .      Q  .       V .         .
14.500      4.1900      8.83  .         .      Q  .       V .         .
14.583      4.2516      8.95  .         .      Q  .        V.         .
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14.667      4.3133      8.95  .         .      Q  .        V.         .
14.750      4.3750      8.95  .         .      Q  .         V         .
14.833      4.4367      8.95  .         .      Q  .         V         .
14.917      4.4983      8.95  .         .      Q  .         V         .
15.000      4.5600      8.95  .         .      Q  .          V        .
15.083      4.6177      8.37  .         .     Q   .         .V        .
15.167      4.6753      8.37  .         .     Q   .         . V       .
15.250      4.7330      8.37  .         .     Q   .         . V       .
15.333      4.7907      8.37  .         .     Q   .         . V       .
15.417      4.8484      8.37  .         .     Q   .         .  V      .
15.500      4.9060      8.37  .         .     Q   .         .  V      .
15.583      4.9543      7.01  .         .   Q     .         .   V     .
15.667      5.0026      7.01  .         .   Q     .         .   V     .
15.750      5.0508      7.01  .         .   Q     .         .   V     .
15.833      5.0991      7.01  .         .   Q     .         .    V    .
15.917      5.1473      7.01  .         .   Q     .         .    V    .
16.000      5.1956      7.01  .         .   Q     .         .    V    .
16.083      5.2133      2.57  .    Q    .         .         .    V    .
16.167      5.2310      2.57  .    Q    .         .         .    V    .
16.250      5.2486      2.57  .    Q    .         .         .     V   .
16.333      5.2663      2.57  .    Q    .         .         .     V   .
16.417      5.2840      2.57  .    Q    .         .         .     V   .
16.500      5.3017      2.57  .    Q    .         .         .     V   .
16.583      5.3069      0.76  .Q        .         .         .     V   .
16.667      5.3121      0.76  .Q        .         .         .     V   .
16.750      5.3173      0.76  .Q        .         .         .     V   .
16.833      5.3226      0.76  .Q        .         .         .     V   .
16.917      5.3278      0.76  .Q        .         .         .     V   .
17.000      5.3330      0.76  .Q        .         .         .     V   .
17.083      5.3411      1.17  . Q       .         .         .     V   .
17.167      5.3492      1.17  . Q       .         .         .     V   .
17.250      5.3573      1.17  . Q       .         .         .     V   .
17.333      5.3653      1.17  . Q       .         .         .     V   .
17.417      5.3734      1.17  . Q       .         .         .     V   .
17.500      5.3815      1.17  . Q       .         .         .     V   .
17.583      5.3903      1.27  . Q       .         .         .      V  .
17.667      5.3990      1.27  . Q       .         .         .      V  .
17.750      5.4078      1.27  . Q       .         .         .      V  .
17.833      5.4166      1.27  . Q       .         .         .      V  .
17.917      5.4254      1.27  . Q       .         .         .      V  .
18.000      5.4341      1.27  . Q       .         .         .      V  .
18.083      5.4419      1.13  . Q       .         .         .      V  .
18.167      5.4497      1.13  . Q       .         .         .      V  .
18.250      5.4575      1.13  . Q       .         .         .      V  .
18.333      5.4653      1.13  . Q       .         .         .      V  .
18.417      5.4730      1.13  . Q       .         .         .      V  .
18.500      5.4808      1.13  . Q       .         .         .      V  .
18.583      5.4857      0.71  .Q        .         .         .      V  .
18.667      5.4906      0.71  .Q        .         .         .      V  .
18.750      5.4956      0.71  .Q        .         .         .      V  .
18.833      5.5005      0.71  .Q        .         .         .      V  .
18.917      5.5054      0.71  .Q        .         .         .      V  .
19.000      5.5103      0.71  .Q        .         .         .      V  .
19.083      5.5162      0.86  .Q        .         .         .      V  .
19.167      5.5222      0.86  .Q        .         .         .      V  .
19.250      5.5281      0.86  .Q        .         .         .       V .
19.333      5.5340      0.86  .Q        .         .         .       V .
19.417      5.5399      0.86  .Q        .         .         .       V .
19.500      5.5459      0.86  .Q        .         .         .       V .
19.583      5.5509      0.73  .Q        .         .         .       V .
19.667      5.5559      0.73  .Q        .         .         .       V .
19.750      5.5609      0.73  .Q        .         .         .       V .
19.833      5.5660      0.73  .Q        .         .         .       V .
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 19.917      5.5710      0.73  .Q         .         .         .       V .
 20.000      5.5760      0.73  .Q         .         .         .       V .
 20.083      5.5815      0.79  .Q         .         .         .       V .
 20.167      5.5869      0.79  .Q         .         .         .       V .
 20.250      5.5924      0.79  .Q         .         .         .       V .
 20.333      5.5979      0.79  .Q         .         .         .       V .
 20.417      5.6033      0.79  .Q         .         .         .       V .
 20.500      5.6088      0.79  .Q         .         .         .       V .
 20.583      5.6139      0.74  .Q         .         .         .       V .
 20.667      5.6190      0.74  .Q         .         .         .       V .
 20.750      5.6241      0.74  .Q         .         .         .       V .
 20.833      5.6292      0.74  .Q         .         .         .       V .
 20.917      5.6343      0.74  .Q         .         .         .       V .
 21.000      5.6394      0.74  .Q         .         .         .       V .
 21.083      5.6444      0.72  .Q         .         .         .       V .
 21.167      5.6493      0.72  .Q         .         .         .       V .
 21.250      5.6543      0.72  .Q         .         .         .       V .
 21.333      5.6592      0.72  .Q         .         .         .       V .
 21.417      5.6642      0.72  .Q         .         .         .       V .
 21.500      5.6691      0.72  .Q         .         .         .       V .
 21.583      5.6742      0.74  .Q         .         .         .        V.
 21.667      5.6794      0.74  .Q         .         .         .        V.
 21.750      5.6845      0.74  .Q         .         .         .        V.
 21.833      5.6896      0.74  .Q         .         .         .        V.
 21.917      5.6947      0.74  .Q         .         .         .        V.
 22.000      5.6999      0.74  .Q         .         .         .        V.
 22.083      5.7052      0.77  .Q         .         .         .        V.
 22.167      5.7104      0.77  .Q         .         .         .        V.
 22.250      5.7157      0.77  .Q         .         .         .        V.
 22.333      5.7210      0.77  .Q         .         .         .        V.
 22.417      5.7263      0.77  .Q         .         .         .        V.
 22.500      5.7316      0.77  .Q         .         .         .        V.
 22.583      5.7361      0.65  .Q         .         .         .        V.
 22.667      5.7406      0.65  .Q         .         .         .        V.
 22.750      5.7451      0.65  .Q         .         .         .        V.
 22.833      5.7496      0.65  .Q         .         .         .        V.
 22.917      5.7541      0.65  .Q         .         .         .        V.
 23.000      5.7586      0.65  .Q         .         .         .        V.
 23.083      5.7629      0.62  .Q         .         .         .        V.
 23.166      5.7671      0.62  .Q         .         .         .        V.
 23.250      5.7714      0.62  .Q         .         .         .        V.
 23.333      5.7756      0.62  .Q         .         .         .        V.
 23.416      5.7799      0.62  .Q         .         .         .        V.
 23.500      5.7842      0.62  .Q         .         .         .        V.
 23.583      5.7885      0.63  .Q         .         .         .        V.
 23.666      5.7928      0.63  .Q         .         .         .        V.
 23.750      5.7971      0.63  .Q         .         .         .        V.
 23.833      5.8015      0.63  .Q         .         .         .        V.
 23.916      5.8058      0.63  .Q         .         .         .        V.
 24.000      5.8101      0.63  .Q         .         .         .        V.
 24.083      5.8114      0.18  Q          .         .         .        V.
 24.166      5.8127      0.18  Q          .         .         .        V.
 24.250      5.8139      0.18  Q          .         .         .        V.
 24.333      5.8152      0.18  Q          .         .         .        V.
 24.416      5.8165      0.18  Q          .         .         .        V.
 24.500      5.8177      0.18  Q          .         .         .        V.
 24.583      5.8178      0.01  Q          .         .         .        V.
 24.666      5.8179      0.01  Q          .         .         .        V.
 24.750      5.8179      0.01  Q          .         .         .        V.
 24.833      5.8180      0.01  Q          .         .         .        V.
 24.916      5.8180      0.01  Q          .         .         .        V.
 25.000      5.8181      0.01  Q          .         .         .        V.
-------------------------------------------------------------------------------
```

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1500.0
10%	720.0
20%	540.0
30%	480.0
40%	450.0
50%	360.0
60%	240.0
70%	180.0
80%	60.0
90%	30.0

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================

                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                 __effective depth
                 -----------             |   (and volume)
                |           |    |    |
                |           |    |....V........
                | detention |<-->|           outflow
                |   basin   |    |.........______
                 -----------     |    ^    |  \
                       |         |  dead   |   basin outlet
                       V         | storage |
                    OUTFLOW       ---------
                  (STREAM 1)


        ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
        THROUGH A FLOW-THROUGH DETENTION BASIN
        SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
          DEAD STORAGE(AF) =      0.710
          SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
          SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
          DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.70
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.21	1.091

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.10	0.10	0.00	0.0	0.000
0.167	0.000	0.10	0.20	0.00	0.0	0.000
0.250	0.000	0.10	0.30	0.00	0.0	0.000
0.333	0.000	0.10	0.40	0.00	0.0	0.000
0.417	0.000	0.10	0.50	0.00	0.0	0.000
0.500	0.000	0.10	0.60	0.00	0.0	0.000
0.583	0.000	0.18	0.70	0.00	0.0	0.000
0.667	0.000	0.18	0.70	0.00	0.0	0.000
0.750	0.000	0.18	0.70	0.00	0.0	0.000
0.833	0.000	0.18	0.70	0.00	0.0	0.000
0.917	0.000	0.18	0.70	0.00	0.0	0.000
1.000	0.000	0.18	0.70	0.00	0.0	0.000
1.083	0.000	0.18	0.70	0.00	0.0	0.000
1.167	0.000	0.18	0.70	0.00	0.0	0.000
1.250	0.000	0.18	0.70	0.00	0.0	0.000
1.333	0.000	0.18	0.70	0.00	0.0	0.000
1.417	0.000	0.18	0.70	0.00	0.0	0.000
1.500	0.000	0.18	0.70	0.00	0.0	0.000
1.583	0.000	0.19	0.70	0.00	0.0	0.000
1.667	0.000	0.19	0.70	0.00	0.0	0.000
1.750	0.000	0.19	0.70	0.00	0.0	0.000
1.833	0.000	0.19	0.70	0.00	0.0	0.000
1.917	0.000	0.19	0.70	0.00	0.0	0.000
2.000	0.000	0.19	0.70	0.00	0.0	0.000
2.083	0.000	0.22	0.70	0.00	0.0	0.000
2.167	0.000	0.22	0.70	0.00	0.0	0.000
2.250	0.000	0.22	0.70	0.00	0.0	0.000
2.333	0.000	0.22	0.70	0.00	0.0	0.000
2.417	0.000	0.22	0.70	0.00	0.0	0.000
2.500	0.000	0.22	0.70	0.00	0.0	0.000
2.583	0.000	0.27	0.70	0.00	0.0	0.000
2.667	0.000	0.27	0.70	0.00	0.0	0.000
2.750	0.000	0.27	0.70	0.00	0.0	0.000
2.833	0.000	0.27	0.70	0.00	0.0	0.000
2.917	0.000	0.27	0.70	0.00	0.0	0.000
3.000	0.000	0.27	0.70	0.00	0.0	0.000
3.083	0.000	0.28	0.70	0.00	0.0	0.000
3.167	0.000	0.28	0.70	0.00	0.0	0.000
3.250	0.000	0.28	0.70	0.00	0.0	0.000
3.333	0.000	0.28	0.70	0.00	0.0	0.000
3.417	0.000	0.28	0.70	0.00	0.0	0.000
3.500	0.000	0.28	0.70	0.00	0.0	0.000
3.583	0.000	0.30	0.70	0.00	0.0	0.000
3.667	0.000	0.30	0.70	0.00	0.0	0.000
3.750	0.000	0.30	0.70	0.00	0.0	0.000
3.833	0.000	0.30	0.70	0.00	0.0	0.000
3.917	0.000	0.30	0.70	0.00	0.0	0.000
4.000	0.000	0.30	0.70	0.00	0.0	0.000
4.083	0.000	0.35	0.70	0.00	0.0	0.000
4.167	0.000	0.35	0.70	0.00	0.0	0.000
4.250	0.000	0.35	0.70	0.00	0.0	0.000
4.333	0.000	0.35	0.70	0.00	0.0	0.000
4.417	0.000	0.35	0.70	0.00	0.0	0.000
4.500	0.000	0.35	0.70	0.00	0.0	0.000

4.583	0.000	0.63	0.70	0.00	0.0	0.000
4.667	0.000	0.63	0.70	0.00	0.0	0.000
4.750	0.000	0.63	0.70	0.00	0.0	0.000
4.833	0.000	0.63	0.70	0.00	0.0	0.000
4.917	0.000	0.63	0.70	0.00	0.0	0.000
5.000	0.000	0.63	0.70	0.00	0.0	0.000
5.083	0.000	0.52	0.70	0.00	0.0	0.000
5.167	0.000	0.52	0.70	0.00	0.0	0.000
5.250	0.000	0.52	0.70	0.00	0.0	0.000
5.333	0.000	0.52	0.70	0.00	0.0	0.000
5.417	0.000	0.52	0.70	0.00	0.0	0.000
5.500	0.000	0.52	0.70	0.00	0.0	0.000
5.583	0.001	0.90	0.70	0.00	0.0	0.000
5.667	0.003	0.90	0.70	0.00	0.0	0.000
5.750	0.004	0.90	0.70	0.00	0.0	0.000
5.833	0.005	0.90	0.70	0.00	0.0	0.000
5.917	0.007	0.90	0.70	0.00	0.0	0.000
6.000	0.008	0.90	0.70	0.00	0.0	0.000
6.083	0.013	1.39	0.70	0.00	0.0	0.000
6.167	0.018	1.39	0.70	0.00	0.0	0.000
6.250	0.022	1.39	0.70	0.00	0.0	0.000
6.333	0.027	1.39	0.70	0.00	0.0	0.000
6.417	0.032	1.39	0.70	0.00	0.0	0.000
6.500	0.037	1.39	0.70	0.00	0.0	0.000
6.583	0.045	1.85	0.70	0.00	0.0	0.000
6.667	0.053	1.85	0.70	0.00	0.0	0.000
6.750	0.060	1.85	0.70	0.00	0.0	0.000
6.833	0.068	1.85	0.70	0.00	0.0	0.000
6.917	0.076	1.85	0.70	0.00	0.0	0.000
7.000	0.084	1.85	0.70	0.00	0.0	0.000
7.083	0.094	2.16	0.70	0.00	0.0	0.000
7.167	0.104	2.16	0.70	0.00	0.0	0.000
7.250	0.114	2.16	0.70	0.00	0.0	0.000
7.333	0.124	2.16	0.70	0.00	0.0	0.000
7.417	0.135	2.16	0.70	0.00	0.0	0.000
7.500	0.145	2.16	0.70	0.00	0.0	0.000
7.583	0.159	2.83	0.70	0.00	0.0	0.000
7.667	0.174	2.83	0.70	0.00	0.0	0.000
7.750	0.189	2.83	0.70	0.00	0.0	0.000
7.833	0.203	2.83	0.70	0.00	0.0	0.000
7.917	0.218	2.83	0.70	0.00	0.0	0.000
8.000	0.233	2.83	0.70	0.00	0.0	0.000
8.083	0.254	3.78	0.70	0.00	0.0	0.000
8.167	0.275	3.78	0.70	0.00	0.0	0.000
8.250	0.296	3.78	0.70	0.00	0.0	0.000
8.333	0.318	3.78	0.70	0.00	0.0	0.000
8.417	0.339	3.78	0.70	0.00	0.0	0.000
8.500	0.360	3.78	0.70	0.00	0.0	0.000
8.583	0.386	4.53	0.70	0.00	0.0	0.000
8.667	0.413	4.53	0.70	0.00	0.0	0.000
8.750	0.439	4.53	0.70	0.00	0.0	0.000
8.833	0.465	4.53	0.70	0.00	0.0	0.000
8.917	0.492	4.53	0.70	0.00	0.0	0.000
9.000	0.518	4.53	0.70	0.00	0.0	0.000
9.083	0.552	5.57	0.70	0.00	0.0	0.000
9.167	0.585	5.57	0.70	0.00	0.0	0.000
9.250	0.619	5.57	0.70	0.00	0.0	0.000
9.333	0.652	5.57	0.70	0.00	0.0	0.000
9.417	0.686	5.57	0.70	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 4.2 (less LOSS)
REMAINING UNIT FLOW IS 1.3 CFS.

9.500	0.710	5.57	0.70	0.00	0.0	0.009
9.583	0.710	6.49	0.70	0.01	0.3	0.047

9.667	0.710	6.49	0.70	0.01	0.6	0.083
9.750	0.710	6.49	0.70	0.02	0.9	0.116
9.833	0.710	6.49	0.70	0.02	1.2	0.147
9.917	0.710	6.49	0.70	0.03	1.5	0.177
10.000	0.710	6.49	0.70	0.03	1.8	0.204
10.083	0.710	5.04	0.70	0.03	2.0	0.220
10.167	0.710	5.04	0.70	0.04	2.2	0.235
10.250	0.710	5.04	0.70	0.04	2.3	0.250
10.333	0.710	5.04	0.70	0.04	2.4	0.263
10.417	0.710	5.04	0.70	0.04	2.5	0.275
10.500	0.710	5.04	0.70	0.04	2.7	0.287
10.583	0.710	5.78	0.70	0.05	2.8	0.303
10.667	0.710	5.78	0.70	0.05	2.9	0.317
10.750	0.710	5.78	0.70	0.05	3.1	0.331
10.833	0.710	5.78	0.70	0.05	3.2	0.344
10.917	0.710	5.78	0.70	0.06	3.3	0.356
11.000	0.710	5.78	0.70	0.06	3.4	0.368
11.083	0.710	6.08	0.70	0.06	3.5	0.381
11.167	0.710	6.08	0.70	0.06	3.7	0.392
11.250	0.710	6.08	0.70	0.06	3.8	0.404
11.333	0.710	6.08	0.70	0.06	3.9	0.414
11.417	0.710	6.08	0.70	0.07	4.0	0.424
11.500	0.710	6.08	0.70	0.07	4.0	0.433
11.583	0.710	5.65	0.70	0.07	4.1	0.439
11.667	0.710	5.65	0.70	0.07	4.2	0.444
11.750	0.710	5.65	0.70	0.07	4.2	0.449
11.833	0.710	5.65	0.70	0.07	4.3	0.454
11.917	0.710	5.65	0.70	0.07	4.3	0.458
12.000	0.710	5.65	0.70	0.07	4.3	0.462
12.083	0.710	7.69	0.70	0.07	4.5	0.480
12.167	0.710	7.69	0.70	0.08	4.6	0.496
12.250	0.710	7.69	0.70	0.08	4.8	0.511
12.333	0.710	7.69	0.70	0.08	4.9	0.526
12.417	0.710	7.69	0.70	0.08	5.0	0.539
12.500	0.710	7.69	0.70	0.09	5.2	0.552
12.583	0.710	9.39	0.70	0.09	5.3	0.575
12.667	0.710	9.39	0.70	0.09	5.5	0.597
12.750	0.710	9.39	0.70	0.10	5.7	0.617
12.833	0.710	9.39	0.70	0.10	5.9	0.636
12.917	0.710	9.39	0.70	0.10	6.1	0.654
13.000	0.710	9.39	0.70	0.10	6.3	0.671
13.083	0.710	11.26	0.70	0.11	6.5	0.699
13.167	0.710	11.26	0.70	0.11	6.7	0.725
13.250	0.710	11.26	0.70	0.12	7.0	0.750
13.333	0.710	11.26	0.70	0.12	7.2	0.773
13.417	0.710	11.26	0.70	0.12	7.4	0.795
13.500	0.710	11.26	0.70	0.14	7.7	0.814
13.583	0.710	8.97	0.70	0.14	8.0	0.816
13.667	0.710	8.97	0.70	0.14	8.0	0.818
13.750	0.710	8.97	0.70	0.15	8.1	0.819
13.833	0.710	8.97	0.70	0.15	8.1	0.820
13.917	0.710	8.97	0.70	0.15	8.2	0.821
14.000	0.710	8.97	0.70	0.15	8.2	0.822
14.083	0.710	8.83	0.70	0.15	8.2	0.821
14.167	0.710	8.83	0.70	0.15	8.2	0.821
14.250	0.710	8.83	0.70	0.15	8.2	0.821
14.333	0.710	8.83	0.70	0.15	8.2	0.821
14.417	0.710	8.83	0.70	0.15	8.2	0.820
14.500	0.710	8.83	0.70	0.15	8.1	0.820
14.583	0.710	8.95	0.70	0.15	8.2	0.821
14.667	0.710	8.95	0.70	0.15	8.2	0.822
14.750	0.710	8.95	0.70	0.15	8.2	0.822
14.833	0.710	8.95	0.70	0.15	8.2	0.822

14.917	0.710	8.95	0.70	0.15	8.2	0.823
15.000	0.710	8.95	0.70	0.15	8.2	0.823
15.083	0.710	8.37	0.70	0.15	8.2	0.819
15.167	0.710	8.37	0.70	0.14	8.1	0.817
15.250	0.710	8.37	0.70	0.14	8.0	0.814
15.333	0.710	8.37	0.70	0.14	7.9	0.813
15.417	0.710	8.37	0.70	0.13	7.9	0.811
15.500	0.710	8.37	0.70	0.13	7.8	0.810
15.583	0.710	7.01	0.70	0.12	7.7	0.801
15.667	0.710	7.01	0.70	0.12	7.5	0.792
15.750	0.710	7.01	0.70	0.12	7.5	0.784
15.833	0.710	7.01	0.70	0.12	7.4	0.777
15.917	0.710	7.01	0.70	0.12	7.3	0.770
16.000	0.710	7.01	0.70	0.12	7.2	0.764
16.083	0.710	2.57	0.70	0.11	7.1	0.728
16.167	0.710	2.57	0.70	0.11	6.7	0.695
16.250	0.710	2.57	0.70	0.10	6.4	0.663
16.333	0.710	2.57	0.70	0.10	6.1	0.634
16.417	0.710	2.57	0.70	0.09	5.9	0.606
16.500	0.710	2.57	0.70	0.09	5.6	0.581
16.583	0.710	0.76	0.70	0.08	5.3	0.544
16.667	0.710	0.76	0.70	0.08	5.0	0.510
16.750	0.710	0.76	0.70	0.07	4.7	0.479
16.833	0.710	0.76	0.70	0.07	4.4	0.449
16.917	0.710	0.76	0.70	0.07	4.1	0.421
17.000	0.710	0.76	0.70	0.06	3.9	0.395
17.083	0.710	1.17	0.70	0.06	3.6	0.373
17.167	0.710	1.17	0.70	0.05	3.4	0.353
17.250	0.710	1.17	0.70	0.05	3.2	0.334
17.333	0.710	1.17	0.70	0.05	3.1	0.316
17.417	0.710	1.17	0.70	0.05	2.9	0.299
17.500	0.710	1.17	0.70	0.04	2.8	0.283
17.583	0.710	1.27	0.70	0.04	2.6	0.269
17.667	0.710	1.27	0.70	0.04	2.5	0.256
17.750	0.710	1.27	0.70	0.04	2.4	0.244
17.833	0.710	1.27	0.70	0.04	2.2	0.232
17.917	0.710	1.27	0.70	0.03	2.1	0.221
18.000	0.710	1.27	0.70	0.03	2.0	0.211
18.083	0.710	1.13	0.70	0.03	1.9	0.201
18.167	0.710	1.13	0.70	0.03	1.9	0.191
18.250	0.710	1.13	0.70	0.03	1.8	0.182
18.333	0.710	1.13	0.70	0.03	1.7	0.173
18.417	0.710	1.13	0.70	0.03	1.6	0.165
18.500	0.710	1.13	0.70	0.02	1.5	0.158
18.583	0.710	0.71	0.70	0.02	1.4	0.148
18.667	0.710	0.71	0.70	0.02	1.4	0.139
18.750	0.710	0.71	0.70	0.02	1.3	0.130
18.833	0.710	0.71	0.70	0.02	1.2	0.122
18.917	0.710	0.71	0.70	0.02	1.1	0.114
19.000	0.710	0.71	0.70	0.02	1.0	0.107
19.083	0.710	0.86	0.70	0.02	1.0	0.101
19.167	0.710	0.86	0.70	0.01	0.9	0.096
19.250	0.710	0.86	0.70	0.01	0.9	0.091
19.333	0.710	0.86	0.70	0.01	0.8	0.086
19.417	0.710	0.86	0.70	0.01	0.8	0.082
19.500	0.710	0.86	0.70	0.01	0.8	0.078
19.583	0.710	0.73	0.70	0.01	0.7	0.073
19.667	0.710	0.73	0.70	0.01	0.7	0.069
19.750	0.710	0.73	0.70	0.01	0.6	0.065
19.833	0.710	0.73	0.70	0.01	0.6	0.061
19.917	0.710	0.73	0.70	0.01	0.6	0.057
20.000	0.710	0.73	0.70	0.01	0.5	0.054
20.083	0.710	0.79	0.70	0.01	0.5	0.051

20.167	0.710	0.79	0.70	0.01	0.5	0.048
20.250	0.710	0.79	0.70	0.01	0.4	0.046
20.333	0.710	0.79	0.70	0.01	0.4	0.044
20.417	0.710	0.79	0.70	0.01	0.4	0.042
20.500	0.710	0.79	0.70	0.01	0.4	0.040
20.583	0.710	0.74	0.70	0.01	0.4	0.037
20.667	0.710	0.74	0.70	0.01	0.3	0.035
20.750	0.710	0.74	0.70	0.01	0.3	0.033
20.833	0.710	0.74	0.70	0.00	0.3	0.031
20.917	0.710	0.74	0.70	0.00	0.3	0.030
21.000	0.710	0.74	0.70	0.00	0.3	0.028
21.083	0.710	0.72	0.70	0.00	0.3	0.027
21.167	0.710	0.72	0.70	0.00	0.2	0.025
21.250	0.710	0.72	0.70	0.00	0.2	0.024
21.333	0.710	0.72	0.70	0.00	0.2	0.022
21.417	0.710	0.72	0.70	0.00	0.2	0.021
21.500	0.710	0.72	0.70	0.00	0.2	0.020
21.583	0.710	0.74	0.70	0.00	0.2	0.019
21.667	0.710	0.74	0.70	0.00	0.2	0.018
21.750	0.710	0.74	0.70	0.00	0.2	0.017
21.833	0.710	0.74	0.70	0.00	0.2	0.016
21.917	0.710	0.74	0.70	0.00	0.2	0.016
22.000	0.710	0.74	0.70	0.00	0.1	0.015
22.083	0.710	0.77	0.70	0.00	0.1	0.014
22.167	0.710	0.77	0.70	0.00	0.1	0.014
22.250	0.710	0.77	0.70	0.00	0.1	0.013
22.333	0.710	0.77	0.70	0.00	0.1	0.013
22.417	0.710	0.77	0.70	0.00	0.1	0.013
22.500	0.710	0.77	0.70	0.00	0.1	0.012
22.583	0.710	0.65	0.70	0.00	0.1	0.011
22.667	0.710	0.65	0.70	0.00	0.1	0.010
22.750	0.710	0.65	0.70	0.00	0.1	0.009
22.833	0.710	0.65	0.70	0.00	0.1	0.008
22.917	0.710	0.65	0.70	0.00	0.1	0.008
23.000	0.710	0.65	0.70	0.00	0.1	0.007
23.083	0.710	0.62	0.70	0.00	0.1	0.006
23.167	0.710	0.62	0.70	0.00	0.1	0.005
23.250	0.710	0.62	0.70	0.00	0.0	0.004
23.333	0.710	0.62	0.70	0.00	0.0	0.003
23.417	0.710	0.62	0.70	0.00	0.0	0.002
23.500	0.710	0.62	0.70	0.00	0.0	0.002
23.583	0.710	0.63	0.70	0.00	0.0	0.001
23.667	0.710	0.63	0.70	0.00	0.0	0.001
23.750	0.710	0.63	0.70	0.00	0.0	0.000
23.833	0.710	0.63	0.70	0.00	0.0	0.000
23.917	0.709	0.63	0.70	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 5.818 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 3.899 AF
LOSS VOLUME = 1.920 AF

****

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 4

>>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<

==========

MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW

VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET: UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO (0.938)(DIAMETER):

PIPELENGTH(FT) = 200.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1390.25
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000
3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000

3.833	0.00	0.00	0.00	0.000
3.917	0.00	0.00	0.00	0.000
4.000	0.00	0.00	0.00	0.000
4.083	0.00	0.00	0.00	0.000
4.167	0.00	0.00	0.00	0.000
4.250	0.00	0.00	0.00	0.000
4.333	0.00	0.00	0.00	0.000
4.417	0.00	0.00	0.00	0.000
4.500	0.00	0.00	0.00	0.000
4.583	0.00	0.00	0.00	0.000
4.667	0.00	0.00	0.00	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000
5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000
6.083	0.00	0.00	0.00	0.000
6.167	0.00	0.00	0.00	0.000
6.250	0.00	0.00	0.00	0.000
6.333	0.00	0.00	0.00	0.000
6.417	0.00	0.00	0.00	0.000
6.500	0.00	0.00	0.00	0.000
6.583	0.00	0.00	0.00	0.000
6.667	0.00	0.00	0.00	0.000
6.750	0.00	0.00	0.00	0.000
6.833	0.00	0.00	0.00	0.000
6.917	0.00	0.00	0.00	0.000
7.000	0.00	0.00	0.00	0.000
7.083	0.00	0.00	0.00	0.000
7.167	0.00	0.00	0.00	0.000
7.250	0.00	0.00	0.00	0.000
7.333	0.00	0.00	0.00	0.000
7.417	0.00	0.00	0.00	0.000
7.500	0.00	0.00	0.00	0.000
7.583	0.00	0.00	0.00	0.000
7.667	0.00	0.00	0.00	0.000
7.750	0.00	0.00	0.00	0.000
7.833	0.00	0.00	0.00	0.000
7.917	0.00	0.00	0.00	0.000
8.000	0.00	0.00	0.00	0.000
8.083	0.00	0.00	0.00	0.000
8.167	0.00	0.00	0.00	0.000
8.250	0.00	0.00	0.00	0.000
8.333	0.00	0.00	0.00	0.000
8.417	0.00	0.00	0.00	0.000
8.500	0.00	0.00	0.00	0.000
8.583	0.00	0.00	0.00	0.000
8.667	0.00	0.00	0.00	0.000
8.750	0.00	0.00	0.00	0.000
8.833	0.00	0.00	0.00	0.000
8.917	0.00	0.00	0.00	0.000
9.000	0.00	0.00	0.00	0.000

9.083	0.00	0.00	0.00	0.000
9.167	0.00	0.00	0.00	0.000
9.250	0.00	0.00	0.00	0.000
9.333	0.00	0.00	0.00	0.000
9.417	0.00	0.00	0.00	0.000
9.500	0.04	0.50	0.00	0.000
9.583	0.26	1.56	0.18	0.000
9.667	0.61	2.69	0.59	0.000
9.750	0.94	3.07	0.89	0.000
9.833	1.25	3.36	1.20	0.000
9.917	1.53	3.57	1.49	0.000
10.000	1.80	3.75	1.77	0.000
10.083	2.01	3.87	1.98	0.000
10.167	2.15	3.95	2.14	0.000
10.250	2.29	4.03	2.28	0.000
10.333	2.42	4.10	2.41	0.000
10.417	2.54	4.15	2.53	0.000
10.500	2.66	4.20	2.64	0.000
10.583	2.79	4.24	2.77	0.000
10.667	2.93	4.29	2.91	0.000
10.750	3.07	4.35	3.05	0.000
10.833	3.19	4.39	3.18	0.000
10.917	3.31	4.44	3.30	0.000
11.000	3.42	4.47	3.41	0.000
11.083	3.54	4.50	3.52	0.000
11.167	3.65	4.53	3.64	0.000
11.250	3.76	4.57	3.75	0.000
11.333	3.86	4.60	3.85	0.000
11.417	3.96	4.63	3.95	0.000
11.500	4.05	4.66	4.04	0.000
11.583	4.12	4.69	4.11	0.000
11.667	4.17	4.70	4.17	0.000
11.750	4.22	4.72	4.22	0.000
11.833	4.27	4.73	4.26	0.000
11.917	4.31	4.74	4.30	0.000
12.000	4.35	4.76	4.35	0.000
12.083	4.45	4.78	4.44	0.000
12.167	4.61	4.83	4.60	0.000
12.250	4.76	4.86	4.75	0.000
12.333	4.90	4.89	4.89	0.000
12.417	5.03	4.92	5.02	0.000
12.500	5.16	4.94	5.14	0.000
12.583	5.33	4.97	5.31	0.000
12.667	5.54	5.01	5.52	0.000
12.750	5.74	5.06	5.72	0.000
12.833	5.92	5.09	5.90	0.000
12.917	6.10	5.12	6.08	0.000
13.000	6.26	5.15	6.24	0.000
13.083	6.47	5.19	6.45	0.000
13.167	6.73	5.23	6.70	0.000
13.250	6.97	5.25	6.95	0.000
13.333	7.20	5.28	7.17	0.000
13.417	7.41	5.30	7.39	0.000
13.500	7.73	5.33	7.69	0.000
13.583	7.97	5.34	7.95	0.000
13.667	8.04	5.35	8.03	0.000
13.750	8.08	5.35	8.08	0.000
13.833	8.12	5.35	8.12	0.000
13.917	8.15	5.35	8.15	0.000
14.000	8.18	5.35	8.17	0.000
14.083	8.18	5.35	8.18	0.000
14.167	8.17	5.35	8.17	0.000
14.250	8.16	5.35	8.16	0.000

14.333	8.16	5.35	8.16	0.000
14.417	8.15	5.35	8.15	0.000
14.500	8.15	5.35	8.15	0.000
14.583	8.16	5.35	8.16	0.000
14.667	8.18	5.35	8.18	0.000
14.750	8.19	5.35	8.19	0.000
14.833	8.21	5.35	8.21	0.000
14.917	8.22	5.35	8.22	0.000
15.000	8.22	5.35	8.22	0.000
15.083	8.17	5.35	8.18	0.000
15.167	8.07	5.35	8.08	0.000
15.250	7.99	5.34	8.00	0.000
15.333	7.92	5.34	7.93	0.000
15.417	7.87	5.34	7.88	0.000
15.500	7.83	5.33	7.83	0.000
15.583	7.69	5.33	7.71	0.000
15.667	7.53	5.31	7.55	0.000
15.750	7.45	5.31	7.46	0.000
15.833	7.38	5.30	7.39	0.000
15.917	7.31	5.29	7.32	0.000
16.000	7.25	5.28	7.26	0.000
16.083	7.05	5.26	7.07	0.000
16.167	6.72	5.23	6.76	0.000
16.250	6.42	5.18	6.45	0.000
16.333	6.13	5.13	6.16	0.000
16.417	5.86	5.08	5.89	0.000
16.500	5.61	5.03	5.63	0.000
16.583	5.32	4.97	5.35	0.000
16.667	4.99	4.91	5.02	0.000
16.750	4.67	4.84	4.71	0.000
16.833	4.38	4.76	4.41	0.000
16.917	4.11	4.69	4.14	0.000
17.000	3.86	4.60	3.88	0.000
17.083	3.63	4.53	3.65	0.000
17.167	3.43	4.47	3.45	0.000
17.250	3.24	4.41	3.26	0.000
17.333	3.07	4.35	3.09	0.000
17.417	2.91	4.29	2.92	0.000
17.500	2.75	4.23	2.77	0.000
17.583	2.61	4.18	2.63	0.000
17.667	2.48	4.13	2.50	0.000
17.750	2.36	4.07	2.38	0.000
17.833	2.25	4.00	2.26	0.000
17.917	2.14	3.95	2.16	0.000
18.000	2.05	3.89	2.06	0.000
18.083	1.95	3.83	1.96	0.000
18.167	1.85	3.78	1.86	0.000
18.250	1.76	3.73	1.77	0.000
18.333	1.68	3.68	1.69	0.000
18.417	1.60	3.62	1.61	0.000
18.500	1.53	3.57	1.54	0.000
18.583	1.44	3.51	1.45	0.000
18.667	1.35	3.44	1.37	0.000
18.750	1.27	3.38	1.28	0.000
18.833	1.19	3.31	1.20	0.000
18.917	1.12	3.24	1.13	0.000
19.000	1.05	3.17	1.06	0.000
19.083	0.99	3.11	0.99	0.000
19.167	0.93	3.06	0.94	0.000
19.250	0.89	3.01	0.89	0.000
19.333	0.84	2.97	0.85	0.000
19.417	0.80	2.92	0.80	0.000
19.500	0.76	2.87	0.76	0.000

19.583	0.71	2.82	0.72	0.000
19.667	0.67	2.76	0.68	0.000
19.750	0.63	2.71	0.64	0.000
19.833	0.59	2.67	0.60	0.000
19.917	0.56	2.62	0.56	0.000
20.000	0.52	2.58	0.53	0.000
20.083	0.49	2.54	0.50	0.000
20.167	0.47	2.51	0.47	0.000
20.250	0.45	2.48	0.45	0.000
20.333	0.42	2.45	0.43	0.000
20.417	0.40	2.37	0.40	0.000
20.500	0.38	2.26	0.38	0.000
20.583	0.36	2.14	0.36	0.000
20.667	0.34	2.02	0.34	0.000
20.750	0.32	1.91	0.32	0.000
20.833	0.31	1.80	0.31	0.000
20.917	0.29	1.70	0.29	0.000
21.000	0.27	1.61	0.27	0.000
21.083	0.26	1.52	0.26	0.000
21.167	0.24	1.43	0.24	0.000
21.250	0.23	1.35	0.23	0.000
21.333	0.22	1.27	0.22	0.000
21.417	0.20	1.20	0.20	0.000
21.500	0.19	1.13	0.19	0.000
21.583	0.18	1.07	0.18	0.000
21.667	0.17	1.02	0.17	0.000
21.750	0.16	0.97	0.16	0.000
21.833	0.16	0.93	0.16	0.000
21.917	0.15	0.88	0.15	0.000
22.000	0.14	0.84	0.14	0.000
22.083	0.14	0.81	0.14	0.000
22.167	0.13	0.79	0.13	0.000
22.250	0.13	0.76	0.13	0.000
22.333	0.13	0.74	0.13	0.000
22.417	0.12	0.72	0.12	0.000
22.500	0.12	0.70	0.12	0.000
22.583	0.11	0.66	0.11	0.000
22.667	0.10	0.60	0.11	0.000
22.750	0.09	0.54	0.09	0.000
22.833	0.08	0.50	0.08	0.000
22.917	0.08	0.50	0.08	0.000
23.000	0.07	0.50	0.08	0.000
23.083	0.06	0.50	0.07	0.000
23.167	0.05	0.50	0.06	0.000
23.250	0.04	0.50	0.05	0.000
23.333	0.03	0.50	0.05	0.000
23.417	0.03	0.50	0.04	0.000
23.500	0.02	0.50	0.03	0.000
23.583	0.01	0.50	0.02	0.000
23.667	0.01	0.50	0.02	0.000
23.750	0.00	0.50	0.01	0.000
23.833	0.00	0.00	0.01	0.000
23.917	0.00	0.00	0.00	0.000
24.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

ADVANCED ENGINEERING SOFTWARE (AES) SUMMARY AND OUTPUT

SAND-FILTER BASIN ANALYSIS

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****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO SAND-FILTER BASIN - 25 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: AREA2.DAT
  TIME/DATE OF STUDY: 13:40 05/06/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.170
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8857
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  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.90
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   770.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.90
  PIPE TRAVEL TIME(MIN.) =   2.83    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.170
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8857
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.90
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   515.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.90
  PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =    9.26
```

```
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.26
  RAINFALL INTENSITY(INCH/HR) =   2.86
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   450.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.303*[(  450.00**3)/(     2.50)]**.2 =    9.861
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.772
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8840
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.87
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      3.87

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.87
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   2.70
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.87

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  350.00**3)/(     3.50)]**.2 =    7.929
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.077
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8853
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      1.16   TOTAL RUNOFF(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.16
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    8.86
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.86
  RAINFALL INTENSITY(INCH/HR) =   2.92
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  USER SPECIFIED Tc(MIN.) =    5.000
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.840
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7785
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.75
  TOTAL AREA(ACRES) =      1.59   TOTAL RUNOFF(CFS) =      4.75

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  5
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   3.84
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.75

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        5.90    10.28        2.716          2.10
    2        5.90     9.26        2.856          2.10
    3        3.87    10.38        2.704          1.58
    4        3.16     8.86        2.918          1.16
    5        4.75     5.00        3.840          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  5 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       14.45     5.00       3.840
    2       20.79     8.86       2.918
    3       21.29     9.26       2.856
    4       21.64    10.28       2.716
    5       21.60    10.38       2.704

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      21.64   Tc(MIN.) =   10.28
TOTAL AREA(ACRES) =        8.5
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    999.00 =    1070.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     10.28
PEAK FLOW RATE(CFS)   =      21.64
*** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)
1       14.45       5.00
2       20.79       8.86
3       21.29       9.26
4       21.64      10.28
5       21.60      10.38
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO SAND-FILTER BASIN - 50 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: AREA2.DAT
  TIME/DATE OF STUDY: 13:39 05/06/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.82
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   770.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   2.77    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   3.14
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.82
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   515.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =    9.22
```

```
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.22
  RAINFALL INTENSITY(INCH/HR) =   3.30
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   450.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.303*[(  450.00**3)/(     2.50)]**.2 =    9.861
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.198
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.48
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      4.48

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.48
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.35
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.35
  RAINFALL INTENSITY(INCH/HR) =   3.12
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.48

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  350.00**3)/(     3.50)]**.2 =    7.929
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.551
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.65
  TOTAL AREA(ACRES) =      1.16   TOTAL RUNOFF(CFS) =      3.65

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.65
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   3.38
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.65

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  USER SPECIFIED Tc(MIN.) =    5.000
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.430
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7928
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.58
  TOTAL AREA(ACRES) =      1.59   TOTAL RUNOFF(CFS) =      5.58

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  5
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   4.43
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.58

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        6.82    10.23        3.142          2.10
    2        6.82     9.22        3.303          2.10
    3        4.48    10.35        3.124          1.58
    4        3.65     8.80        3.378          1.16
    5        5.58     5.00        4.430          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  5 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       16.85     5.00       4.430
    2       24.08     8.80       3.378
    3       24.68     9.22       3.303
    4       25.08    10.23       3.142
    5       25.01    10.35       3.124

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      25.08   Tc(MIN.) =   10.23
TOTAL AREA(ACRES) =        8.5
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    999.00 =    1070.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     10.23
PEAK FLOW RATE(CFS)   =      25.08
*** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)
1       16.85       5.00
2       24.08       8.80
3       24.68       9.22
4       25.08      10.23
5       25.01      10.35
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                                SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO SAND-FILTER BASIN - 100 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: AREA2.DAT
  TIME/DATE OF STUDY: 13:37 05/06/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.082
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8885
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.62
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   770.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.62
  PIPE TRAVEL TIME(MIN.) =   2.63    Tc(MIN.) =   10.09
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.09
  RAINFALL INTENSITY(INCH/HR) =   3.53
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.082
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8885
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.62
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   515.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.62
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =    9.14
```

```
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   3.70
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   450.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.303*[(  450.00**3)/(     2.50)]**.2 =    9.861
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.569
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.00
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.95
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.00
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.34
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   3.49
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  350.00**3)/(     3.50)]**.2 =    7.929
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.963
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8882
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.08
  TOTAL AREA(ACRES) =      1.16   TOTAL RUNOFF(CFS) =      4.08

******************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.08
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    8.77
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     615.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    999.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.77
  RAINFALL INTENSITY(INCH/HR) =   3.77
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.08

******************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  22
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.944
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .8027
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.31
  TOTAL AREA(ACRES) =      1.59   TOTAL RUNOFF(CFS) =      6.31

******************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    999.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
```

```
TOTAL NUMBER OF STREAMS =  5
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   4.94
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        7.62    10.09        3.530          2.10
    2        7.62     9.14        3.702          2.10
    3        5.00    10.34        3.488          1.58
    4        4.08     8.77        3.775          1.16
    5        6.31     5.00        4.944          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  5 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       19.00     5.00       4.944
    2       27.08     8.77       3.775
    3       27.66     9.14       3.702
    4       28.08    10.09       3.530
    5       27.93    10.34       3.488

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      28.08   Tc(MIN.) =   10.09
TOTAL AREA(ACRES) =        8.5
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    999.00 =    1070.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     10.09
PEAK FLOW RATE(CFS)   =      28.08
*** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)
1       19.00       5.00
2       27.08       8.77
3       27.66       9.14
4       28.08      10.09
5       27.93      10.34
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

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****************************************************************************

              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-1HR
----------------------------------------------------------------------------
  FILE NAME: BASIN201.DAT
  TIME/DATE OF STUDY: 15:29 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  1.50 INCHES
         RCFC&WCD 1-Hour Storm (5-Minute period) SELECTED
         (SLOPE OF INTENSITY-DURATION CURVE = 0.48)
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  83.333


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                13.994                14.385
        2                59.664                46.948
        3                78.792                19.663
        4                86.766                 8.197
        5                91.428                 4.792
```

6	94.514	3.173
7	96.650	2.195
8	98.044	1.433
9	98.699	0.673
10	99.289	0.607
11	99.716	0.439
12	99.929	0.219
13	100.000	0.073

♀
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0669	0.0083	0.0586
2	0.0707	0.0083	0.0624
3	0.0751	0.0083	0.0668
4	0.0829	0.0083	0.0745
5	0.0874	0.0083	0.0791
6	0.0994	0.0083	0.0911
7	0.1167	0.0083	0.1084
8	0.1282	0.0083	0.1199
9	0.1929	0.0083	0.1846
10	0.3979	0.0083	0.3896
11	0.1079	0.0083	0.0996
12	0.0739	0.0083	0.0656

TOTAL STORM RAINFALL(INCHES) = 1.50
TOTAL SOIL-LOSS(INCHES) = 0.10
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.40

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.0708
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.9912

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1 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 7.5 15.0 22.5 30.0
0.083	0.0058	0.84	VQ . . . .
0.167	0.0309	3.65	.V Q . . . .
0.250	0.0657	5.04	. V Q . . . .
0.333	0.1064	5.91	. V Q . . . .
0.417	0.1528	6.74	. V Q . . . .
0.500	0.2046	7.52	. V Q . . . .
0.583	0.2642	8.65	. VQ . . . .
0.667	0.3333	10.04	. . Q . . . .
0.750	0.4163	12.05	. . Q . . . .
0.833	0.5440	18.54	. . .V Q . . .
0.917	0.7198	25.53	. . . V. Q .
1.000	0.8311	16.15	. . .Q . V .
1.083	0.9000	10.01	. . Q . . . V .
1.167	0.9354	5.14	. Q . . . . V .

```
   1.250      0.9561      3.01  .   Q     .         .         .       V .
   1.333      0.9696      1.96  . Q       .         .         .        V.
   1.417      0.9783      1.26  .Q        .         .         .        V.
   1.500      0.9834      0.74  Q         .         .         .        V.
   1.583      0.9869      0.51  Q         .         .         .        V.
   1.667      0.9892      0.32  Q         .         .         .        V.
   1.750      0.9904      0.18  Q         .         .         .        V.
   1.833      0.9910      0.08  Q         .         .         .        V.
   1.917      0.9911      0.02  Q         .         .         .        V.
   2.000      0.9912      0.00  Q         .         .         .        V.
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   =======================                 =========
             0%                              120.0
            10%                               70.0
            20%                               55.0
            30%                               35.0
            40%                               20.0
            50%                               15.0
            60%                               15.0
            70%                               10.0
            80%                                5.0
            90%                                5.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ==============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                    -----------           |   (and volume)
                   |           |    |     |
                   |           |    |....V........
                   | detention |<-->|           outflow
                   |   basin   |    |.........______
                    -----------     |    ^    |  \
                        |           |  dead   |   basin outlet
                        V           | storage |
                     OUTFLOW         ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.377
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    1.00
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498
5	0.80	17.31	0.542
6	1.00	19.36	0.587

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.84	0.84	0.00	0.0	0.000
0.167	0.018	3.65	1.00	0.00	0.0	0.000
0.250	0.046	5.04	1.00	0.00	0.0	0.000
0.333	0.080	5.91	1.00	0.00	0.0	0.000
0.417	0.119	6.74	1.00	0.00	0.0	0.000
0.500	0.164	7.52	1.00	0.00	0.0	0.000
0.583	0.217	8.65	1.00	0.00	0.0	0.000
0.667	0.279	10.04	1.00	0.00	0.0	0.000
0.750	0.355	12.05	1.00	0.00	0.0	0.000
DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) =					4.2 (less LOSS)	
REMAINING UNIT FLOW IS		14.4 CFS.				
0.833	0.377	18.54	1.00	0.04	1.0	0.092
0.917	0.377	25.53	1.00	0.11	3.4	0.238
1.000	0.377	16.15	1.00	0.15	5.6	0.303
1.083	0.377	10.01	1.00	0.15	6.5	0.321
1.167	0.377	5.14	1.00	0.15	6.5	0.304
1.250	0.377	3.01	1.00	0.13	6.0	0.276
1.333	0.377	1.96	1.00	0.12	5.4	0.246
1.417	0.377	1.26	1.00	0.10	4.8	0.214
1.500	0.377	0.74	1.00	0.09	4.1	0.184
1.583	0.377	0.51	1.00	0.08	3.5	0.156
1.667	0.377	0.32	1.00	0.06	3.0	0.131
1.750	0.377	0.18	1.00	0.05	2.5	0.108
1.833	0.377	0.08	1.00	0.04	2.0	0.088
1.917	0.377	0.02	1.00	0.03	1.6	0.070
2.000	0.377	0.00	1.00	0.03	1.3	0.054
2.083	0.377	0.00	1.00	0.02	1.0	0.040
2.167	0.377	0.00	1.00	0.01	0.7	0.029
2.250	0.377	0.00	1.00	0.01	0.5	0.018
2.333	0.377	0.00	1.00	0.00	0.3	0.009
2.417	0.377	0.00	1.00	0.00	0.1	0.002
2.500	0.372	0.00	1.00	0.00	0.0	0.000
2.583	0.365	0.00	1.00	0.00	0.0	0.000
2.667	0.358	0.00	1.00	0.00	0.0	0.000
2.750	0.351	0.00	1.00	0.00	0.0	0.000
2.833	0.345	0.00	1.00	0.00	0.0	0.000
2.917	0.338	0.00	1.00	0.00	0.0	0.000
3.000	0.331	0.00	1.00	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 0.991 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)

```
    OUTFLOW VOLUME =      0.414 AF
    LOSS    VOLUME =      0.578 AF

****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================
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MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 400.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1391.00
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.96	2.86	0.51	0.000
0.917	3.43	4.11	2.77	0.000
1.000	5.63	4.61	5.12	0.000
1.083	6.49	4.73	6.29	0.000
1.167	6.50	4.73	6.50	0.000
1.250	6.04	4.68	6.15	0.000
1.333	5.43	4.58	5.58	0.000
1.417	4.79	4.45	4.94	0.000
1.500	4.15	4.32	4.30	0.000
1.583	3.54	4.15	3.68	0.000
1.667	2.99	3.98	3.13	0.000
1.750	2.49	3.79	2.62	0.000
1.833	2.04	3.60	2.16	0.000
1.917	1.64	3.37	1.75	0.000
2.000	1.29	3.13	1.39	0.000
2.083	0.98	2.88	1.08	0.000
2.167	0.72	2.62	0.81	0.000
2.250	0.49	2.33	0.58	0.000
2.333	0.29	1.70	0.34	0.000
2.417	0.12	0.69	0.23	0.000
2.500	0.02	0.50	0.01	0.000
2.583	0.00	0.00	0.11	0.000
2.667	0.00	0.00	0.01	0.000

2.750	0.00	0.00	0.01	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-3HR


----------------------------------------------------------------------------
  FILE NAME: BASIN203.DAT
  TIME/DATE OF STUDY: 15:43 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  2.55 INCHES
         RCFC&WCD 3-Hour Storm (10-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  10.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 166.667


============================================================================
                       UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                36.829                18.930
        2                82.779                23.618
        3                92.971                 5.239
        4                97.347                 2.249
```

5	98.994	0.846
6	99.522	0.272
7	99.809	0.147
8	99.952	0.074
9	100.000	0.025

♀
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0663	0.0167	0.0496
2	0.0663	0.0167	0.0496
3	0.0841	0.0167	0.0675
4	0.0841	0.0167	0.0675
5	0.0841	0.0167	0.0675
6	0.0867	0.0167	0.0700
7	0.1122	0.0167	0.0955
8	0.1071	0.0167	0.0904
9	0.1351	0.0167	0.1185
10	0.1300	0.0167	0.1134
11	0.1632	0.0167	0.1465
12	0.1504	0.0167	0.1338
13	0.1861	0.0167	0.1695
14	0.2167	0.0167	0.2001
15	0.3595	0.0167	0.3429
16	0.3595	0.0167	0.3429
17	0.0969	0.0167	0.0802
18	0.0612	0.0167	0.0445

TOTAL STORM RAINFALL(INCHES) = 2.55
TOTAL SOIL-LOSS(INCHES) = 0.30
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.25

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.2125
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.5929

♀
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3 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0065	0.94	VQ . . . .
0.167	0.0129	0.94	VQ . . . .
0.250	0.0275	2.11	V Q . . . .
0.333	0.0420	2.11	V Q . . . .
0.417	0.0607	2.71	.V Q . . . .
0.500	0.0793	2.71	.V Q . . . .
0.583	0.1017	3.24	. V Q . . . .
0.667	0.1240	3.24	. V Q . . . .
0.750	0.1473	3.38	. V Q . . . .
0.833	0.1705	3.38	. V Q . . . .
0.917	0.1945	3.48	. V Q . . . .

```
   1.000      0.2185      3.48  .    VQ   .         .         .         .
   1.083      0.2463      4.05  .     V Q .         .         .         .
   1.167      0.2742      4.05  .     V Q .         .         .         .
   1.250      0.3057      4.57  .      V Q.         .         .         .
   1.333      0.3372      4.57  .       VQ.         .         .         .
   1.417      0.3725      5.13  .        VQ         .         .         .
   1.500      0.4078      5.13  .         Q         .         .         .
   1.583      0.4472      5.73  .         .Q        .         .         .
   1.667      0.4867      5.73  .         .QV       .         .         .
   1.750      0.5307      6.39  .         . QV      .         .         .
   1.833      0.5747      6.39  .         . Q V     .         .         .
   1.917      0.6228      6.97  .         .  Q V    .         .         .
   2.000      0.6708      6.97  .         .  Q  V   .         .         .
   2.083      0.7227      7.54  .         .    Q  V .         .         .
   2.167      0.7746      7.54  .         .    Q   V.         .         .
   2.250      0.8364      8.97  .         .      Q  .V        .         .
   2.333      0.8981      8.97  .         .      Q  . V       .         .
   2.417      0.9848     12.59  .         .         .   VQ    .         .
   2.500      1.0715     12.59  .         .         .    QV   .         .
   2.583      1.1831     16.20  .         .         .        V. Q       .
   2.667      1.2946     16.20  .         .         .         . Q       .
   2.750      1.3778     12.08  .         .         .   Q     .   V     .
   2.833      1.4609     12.08  .         .         .   Q     .     V   .
   2.917      1.4992      5.55  .         .Q        .         .      V  .
   3.000      1.5374      5.55  .         .Q        .         .       V .
   3.083      1.5555      2.63  .    Q    .         .         .        V.
   3.167      1.5736      2.63  .    Q    .         .         .        V.
   3.250      1.5794      0.84  .Q        .         .         .        V.
   3.333      1.5852      0.84  .Q        .         .         .        V.
   3.417      1.5875      0.33  Q         .         .         .        V.
   3.500      1.5898      0.33  Q         .         .         .        V.
   3.583      1.5907      0.14  Q         .         .         .        V.
   3.667      1.5917      0.14  Q         .         .         .        V.
   3.750      1.5921      0.06  Q         .         .         .        V.
   3.833      1.5925      0.06  Q         .         .         .        V.
   3.917      1.5926      0.02  Q         .         .         .        V.
   4.000      1.5928      0.02  Q         .         .         .        V.
   4.083      1.5928      0.01  Q         .         .         .        V.
   4.167      1.5929      0.01  Q         .         .         .        V.
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ========================                =========
             0%                              250.0
            10%                              180.0
            20%                              150.0
            30%                              100.0
            40%                               60.0
            50%                               40.0
            60%                               30.0
            70%                               30.0
            80%                               10.0
            90%                               10.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
```

```
                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                 __effective depth
                 -----------             |   (and volume)
                |           |    |     |
                |           |    |....V........
                | detention |<-->|           outflow
                |   basin   |    |.........______
                 -----------     |    ^    |  \
                       |         |  dead   |   basin outlet
                       V         | storage |
                    OUTFLOW       ---------
                  (STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.377
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 1.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498
5	0.80	17.31	0.542
6	1.00	19.36	0.587

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.94	0.94	0.00	0.0	0.000
0.167	0.000	0.94	1.00	0.00	0.0	0.000
0.250	0.008	2.11	1.00	0.00	0.0	0.000
0.333	0.015	2.11	1.00	0.00	0.0	0.000
0.417	0.027	2.71	1.00	0.00	0.0	0.000
0.500	0.039	2.71	1.00	0.00	0.0	0.000
0.583	0.054	3.24	1.00	0.00	0.0	0.000
0.667	0.070	3.24	1.00	0.00	0.0	0.000
0.750	0.086	3.38	1.00	0.00	0.0	0.000
0.833	0.103	3.38	1.00	0.00	0.0	0.000
0.917	0.120	3.48	1.00	0.00	0.0	0.000
1.000	0.137	3.48	1.00	0.00	0.0	0.000
1.083	0.158	4.05	1.00	0.00	0.0	0.000

1.167	0.179	4.05	1.00	0.00	0.0	0.000
1.250	0.203	4.57	1.00	0.00	0.0	0.000
1.333	0.228	4.57	1.00	0.00	0.0	0.000
1.417	0.256	5.13	1.00	0.00	0.0	0.000
1.500	0.285	5.13	1.00	0.00	0.0	0.000
1.583	0.317	5.73	1.00	0.00	0.0	0.000
1.667	0.350	5.73	1.00	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 5.0 (less LOSS)
REMAINING UNIT FLOW IS 1.4 CFS.

1.750	0.377	6.39	1.00	0.00	0.1	0.009
1.833	0.377	6.39	1.00	0.02	0.5	0.042
1.917	0.377	6.97	1.00	0.04	1.2	0.075
2.000	0.377	6.97	1.00	0.05	1.9	0.103
2.083	0.377	7.54	1.00	0.06	2.4	0.132
2.167	0.377	7.54	1.00	0.08	3.0	0.156
2.250	0.377	8.97	1.00	0.09	3.6	0.186
2.333	0.377	8.97	1.00	0.10	4.2	0.213
2.417	0.377	12.59	1.00	0.12	4.9	0.259
2.500	0.377	12.59	1.00	0.14	5.8	0.299
2.583	0.377	16.20	1.00	0.17	6.8	0.356
2.667	0.377	16.20	1.00	0.20	7.9	0.406
2.750	0.377	12.08	1.00	0.23	8.8	0.422
2.833	0.377	12.08	1.00	0.28	9.6	0.432
2.917	0.377	5.55	1.00	0.19	9.2	0.400
3.000	0.377	5.55	1.00	0.18	8.1	0.376
3.083	0.377	2.63	1.00	0.16	7.4	0.336
3.167	0.377	2.63	1.00	0.14	6.6	0.301
3.250	0.377	0.84	1.00	0.12	5.8	0.260
3.333	0.377	0.84	1.00	0.11	5.0	0.224
3.417	0.377	0.33	1.00	0.09	4.3	0.190
3.500	0.377	0.33	1.00	0.08	3.6	0.160
3.583	0.377	0.14	1.00	0.06	3.1	0.133
3.667	0.377	0.14	1.00	0.05	2.5	0.110
3.750	0.377	0.06	1.00	0.04	2.1	0.089
3.833	0.377	0.06	1.00	0.03	1.7	0.071
3.917	0.377	0.02	1.00	0.03	1.3	0.055
4.000	0.377	0.02	1.00	0.02	1.0	0.042
4.083	0.377	0.01	1.00	0.01	0.7	0.030
4.167	0.377	0.01	1.00	0.01	0.5	0.019
4.250	0.377	0.00	1.00	0.00	0.3	0.010
4.333	0.377	0.00	1.00	0.00	0.1	0.003
4.417	0.373	0.00	1.00	0.00	0.0	0.000
4.500	0.366	0.00	1.00	0.00	0.0	0.000
4.583	0.359	0.00	1.00	0.00	0.0	0.000
4.667	0.352	0.00	1.00	0.00	0.0	0.000
4.750	0.345	0.00	1.00	0.00	0.0	0.000
4.833	0.338	0.00	1.00	0.00	0.0	0.000
4.917	0.331	0.00	1.00	0.00	0.0	0.000
5.000	0.325	0.00	1.00	0.00	0.0	0.000
5.083	0.318	0.00	1.00	0.00	0.0	0.000
5.167	0.311	0.00	1.00	0.00	0.0	0.000
5.250	0.304	0.00	1.00	0.00	0.0	0.000
5.333	0.297	0.00	1.00	0.00	0.0	0.000
5.417	0.290	0.00	1.00	0.00	0.0	0.000
5.500	0.283	0.00	1.00	0.00	0.0	0.000
5.583	0.276	0.00	1.00	0.00	0.0	0.000
5.667	0.269	0.00	1.00	0.00	0.0	0.000
5.750	0.263	0.00	1.00	0.00	0.0	0.000
5.833	0.256	0.00	1.00	0.00	0.0	0.000
5.917	0.249	0.00	1.00	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 1.593 AF

```
BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME =      0.856 AF
LOSS    VOLUME =      0.737 AF

****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE     95.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================

        MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
        STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
        VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
        EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
        OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
        UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
        (0.938)(DIAMETER):


        PIPELENGTH(FT) =     400.00     MANNINGS FACTOR = 0.013
        UPSTREAM ELEVATION(FT) =    1391.00
        DOWNSTREAM ELEVATION(FT) =    1389.00
        PIPE DIAMETER(FT) =   1.50


        NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:
```

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.09	0.55	0.00	0.000
1.833	0.53	2.39	0.24	0.000
1.917	1.22	3.09	1.05	0.000
2.000	1.86	3.50	1.72	0.000
2.083	2.45	3.78	2.29	0.000
2.167	2.99	3.98	2.85	0.000
2.250	3.56	4.15	3.42	0.000
2.333	4.15	4.32	4.02	0.000
2.417	4.91	4.47	4.72	0.000
2.500	5.80	4.64	5.60	0.000
2.583	6.82	4.76	6.57	0.000

2.667	7.94	4.79	7.27	0.004
2.750	8.82	4.79	7.43	0.013
2.833	9.63	4.79	7.43	0.028
2.917	9.20	4.79	7.43	0.040
3.000	8.07	4.79	7.43	0.045
3.083	7.40	4.79	7.43	0.045
3.167	6.63	4.79	7.43	0.039
3.250	5.84	4.79	7.43	0.028
3.333	5.04	4.79	7.43	0.012
3.417	4.31	4.68	6.38	0.000
3.500	3.64	4.18	4.20	0.000
3.583	3.05	4.00	3.20	0.000
3.667	2.53	3.81	2.66	0.000
3.750	2.07	3.61	2.19	0.000
3.833	1.67	3.39	1.78	0.000
3.917	1.32	3.15	1.42	0.000
4.000	1.01	2.90	1.10	0.000
4.083	0.74	2.65	0.83	0.000
4.167	0.51	2.36	0.60	0.000
4.250	0.31	1.82	0.37	0.000
4.333	0.13	0.79	0.23	0.000
4.417	0.03	0.50	0.04	0.000
4.500	0.00	0.00	0.09	0.000
4.583	0.00	0.00	0.01	0.000
4.667	0.00	0.00	0.02	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000
5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-6HR
----------------------------------------------------------------------------
  FILE NAME: BASIN206.DAT
  TIME/DATE OF STUDY: 15:47 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  3.40 INCHES
         RCFC&WCD 6-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                12.140
        2                98.621                 4.756
        3                99.599                 0.167
        4                99.839                 0.041
        5                99.960                 0.021
        6               100.000                 0.007
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.1224	0.0500	0.0724
2	0.1462	0.0500	0.0962
3	0.1632	0.0500	0.1132
4	0.1666	0.0500	0.1166
5	0.1802	0.0500	0.1302
6	0.1972	0.0500	0.1472
7	0.2312	0.0500	0.1812
8	0.3060	0.0500	0.2560
9	0.3944	0.0500	0.3444
10	0.4896	0.0500	0.4396
11	0.8534	0.0500	0.8034
12	0.1496	0.0500	0.0996

TOTAL STORM RAINFALL(INCHES) = 3.40
TOTAL SOIL-LOSS(INCHES) = 0.60
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.80

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.4250
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.9823

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6 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0061	0.88	VQ
0.167	0.0121	0.88	VQ
0.250	0.0182	0.88	VQ
0.333	0.0242	0.88	VQ
0.417	0.0303	0.88	VQ
0.500	0.0363	0.88	VQ
0.583	0.0467	1.51	V Q
0.667	0.0571	1.51	V Q
0.750	0.0676	1.51	V Q
0.833	0.0780	1.51	V Q
0.917	0.0884	1.51	V Q
1.000	0.0988	1.51	V Q
1.083	0.1115	1.84	. VQ
1.167	0.1242	1.84	. VQ
1.250	0.1369	1.84	. VQ
1.333	0.1496	1.84	. Q
1.417	0.1623	1.84	. Q
1.500	0.1750	1.84	. Q
1.583	0.1886	1.97	. Q
1.667	0.2022	1.97	. QV
1.750	0.2158	1.97	. QV
1.833	0.2294	1.97	. QV

```
1.917      0.2429      1.97  .  QV     .         .         .         .
2.000      0.2565      1.97  .  Q V    .         .         .         .
2.083      0.2714      2.16  .   QV    .         .         .         .
2.167      0.2863      2.16  .   QV    .         .         .         .
2.250      0.3011      2.16  .   Q V   .         .         .         .
2.333      0.3160      2.16  .   Q V   .         .         .         .
2.417      0.3309      2.16  .   Q V   .         .         .         .
2.500      0.3458      2.16  .   Q V   .         .         .         .
2.583      0.3625      2.43  .   Q  V  .         .         .         .
2.667      0.3793      2.43  .   Q  V  .         .         .         .
2.750      0.3960      2.43  .   Q  V  .         .         .         .
2.833      0.4128      2.43  .   Q   V .         .         .         .
2.917      0.4295      2.43  .   Q   V .         .         .         .
3.000      0.4463      2.43  .   Q    V.         .         .         .
3.083      0.4665      2.93  .    Q   V.         .         .         .
3.167      0.4867      2.93  .    Q   V.         .         .         .
3.250      0.5068      2.93  .    Q    V         .         .         .
3.333      0.5270      2.93  .    Q    V         .         .         .
3.417      0.5472      2.93  .    Q     V        .         .         .
3.500      0.5674      2.93  .    Q     V        .         .         .
3.583      0.5949      4.00  .       Q . V       .         .         .
3.667      0.6225      4.00  .       Q . V       .         .         .
3.750      0.6501      4.00  .       Q .  V      .         .         .
3.833      0.6776      4.00  .       Q .  V      .         .         .
3.917      0.7052      4.00  .       Q .   V     .         .         .
4.000      0.7328      4.00  .       Q .   V     .         .         .
4.083      0.7702      5.44  .         Q    V    .         .         .
4.167      0.8077      5.44  .         Q     V   .         .         .
4.250      0.8451      5.44  .         Q      V  .         .         .
4.333      0.8826      5.44  .         Q      V  .         .         .
4.417      0.9200      5.44  .         Q       V .         .         .
4.500      0.9575      5.44  .         Q        V.         .         .
4.583      1.0059      7.03  .         .   Q     V         .         .
4.667      1.0543      7.03  .         .   Q      V        .         .
4.750      1.1027      7.03  .         .   Q       V       .         .
4.833      1.1511      7.03  .         .   Q        V      .         .
4.917      1.1995      7.03  .         .   Q         V     .         .
5.000      1.2479      7.03  .         .   Q          V    .         .
5.083      1.3300     11.92  .         .         .  Q  V   .         .
5.167      1.4121     11.92  .         .         .  Q    V .         .
5.250      1.4942     11.92  .         .         .  Q      V         .
5.333      1.5762     11.92  .         .         .  Q       V        .
5.417      1.6583     11.92  .         .         .  Q         V      .
5.500      1.7404     11.92  .         .         .  Q           V    .
5.583      1.7757      5.12  .         Q         .         .    V    .
5.667      1.8110      5.12  .         Q         .         .     V   .
5.750      1.8463      5.12  .         Q         .         .      V  .
5.833      1.8816      5.12  .         Q         .         .      V  .
5.917      1.9169      5.12  .         Q         .         .       V .
6.000      1.9521      5.12  .         Q         .         .        V.
6.083      1.9565      0.64  .Q        .         .         .        V.
6.167      1.9609      0.64  .Q        .         .         .        V.
6.250      1.9653      0.64  .Q        .         .         .        V.
6.333      1.9696      0.64  .Q        .         .         .        V.
6.417      1.9740      0.64  .Q        .         .         .        V.
6.500      1.9784      0.64  .Q        .         .         .        V.
6.583      1.9788      0.06  Q         .         .         .        V.
6.667      1.9792      0.06  Q         .         .         .        V.
6.750      1.9797      0.06  Q         .         .         .        V.
6.833      1.9801      0.06  Q         .         .         .        V.
6.917      1.9805      0.06  Q         .         .         .        V.
7.000      1.9809      0.06  Q         .         .         .        V.
7.083      1.9811      0.02  Q         .         .         .        V.
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   7.167      1.9813      0.02  Q         .         .         .        V.
   7.250      1.9814      0.02  Q         .         .         .        V.
   7.333      1.9816      0.02  Q         .         .         .        V.
   7.417      1.9817      0.02  Q         .         .         .        V.
   7.500      1.9819      0.02  Q         .         .         .        V.
   7.583      1.9820      0.01  Q         .         .         .        V.
   7.667      1.9820      0.01  Q         .         .         .        V.
   7.750      1.9821      0.01  Q         .         .         .        V.
   7.833      1.9821      0.01  Q         .         .         .        V.
   7.917      1.9822      0.01  Q         .         .         .        V.
   8.000      1.9822      0.01  Q         .         .         .        V.
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ======================                  =========
             0%                              480.0
            10%                              330.0
            20%                              210.0
            30%                              150.0
            40%                              120.0
            50%                               60.0
            60%                               30.0
            70%                               30.0
            80%                               30.0
            90%                               30.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    999.00 TO NODE    950.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ==============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                  -----------             |   (and volume)
                 |           |    |       |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                        |         |  dead   |   basin outlet
                        V         | storage |
                     OUTFLOW       ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.377
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    1.00
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498
5	0.80	17.31	0.542
6	1.00	19.36	0.587

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.88	0.88	0.00	0.0	0.000
0.167	0.000	0.88	1.00	0.00	0.0	0.000
0.250	0.000	0.88	1.00	0.00	0.0	0.000
0.333	0.000	0.88	1.00	0.00	0.0	0.000
0.417	0.000	0.88	1.00	0.00	0.0	0.000
0.500	0.000	0.88	1.00	0.00	0.0	0.000
0.583	0.004	1.51	1.00	0.00	0.0	0.000
0.667	0.007	1.51	1.00	0.00	0.0	0.000
0.750	0.011	1.51	1.00	0.00	0.0	0.000
0.833	0.014	1.51	1.00	0.00	0.0	0.000
0.917	0.018	1.51	1.00	0.00	0.0	0.000
1.000	0.021	1.51	1.00	0.00	0.0	0.000
1.083	0.027	1.84	1.00	0.00	0.0	0.000
1.167	0.033	1.84	1.00	0.00	0.0	0.000
1.250	0.039	1.84	1.00	0.00	0.0	0.000
1.333	0.044	1.84	1.00	0.00	0.0	0.000
1.417	0.050	1.84	1.00	0.00	0.0	0.000
1.500	0.056	1.84	1.00	0.00	0.0	0.000
1.583	0.063	1.97	1.00	0.00	0.0	0.000
1.667	0.069	1.97	1.00	0.00	0.0	0.000
1.750	0.076	1.97	1.00	0.00	0.0	0.000
1.833	0.083	1.97	1.00	0.00	0.0	0.000
1.917	0.090	1.97	1.00	0.00	0.0	0.000
2.000	0.096	1.97	1.00	0.00	0.0	0.000
2.083	0.104	2.16	1.00	0.00	0.0	0.000
2.167	0.112	2.16	1.00	0.00	0.0	0.000
2.250	0.120	2.16	1.00	0.00	0.0	0.000
2.333	0.128	2.16	1.00	0.00	0.0	0.000
2.417	0.136	2.16	1.00	0.00	0.0	0.000
2.500	0.144	2.16	1.00	0.00	0.0	0.000
2.583	0.154	2.43	1.00	0.00	0.0	0.000
2.667	0.164	2.43	1.00	0.00	0.0	0.000
2.750	0.174	2.43	1.00	0.00	0.0	0.000
2.833	0.184	2.43	1.00	0.00	0.0	0.000
2.917	0.194	2.43	1.00	0.00	0.0	0.000
3.000	0.203	2.43	1.00	0.00	0.0	0.000
3.083	0.217	2.93	1.00	0.00	0.0	0.000
3.167	0.230	2.93	1.00	0.00	0.0	0.000
3.250	0.243	2.93	1.00	0.00	0.0	0.000
3.333	0.257	2.93	1.00	0.00	0.0	0.000
3.417	0.270	2.93	1.00	0.00	0.0	0.000

3.500	0.283	2.93	1.00	0.00	0.0	0.000
3.583	0.304	4.00	1.00	0.00	0.0	0.000
3.667	0.324	4.00	1.00	0.00	0.0	0.000
3.750	0.345	4.00	1.00	0.00	0.0	0.000
3.833	0.366	4.00	1.00	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 2.7 (less LOSS)
REMAINING UNIT FLOW IS 1.3 CFS.

3.917	0.377	4.00	1.00	0.00	0.1	0.009
4.000	0.377	4.00	1.00	0.01	0.4	0.027
4.083	0.377	5.44	1.00	0.02	0.8	0.052
4.167	0.377	5.44	1.00	0.04	1.3	0.073
4.250	0.377	5.44	1.00	0.04	1.7	0.092
4.333	0.377	5.44	1.00	0.05	2.1	0.108
4.417	0.377	5.44	1.00	0.06	2.4	0.122
4.500	0.377	5.44	1.00	0.06	2.7	0.134
4.583	0.377	7.03	1.00	0.07	3.0	0.155
4.667	0.377	7.03	1.00	0.08	3.4	0.173
4.750	0.377	7.03	1.00	0.09	3.8	0.189
4.833	0.377	7.03	1.00	0.10	4.1	0.202
4.917	0.377	7.03	1.00	0.10	4.3	0.214
5.000	0.377	7.03	1.00	0.11	4.6	0.224
5.083	0.377	11.92	1.00	0.13	5.1	0.264
5.167	0.377	11.92	1.00	0.14	5.9	0.299
5.250	0.377	11.92	1.00	0.16	6.5	0.329
5.333	0.377	11.92	1.00	0.17	7.1	0.355
5.417	0.377	11.92	1.00	0.18	7.6	0.378
5.500	0.377	11.92	1.00	0.19	8.1	0.398
5.583	0.377	5.12	1.00	0.18	8.0	0.371
5.667	0.377	5.12	1.00	0.17	7.5	0.348
5.750	0.377	5.12	1.00	0.16	7.0	0.328
5.833	0.377	5.12	1.00	0.15	6.6	0.310
5.917	0.377	5.12	1.00	0.14	6.3	0.295
6.000	0.377	5.12	1.00	0.14	6.0	0.282
6.083	0.377	0.64	1.00	0.12	5.5	0.242
6.167	0.377	0.64	1.00	0.10	4.7	0.207
6.250	0.377	0.64	1.00	0.09	4.0	0.177
6.333	0.377	0.64	1.00	0.07	3.4	0.151
6.417	0.377	0.64	1.00	0.06	2.9	0.129
6.500	0.377	0.64	1.00	0.05	2.5	0.109
6.583	0.377	0.06	1.00	0.04	2.1	0.089
6.667	0.377	0.06	1.00	0.03	1.7	0.071
6.750	0.377	0.06	1.00	0.03	1.3	0.055
6.833	0.377	0.06	1.00	0.02	1.0	0.042
6.917	0.377	0.06	1.00	0.01	0.7	0.030
7.000	0.377	0.06	1.00	0.01	0.5	0.020
7.083	0.377	0.02	1.00	0.01	0.3	0.011
7.167	0.377	0.02	1.00	0.00	0.2	0.003
7.250	0.374	0.02	1.00	0.00	0.0	0.000
7.333	0.367	0.02	1.00	0.00	0.0	0.000
7.417	0.360	0.02	1.00	0.00	0.0	0.000
7.500	0.354	0.02	1.00	0.00	0.0	0.000
7.583	0.347	0.01	1.00	0.00	0.0	0.000
7.667	0.340	0.01	1.00	0.00	0.0	0.000
7.750	0.333	0.01	1.00	0.00	0.0	0.000
7.833	0.326	0.01	1.00	0.00	0.0	0.000
7.917	0.319	0.01	1.00	0.00	0.0	0.000
8.000	0.313	0.01	1.00	0.00	0.0	0.000
8.083	0.306	0.00	1.00	0.00	0.0	0.000
8.167	0.299	0.00	1.00	0.00	0.0	0.000
8.250	0.292	0.00	1.00	0.00	0.0	0.000
8.333	0.285	0.00	1.00	0.00	0.0	0.000
8.417	0.278	0.00	1.00	0.00	0.0	0.000
8.500	0.271	0.00	1.00	0.00	0.0	0.000

8.583	0.264	0.00	1.00	0.00	0.0	0.000
8.667	0.257	0.00	1.00	0.00	0.0	0.000
8.750	0.251	0.00	1.00	0.00	0.0	0.000
8.833	0.244	0.00	1.00	0.00	0.0	0.000
8.917	0.237	0.00	1.00	0.00	0.0	0.000
9.000	0.230	0.00	1.00	0.00	0.0	0.000
9.083	0.223	0.00	1.00	0.00	0.0	0.000
9.167	0.216	0.00	1.00	0.00	0.0	0.000
9.250	0.209	0.00	1.00	0.00	0.0	0.000
9.333	0.202	0.00	1.00	0.00	0.0	0.000
9.417	0.195	0.00	1.00	0.00	0.0	0.000
9.500	0.189	0.00	1.00	0.00	0.0	0.000
9.583	0.182	0.00	1.00	0.00	0.0	0.000
9.667	0.175	0.00	1.00	0.00	0.0	0.000
9.750	0.168	0.00	1.00	0.00	0.0	0.000
9.833	0.161	0.00	1.00	0.00	0.0	0.000
9.917	0.154	0.00	1.00	0.00	0.0	0.000
10.000	0.147	0.00	1.00	0.00	0.0	0.000
10.083	0.140	0.00	1.00	0.00	0.0	0.000
10.167	0.133	0.00	1.00	0.00	0.0	0.000
10.250	0.127	0.00	1.00	0.00	0.0	0.000
10.333	0.120	0.00	1.00	0.00	0.0	0.000
10.417	0.113	0.00	1.00	0.00	0.0	0.000
10.500	0.106	0.00	1.00	0.00	0.0	0.000
10.583	0.099	0.00	1.00	0.00	0.0	0.000
10.667	0.092	0.00	1.00	0.00	0.0	0.000
10.750	0.085	0.00	1.00	0.00	0.0	0.000
10.833	0.078	0.00	1.00	0.00	0.0	0.000
10.917	0.071	0.00	1.00	0.00	0.0	0.000
11.000	0.065	0.00	1.00	0.00	0.0	0.000
11.083	0.058	0.00	1.00	0.00	0.0	0.000
11.167	0.051	0.00	1.00	0.00	0.0	0.000
11.250	0.044	0.00	1.00	0.00	0.0	0.000
11.333	0.037	0.00	1.00	0.00	0.0	0.000
11.417	0.030	0.00	1.00	0.00	0.0	0.000
11.500	0.023	0.00	1.00	0.00	0.0	0.000
11.583	0.016	0.00	1.00	0.00	0.0	0.000
11.667	0.010	0.00	1.00	0.00	0.0	0.000
11.750	0.003	0.00	1.00	0.00	0.0	0.000
11.833	0.000	0.00	0.38	0.00	0.0	0.000
11.917	0.000	0.00	0.00	0.00	0.0	0.000
12.000	0.000	0.00	0.00	0.00	0.0	0.000

```
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =      1.982 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =      1.014 AF
    LOSS    VOLUME =      0.969 AF


****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================


         MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
         STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
         VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
         EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
         OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
         UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
```

(0.938)(DIAMETER):

PIPELENGTH(FT) = 400.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1391.00
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000
3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000
3.833	0.00	0.00	0.00	0.000
3.917	0.09	0.53	0.00	0.000
4.000	0.37	2.16	0.14	0.000
4.083	0.82	2.72	0.68	0.000

4.167	1.30	3.14	1.20	0.000
4.250	1.72	3.42	1.60	0.000
4.333	2.08	3.62	1.99	0.000
4.417	2.40	3.76	2.32	0.000
4.500	2.67	3.86	2.60	0.000
4.583	3.01	3.98	2.93	0.000
4.667	3.42	4.10	3.32	0.000
4.750	3.77	4.22	3.69	0.000
4.833	4.07	4.30	4.00	0.000
4.917	4.33	4.36	4.27	0.000
5.000	4.56	4.41	4.50	0.000
5.083	5.08	4.51	4.96	0.000
5.167	5.86	4.65	5.68	0.000
5.250	6.54	4.73	6.38	0.000
5.333	7.12	4.78	6.98	0.000
5.417	7.63	4.79	7.35	0.001
5.500	8.07	4.79	7.43	0.006
5.583	8.00	4.79	7.43	0.010
5.667	7.48	4.79	7.43	0.010
5.750	7.03	4.79	7.43	0.007
5.833	6.64	4.79	7.43	0.002
5.917	6.31	4.74	6.81	0.000
6.000	6.01	4.67	6.15	0.000
6.083	5.46	4.58	5.59	0.000
6.167	4.68	4.43	4.86	0.000
6.250	4.01	4.29	4.17	0.000
6.333	3.42	4.10	3.56	0.000
6.417	2.91	3.95	3.04	0.000
6.500	2.48	3.79	2.59	0.000
6.583	2.06	3.61	2.17	0.000
6.667	1.66	3.38	1.76	0.000
6.750	1.31	3.15	1.41	0.000
6.833	1.01	2.90	1.10	0.000
6.917	0.75	2.65	0.84	0.000
7.000	0.52	2.37	0.61	0.000
7.083	0.32	1.91	0.39	0.000
7.167	0.15	0.89	0.23	0.000
7.250	0.03	0.50	0.07	0.000
7.333	0.00	0.00	0.08	0.000
7.417	0.00	0.00	0.01	0.000
7.500	0.00	0.00	0.02	0.000
7.583	0.00	0.00	0.00	0.000
7.667	0.00	0.00	0.00	0.000
7.750	0.00	0.00	0.00	0.000
7.833	0.00	0.00	0.00	0.000
7.917	0.00	0.00	0.00	0.000
8.000	0.00	0.00	0.00	0.000
8.083	0.00	0.00	0.00	0.000
8.167	0.00	0.00	0.00	0.000
8.250	0.00	0.00	0.00	0.000
8.333	0.00	0.00	0.00	0.000
8.417	0.00	0.00	0.00	0.000
8.500	0.00	0.00	0.00	0.000
8.583	0.00	0.00	0.00	0.000
8.667	0.00	0.00	0.00	0.000
8.750	0.00	0.00	0.00	0.000
8.833	0.00	0.00	0.00	0.000
8.917	0.00	0.00	0.00	0.000
9.000	0.00	0.00	0.00	0.000
9.083	0.00	0.00	0.00	0.000
9.167	0.00	0.00	0.00	0.000
9.250	0.00	0.00	0.00	0.000
9.333	0.00	0.00	0.00	0.000

9.417	0.00	0.00	0.00	0.000
9.500	0.00	0.00	0.00	0.000
9.583	0.00	0.00	0.00	0.000
9.667	0.00	0.00	0.00	0.000
9.750	0.00	0.00	0.00	0.000
9.833	0.00	0.00	0.00	0.000
9.917	0.00	0.00	0.00	0.000
10.000	0.00	0.00	0.00	0.000
10.083	0.00	0.00	0.00	0.000
10.167	0.00	0.00	0.00	0.000
10.250	0.00	0.00	0.00	0.000
10.333	0.00	0.00	0.00	0.000
10.417	0.00	0.00	0.00	0.000
10.500	0.00	0.00	0.00	0.000
10.583	0.00	0.00	0.00	0.000
10.667	0.00	0.00	0.00	0.000
10.750	0.00	0.00	0.00	0.000
10.833	0.00	0.00	0.00	0.000
10.917	0.00	0.00	0.00	0.000
11.000	0.00	0.00	0.00	0.000
11.083	0.00	0.00	0.00	0.000
11.167	0.00	0.00	0.00	0.000
11.250	0.00	0.00	0.00	0.000
11.333	0.00	0.00	0.00	0.000
11.417	0.00	0.00	0.00	0.000
11.500	0.00	0.00	0.00	0.000
11.583	0.00	0.00	0.00	0.000
11.667	0.00	0.00	0.00	0.000
11.750	0.00	0.00	0.00	0.000
11.833	0.00	0.00	0.00	0.000
11.917	0.00	0.00	0.00	0.000
12.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                     (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-24HR


----------------------------------------------------------------------------
  FILE NAME: BASIN224.DAT
  TIME/DATE OF STUDY: 16:03 05/06/2014


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  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.075
         USER-ENTERED RAINFALL =  7.80 INCHES
         RCFC&WCD 24-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                       UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                12.140
        2                98.621                 4.756
        3                99.599                 0.167
```

4	99.839	0.041
5	99.960	0.021
6	100.000	0.007

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0390	0.0331	0.0058
2	0.0546	0.0464	0.0082
3	0.0468	0.0398	0.0070
4	0.0546	0.0464	0.0082
5	0.0624	0.0530	0.0094
6	0.0780	0.0639	0.0141
7	0.0780	0.0630	0.0150
8	0.0858	0.0620	0.0238
9	0.1014	0.0611	0.0403
10	0.1170	0.0602	0.0568
11	0.1014	0.0593	0.0421
12	0.1248	0.0584	0.0664
13	0.1404	0.0575	0.0829
14	0.1560	0.0566	0.0994
15	0.1638	0.0558	0.1080
16	0.1950	0.0549	0.1401
17	0.2340	0.0541	0.1799
18	0.2574	0.0533	0.2041
19	0.3042	0.0525	0.2517
20	0.3354	0.0517	0.2837
21	0.2340	0.0510	0.1830
22	0.3120	0.0502	0.2618
23	0.2964	0.0495	0.2469
24	0.2730	0.0487	0.2242
25	0.3978	0.0480	0.3497
26	0.4446	0.0474	0.3972
27	0.5304	0.0467	0.4837
28	0.3588	0.0460	0.3128
29	0.4134	0.0454	0.3680
30	0.3978	0.0448	0.3530
31	0.3666	0.0442	0.3224
32	0.2964	0.0436	0.2528
33	0.0624	0.0430	0.0194
34	0.0468	0.0398	0.0070
35	0.0780	0.0420	0.0360
36	0.0702	0.0415	0.0287
37	0.0624	0.0410	0.0214
38	0.0390	0.0331	0.0058
39	0.0546	0.0401	0.0145
40	0.0390	0.0331	0.0058
41	0.0468	0.0393	0.0075
42	0.0390	0.0331	0.0058
43	0.0390	0.0331	0.0058
44	0.0390	0.0331	0.0058
45	0.0390	0.0331	0.0058
46	0.0312	0.0265	0.0047
47	0.0312	0.0265	0.0047
48	0.0312	0.0265	0.0047

TOTAL STORM RAINFALL(INCHES) = 7.80
TOTAL SOIL-LOSS(INCHES) = 2.21
TOTAL EFFECTIVE RAINFALL(INCHES) = 5.59

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    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       1.5679
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =       3.9550
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                        2 4 - H O U R    S T O R M
                    R U N O F F    H Y D R O G R A P H

================================================================================
                HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.        2.5       5.0       7.5      10.0
--------------------------------------------------------------------------------
   0.083      0.0005      0.07  Q         .         .         .         .
   0.167      0.0010      0.07  Q         .         .         .         .
   0.250      0.0015      0.07  Q         .         .         .         .
   0.333      0.0020      0.07  Q         .         .         .         .
   0.417      0.0024      0.07  Q         .         .         .         .
   0.500      0.0029      0.07  Q         .         .         .         .
   0.583      0.0038      0.13  Q         .         .         .         .
   0.667      0.0047      0.13  Q         .         .         .         .
   0.750      0.0056      0.13  Q         .         .         .         .
   0.833      0.0064      0.13  Q         .         .         .         .
   0.917      0.0073      0.13  Q         .         .         .         .
   1.000      0.0082      0.13  Q         .         .         .         .
   1.083      0.0091      0.13  Q         .         .         .         .
   1.167      0.0099      0.13  Q         .         .         .         .
   1.250      0.0108      0.13  Q         .         .         .         .
   1.333      0.0116      0.13  Q         .         .         .         .
   1.417      0.0125      0.13  Q         .         .         .         .
   1.500      0.0134      0.13  Q         .         .         .         .
   1.583      0.0143      0.13  Q         .         .         .         .
   1.667      0.0152      0.13  Q         .         .         .         .
   1.750      0.0161      0.13  Q         .         .         .         .
   1.833      0.0171      0.13  Q         .         .         .         .
   1.917      0.0180      0.13  Q         .         .         .         .
   2.000      0.0189      0.13  Q         .         .         .         .
   2.083      0.0200      0.15  Q         .         .         .         .
   2.167      0.0210      0.15  Q         .         .         .         .
   2.250      0.0221      0.15  Q         .         .         .         .
   2.333      0.0232      0.15  Q         .         .         .         .
   2.417      0.0242      0.15  Q         .         .         .         .
   2.500      0.0253      0.15  Q         .         .         .         .
   2.583      0.0268      0.22  Q         .         .         .         .
   2.667      0.0283      0.22  Q         .         .         .         .
   2.750      0.0298      0.22  Q         .         .         .         .
   2.833      0.0313      0.22  Q         .         .         .         .
   2.917      0.0328      0.22  Q         .         .         .         .
   3.000      0.0343      0.22  Q         .         .         .         .
   3.083      0.0360      0.25  VQ        .         .         .         .
   3.167      0.0377      0.25  VQ        .         .         .         .
   3.250      0.0395      0.25  VQ        .         .         .         .
   3.333      0.0412      0.25  VQ        .         .         .         .
   3.417      0.0429      0.25  VQ        .         .         .         .
   3.500      0.0447      0.25  VQ        .         .         .         .
   3.583      0.0472      0.36  VQ        .         .         .         .
   3.667      0.0497      0.36  VQ        .         .         .         .
   3.750      0.0522      0.36  VQ        .         .         .         .
   3.833      0.0547      0.36  VQ        .         .         .         .
```

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3.917      0.0572      0.36  VQ        .         .         .         .
4.000      0.0597      0.36  VQ        .         .         .         .
4.083      0.0639      0.61  V Q       .         .         .         .
4.167      0.0680      0.61  V Q       .         .         .         .
4.250      0.0722      0.61  V Q       .         .         .         .
4.333      0.0764      0.61  V Q       .         .         .         .
4.417      0.0805      0.61  V Q       .         .         .         .
4.500      0.0847      0.61  V Q       .         .         .         .
4.583      0.0908      0.89  V  Q      .         .         .         .
4.667      0.0969      0.89  V  Q      .         .         .         .
4.750      0.1030      0.89   V Q      .         .         .         .
4.833      0.1091      0.89   V Q      .         .         .         .
4.917      0.1152      0.89   V Q      .         .         .         .
5.000      0.1214      0.89   V Q      .         .         .         .
5.083      0.1268      0.79  .V Q      .         .         .         .
5.167      0.1322      0.79  .V Q      .         .         .         .
5.250      0.1377      0.79  .V Q      .         .         .         .
5.333      0.1431      0.79  .V Q      .         .         .         .
5.417      0.1486      0.79  .V Q      .         .         .         .
5.500      0.1540      0.79  .V Q      .         .         .         .
5.583      0.1610      1.02  .V  Q     .         .         .         .
5.667      0.1680      1.02  .V  Q     .         .         .         .
5.750      0.1750      1.02  .V  Q     .         .         .         .
5.833      0.1821      1.02  .V  Q     .         .         .         .
5.917      0.1891      1.02  .V  Q     .         .         .         .
6.000      0.1961      1.02  .V  Q     .         .         .         .
6.083      0.2053      1.33  . V  Q    .         .         .         .
6.167      0.2145      1.33  . V  Q    .         .         .         .
6.250      0.2236      1.33  . V  Q    .         .         .         .
6.333      0.2328      1.33  . V  Q    .         .         .         .
6.417      0.2420      1.33  . V  Q    .         .         .         .
6.500      0.2512      1.33  . V  Q    .         .         .         .
6.583      0.2623      1.62  . V   Q   .         .         .         .
6.667      0.2734      1.62  . V   Q   .         .         .         .
6.750      0.2845      1.62  . V   Q   .         .         .         .
6.833      0.2957      1.62  . V   Q   .         .         .         .
6.917      0.3068      1.62  .  V  Q   .         .         .         .
7.000      0.3179      1.62  .  V  Q   .         .         .         .
7.083      0.3303      1.80  .  V   Q  .         .         .         .
7.167      0.3427      1.80  .  V   Q  .         .         .         .
7.250      0.3551      1.80  .  V   Q  .         .         .         .
7.333      0.3676      1.80  .  V   Q  .         .         .         .
7.417      0.3800      1.80  .  V   Q  .         .         .         .
7.500      0.3924      1.80  .  V   Q  .         .         .         .
7.583      0.4078      2.24  .   V   Q .         .         .         .
7.667      0.4232      2.24  .   V   Q .         .         .         .
7.750      0.4386      2.24  .   V   Q .         .         .         .
7.833      0.4540      2.24  .   V   Q .         .         .         .
7.917      0.4694      2.24  .   V   Q .         .         .         .
8.000      0.4848      2.24  .   V   Q .         .         .         .
8.083      0.5046      2.87  .    V    .Q        .         .         .
8.167      0.5244      2.87  .    V    .Q        .         .         .
8.250      0.5442      2.87  .    V    .Q        .         .         .
8.333      0.5640      2.87  .    V    .Q        .         .         .
8.417      0.5838      2.87  .    V    .Q        .         .         .
8.500      0.6035      2.87  .     V   .Q        .         .         .
8.583      0.6267      3.36  .     V   .  Q      .         .         .
8.667      0.6499      3.36  .     V   .  Q      .         .         .
8.750      0.6731      3.36  .     V   .  Q      .         .         .
8.833      0.6962      3.36  .      V  .  Q      .         .         .
8.917      0.7194      3.36  .      V  .  Q      .         .         .
9.000      0.7426      3.36  .      V  .  Q      .         .         .
9.083      0.7706      4.07  .      V  .     Q   .         .         .
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 9.167      0.7985      4.07  .       V .     Q   .          .          .
 9.250      0.8265      4.07  .       V .     Q   .          .          .
 9.333      0.8545      4.07  .       V .     Q   .          .          .
 9.417      0.8825      4.07  .       V .     Q   .          .          .
 9.500      0.9105      4.07  .        V.     Q   .          .          .
 9.583      0.9428      4.69  .        V.       Q .          .          .
 9.667      0.9751      4.69  .        V.       Q .          .          .
 9.750      1.0074      4.69  .         V       Q .          .          .
 9.833      1.0396      4.69  .         V       Q .          .          .
 9.917      1.0719      4.69  .         V       Q .          .          .
10.000      1.1042      4.69  .          V      Q .          .          .
10.083      1.1292      3.63  .         .V  Q     .          .          .
10.167      1.1541      3.63  .         .V  Q     .          .          .
10.250      1.1791      3.63  .         .V  Q     .          .          .
10.333      1.2041      3.63  .         . V Q     .          .          .
10.417      1.2291      3.63  .         . V Q     .          .          .
10.500      1.2540      3.63  .         . V Q     .          .          .
10.583      1.2824      4.11  .         . V   Q   .          .          .
10.667      1.3107      4.11  .         .  V  Q   .          .          .
10.750      1.3390      4.11  .         .  V  Q   .          .          .
10.833      1.3673      4.11  .         .  V  Q   .          .          .
10.917      1.3956      4.11  .         .   V Q   .          .          .
11.000      1.4240      4.11  .         .   V Q   .          .          .
11.083      1.4535      4.29  .         .   V  Q  .          .          .
11.167      1.4831      4.29  .         .   V  Q  .          .          .
11.250      1.5126      4.29  .         .    V Q  .          .          .
11.333      1.5422      4.29  .         .    V Q  .          .          .
11.417      1.5718      4.29  .         .    V Q  .          .          .
11.500      1.6013      4.29  .         .     VQ  .          .          .
11.583      1.6286      3.96  .         .    QV   .          .          .
11.667      1.6558      3.96  .         .    QV   .          .          .
11.750      1.6831      3.96  .         .    Q V  .          .          .
11.833      1.7103      3.96  .         .    Q V  .          .          .
11.917      1.7375      3.96  .         .    Q V  .          .          .
12.000      1.7648      3.96  .         .    Q V  .          .          .
12.083      1.8018      5.37  .         .       V .Q         .          .
12.167      1.8388      5.37  .         .       V .Q         .          .
12.250      1.8757      5.37  .         .       V .Q         .          .
12.333      1.9127      5.37  .         .        V.Q         .          .
12.417      1.9497      5.37  .         .        V.Q         .          .
12.500      1.9867      5.37  .         .         VQ         .          .
12.583      2.0318      6.54  .         .         V     Q    .          .
12.667      2.0768      6.54  .         .          V    Q    .          .
12.750      2.1218      6.54  .         .          V    Q    .          .
12.833      2.1669      6.54  .         .          V    Q    .          .
12.917      2.2119      6.54  .         .           V   Q    .          .
13.000      2.2570      6.54  .         .           V   Q    .          .
13.083      2.3109      7.84  .         .         .  V       .Q         .
13.167      2.3649      7.84  .         .         .  V       .Q         .
13.250      2.4189      7.84  .         .         .   V      .Q         .
13.333      2.4729      7.84  .         .         .    V     .Q         .
13.417      2.5268      7.84  .         .         .    V     .Q         .
13.500      2.5808      7.84  .         .         .     V    .Q         .
13.583      2.6234      6.18  .         .         .   Q V    .          .
13.667      2.6660      6.18  .         .         .   Q V    .          .
13.750      2.7086      6.18  .         .         .   Q  V   .          .
13.833      2.7512      6.18  .         .         .   Q  V   .          .
13.917      2.7938      6.18  .         .         .   Q   V  .          .
14.000      2.8364      6.18  .         .         .   Q   V  .          .
14.083      2.8781      6.06  .         .         .   Q    V.          .
14.167      2.9199      6.06  .         .         .   Q    V.          .
14.250      2.9616      6.06  .         .         .   Q    V.          .
14.333      3.0033      6.06  .         .         .   Q     V          .
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14.417      3.0451      6.06  .         .         .   Q     V         .
14.500      3.0868      6.06  .         .         .   Q      V        .
14.583      3.1290      6.12  .         .         .   Q     .V        .
14.667      3.1711      6.12  .         .         .   Q     . V       .
14.750      3.2133      6.12  .         .         .   Q     . V       .
14.833      3.2554      6.12  .         .         .   Q     . V       .
14.917      3.2975      6.12  .         .         .   Q     .  V      .
15.000      3.3397      6.12  .         .         .   Q     .  V      .
15.083      3.3788      5.68  .         .         . Q       .   V     .
15.167      3.4179      5.68  .         .         . Q       .   V     .
15.250      3.4570      5.68  .         .         . Q       .   V     .
15.333      3.4962      5.68  .         .         . Q       .    V    .
15.417      3.5353      5.68  .         .         . Q       .    V    .
15.500      3.5744      5.68  .         .         . Q       .     V   .
15.583      3.6067      4.69  .         .       Q .         .     V   .
15.667      3.6390      4.69  .         .       Q .         .     V   .
15.750      3.6712      4.69  .         .       Q .         .      V  .
15.833      3.7035      4.69  .         .       Q .         .      V  .
15.917      3.7358      4.69  .         .       Q .         .      V  .
16.000      3.7681      4.69  .         .       Q .         .       V .
16.083      3.7785      1.52  .     Q   .         .         .       V .
16.167      3.7890      1.52  .     Q   .         .         .       V .
16.250      3.7994      1.52  .     Q   .         .         .       V .
16.333      3.8098      1.52  .     Q   .         .         .       V .
16.417      3.8203      1.52  .     Q   .         .         .       V .
16.500      3.8307      1.52  .     Q   .         .         .       V .
16.583      3.8324      0.24  Q         .         .         .       V .
16.667      3.8341      0.24  Q         .         .         .       V .
16.750      3.8357      0.24  Q         .         .         .       V .
16.833      3.8374      0.24  Q         .         .         .       V .
16.917      3.8391      0.24  Q         .         .         .       V .
17.000      3.8407      0.24  Q         .         .         .       V .
17.083      3.8441      0.49  .Q        .         .         .       V .
17.167      3.8475      0.49  .Q        .         .         .       V .
17.250      3.8509      0.49  .Q        .         .         .       V .
17.333      3.8543      0.49  .Q        .         .         .       V .
17.417      3.8577      0.49  .Q        .         .         .        V.
17.500      3.8611      0.49  .Q        .         .         .        V.
17.583      3.8648      0.53  . Q       .         .         .        V.
17.667      3.8684      0.53  . Q       .         .         .        V.
17.750      3.8721      0.53  . Q       .         .         .        V.
17.833      3.8757      0.53  . Q       .         .         .        V.
17.917      3.8794      0.53  . Q       .         .         .        V.
18.000      3.8830      0.53  . Q       .         .         .        V.
18.083      3.8858      0.41  .Q        .         .         .        V.
18.167      3.8886      0.41  .Q        .         .         .        V.
18.250      3.8914      0.41  .Q        .         .         .        V.
18.333      3.8942      0.41  .Q        .         .         .        V.
18.417      3.8970      0.41  .Q        .         .         .        V.
18.500      3.8998      0.41  .Q        .         .         .        V.
18.583      3.9010      0.18  Q         .         .         .        V.
18.667      3.9022      0.18  Q         .         .         .        V.
18.750      3.9035      0.18  Q         .         .         .        V.
18.833      3.9047      0.18  Q         .         .         .        V.
18.917      3.9059      0.18  Q         .         .         .        V.
19.000      3.9072      0.18  Q         .         .         .        V.
19.083      3.9086      0.21  Q         .         .         .        V.
19.167      3.9101      0.21  Q         .         .         .        V.
19.250      3.9115      0.21  Q         .         .         .        V.
19.333      3.9130      0.21  Q         .         .         .        V.
19.417      3.9144      0.21  Q         .         .         .        V.
19.500      3.9158      0.21  Q         .         .         .        V.
19.583      3.9168      0.14  Q         .         .         .        V.
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19.667	3.9178	0.14	Q	.	.	.	V.
19.750	3.9188	0.14	Q	.	.	.	V.
19.833	3.9198	0.14	Q	.	.	.	V.
19.917	3.9208	0.14	Q	.	.	.	V.
20.000	3.9217	0.14	Q	.	.	.	V.
20.083	3.9226	0.12	Q	.	.	.	V.
20.167	3.9234	0.12	Q	.	.	.	V.
20.250	3.9243	0.12	Q	.	.	.	V.
20.333	3.9251	0.12	Q	.	.	.	V.
20.417	3.9260	0.12	Q	.	.	.	V.
20.500	3.9268	0.12	Q	.	.	.	V.
20.583	3.9275	0.11	Q	.	.	.	V.
20.667	3.9283	0.11	Q	.	.	.	V.
20.750	3.9290	0.11	Q	.	.	.	V.
20.833	3.9298	0.11	Q	.	.	.	V.
20.917	3.9305	0.11	Q	.	.	.	V.
21.000	3.9313	0.11	Q	.	.	.	V.
21.083	3.9320	0.10	Q	.	.	.	V.
21.167	3.9327	0.10	Q	.	.	.	V.
21.250	3.9334	0.10	Q	.	.	.	V.
21.333	3.9341	0.10	Q	.	.	.	V.
21.417	3.9347	0.10	Q	.	.	.	V.
21.500	3.9354	0.10	Q	.	.	.	V.
21.583	3.9361	0.10	Q	.	.	.	V.
21.667	3.9368	0.10	Q	.	.	.	V.
21.750	3.9375	0.10	Q	.	.	.	V.
21.833	3.9382	0.10	Q	.	.	.	V.
21.917	3.9389	0.10	Q	.	.	.	V.
22.000	3.9396	0.10	Q	.	.	.	V.
22.083	3.9403	0.10	Q	.	.	.	V.
22.167	3.9410	0.10	Q	.	.	.	V.
22.250	3.9417	0.10	Q	.	.	.	V.
22.333	3.9423	0.10	Q	.	.	.	V.
22.417	3.9430	0.10	Q	.	.	.	V.
22.500	3.9437	0.10	Q	.	.	.	V.
22.583	3.9443	0.09	Q	.	.	.	V.
22.667	3.9449	0.09	Q	.	.	.	V.
22.750	3.9455	0.09	Q	.	.	.	V.
22.833	3.9461	0.09	Q	.	.	.	V.
22.917	3.9467	0.09	Q	.	.	.	V.
23.000	3.9473	0.09	Q	.	.	.	V.
23.083	3.9478	0.08	Q	.	.	.	V.
23.166	3.9484	0.08	Q	.	.	.	V.
23.250	3.9489	0.08	Q	.	.	.	V.
23.333	3.9495	0.08	Q	.	.	.	V.
23.416	3.9501	0.08	Q	.	.	.	V.
23.500	3.9506	0.08	Q	.	.	.	V.
23.583	3.9512	0.08	Q	.	.	.	V.
23.666	3.9517	0.08	Q	.	.	.	V.
23.750	3.9523	0.08	Q	.	.	.	V.
23.833	3.9528	0.08	Q	.	.	.	V.
23.916	3.9534	0.08	Q	.	.	.	V.
24.000	3.9539	0.08	Q	.	.	.	V.
24.083	3.9541	0.02	Q	.	.	.	V.
24.166	3.9542	0.02	Q	.	.	.	V.
24.250	3.9544	0.02	Q	.	.	.	V.
24.333	3.9546	0.02	Q	.	.	.	V.
24.416	3.9547	0.02	Q	.	.	.	V.
24.500	3.9549	0.02	Q	.	.	.	V.
24.583	3.9549	0.00	Q	.	.	.	V.
24.666	3.9549	0.00	Q	.	.	.	V.
24.750	3.9549	0.00	Q	.	.	.	V.
24.833	3.9549	0.00	Q	.	.	.	V.

```
  24.916      3.9549      0.00  Q         .         .         .        V.
  25.000      3.9549      0.00  Q         .         .         .        V.
----------------------------------------------------------------------------
```

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1500.0
10%	720.0
20%	570.0
30%	480.0
40%	450.0
50%	390.0
60%	210.0
70%	180.0
80%	60.0
90%	30.0

```
****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================
```

```
                  INFLOW
                (STREAM 1)
                     |
                     |
                     V                __effective depth
                -----------           |   (and volume)
               |           |    |     |
               |           |    |....V........
               | detention |<-->|           outflow
               |   basin   |    |.........______
                -----------     |    ^    |  \
                     |          |  dead   |   basin outlet
                     V          | storage |
                  OUTFLOW        ---------
                (STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.377
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 1.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498

5	0.80	17.31	0.542
6	1.00	19.36	0.587

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.07	0.07	0.00	0.0	0.000
0.167	0.000	0.07	0.14	0.00	0.0	0.000
0.250	0.000	0.07	0.21	0.00	0.0	0.000
0.333	0.000	0.07	0.28	0.00	0.0	0.000
0.417	0.000	0.07	0.36	0.00	0.0	0.000
0.500	0.000	0.07	0.43	0.00	0.0	0.000
0.583	0.000	0.13	0.55	0.00	0.0	0.000
0.667	0.000	0.13	0.68	0.00	0.0	0.000
0.750	0.000	0.13	0.81	0.00	0.0	0.000
0.833	0.000	0.13	0.94	0.00	0.0	0.000
0.917	0.000	0.13	1.00	0.00	0.0	0.000
1.000	0.000	0.13	1.00	0.00	0.0	0.000
1.083	0.000	0.13	1.00	0.00	0.0	0.000
1.167	0.000	0.13	1.00	0.00	0.0	0.000
1.250	0.000	0.13	1.00	0.00	0.0	0.000
1.333	0.000	0.13	1.00	0.00	0.0	0.000
1.417	0.000	0.13	1.00	0.00	0.0	0.000
1.500	0.000	0.13	1.00	0.00	0.0	0.000
1.583	0.000	0.13	1.00	0.00	0.0	0.000
1.667	0.000	0.13	1.00	0.00	0.0	0.000
1.750	0.000	0.13	1.00	0.00	0.0	0.000
1.833	0.000	0.13	1.00	0.00	0.0	0.000
1.917	0.000	0.13	1.00	0.00	0.0	0.000
2.000	0.000	0.13	1.00	0.00	0.0	0.000
2.083	0.000	0.15	1.00	0.00	0.0	0.000
2.167	0.000	0.15	1.00	0.00	0.0	0.000
2.250	0.000	0.15	1.00	0.00	0.0	0.000
2.333	0.000	0.15	1.00	0.00	0.0	0.000
2.417	0.000	0.15	1.00	0.00	0.0	0.000
2.500	0.000	0.15	1.00	0.00	0.0	0.000
2.583	0.000	0.22	1.00	0.00	0.0	0.000
2.667	0.000	0.22	1.00	0.00	0.0	0.000
2.750	0.000	0.22	1.00	0.00	0.0	0.000
2.833	0.000	0.22	1.00	0.00	0.0	0.000
2.917	0.000	0.22	1.00	0.00	0.0	0.000
3.000	0.000	0.22	1.00	0.00	0.0	0.000
3.083	0.000	0.25	1.00	0.00	0.0	0.000
3.167	0.000	0.25	1.00	0.00	0.0	0.000
3.250	0.000	0.25	1.00	0.00	0.0	0.000
3.333	0.000	0.25	1.00	0.00	0.0	0.000
3.417	0.000	0.25	1.00	0.00	0.0	0.000
3.500	0.000	0.25	1.00	0.00	0.0	0.000
3.583	0.000	0.36	1.00	0.00	0.0	0.000
3.667	0.000	0.36	1.00	0.00	0.0	0.000
3.750	0.000	0.36	1.00	0.00	0.0	0.000
3.833	0.000	0.36	1.00	0.00	0.0	0.000
3.917	0.000	0.36	1.00	0.00	0.0	0.000
4.000	0.000	0.36	1.00	0.00	0.0	0.000
4.083	0.000	0.61	1.00	0.00	0.0	0.000
4.167	0.000	0.61	1.00	0.00	0.0	0.000

4.250	0.000	0.61	1.00	0.00	0.0	0.000
4.333	0.000	0.61	1.00	0.00	0.0	0.000
4.417	0.000	0.61	1.00	0.00	0.0	0.000
4.500	0.000	0.61	1.00	0.00	0.0	0.000
4.583	0.000	0.89	1.00	0.00	0.0	0.000
4.667	0.000	0.89	1.00	0.00	0.0	0.000
4.750	0.000	0.89	1.00	0.00	0.0	0.000
4.833	0.000	0.89	1.00	0.00	0.0	0.000
4.917	0.000	0.89	1.00	0.00	0.0	0.000
5.000	0.000	0.89	1.00	0.00	0.0	0.000
5.083	0.000	0.79	1.00	0.00	0.0	0.000
5.167	0.000	0.79	1.00	0.00	0.0	0.000
5.250	0.000	0.79	1.00	0.00	0.0	0.000
5.333	0.000	0.79	1.00	0.00	0.0	0.000
5.417	0.000	0.79	1.00	0.00	0.0	0.000
5.500	0.000	0.79	1.00	0.00	0.0	0.000
5.583	0.000	1.02	1.00	0.00	0.0	0.000
5.667	0.000	1.02	1.00	0.00	0.0	0.000
5.750	0.000	1.02	1.00	0.00	0.0	0.000
5.833	0.001	1.02	1.00	0.00	0.0	0.000
5.917	0.001	1.02	1.00	0.00	0.0	0.000
6.000	0.001	1.02	1.00	0.00	0.0	0.000
6.083	0.003	1.33	1.00	0.00	0.0	0.000
6.167	0.005	1.33	1.00	0.00	0.0	0.000
6.250	0.008	1.33	1.00	0.00	0.0	0.000
6.333	0.010	1.33	1.00	0.00	0.0	0.000
6.417	0.012	1.33	1.00	0.00	0.0	0.000
6.500	0.015	1.33	1.00	0.00	0.0	0.000
6.583	0.019	1.62	1.00	0.00	0.0	0.000
6.667	0.023	1.62	1.00	0.00	0.0	0.000
6.750	0.027	1.62	1.00	0.00	0.0	0.000
6.833	0.031	1.62	1.00	0.00	0.0	0.000
6.917	0.036	1.62	1.00	0.00	0.0	0.000
7.000	0.040	1.62	1.00	0.00	0.0	0.000
7.083	0.045	1.80	1.00	0.00	0.0	0.000
7.167	0.051	1.80	1.00	0.00	0.0	0.000
7.250	0.057	1.80	1.00	0.00	0.0	0.000
7.333	0.062	1.80	1.00	0.00	0.0	0.000
7.417	0.068	1.80	1.00	0.00	0.0	0.000
7.500	0.073	1.80	1.00	0.00	0.0	0.000
7.583	0.082	2.24	1.00	0.00	0.0	0.000
7.667	0.090	2.24	1.00	0.00	0.0	0.000
7.750	0.099	2.24	1.00	0.00	0.0	0.000
7.833	0.107	2.24	1.00	0.00	0.0	0.000
7.917	0.116	2.24	1.00	0.00	0.0	0.000
8.000	0.124	2.24	1.00	0.00	0.0	0.000
8.083	0.137	2.87	1.00	0.00	0.0	0.000
8.167	0.150	2.87	1.00	0.00	0.0	0.000
8.250	0.163	2.87	1.00	0.00	0.0	0.000
8.333	0.176	2.87	1.00	0.00	0.0	0.000
8.417	0.189	2.87	1.00	0.00	0.0	0.000
8.500	0.202	2.87	1.00	0.00	0.0	0.000
8.583	0.218	3.36	1.00	0.00	0.0	0.000
8.667	0.234	3.36	1.00	0.00	0.0	0.000
8.750	0.250	3.36	1.00	0.00	0.0	0.000
8.833	0.267	3.36	1.00	0.00	0.0	0.000
8.917	0.283	3.36	1.00	0.00	0.0	0.000
9.000	0.299	3.36	1.00	0.00	0.0	0.000
9.083	0.320	4.07	1.00	0.00	0.0	0.000
9.167	0.342	4.07	1.00	0.00	0.0	0.000
9.250	0.363	4.07	1.00	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 3.1 (less LOSS)
REMAINING UNIT FLOW IS 0.9 CFS.

9.333	0.377	4.07	1.00	0.00	0.1	0.006
9.417	0.377	4.07	1.00	0.01	0.3	0.025
9.500	0.377	4.07	1.00	0.02	0.7	0.041
9.583	0.377	4.69	1.00	0.03	1.0	0.059
9.667	0.377	4.69	1.00	0.04	1.4	0.075
9.750	0.377	4.69	1.00	0.04	1.7	0.089
9.833	0.377	4.69	1.00	0.05	2.0	0.101
9.917	0.377	4.69	1.00	0.05	2.2	0.111
10.000	0.377	4.69	1.00	0.06	2.4	0.120
10.083	0.377	3.63	1.00	0.06	2.5	0.121
10.167	0.377	3.63	1.00	0.06	2.5	0.121
10.250	0.377	3.63	1.00	0.06	2.5	0.122
10.333	0.377	3.63	1.00	0.06	2.5	0.123
10.417	0.377	3.63	1.00	0.06	2.6	0.123
10.500	0.377	3.63	1.00	0.06	2.6	0.123
10.583	0.377	4.11	1.00	0.06	2.6	0.127
10.667	0.377	4.11	1.00	0.06	2.7	0.130
10.750	0.377	4.11	1.00	0.06	2.7	0.133
10.833	0.377	4.11	1.00	0.06	2.8	0.135
10.917	0.377	4.11	1.00	0.07	2.8	0.137
11.000	0.377	4.11	1.00	0.07	2.9	0.138
11.083	0.377	4.29	1.00	0.07	2.9	0.141
11.167	0.377	4.29	1.00	0.07	3.0	0.143
11.250	0.377	4.29	1.00	0.07	3.0	0.145
11.333	0.377	4.29	1.00	0.07	3.0	0.147
11.417	0.377	4.29	1.00	0.07	3.1	0.149
11.500	0.377	4.29	1.00	0.07	3.1	0.150
11.583	0.377	3.96	1.00	0.07	3.1	0.149
11.667	0.377	3.96	1.00	0.07	3.1	0.148
11.750	0.377	3.96	1.00	0.07	3.1	0.147
11.833	0.377	3.96	1.00	0.07	3.1	0.146
11.917	0.377	3.96	1.00	0.07	3.0	0.146
12.000	0.377	3.96	1.00	0.07	3.0	0.145
12.083	0.377	5.37	1.00	0.07	3.1	0.154
12.167	0.377	5.37	1.00	0.08	3.3	0.161
12.250	0.377	5.37	1.00	0.08	3.4	0.168
12.333	0.377	5.37	1.00	0.08	3.6	0.174
12.417	0.377	5.37	1.00	0.09	3.7	0.178
12.500	0.377	5.37	1.00	0.09	3.8	0.183
12.583	0.377	6.54	1.00	0.09	3.9	0.194
12.667	0.377	6.54	1.00	0.10	4.1	0.203
12.750	0.377	6.54	1.00	0.10	4.3	0.212
12.833	0.377	6.54	1.00	0.11	4.5	0.219
12.917	0.377	6.54	1.00	0.11	4.6	0.225
13.000	0.377	6.54	1.00	0.11	4.7	0.231
13.083	0.377	7.84	1.00	0.12	4.9	0.244
13.167	0.377	7.84	1.00	0.12	5.2	0.255
13.250	0.377	7.84	1.00	0.13	5.4	0.265
13.333	0.377	7.84	1.00	0.13	5.6	0.273
13.417	0.377	7.84	1.00	0.14	5.8	0.281
13.500	0.377	7.84	1.00	0.14	5.9	0.287
13.583	0.377	6.18	1.00	0.14	5.9	0.282
13.667	0.377	6.18	1.00	0.13	5.8	0.278
13.750	0.377	6.18	1.00	0.13	5.7	0.274
13.833	0.377	6.18	1.00	0.13	5.7	0.271
13.917	0.377	6.18	1.00	0.13	5.6	0.268
14.000	0.377	6.18	1.00	0.13	5.5	0.265
14.083	0.377	6.06	1.00	0.13	5.5	0.262
14.167	0.377	6.06	1.00	0.12	5.4	0.260
14.250	0.377	6.06	1.00	0.12	5.4	0.257
14.333	0.377	6.06	1.00	0.12	5.3	0.256
14.417	0.377	6.06	1.00	0.12	5.3	0.254
14.500	0.377	6.06	1.00	0.12	5.3	0.252

14.583	0.377	6.12	1.00	0.12	5.2	0.252
14.667	0.377	6.12	1.00	0.12	5.2	0.251
14.750	0.377	6.12	1.00	0.12	5.2	0.250
14.833	0.377	6.12	1.00	0.12	5.2	0.250
14.917	0.377	6.12	1.00	0.12	5.2	0.249
15.000	0.377	6.12	1.00	0.12	5.2	0.249
15.083	0.377	5.68	1.00	0.12	5.1	0.245
15.167	0.377	5.68	1.00	0.12	5.1	0.243
15.250	0.377	5.68	1.00	0.12	5.0	0.240
15.333	0.377	5.68	1.00	0.11	5.0	0.238
15.417	0.377	5.68	1.00	0.11	4.9	0.236
15.500	0.377	5.68	1.00	0.11	4.9	0.235
15.583	0.377	4.69	1.00	0.11	4.8	0.227
15.667	0.377	4.69	1.00	0.11	4.7	0.220
15.750	0.377	4.69	1.00	0.10	4.5	0.215
15.833	0.377	4.69	1.00	0.10	4.4	0.210
15.917	0.377	4.69	1.00	0.10	4.3	0.205
16.000	0.377	4.69	1.00	0.10	4.2	0.202
16.083	0.377	1.52	1.00	0.09	3.9	0.178
16.167	0.377	1.52	1.00	0.08	3.5	0.157
16.250	0.377	1.52	1.00	0.07	3.1	0.140
16.333	0.377	1.52	1.00	0.06	2.7	0.124
16.417	0.377	1.52	1.00	0.05	2.4	0.111
16.500	0.377	1.52	1.00	0.05	2.2	0.099
16.583	0.377	0.24	1.00	0.04	1.9	0.081
16.667	0.377	0.24	1.00	0.03	1.5	0.066
16.750	0.377	0.24	1.00	0.02	1.2	0.052
16.833	0.377	0.24	1.00	0.02	1.0	0.040
16.917	0.377	0.24	1.00	0.01	0.7	0.030
17.000	0.377	0.24	1.00	0.01	0.5	0.021
17.083	0.377	0.49	1.00	0.01	0.4	0.015
17.167	0.377	0.49	1.00	0.00	0.3	0.010
17.250	0.377	0.49	1.00	0.00	0.2	0.005
17.333	0.377	0.49	1.00	0.00	0.1	0.001
17.417	0.375	0.49	1.00	0.00	0.0	0.000
17.500	0.371	0.49	1.00	0.00	0.0	0.000
17.583	0.368	0.53	1.00	0.00	0.0	0.000
17.667	0.365	0.53	1.00	0.00	0.0	0.000
17.750	0.362	0.53	1.00	0.00	0.0	0.000
17.833	0.358	0.53	1.00	0.00	0.0	0.000
17.917	0.355	0.53	1.00	0.00	0.0	0.000
18.000	0.352	0.53	1.00	0.00	0.0	0.000
18.083	0.348	0.41	1.00	0.00	0.0	0.000
18.167	0.344	0.41	1.00	0.00	0.0	0.000
18.250	0.340	0.41	1.00	0.00	0.0	0.000
18.333	0.336	0.41	1.00	0.00	0.0	0.000
18.417	0.332	0.41	1.00	0.00	0.0	0.000
18.500	0.327	0.41	1.00	0.00	0.0	0.000
18.583	0.322	0.18	1.00	0.00	0.0	0.000
18.667	0.316	0.18	1.00	0.00	0.0	0.000
18.750	0.310	0.18	1.00	0.00	0.0	0.000
18.833	0.305	0.18	1.00	0.00	0.0	0.000
18.917	0.299	0.18	1.00	0.00	0.0	0.000
19.000	0.294	0.18	1.00	0.00	0.0	0.000
19.083	0.288	0.21	1.00	0.00	0.0	0.000
19.167	0.283	0.21	1.00	0.00	0.0	0.000
19.250	0.277	0.21	1.00	0.00	0.0	0.000
19.333	0.272	0.21	1.00	0.00	0.0	0.000
19.417	0.266	0.21	1.00	0.00	0.0	0.000
19.500	0.261	0.21	1.00	0.00	0.0	0.000
19.583	0.255	0.14	1.00	0.00	0.0	0.000
19.667	0.249	0.14	1.00	0.00	0.0	0.000
19.750	0.243	0.14	1.00	0.00	0.0	0.000

19.833	0.237	0.14	1.00	0.00	0.0	0.000
19.917	0.231	0.14	1.00	0.00	0.0	0.000
20.000	0.225	0.14	1.00	0.00	0.0	0.000
20.083	0.219	0.12	1.00	0.00	0.0	0.000
20.167	0.213	0.12	1.00	0.00	0.0	0.000
20.250	0.207	0.12	1.00	0.00	0.0	0.000
20.333	0.201	0.12	1.00	0.00	0.0	0.000
20.417	0.195	0.12	1.00	0.00	0.0	0.000
20.500	0.189	0.12	1.00	0.00	0.0	0.000
20.583	0.183	0.11	1.00	0.00	0.0	0.000
20.667	0.177	0.11	1.00	0.00	0.0	0.000
20.750	0.171	0.11	1.00	0.00	0.0	0.000
20.833	0.165	0.11	1.00	0.00	0.0	0.000
20.917	0.158	0.11	1.00	0.00	0.0	0.000
21.000	0.152	0.11	1.00	0.00	0.0	0.000
21.083	0.146	0.10	1.00	0.00	0.0	0.000
21.167	0.140	0.10	1.00	0.00	0.0	0.000
21.250	0.134	0.10	1.00	0.00	0.0	0.000
21.333	0.128	0.10	1.00	0.00	0.0	0.000
21.417	0.121	0.10	1.00	0.00	0.0	0.000
21.500	0.115	0.10	1.00	0.00	0.0	0.000
21.583	0.109	0.10	1.00	0.00	0.0	0.000
21.667	0.103	0.10	1.00	0.00	0.0	0.000
21.750	0.097	0.10	1.00	0.00	0.0	0.000
21.833	0.090	0.10	1.00	0.00	0.0	0.000
21.917	0.084	0.10	1.00	0.00	0.0	0.000
22.000	0.078	0.10	1.00	0.00	0.0	0.000
22.083	0.072	0.10	1.00	0.00	0.0	0.000
22.167	0.066	0.10	1.00	0.00	0.0	0.000
22.250	0.059	0.10	1.00	0.00	0.0	0.000
22.333	0.053	0.10	1.00	0.00	0.0	0.000
22.417	0.047	0.10	1.00	0.00	0.0	0.000
22.500	0.041	0.10	1.00	0.00	0.0	0.000
22.583	0.034	0.09	1.00	0.00	0.0	0.000
22.667	0.028	0.09	1.00	0.00	0.0	0.000
22.750	0.022	0.09	1.00	0.00	0.0	0.000
22.833	0.016	0.09	1.00	0.00	0.0	0.000
22.917	0.009	0.09	1.00	0.00	0.0	0.000
23.000	0.003	0.09	1.00	0.00	0.0	0.000
23.083	0.000	0.08	0.52	0.00	0.0	0.000
23.167	0.000	0.08	0.08	0.00	0.0	0.000
23.250	0.000	0.08	0.08	0.00	0.0	0.000
23.333	0.000	0.08	0.08	0.00	0.0	0.000
23.417	0.000	0.08	0.08	0.00	0.0	0.000
23.500	0.000	0.08	0.08	0.00	0.0	0.000
23.583	0.000	0.08	0.08	0.00	0.0	0.000
23.667	0.000	0.08	0.08	0.00	0.0	0.000
23.750	0.000	0.08	0.08	0.00	0.0	0.000
23.833	0.000	0.08	0.08	0.00	0.0	0.000
23.917	0.000	0.08	0.08	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 3.955 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 2.344 AF
LOSS VOLUME = 1.611 AF

****
FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 4

>>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
==========

MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 400.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1391.00
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000

3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000
3.833	0.00	0.00	0.00	0.000
3.917	0.00	0.00	0.00	0.000
4.000	0.00	0.00	0.00	0.000
4.083	0.00	0.00	0.00	0.000
4.167	0.00	0.00	0.00	0.000
4.250	0.00	0.00	0.00	0.000
4.333	0.00	0.00	0.00	0.000
4.417	0.00	0.00	0.00	0.000
4.500	0.00	0.00	0.00	0.000
4.583	0.00	0.00	0.00	0.000
4.667	0.00	0.00	0.00	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000
5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000
6.083	0.00	0.00	0.00	0.000
6.167	0.00	0.00	0.00	0.000
6.250	0.00	0.00	0.00	0.000
6.333	0.00	0.00	0.00	0.000
6.417	0.00	0.00	0.00	0.000
6.500	0.00	0.00	0.00	0.000
6.583	0.00	0.00	0.00	0.000
6.667	0.00	0.00	0.00	0.000
6.750	0.00	0.00	0.00	0.000
6.833	0.00	0.00	0.00	0.000
6.917	0.00	0.00	0.00	0.000
7.000	0.00	0.00	0.00	0.000
7.083	0.00	0.00	0.00	0.000
7.167	0.00	0.00	0.00	0.000
7.250	0.00	0.00	0.00	0.000
7.333	0.00	0.00	0.00	0.000
7.417	0.00	0.00	0.00	0.000
7.500	0.00	0.00	0.00	0.000
7.583	0.00	0.00	0.00	0.000
7.667	0.00	0.00	0.00	0.000
7.750	0.00	0.00	0.00	0.000
7.833	0.00	0.00	0.00	0.000
7.917	0.00	0.00	0.00	0.000
8.000	0.00	0.00	0.00	0.000
8.083	0.00	0.00	0.00	0.000
8.167	0.00	0.00	0.00	0.000
8.250	0.00	0.00	0.00	0.000
8.333	0.00	0.00	0.00	0.000
8.417	0.00	0.00	0.00	0.000
8.500	0.00	0.00	0.00	0.000
8.583	0.00	0.00	0.00	0.000
8.667	0.00	0.00	0.00	0.000

8.750	0.00	0.00	0.00	0.000
8.833	0.00	0.00	0.00	0.000
8.917	0.00	0.00	0.00	0.000
9.000	0.00	0.00	0.00	0.000
9.083	0.00	0.00	0.00	0.000
9.167	0.00	0.00	0.00	0.000
9.250	0.00	0.00	0.00	0.000
9.333	0.06	0.50	0.00	0.000
9.417	0.32	1.89	0.10	0.000
9.500	0.69	2.58	0.58	0.000
9.583	1.05	2.94	0.97	0.000
9.667	1.40	3.22	1.30	0.000
9.750	1.71	3.41	1.62	0.000
9.833	1.97	3.56	1.90	0.000
9.917	2.20	3.68	2.14	0.000
10.000	2.40	3.76	2.35	0.000
10.083	2.50	3.80	2.47	0.000
10.167	2.52	3.80	2.51	0.000
10.250	2.53	3.81	2.53	0.000
10.333	2.54	3.81	2.54	0.000
10.417	2.56	3.82	2.55	0.000
10.500	2.57	3.82	2.56	0.000
10.583	2.61	3.84	2.60	0.000
10.667	2.67	3.86	2.66	0.000
10.750	2.73	3.88	2.72	0.000
10.833	2.78	3.90	2.77	0.000
10.917	2.83	3.92	2.82	0.000
11.000	2.87	3.93	2.86	0.000
11.083	2.91	3.95	2.90	0.000
11.167	2.96	3.97	2.95	0.000
11.250	3.01	3.98	2.99	0.000
11.333	3.04	3.99	3.03	0.000
11.417	3.08	4.00	3.07	0.000
11.500	3.11	4.01	3.10	0.000
11.583	3.11	4.01	3.11	0.000
11.667	3.09	4.01	3.09	0.000
11.750	3.07	4.00	3.07	0.000
11.833	3.05	4.00	3.06	0.000
11.917	3.04	3.99	3.05	0.000
12.000	3.03	3.99	3.03	0.000
12.083	3.11	4.01	3.09	0.000
12.167	3.28	4.06	3.24	0.000
12.250	3.43	4.11	3.39	0.000
12.333	3.55	4.15	3.53	0.000
12.417	3.66	4.19	3.64	0.000
12.500	3.76	4.22	3.74	0.000
12.583	3.92	4.26	3.88	0.000
12.667	4.14	4.32	4.08	0.000
12.750	4.32	4.36	4.28	0.000
12.833	4.49	4.40	4.45	0.000
12.917	4.63	4.42	4.59	0.000
13.000	4.75	4.44	4.72	0.000
13.083	4.94	4.48	4.90	0.000
13.167	5.20	4.54	5.14	0.000
13.250	5.41	4.58	5.36	0.000
13.333	5.61	4.61	5.56	0.000
13.417	5.77	4.64	5.73	0.000
13.500	5.91	4.66	5.88	0.000
13.583	5.93	4.66	5.92	0.000
13.667	5.83	4.65	5.85	0.000
13.750	5.74	4.63	5.76	0.000
13.833	5.67	4.62	5.68	0.000
13.917	5.60	4.61	5.62	0.000

14.000	5.55	4.60	5.56	0.000
14.083	5.49	4.59	5.50	0.000
14.167	5.43	4.58	5.45	0.000
14.250	5.38	4.57	5.39	0.000
14.333	5.34	4.56	5.35	0.000
14.417	5.30	4.56	5.31	0.000
14.500	5.27	4.55	5.28	0.000
14.583	5.25	4.55	5.25	0.000
14.667	5.23	4.54	5.23	0.000
14.750	5.21	4.54	5.22	0.000
14.833	5.20	4.54	5.20	0.000
14.917	5.19	4.54	5.19	0.000
15.000	5.18	4.54	5.18	0.000
15.083	5.14	4.53	5.15	0.000
15.167	5.08	4.51	5.09	0.000
15.250	5.03	4.50	5.04	0.000
15.333	4.98	4.49	4.99	0.000
15.417	4.94	4.48	4.95	0.000
15.500	4.91	4.47	4.91	0.000
15.583	4.81	4.45	4.83	0.000
15.667	4.66	4.43	4.70	0.000
15.750	4.53	4.40	4.56	0.000
15.833	4.42	4.38	4.44	0.000
15.917	4.32	4.36	4.34	0.000
16.000	4.23	4.34	4.25	0.000
16.083	3.95	4.27	4.02	0.000
16.167	3.49	4.13	3.60	0.000
16.250	3.09	4.01	3.19	0.000
16.333	2.75	3.89	2.83	0.000
16.417	2.45	3.78	2.53	0.000
16.500	2.19	3.68	2.26	0.000
16.583	1.88	3.51	1.96	0.000
16.667	1.53	3.30	1.63	0.000
16.750	1.22	3.08	1.31	0.000
16.833	0.96	2.85	1.04	0.000
16.917	0.73	2.63	0.81	0.000
17.000	0.53	2.38	0.60	0.000
17.083	0.37	2.19	0.44	0.000
17.167	0.26	1.51	0.26	0.000
17.250	0.15	0.91	0.23	0.000
17.333	0.07	0.50	0.08	0.000
17.417	0.01	0.50	0.07	0.000
17.500	0.00	0.00	0.02	0.000
17.583	0.00	0.00	0.05	0.000
17.667	0.00	0.00	0.01	0.000
17.750	0.00	0.00	0.00	0.000
17.833	0.00	0.00	0.00	0.000
17.917	0.00	0.00	0.00	0.000
18.000	0.00	0.00	0.00	0.000
18.083	0.00	0.00	0.00	0.000
18.167	0.00	0.00	0.00	0.000
18.250	0.00	0.00	0.00	0.000
18.333	0.00	0.00	0.00	0.000
18.417	0.00	0.00	0.00	0.000
18.500	0.00	0.00	0.00	0.000
18.583	0.00	0.00	0.00	0.000
18.667	0.00	0.00	0.00	0.000
18.750	0.00	0.00	0.00	0.000
18.833	0.00	0.00	0.00	0.000
18.917	0.00	0.00	0.00	0.000
19.000	0.00	0.00	0.00	0.000
19.083	0.00	0.00	0.00	0.000
19.167	0.00	0.00	0.00	0.000

19.250	0.00	0.00	0.00	0.000
19.333	0.00	0.00	0.00	0.000
19.417	0.00	0.00	0.00	0.000
19.500	0.00	0.00	0.00	0.000
19.583	0.00	0.00	0.00	0.000
19.667	0.00	0.00	0.00	0.000
19.750	0.00	0.00	0.00	0.000
19.833	0.00	0.00	0.00	0.000
19.917	0.00	0.00	0.00	0.000
20.000	0.00	0.00	0.00	0.000
20.083	0.00	0.00	0.00	0.000
20.167	0.00	0.00	0.00	0.000
20.250	0.00	0.00	0.00	0.000
20.333	0.00	0.00	0.00	0.000
20.417	0.00	0.00	0.00	0.000
20.500	0.00	0.00	0.00	0.000
20.583	0.00	0.00	0.00	0.000
20.667	0.00	0.00	0.00	0.000
20.750	0.00	0.00	0.00	0.000
20.833	0.00	0.00	0.00	0.000
20.917	0.00	0.00	0.00	0.000
21.000	0.00	0.00	0.00	0.000
21.083	0.00	0.00	0.00	0.000
21.167	0.00	0.00	0.00	0.000
21.250	0.00	0.00	0.00	0.000
21.333	0.00	0.00	0.00	0.000
21.417	0.00	0.00	0.00	0.000
21.500	0.00	0.00	0.00	0.000
21.583	0.00	0.00	0.00	0.000
21.667	0.00	0.00	0.00	0.000
21.750	0.00	0.00	0.00	0.000
21.833	0.00	0.00	0.00	0.000
21.917	0.00	0.00	0.00	0.000
22.000	0.00	0.00	0.00	0.000
22.083	0.00	0.00	0.00	0.000
22.167	0.00	0.00	0.00	0.000
22.250	0.00	0.00	0.00	0.000
22.333	0.00	0.00	0.00	0.000
22.417	0.00	0.00	0.00	0.000
22.500	0.00	0.00	0.00	0.000
22.583	0.00	0.00	0.00	0.000
22.667	0.00	0.00	0.00	0.000
22.750	0.00	0.00	0.00	0.000
22.833	0.00	0.00	0.00	0.000
22.917	0.00	0.00	0.00	0.000
23.000	0.00	0.00	0.00	0.000
23.083	0.00	0.00	0.00	0.000
23.167	0.00	0.00	0.00	0.000
23.250	0.00	0.00	0.00	0.000
23.333	0.00	0.00	0.00	0.000
23.417	0.00	0.00	0.00	0.000
23.500	0.00	0.00	0.00	0.000
23.583	0.00	0.00	0.00	0.000
23.667	0.00	0.00	0.00	0.000
23.750	0.00	0.00	0.00	0.000
23.833	0.00	0.00	0.00	0.000
23.917	0.00	0.00	0.00	0.000
24.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

APPENDIX C

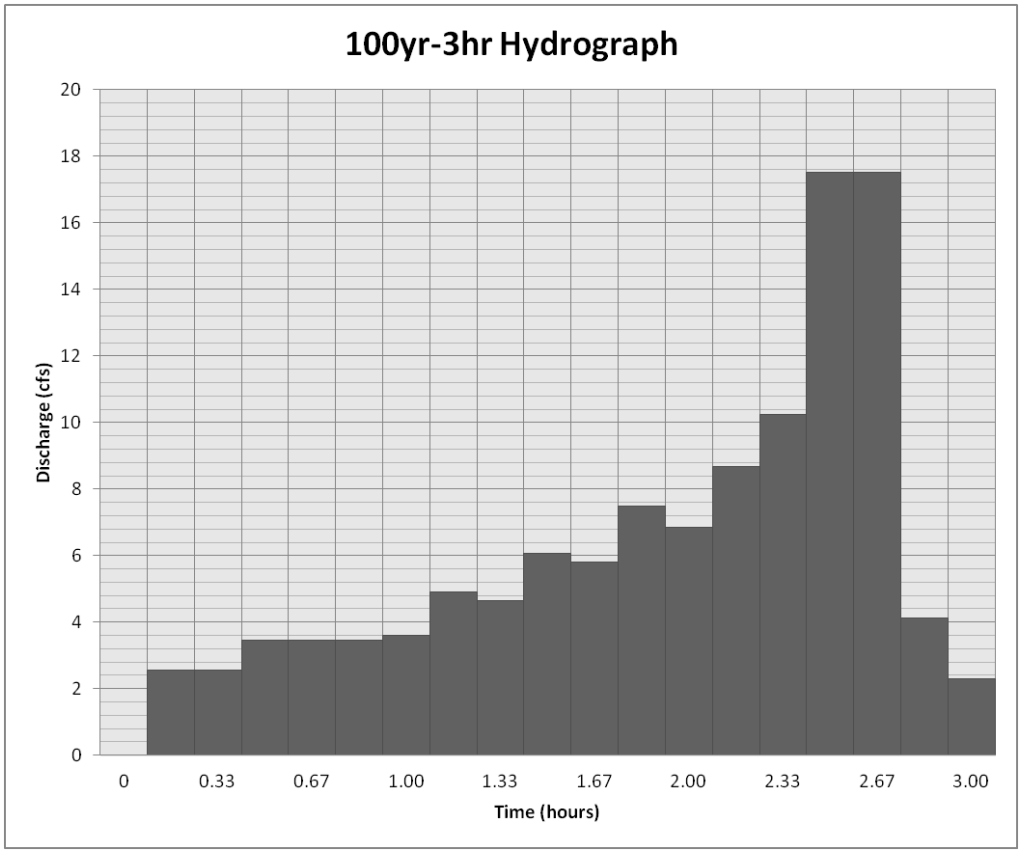
PROPOSED BASIN CONDITIONS
100 YEAR – 1 HOUR, 3 HOUR, 6, HOUR, AND 24 HOUR STORM EVENTS

RESULTS FROM HAND CALCULATED SYNTHETIC UNIT HYDROGRAPH METHOD

SYNTETHIC UNIT HYDROGRAPH METHOD CALCULATIONS

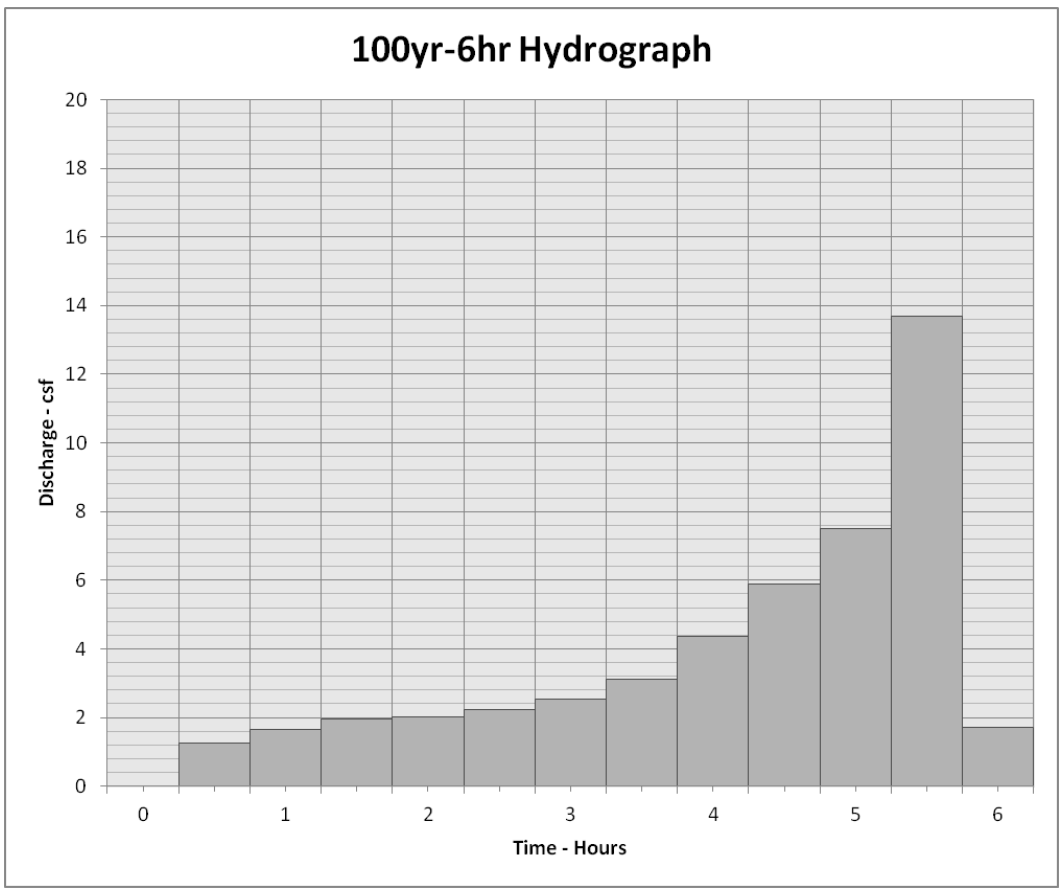
Data and Hydrograph for 100 yr – 3 hr storm event:

Hours 0	[15] Unit Time Period m	[16] Time Percent of Lag =[7]*[15]	[17] Cummulative Average Discharge	[18] Distrib Graph Percent	[19] Unit Hydrograph	Total Adjusted Storm Rain	[20] Pattern Percent Pt E-5.9	Unit Time [min]	[21] Storm Rain [in/hr]	[22] Loss Rate in/hr	[23] Effective Rain [in/hr]	Flood Hydrograph (Short Cut Method:[23]*[3]
0.17	1					2.55	2.6	10	0.398	0.097	0.30	2.557
0.33	2					2.55	2.6	10	0.398	0.097	0.30	2.557
0.50	3					2.55	3.3	10	0.505	0.097	0.41	3.467
0.67	4					2.55	3.3	10	0.505	0.097	0.41	3.467
0.83	5					2.55	3.3	10	0.505	0.097	0.41	3.467
1.00	6					2.55	3.4	10	0.520	0.097	0.42	3.597
1.17	7					2.55	4.4	10	0.673	0.097	0.58	4.898
1.33	8					2.55	4.2	10	0.643	0.097	0.55	4.638
1.50	9	SHORT CUT				2.55	5.3	10	0.811	0.097	0.71	6.068
1.67	10					2.55	5.1	10	0.780	0.097	0.68	5.808
1.83	11					2.55	6.4	10	0.979	0.097	0.88	7.499
2.00	12					2.55	5.9	10	0.903	0.097	0.81	6.848
2.17	13					2.55	7.3	10	1.117	0.097	1.02	8.669
2.33	14					2.55	8.5	10	1.301	0.097	1.20	10.230
2.50	15					2.55	14.1	10	2.157	0.097	2.06	17.513
2.67	16					2.55	14.1	10	2.157	0.097	2.06	17.513
2.83	17					2.55	3.8	10	0.581	0.097	0.48	4.117
3.00	18					2.55	2.4	10	0.367	0.097	0.27	2.297



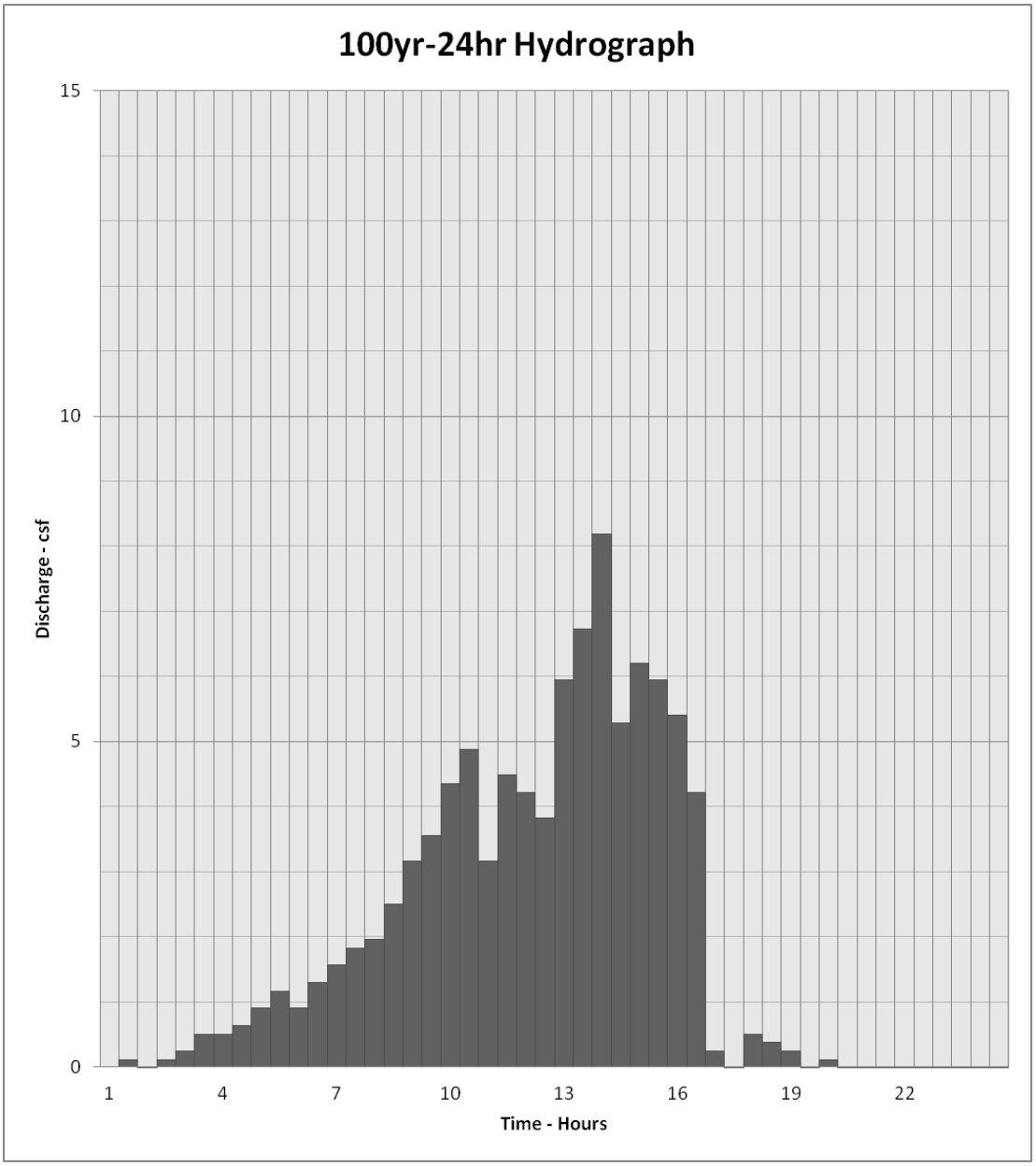
Data and Hydrograph for 100 yr – 6 hr storm event:

Hours	[15] Unit Time Period m	[16] Time Percent of Lag =[7]*[15]	[17] Cummulative Average Discharge	[18] Distrib Graph Percent	[19] Unit Hydrograph	[10] Total Adjusted Storm Rain	[20] Pattern Percent Pt E-5.9	[5] Unit Time [min]	[21] Storm Rain [in/hr]	[22] Loss Rate in/hr	[23] Effective Rain [in/hr]	Flood Hydrograph (Short Cut Method:[23] *[3]
0.00												
0.50	1					3.4	3.6	30	0.245	0.097	0.15	1.256
1.00	2					3.4	4.3	30	0.292	0.097	0.20	1.661
1.50	3					3.4	4.8	30	0.326	0.097	0.23	1.950
2.00	4					3.4	4.9	30	0.333	0.097	0.24	2.008
2.50	5					3.4	5.3	30	0.360	0.097	0.26	2.239
3.00	6					3.4	5.8	30	0.394	0.097	0.30	2.528
3.50	7					3.4	6.8	30	0.462	0.097	0.37	3.106
4.00	8					3.4	9	30	0.612	0.097	0.52	4.378
4.50	9					3.4	11.6	30	0.789	0.097	0.69	5.880
5.00	10					3.4	14.4	30	0.979	0.097	0.88	7.499
5.50	11					3.4	25.1	30	1.707	0.097	1.61	13.683
6.00	12					3.4	4.4	30	0.299	0.097	0.20	1.719



Data and Hydrograph for 100 yr – 24 hr storm event:

Hours	[15] Unit Time Period m	[16] Time Percent of Lag =[7]*[15]	[17] Cummulative Average	[18] Distrib Graph Percent	[19] Unit Hydrograph	[10] Total Adjusted Storm Rain	[20] Pattern Percent Pt E-5.9	[5] Unit Time [min]	[21] Storm Rain [in/hr]	[22] Loss Rate in/hr	[23] Effective Rain [in/hr]	Flood Hydrograph (Short Cut Method:[23] *[3]
0.00												
0.50	1					7.8	0.5	30	0.078	0.097	0.00	0.000
1.00	2					7.8	0.7	30	0.109	0.097	0.01	0.104
1.50	3					7.8	0.6	30	0.094	0.097	0.00	-0.029
2.00	4					7.8	0.7	30	0.109	0.097	0.01	0.104
2.50	5					7.8	0.8	30	0.125	0.097	0.03	0.236
3.00	6					7.8	1	30	0.156	0.097	0.06	0.502
3.50	7					7.8	1	30	0.156	0.097	0.06	0.502
4.00	8					7.8	1.1	30	0.172	0.097	0.07	0.634
4.50	9					7.8	1.3	30	0.203	0.097	0.11	0.899
5.00	10					7.8	1.5	30	0.234	0.097	0.14	1.165
5.50	11					7.8	1.3	30	0.203	0.097	0.11	0.899
6.00	12					7.8	1.6	30	0.250	0.097	0.15	1.297
6.50	13					7.8	1.8	30	0.281	0.097	0.18	1.562
7.00	14					7.8	2	30	0.312	0.097	0.22	1.828
7.50	15					7.8	2.1	30	0.328	0.097	0.23	1.960
8.00	16					7.8	2.5	30	0.390	0.097	0.29	2.491
8.50	17					7.8	3	30	0.468	0.097	0.37	3.154
9.00	18					7.8	3.3	30	0.515	0.097	0.42	3.551
9.50	19					7.8	3.9	30	0.608	0.097	0.51	4.347
10.00	20					7.8	4.3	30	0.671	0.097	0.57	4.877
10.50	21					7.8	3	30	0.468	0.097	0.37	3.154
11.00	22					7.8	4	30	0.624	0.097	0.53	4.480
11.50	23					7.8	3.8	30	0.593	0.097	0.50	4.214
12.00	24					7.8	3.5	30	0.546	0.097	0.45	3.817
12.50	25					7.8	5.1	30	0.796	0.097	0.70	5.938
13.00	26					7.8	5.7	30	0.889	0.097	0.79	6.734
13.50	27					7.8	6.8	30	1.061	0.097	0.96	8.192
14.00	28					7.8	4.6	30	0.718	0.097	0.62	5.275
14.50	29					7.8	5.3	30	0.827	0.097	0.73	6.203
15.00	30					7.8	5.1	30	0.796	0.097	0.70	5.938
15.50	31					7.8	4.7	30	0.733	0.097	0.64	5.408
16.00	32					7.8	3.8	30	0.593	0.097	0.50	4.214
16.50	33					7.8	0.8	30	0.125	0.097	0.03	0.236
17.00	34					7.8	0.6	30	0.094	0.097	0.00	-0.029
17.50	35					7.8	1	30	0.156	0.097	0.06	0.502
18.00	36					7.8	0.9	30	0.140	0.097	0.04	0.369
18.50	37					7.8	0.8	30	0.125	0.097	0.03	0.236
19.00	38					7.8	0.5	30	0.078	0.097	-0.02	-0.162
19.50	39					7.8	0.7	30	0.109	0.097	0.01	0.104
20.00	40					7.8	0.5	30	0.078	0.097	-0.02	-0.162
20.50	41					7.8	0.6	30	0.094	0.097	0.00	-0.029
21.00	42					7.8	0.5	30	0.078	0.097	-0.02	-0.162
21.50	43					7.8	0.5	30	0.078	0.097	-0.02	-0.162
22.00	44					7.8	0.5	30	0.078	0.097	-0.02	-0.162
22.50	45					7.8	0.4	30	0.062	0.097	-0.03	-0.294
23.00	46					7.8	0.4	30	0.062	0.097	-0.03	-0.294
23.50	47					7.8	0.4	30	0.062	0.097	-0.03	-0.294
24.00	48					7.8	0.4	30	0.062	0.097	-0.03	-0.294


100yr-24hr Hydrograph
15
10
5
0
Discharge - csf
1
4
7
10
13
16
19
22
Time - Hours

APPENDIX D

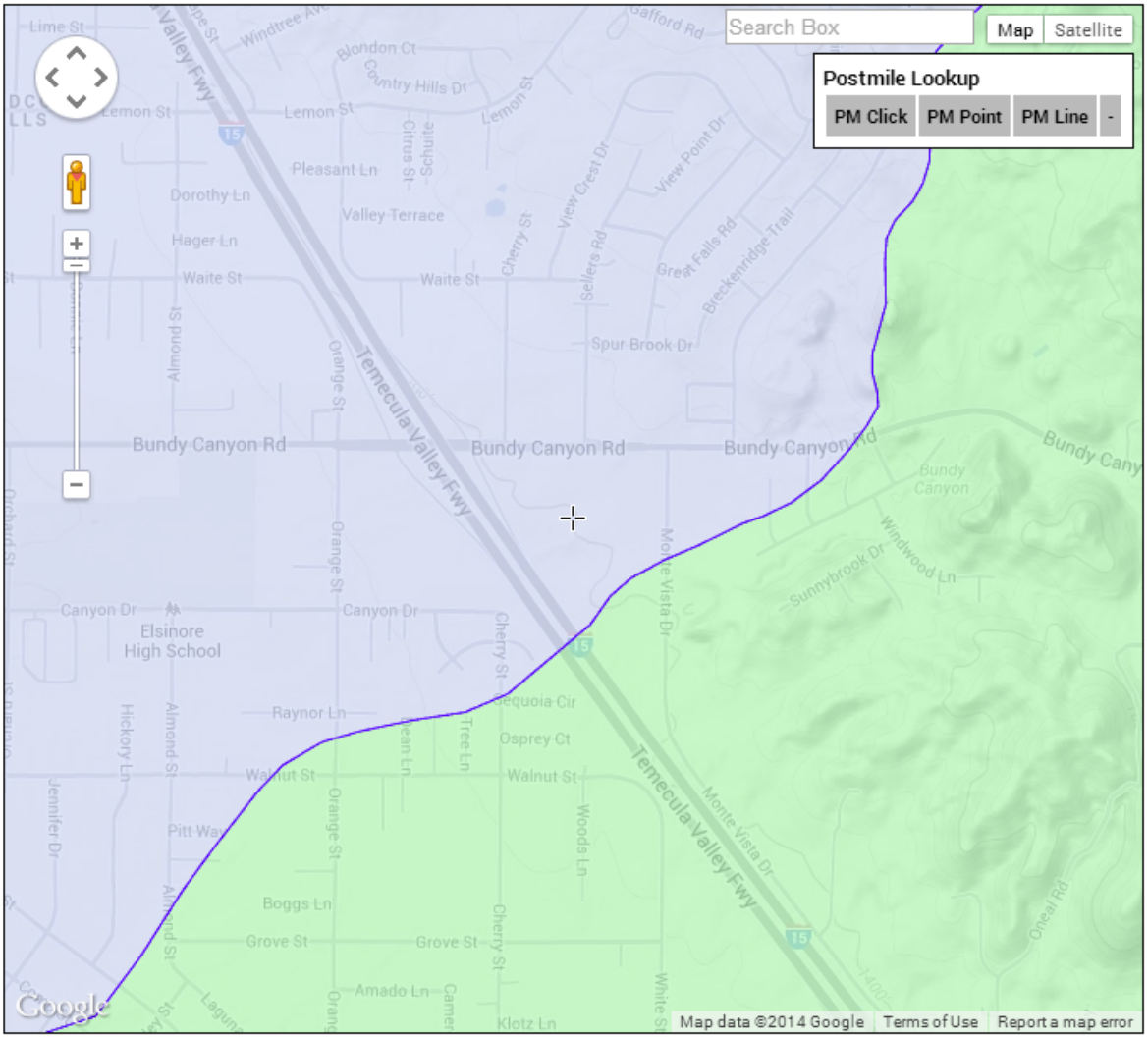
MAPPING OF EXISTING WATERSHEDS AND 100-YEAR FLOODPLAIN

Caltrans > DEA > Stormwater > **Water Quality Planning Tool**

Layers

- 303(d) List and TMDLs (Legend)
- Areas of Special Biological Significance
- Caltrans Districts
- Caltrans Facilities (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

Hydrologic Unit	SAN JACINTO VALLEY	**Hydrologic Area**	Elsinore Valley	**Hydrologic Sub-Area #**	802.31
Hydrologic Sub-Area Name	Elsinore	**Planning Watershed**	4802310000	**HSA Area (acres)**	25729
Latitude, Longitude	33.6253, -117.2692				

WATERSHED BOUNDARY DATASET

Watershed	Lower San Jacinto River	**Subwatershed**	Lake Elsinore	**Hydrologic Unit Code**	180702020308
Average Annual Precipitation (inches)	17.41				

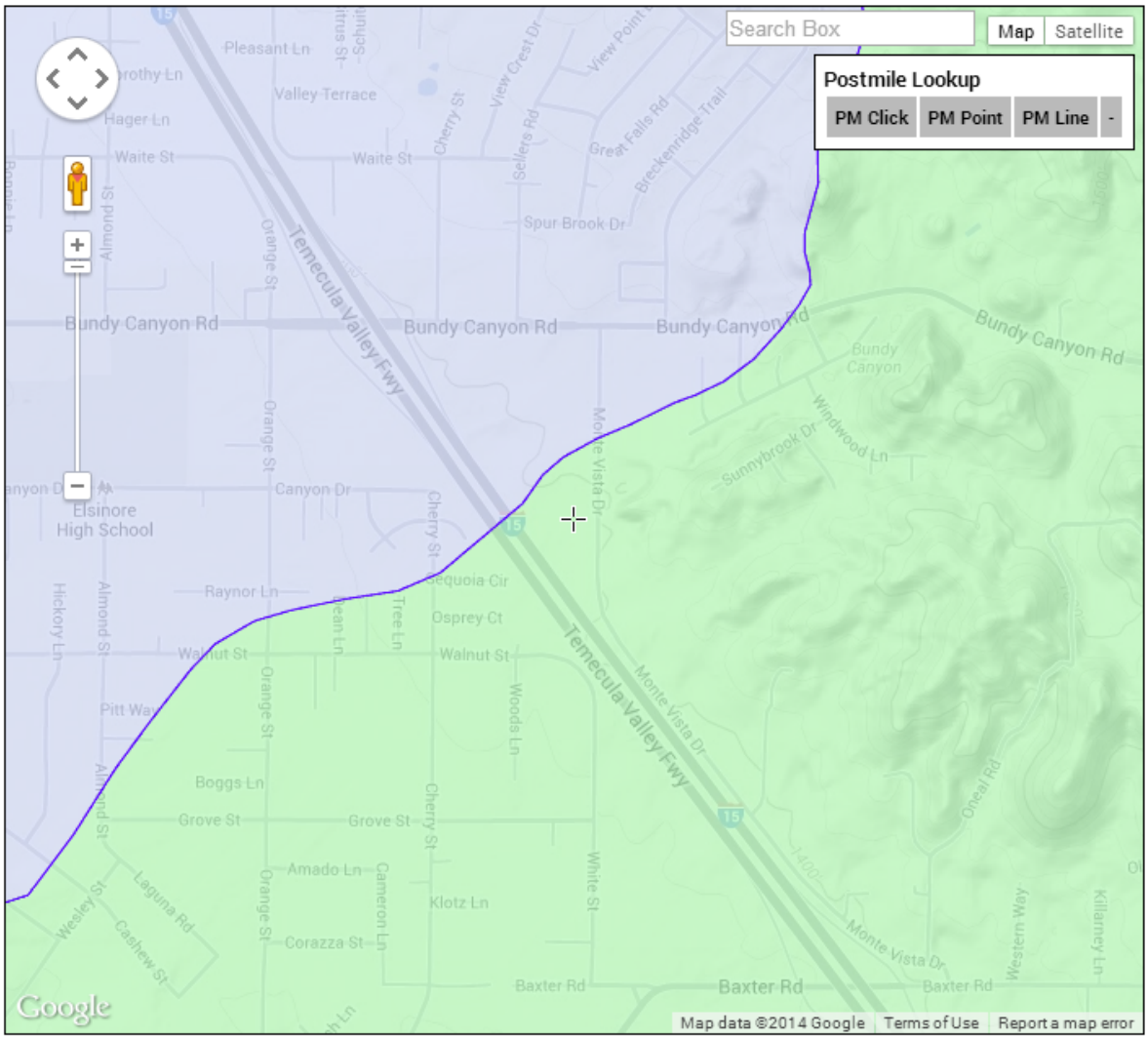
Layers

- 303(d) List and TMDLs (Legend)
- Areas of Special Biological Significance
- Caltrans Districts
- Caltrans Facilities (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation

Information

Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.

Help



Watershed Information

CALWATER WATERSHED

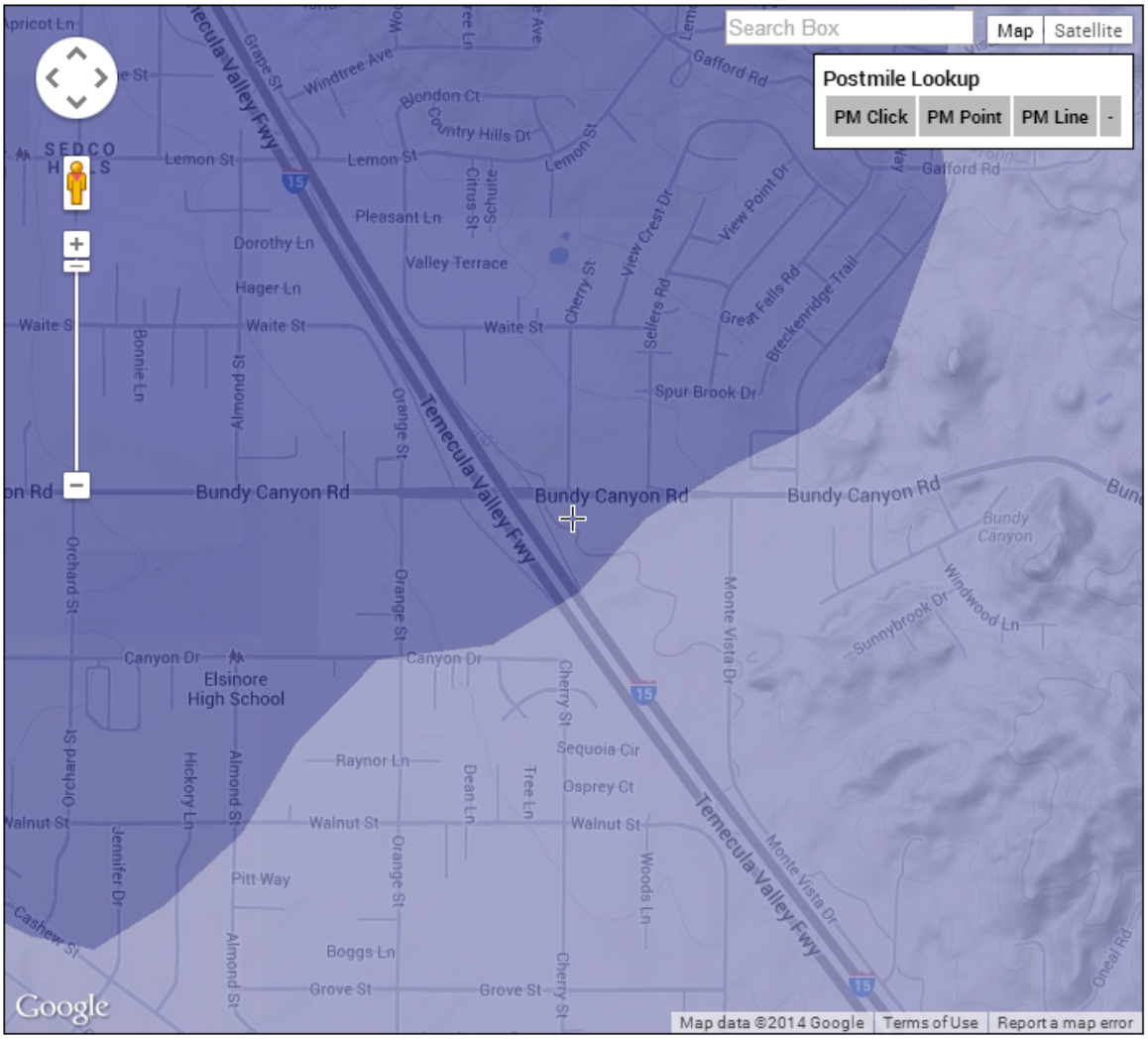
Hydrologic Unit	SANTA MARGARITA	**Hydrologic Area**	Murrieta	**Hydrologic Sub-Area #**	902.31
Hydrologic Sub-Area Name	Wildomar	**Planning Watershed**	4902310000	**HSA Area (acres)**	13114
Latitude, Longitude	33.6226, -117.2674				

WATERSHED BOUNDARY DATASET

Watershed	Murrieta Creek	**Subwatershed**	Cole Canyon-Murrieta Creek	**Hydrologic Unit Code**	180703020402
Average Annual Precipitation (inches)	16.91				

- (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes
- **Soil Loss**

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

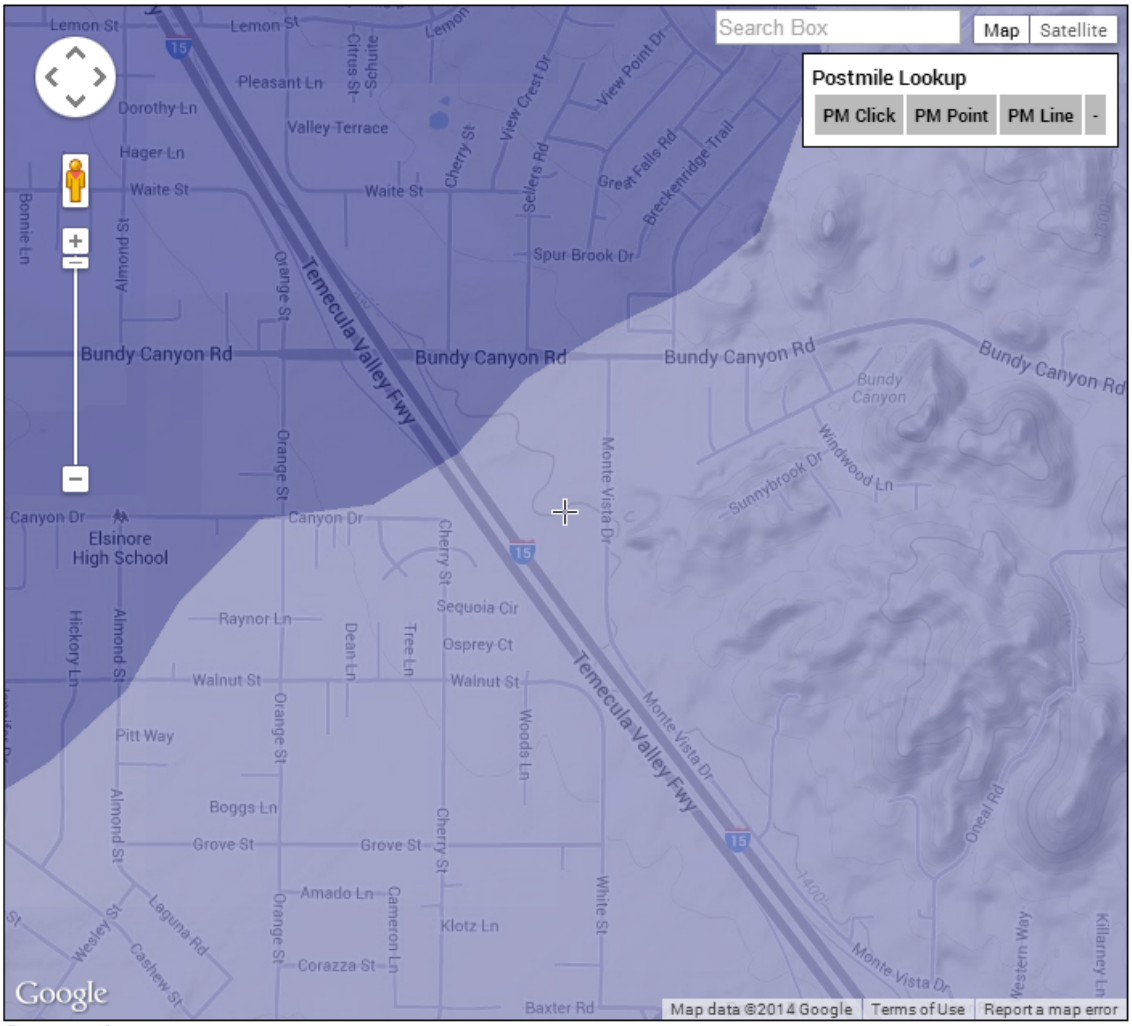
Hydrologic Unit	SAN JACINTO VALLEY	**Hydrologic Area**	Elsinore Valley	**Hydrologic Sub-Area #**	802.31
Hydrologic Sub-Area Name	Elsinore	**Planning Watershed**	4802310000	**HSA Area (acres)**	25729
Latitude, Longitude	33.6263, -117.2708				

WATERSHED BOUNDARY DATASET

Watershed	Lower San Jacinto River	**Subwatershed**	Lake Elsinore	**Hydrologic Unit Code**	180702020308
Average Annual Precipitation (inches)	17.41				

- (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes
- **Soil Loss**

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

Hydrologic Unit	SANTA MARGARITA	**Hydrologic Area**	Murrieta	**Hydrologic Sub-Area #**	902.31
Hydrologic Sub-Area Name	Wildomar	**Planning Watershed**	4902310000	**HSA Area (acres)**	13114
Latitude, Longitude	33.6234, -117.2678				

WATERSHED BOUNDARY DATASET

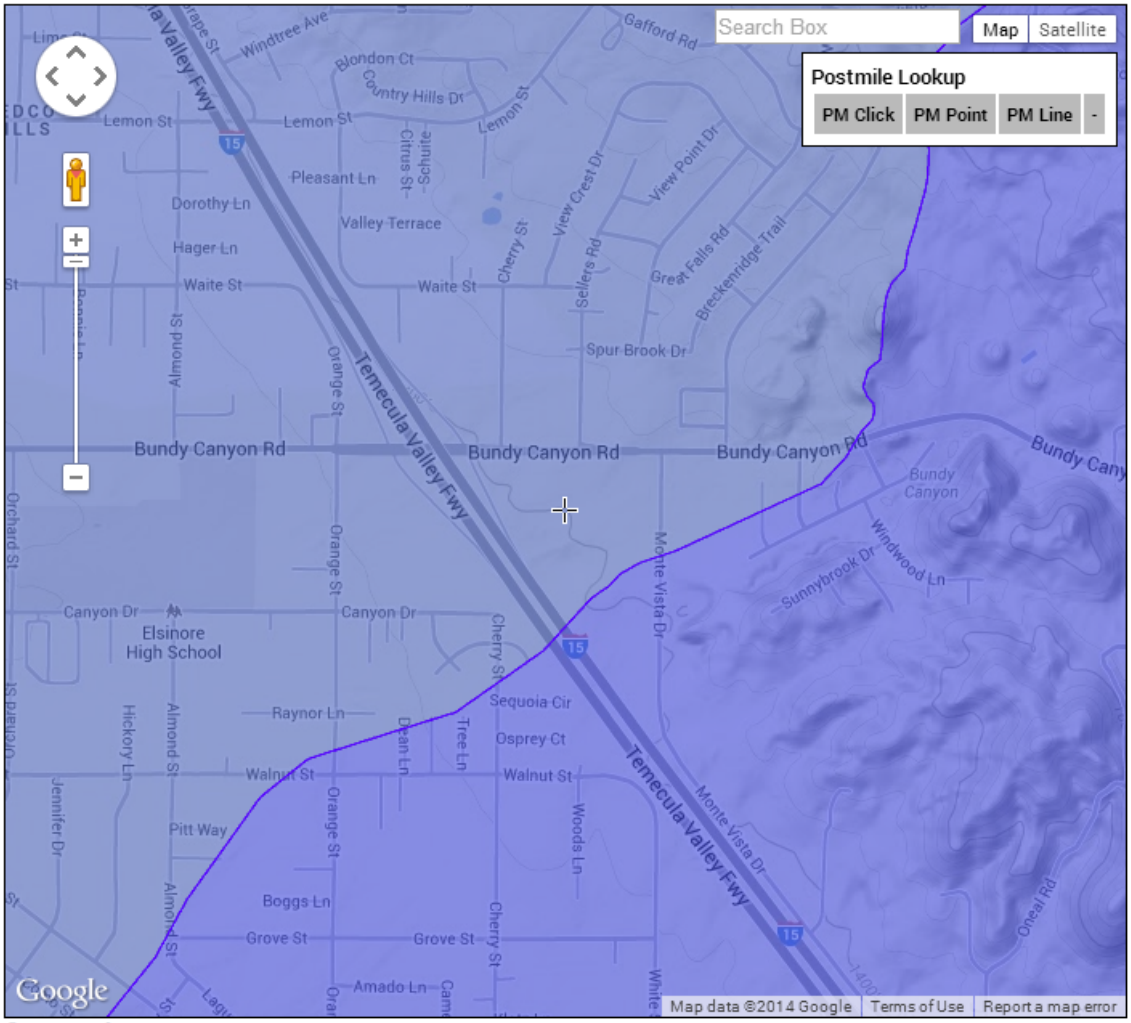
Watershed	Murrieta Creek	**Subwatershed**	Cole Canyon-Murrieta Creek	**Hydrologic Unit Code**	180703020402
Average Annual Precipitation (inches)	16.91				

Caltrans > DEA > Stormwater > **Water Quality Planning Tool**

(Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes

Soil Loss

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

Hydrologic Unit	SAN JACINTO VALLEY	**Hydrologic Area**	Elsinore Valley	**Hydrologic Sub-Area #**	802.31
Hydrologic Sub-Area Name	Elsinore	**Planning Watershed**	4802310000	**HSA Area (acres)**	25729
Latitude, Longitude	33.6255, -117.2692				

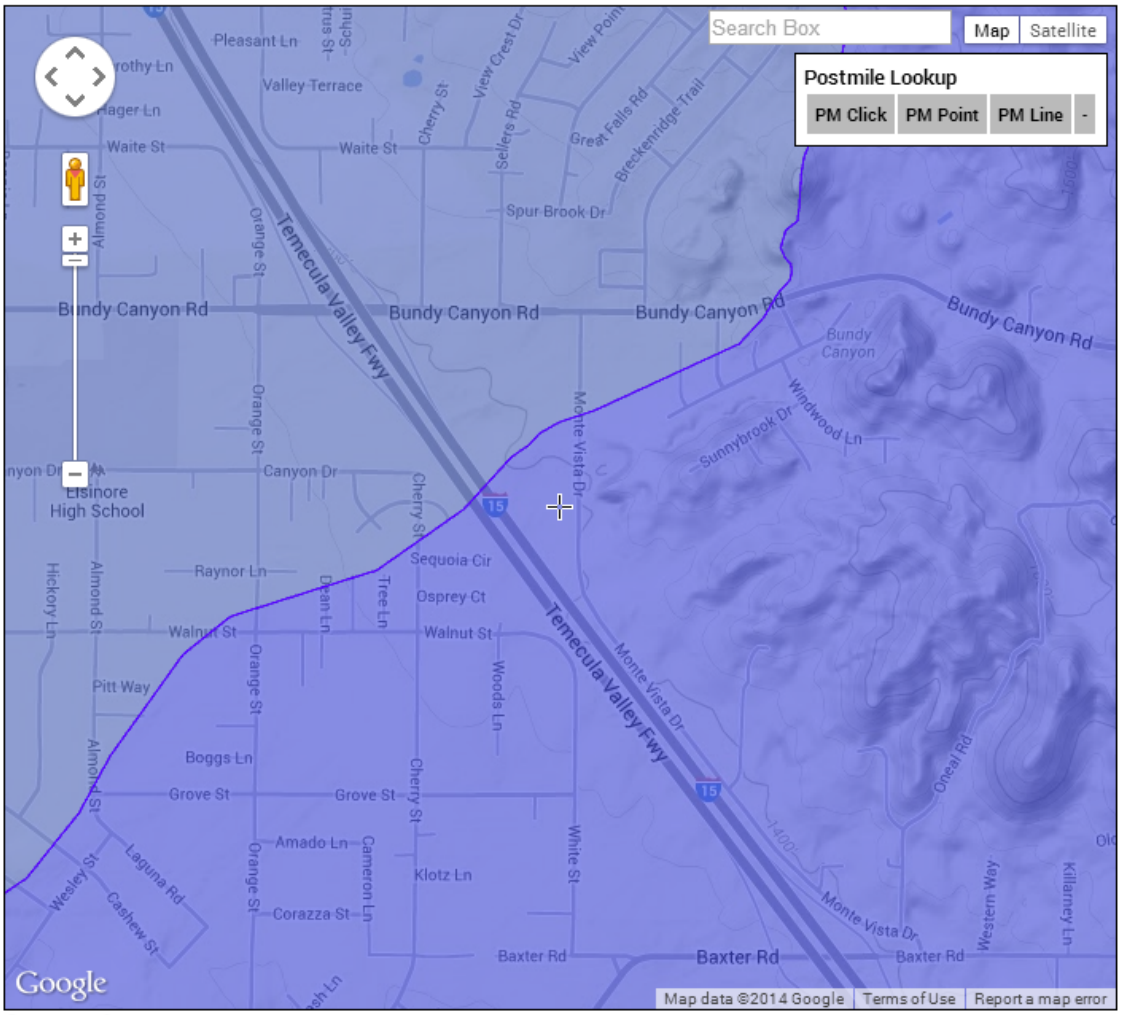
WATERSHED BOUNDARY DATASET

Watershed	Lower San Jacinto River	**Subwatershed**	Lake Elsinore	**Hydrologic Unit Code**	180702020308
Average Annual Precipitation (inches)	17.41				

(Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes

Soil Loss

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

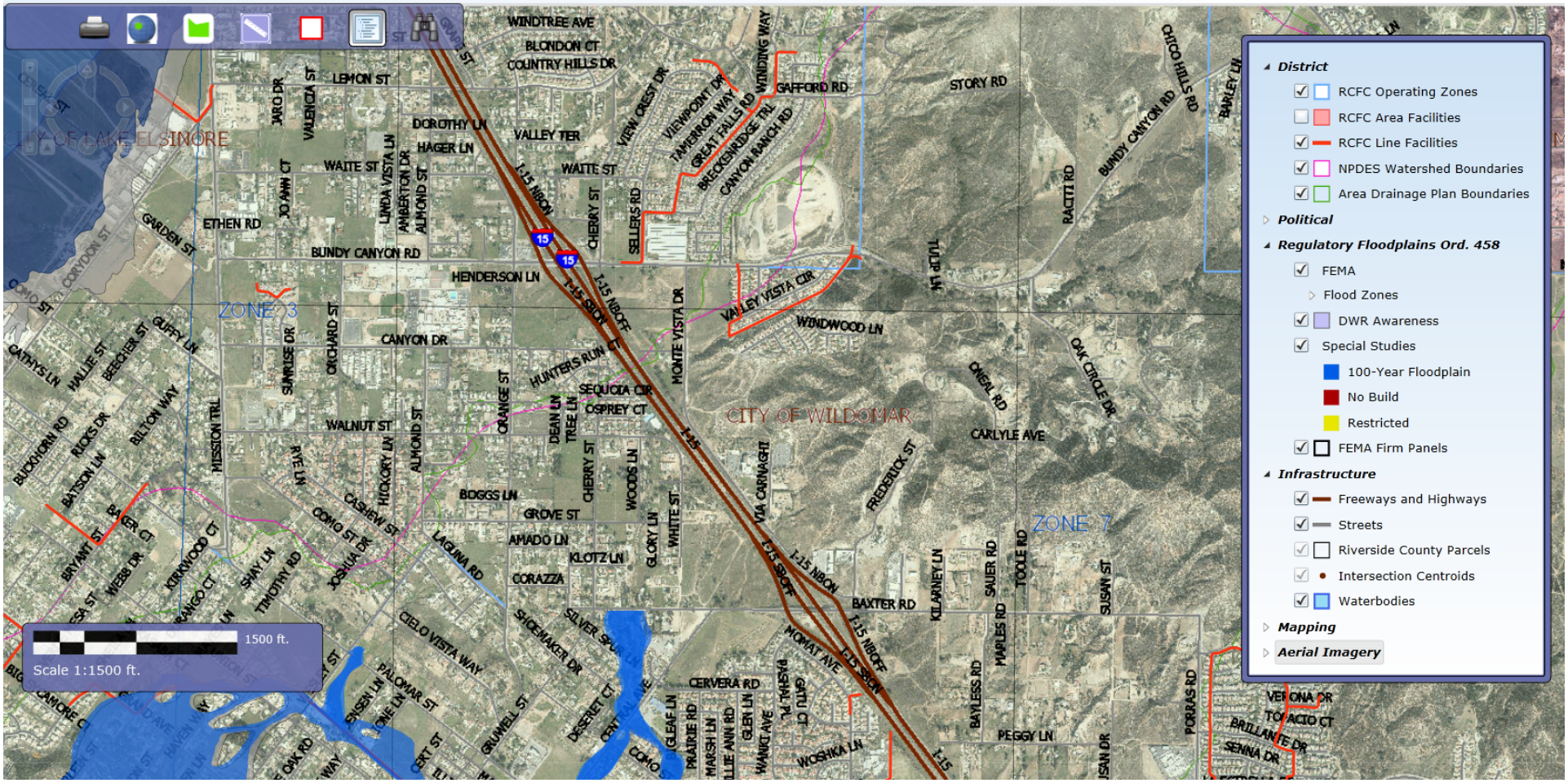
Hydrologic Unit	SANTA MARGARITA	**Hydrologic Area**	Murrieta	**Hydrologic Sub-Area #**	902.31
Hydrologic Sub-Area Name	Wildomar	**Planning Watershed**	4902310000	**HSA Area (acres)**	13114
Latitude, Longitude	33.6225, -117.2672				

WATERSHED BOUNDARY DATASET

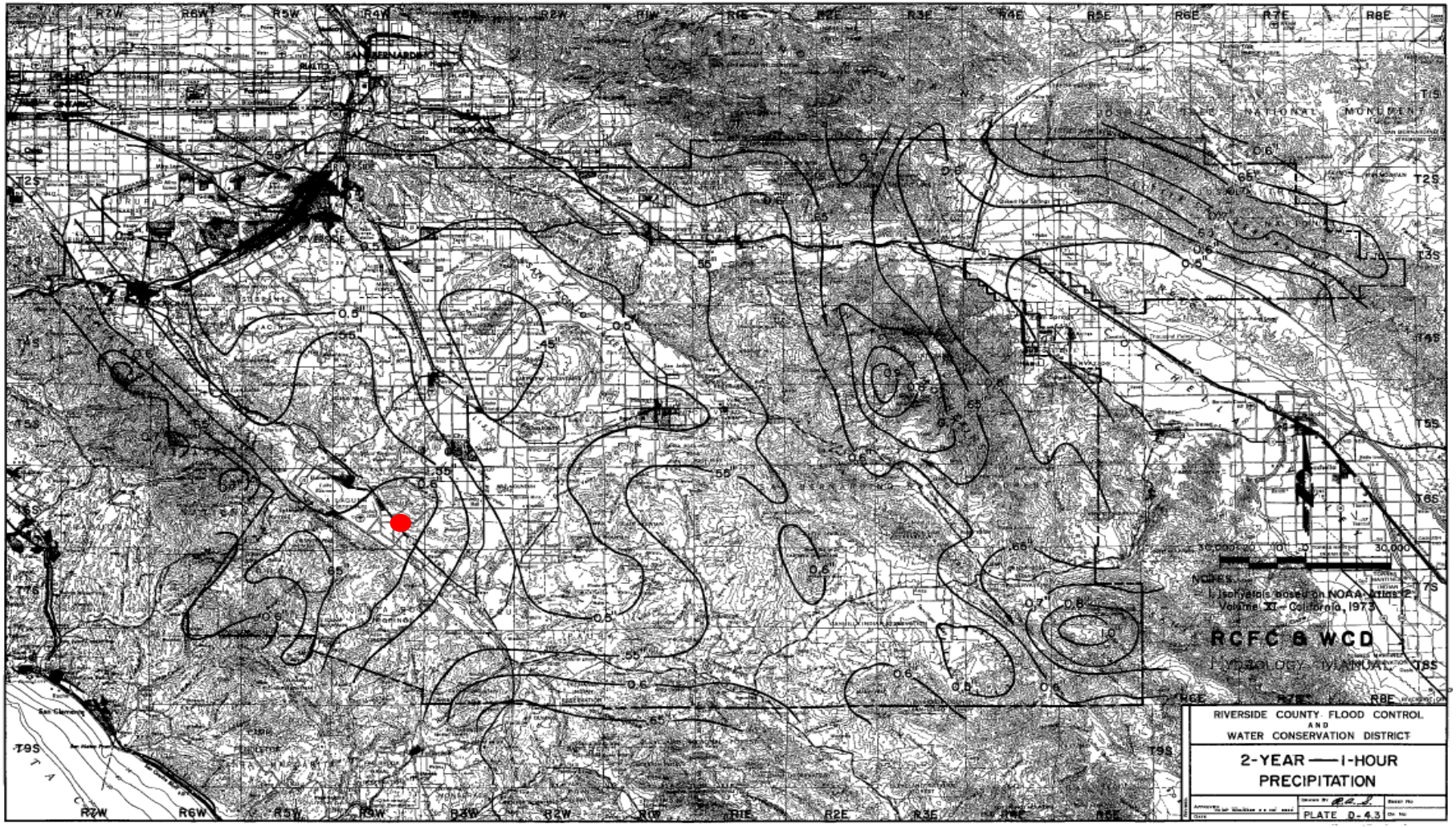
Watershed	Murrieta Creek	**Subwatershed**	Cole Canyon-Murrieta Creek	**Hydrologic Unit Code**	180703020402
Average Annual Precipitation (inches)	16.91				

RCFCWCD - Public Flood Hazard Determination

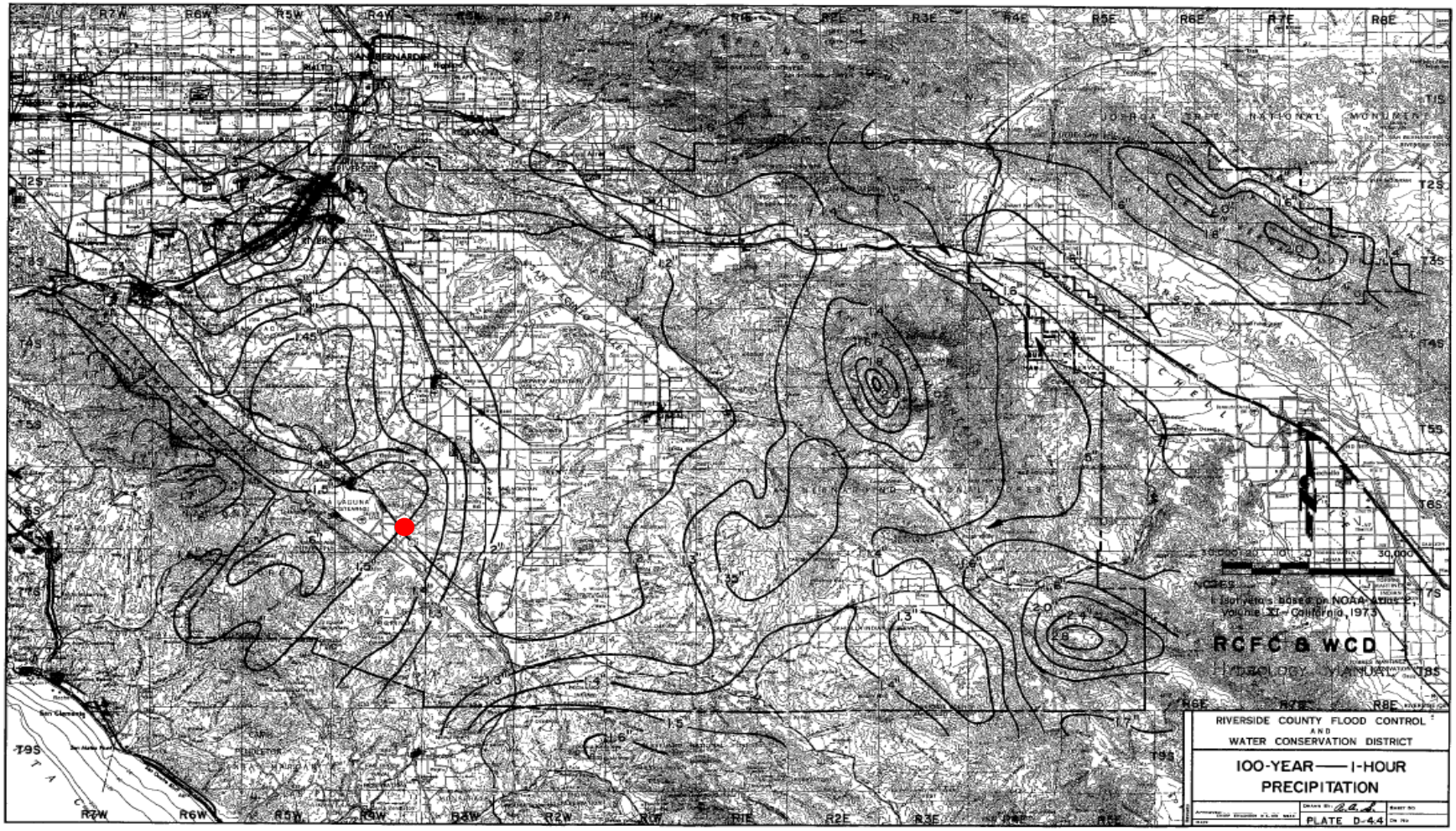
GIS - Information Technology



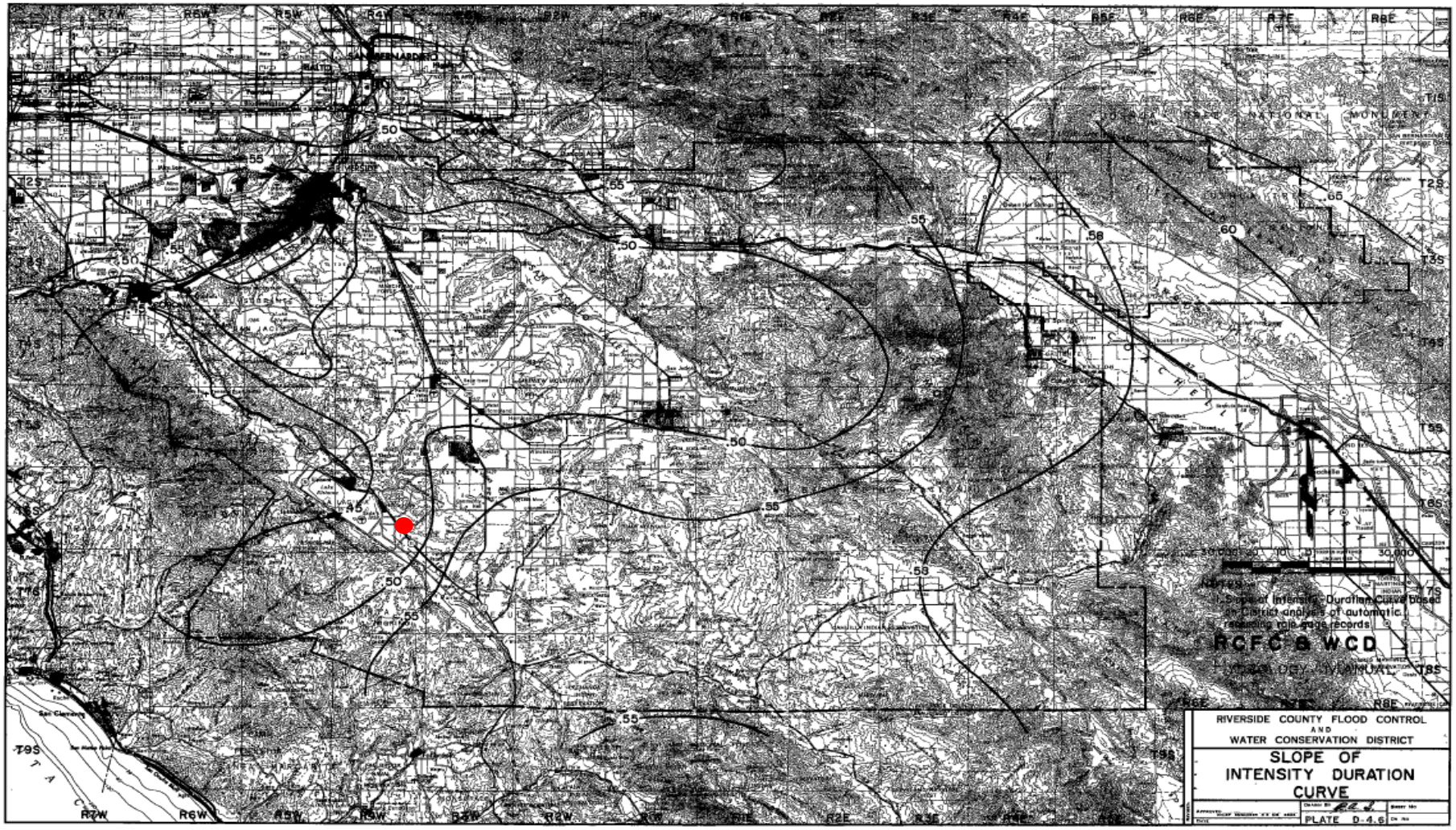
SUPPORTING REFERENCE MATERIAL AND DOCUMENTATION



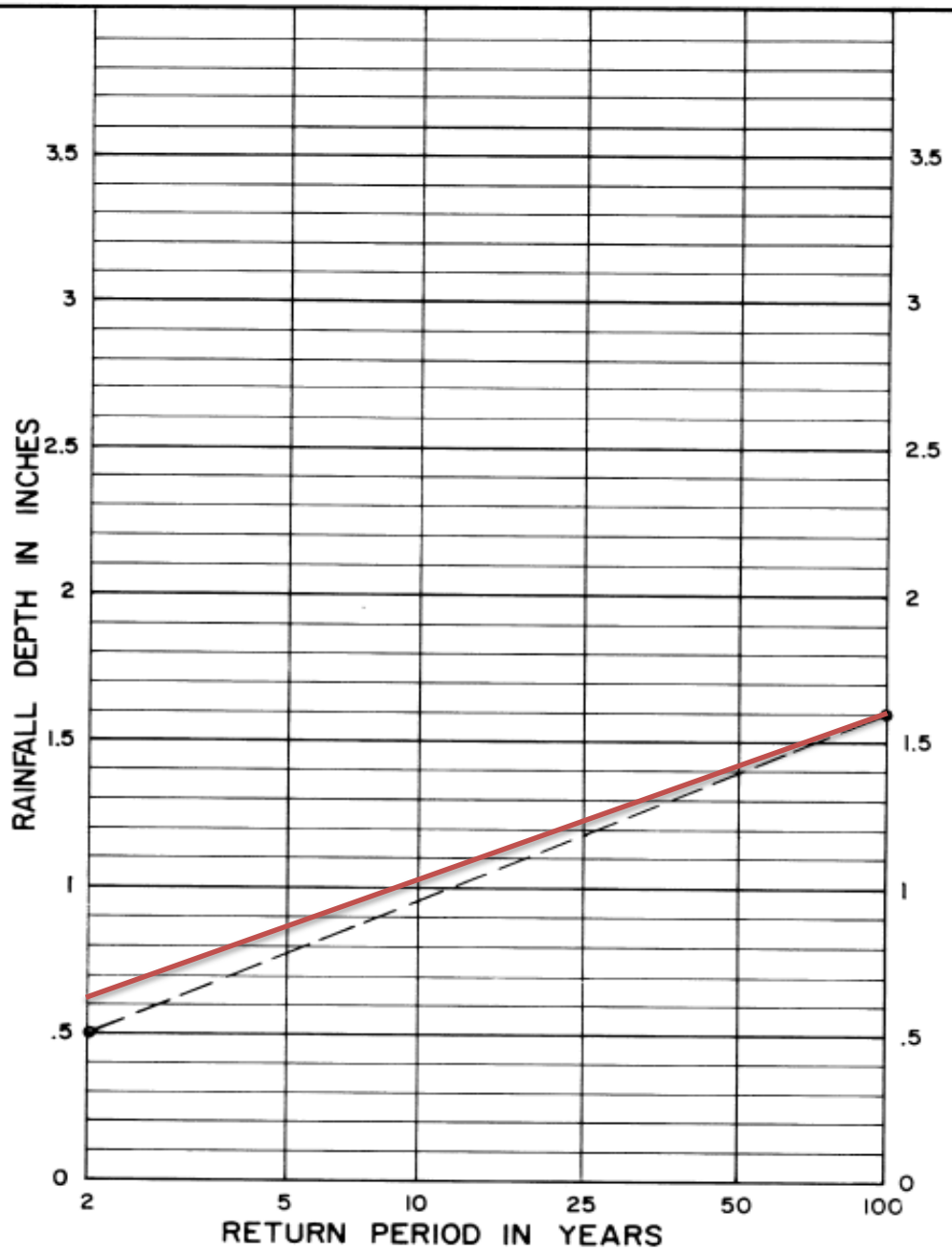
2 Year -- I-Hour Precipitation = 0.62"



100 Year -- I-Hour Precipitation = 1.5"



Slope of Intensity Duration Curve = 0.48



NOTE:
1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

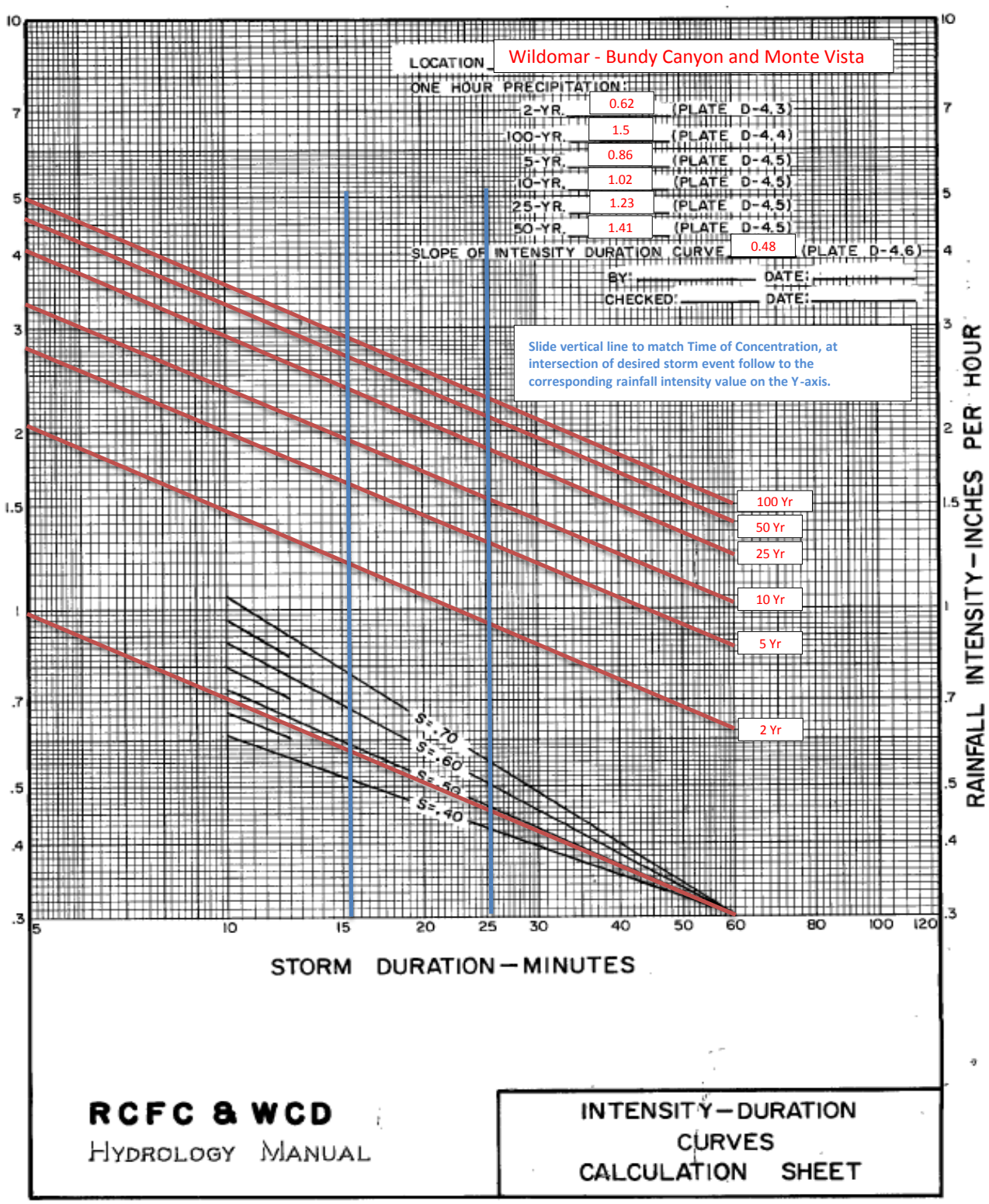
Reference: NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS
RETURN PERIOD FOR
PARTIAL DURATION SERIES

PLATE D-4.5

2 Year Depth taken from Plate D4.3 and 100 Yr Depth taken from Plate 4.4



Slope of 0.48 was taken from Plate D4.6

LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

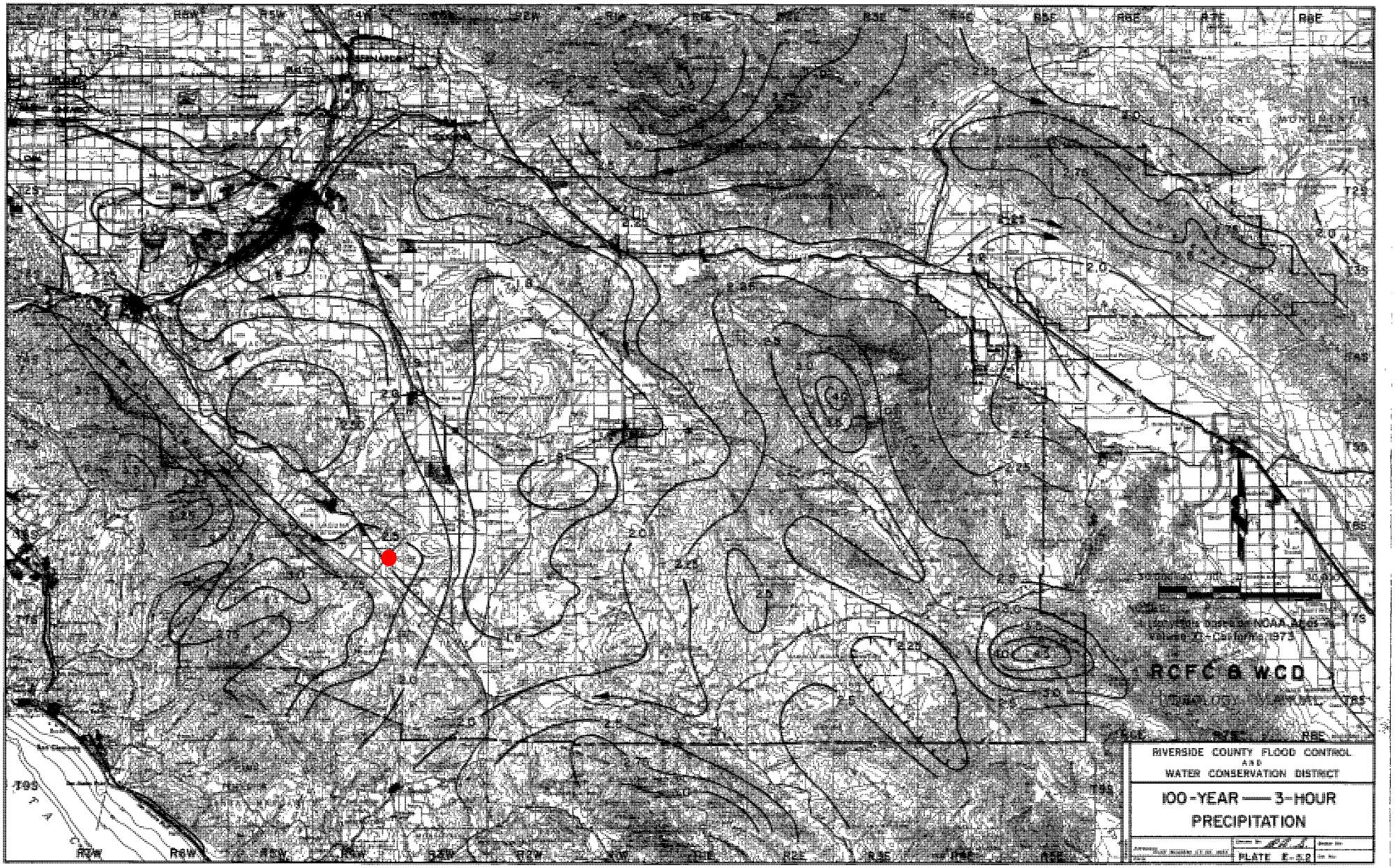
HYDROLOGY MANUAL

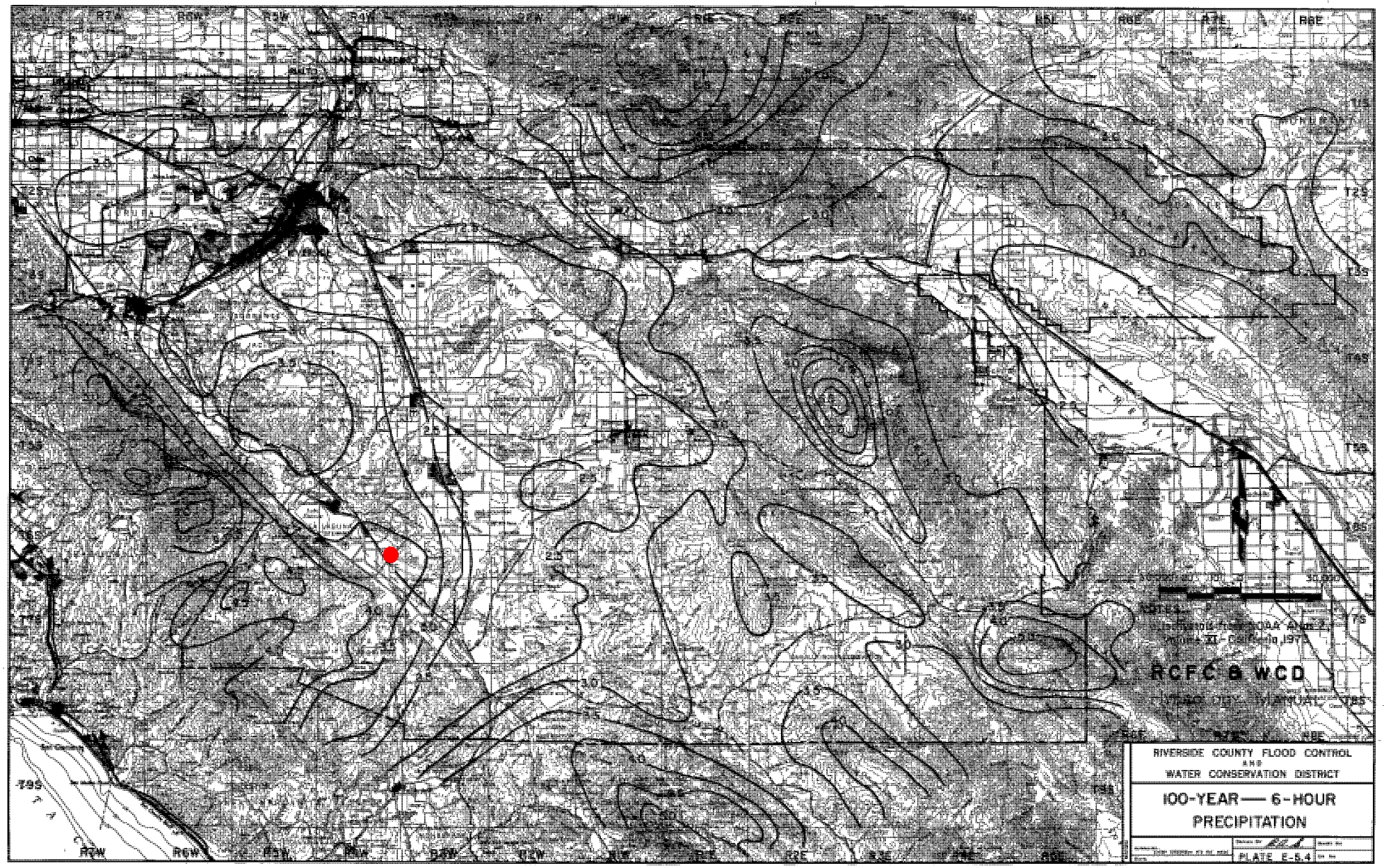
N

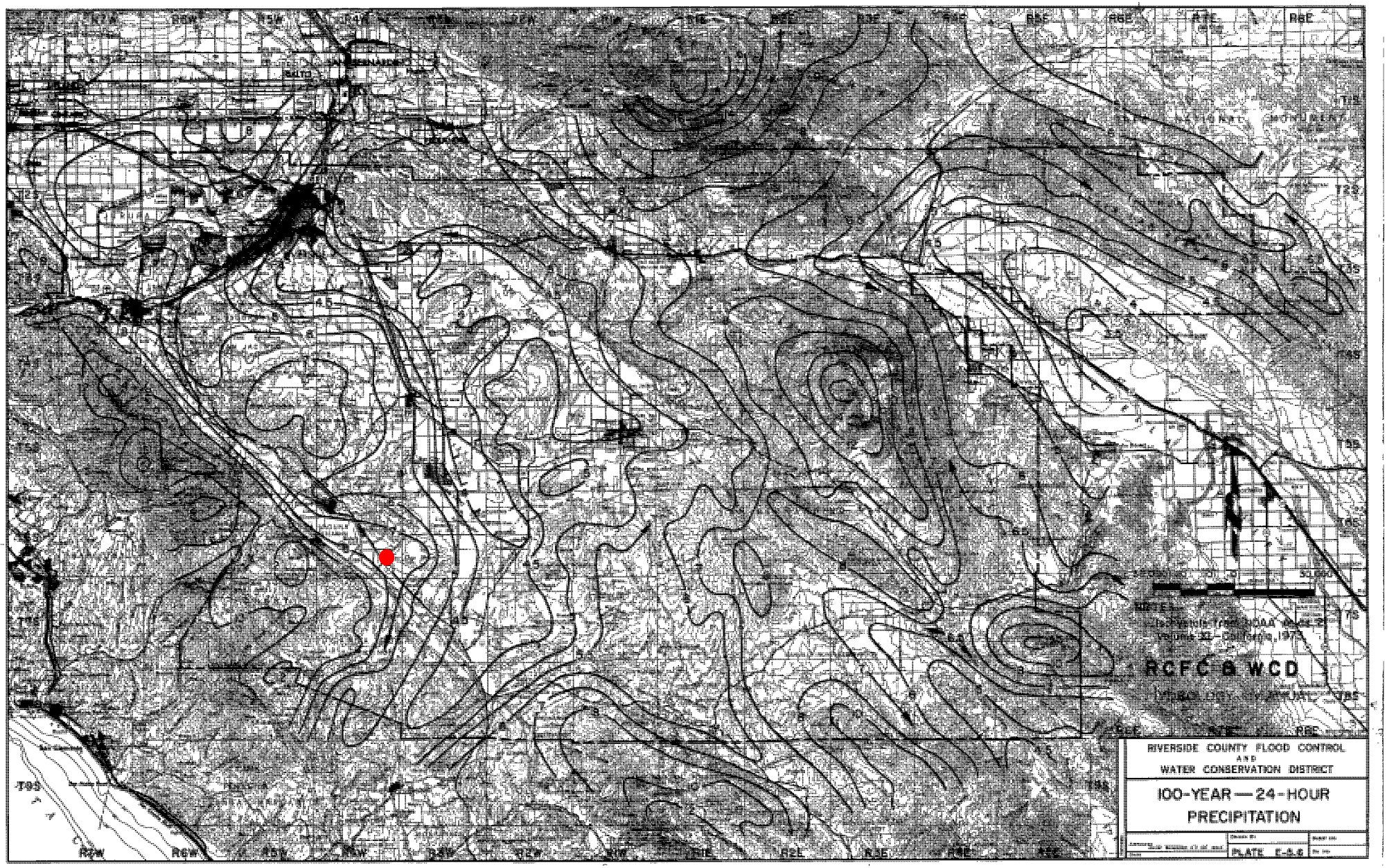
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR ELSINORE

PLATE C-1.41


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR
PRECIPITATION
PLATE E-5.2


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.4


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.6

INSTRUCTIONS FOR SYNTHETIC UNIT HYDROGRAPH METHOD HYDROLOGY CALCULATIONS

A. Synthetic Unit Hydrograph Development

1. On a USGS topographic quandrangle sheet or other map of suitable scale, outline the proposed drainage system and outline the area or subareas tributary to it.

2. From the map of the drainage system, determine the following basin physical factors and enter them on Sheet 1 of Plate E-2.1.

   A = Drainage area - square miles

   L = Length of longest watercourse - miles

   L_{ca} = Length along the longest watercourse, measured upstream to a point opposite the centroid of the area - miles

   H = Difference in elevation between the concentration point and the most remote point of the basin-feet

   S = Overall slope of longest watercourse between headwaters and concentration point - feet per mile (S = H/L)

3. Determine lag time using Plate E-3 or the following expression (See Sheet 1 of Plate E-2.1):

$$\text{Lag (hours)} = 24\bar{n}\left[\frac{L.Lca}{S^{\frac{1}{2}}}\right]^{(.38)}$$

where:

   $\bar{n}$ = The visually estimated mean of the n (Mannings formula) values of all collection streams and channels within the watershed.

4. Select a unit time period. To adequately define the unit hydrograph the unit time period should be about 25-percent of lag time, and never more than 40-percent of lag time. For ease of calculation, the unit time should match the times for which precipitation patterns are available (Plate E-5.9). Also see Sheet 1 of Plate E-2.1.

5. Utilizing the S-graph applicable to the drainage basin (Plates E-4.1 through E-4.4), determine the average percentage of the ultimate discharge for each unit period. In reading the percentage of discharge from the S-graph, the average ordinate over the time

5. (continued)

increment should be determined rather than the mean of the ordinates at the beginning and end of the time increment. See Columns 16 and 17 of Plate E-2.2.

6. Compute the unit distribution graph by subtracting from the percentage of ultimate discharge for each unit time period, the percentage of ultimate discharge for the previous time period. See Column 18 of Plate E-2.2.

7. Compute the ordinates of the synthetic unit hydrograph (unit graph) by multiplying the distribution graph values by the ultimate discharge K, using:

$$K \text{ (cfs-hours/inch)} = 645A$$

where:

A = Drainage area - square miles

See Column 19 of Plate E-2.2.

B. Flood Hydrograph Development

1. Determine the average point rainfall over the area for the storm duration and frequency desired using Plates E-5.1 through E-5.7. Adjust the average point rainfall for areal effect using Plate E-5.8. See Sheet 1 of Plate E-2.1.

2. Determine the unit period rainfall amounts using the pattern percentages from Plate E-5.9 times the adjusted average point rainfall, and convert them to rainfall rates in inches per hour. See Columns 20 and 21 of Plate E-2.2.

3. Find the pervious area loss rates for subareas within the drainage area using Plates E-6.1 and E-6.2. Adjust these rates to account for impervious area using the relationship below, and then compute a weighted average loss rate for the watershed. See Sheet 2 of Plate E-2.1.

$$F = F_p\,(1.00 - 0.9A_i)$$

where:

F = Adjusted loss rate - inches/hour

F_p = Loss rate for pervious areas - inches/hour (Plate E-6.2)

A_i = Impervious area (actual) - decimal percent (Plate E-6.3)

4. For 3 and 6-hour duration storms assume the weighted average loss rate is a constant defining the maximum loss rate for each unit time period. For 24-hour storms use the variable loss rate function below to compute the maximum loss rate for each unit time period:

$$F_T \text{ (inches/hour)} = C\,(24-(T/60))^{1.55} + F_m$$

where:

$C = (F - F_m)/54$

F = Adjusted loss rate - inches/hour (as previously defined)

T = Time from beginning of storm - minutes

F_m = Minimum value on loss rate curve - inches/hour (typically 50 to 75-percent of F)

The time "T" used should be from the start of the storm to the middle of each unit time period, i.e., for a unit time of 30-minutes the maximum loss rate would be computed for T=15-minutes for period one, T=45-minutes for period two, etc. Enter the maximum loss rates (constant or variable) on Column 22 of Plate E-2.2.

5. Compute the low loss rate for each unit time period where the maximum loss rate exceeds the rainfall rate for that period. The low loss rate should normally be 80 to 90-percent times the rainfall rate. See Column 22 of Plate E-2.2.

6. Compute the effective rainfall rate for each unit time period by subtracting the loss rate from the rainfall rate. See Column 23 of Plate E-2.2. Be sure to use the low loss rate where the maximum loss rate exceeds unit period intensity.

7. Compute the flood hydrograph using one of the following two methods. Do not use the simplified method until the long form method is thoroughly understood:

   (a) Long form method (use Plate E-2.3):

      (1) Multiply the effective rainfall rate for the first unit time period times each synthetic unit hydrograph value to determine the flood hydrograph which would result from that rainfall increment.

      (2) Repeat the above process for each suceeding effective rainfall value, advancing the resultant flood hydrographs one unit time period for each cycle.

7. (continued)

(3) Sum the flow ordinates found in the steps above to determine the average flow ordinate per unit time period for the design storm flood hydrograph.

(b) Simplified Method:

(1) List the unit graph values (Column 19, Plate E-2.2) in reverse order on the right hand side of a separate sheet of paper.

(2) Align the separate sheet with the effective rain column (Column 23 of Plate E-2.2) so that the bottom unit graph value is adjacent to the top effective rain value. The product of these values is the flood hydrograph value in cfs for the first unit period (Column 24 of Plate E-2.2).

(3) Move the separate sheet down one unit time period. The sum of the products of the first two effective rain values, times the adjacent unit graph values, is the flood hydrograph value for the second unit time period.

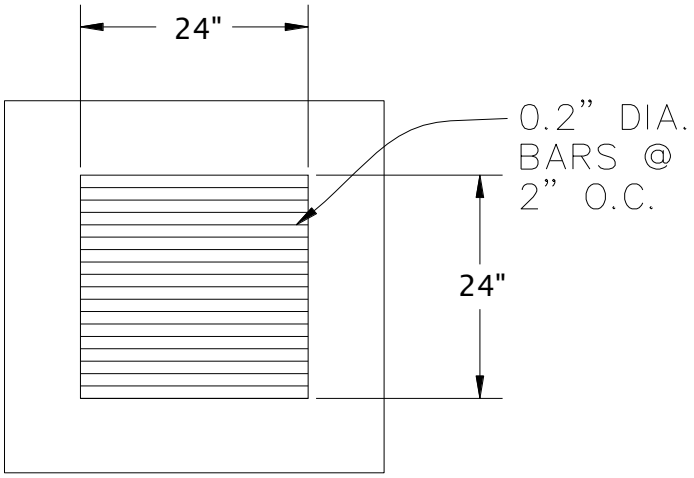
(4) Move the separate sheet down one unit time period to compute each successive flood hydrograph value. The flood hydrograph value in each case is the sum of the products of each effective rain value times the adjacent unit graph value. The procedure is illustrated by the example on the next page. Continue this process until the hydrograph is completely defined (the top unit graph value will be opposite the bottom effective rain value).

The flood hydrograph value computed for any positioning of the separate sheet is always entered opposite the unit graph value at the bottom of the separate sheet.

It is possible to determine the peak discharge without defining the entire hydrograph by aligning the maximum unit graph values just above the maximum effective rain values, and then computing enough flood hydrograph values to identify the peak discharge.

8. If desired add base flow to the flood hydrograph ordinates determined in Step 7.

24" x 24"



CLEAR OPEN AREA

AREA OF BARS: (24/12 x 24/12) - (24/12 x 24/1 x 0.2/12) = 0.4 ft^2

PERMITER:

4 x 24/12 = 8 ft

ORFICE FLOW:

Q = 0.67*Ag*(2gd)^(1/2)

Ag (ft2)	Depth (ft)	Q (cfs)
3.6	0	0
3.6	0.125	6.843452
3.6	0.25	9.678103
3.6	0.375	11.85321
3.6	0.5	13.6869
3.6	0.625	15.30242
3.6	0.75	16.76297
3.6	0.875	18.10607
3.6	1	19.35621

Note: Flow values at various depths were inputted to AES in order to properly size basin outfall structure and limit outfall flows to less than existing conditions.

Limited Off-Site Storm Drain Analysis

For

#3882-02 Wildomar, CA Walmart
Planning Application No. 13-0086
I-15 & Bundy Canyon Road
Wildomar, CA

Prepared For:

Wal-Mart Real Estate Business Trust
2001 SE 10th Street
Bentonville, AR 72716-5570

Prepared By:

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
858-292-7770

July 8, 2014

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Riverside County Conditions of Approval II

VICINITY MAP

PROJECT DESCRIPTION:

The project proposes an 185,992 square foot Walmart building, parking lot, and an additional 7,800 square foot future retail outparcel. Two undeveloped parcels (Tentative Tracts 31409 and 32024) to the east of the project site currently convey sotrmwater drainage onto the proposed project site via surface flow and a culvert existing underneath Monte Vista Drive. This off-site run-on will be re-routed in the future to the existing culvert on the east side of Monte Vista Drive, south of the project site. Re-routing as described is a Condition of Approval for Tentative Tracts 31409 and 32024.

Due to the schedule uncertainty of the above-referenced TTMs, the Walmart project has been required to design a potential "interim" solution to address this off-site run-on. This interim design will only be required if the Walmart project is entitled, designed and permitted for construction prior to the TTMs.

This Limited Off-Site Storm Drain Analysis provides supporting hydrologic calculations for the required interim storm drain system. This storm drain will collect the off-site run-on at the discharge point along Monte Vista Drive and will convey stormwater around the project site for discharge at the existing 30" Caltrans culvert under the I-15 Freeway.

Additional surface flows entering the project site will be collected by permanent proposed street curb inlets along the west side of Monte Vista Drive along the project frontage. The future construction of Tentative Tracts 31409 and 32024 will include additional east side street and storm drain improvements.

This Limited Off-Site Storm Drain Analysis was prepared to verify that the proposed interim storm drain pipe routing stormwater around the site is designed for adequate flow as identified by the Riverside County LMS "Conditions of Approval", dated April 4, 2008 (attached for reference).

EXISTING DRAINAGE PATTERNS:

The proposed development area is located within a portion of the Bundy Canyon Wash, which produces a flowrate of approximately 2,100 cfs during a 100-year storm event. A portion of this flow, approximately 100 cfs (per the attached Riverside County letter), is directed into a culvert running underneath Monte Vista Drive that is discharged onto the proposed project site. This flow currently travels across the site by the way of natural surface channels that drain into an existing 30" Caltrans culvert directed underneath the I-15 Freeway.

PROPOSED INTERIM DRAINAGE SYSTEM:

Flow from the existing Monte Vista Drive culvert that discharges onto the project property will be conveyed by a new interim storm drain line that will be directed south along Monte Vista Drive, west along Canyon Drive, and then north along the perimeter of the project site to discharge near the existing inlet for the 30" Caltrans culvert that conveys runoff under the I-15 Freeway. Based on hydraulic calculations performed by Hydraflow Storm Sewers Extension for AutoCAD Civil 3D 2013, a 54" RCP is capable of carrying the estimated 100 cfs flow rate for the surrounding watershed area. Additionally, an outlet structure and erosion control measures (riprap) will be required at the outlet of the proposed pipe.

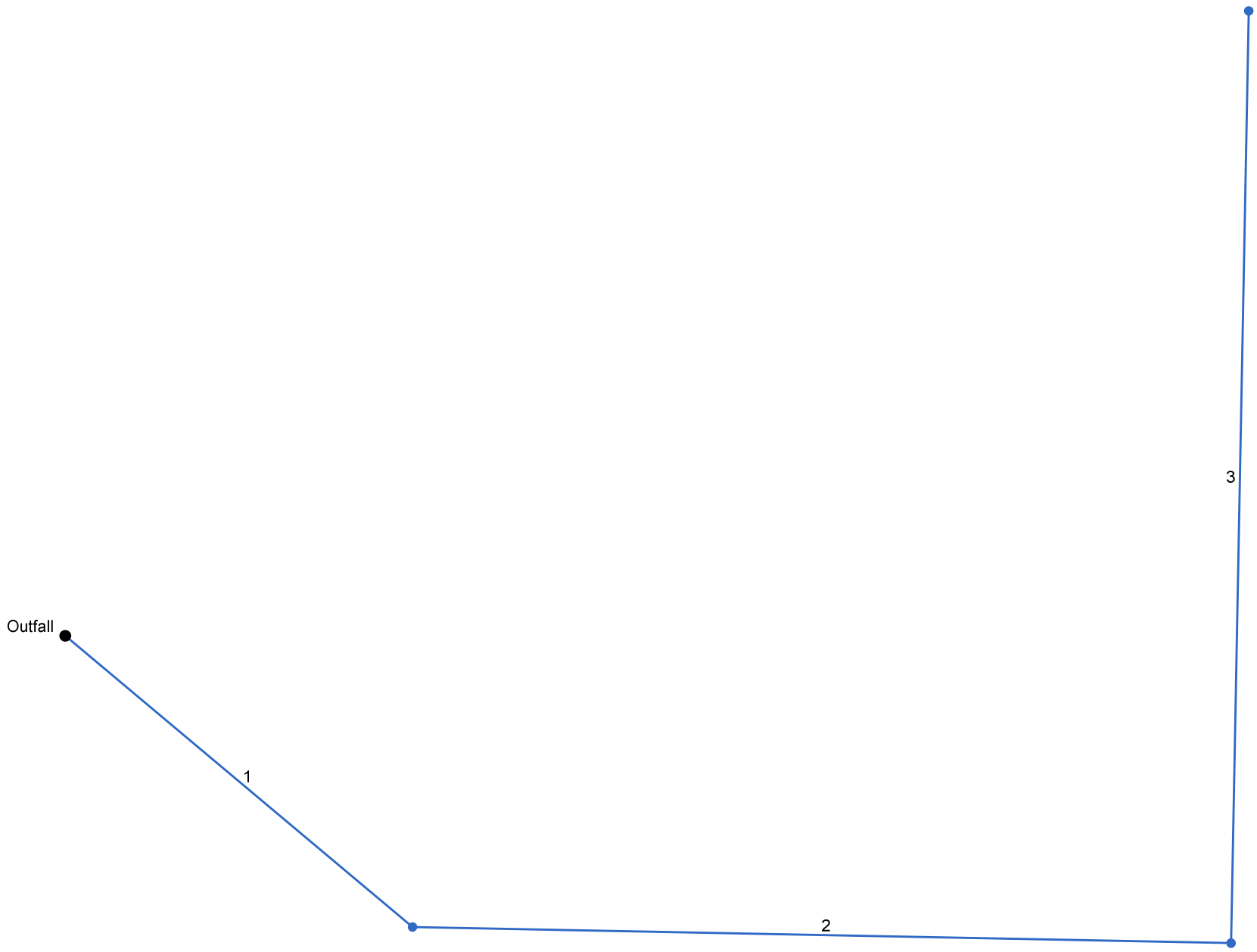
CALCULATIONS/METHODOLOGY:

The 100-year flow rate for the portion of Bundy Canyon Wash that transverses the site was set forth in the "Conditions of Approval" for Plan Plot Case #PP20240 by Riverside County LMS, dated April 4, 2008. This flow rate was used for analysis in Hydraflow Storm Sewers Extension for AutoCAD Civil 3D 2013 to determine the required pipe size and to confirm that the hydraulic grade line does not negatively impact the pipe network. As noted in Appendix A, the resulting pipe is 54" in diameter and travels approximately 1,700 feet at a slope of 0.66%.

APPENDIX A

PROPOSED SYSTEM ANALYSIS

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2013 Plan



Project File: storm.stm	Number of lines: 3	Date: 7/3/2014

Storm Sewers v10.00

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	308.000	40.119	MH	0.00	0.00	0.00	0.0	1389.00	0.66	1391.03	54	Cir	0.012	0.68	1400.00	Pipe - 529
2	1	555.000	-38.983	MH	0.00	0.00	0.00	0.0	1391.03	0.66	1394.70	54	Cir	0.012	1.00	1400.00	Pipe - 528
3	2	635.000	-90.031	Comb	100.00	10.60	0.60	5.0	1394.70	0.66	1398.89	54	Cir	0.012	1.00	1407.00	Pipe - 527

Project File: storm.stm | Number of lines: 3 | Date: 7/3/2014

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - 529	131.6	54	Cir	308.000	1389.00	1391.03	0.659	1393.50	1394.40	1.12	1394.40	End	Manhole
2	Pipe - 528	134.8	54	Cir	555.000	1391.03	1394.70	0.661	1394.40	1398.11	n/a	1398.11	1	Manhole
3	Pipe - 527	139.5	54	Cir	635.000	1394.70	1398.89	0.660	1398.11	1402.36	n/a	1402.36	2	Combination

Project File: storm.stm

Number of lines: 3

Run Date: 7/3/2014

NOTES: Return period = 100 Yrs.

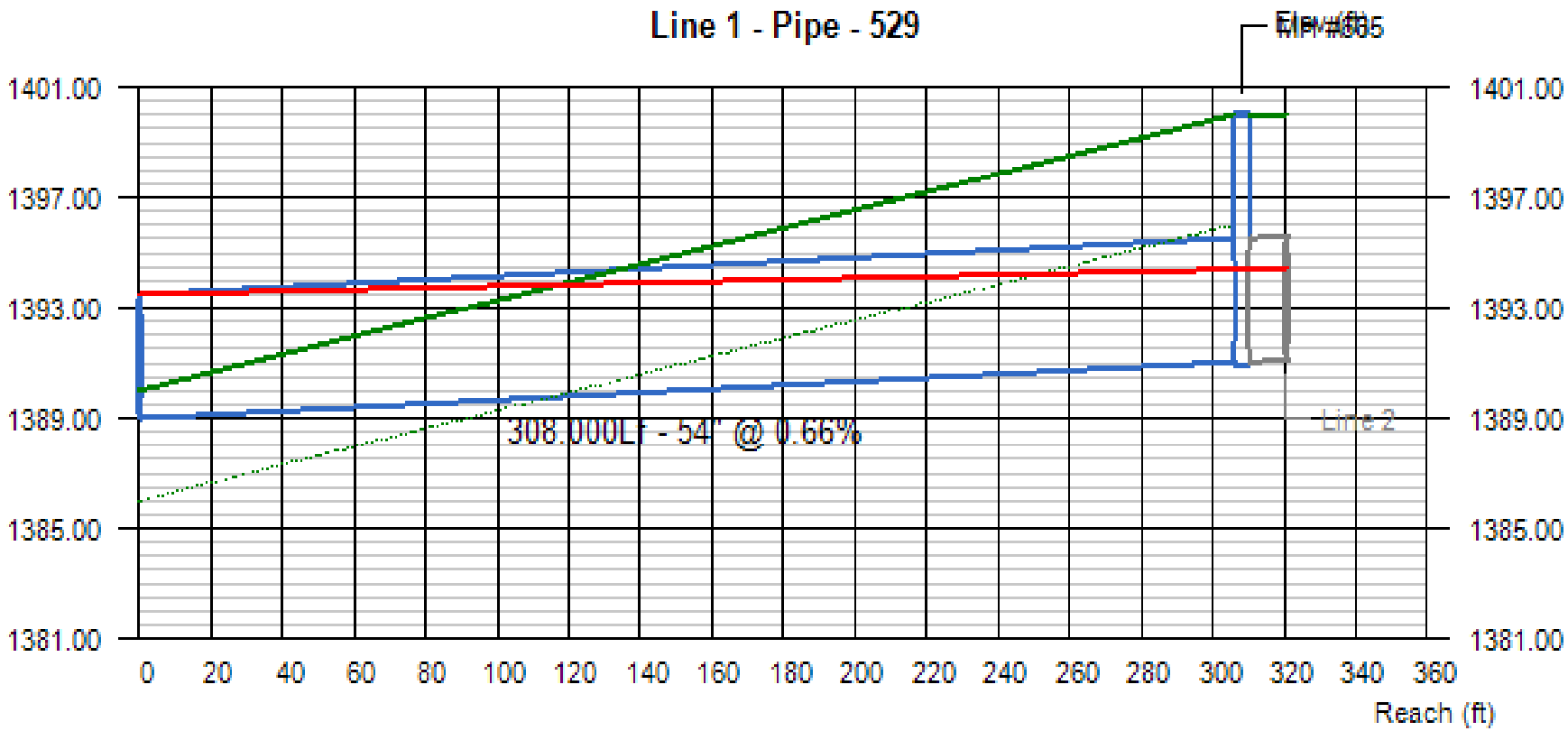
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	308.000	0.00	10.60	0.00	0.00	6.36	0.0	7.3	5.0	131.6	173.0	9.28	54	0.66	1389.00	1391.03	1393.50	1394.40	1390.00	1400.00	Pipe - 529
2	1	555.000	0.00	10.60	0.00	0.00	6.36	0.0	6.2	5.5	134.8	173.2	10.48	54	0.66	1391.03	1394.70	1394.40	1398.11	1400.00	1400.00	Pipe - 528
3	2	635.000	10.60	10.60	0.60	6.36	6.36	5.0	5.0	6.2	139.5	173.1	10.69	54	0.66	1394.70	1398.89	1398.11	1402.36	1400.00	1407.00	Pipe - 527

Project File: storm.stm | Number of lines: 3 | Run Date: 7/3/2014

NOTES:Intensity = 16.23 / (Inlet time + 0.10) ^ 0.59 ; Return period =Yrs. 100 ; c = cir e = ellip b = box

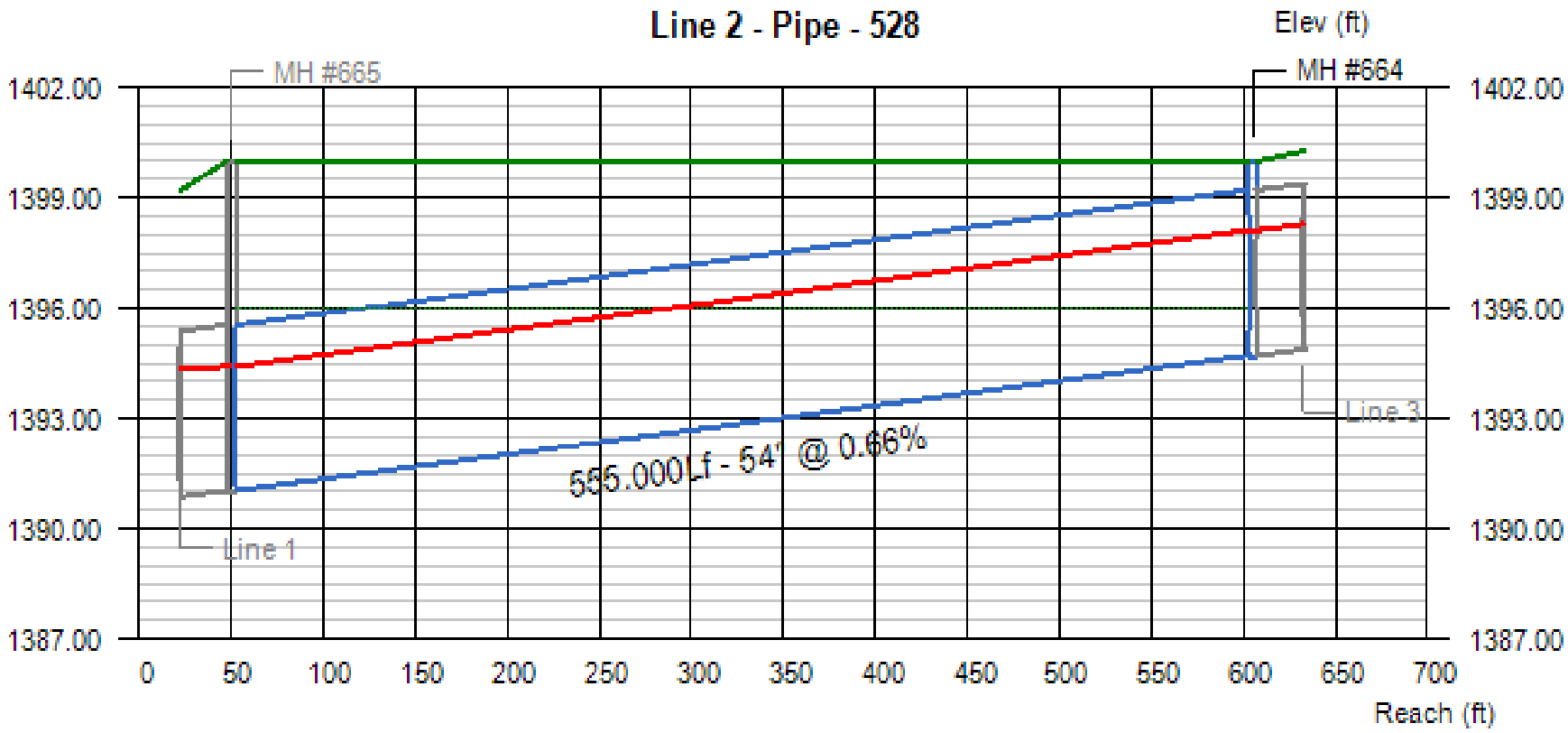
Line Profile (Line 1) - Pipe - 529



Line #	Q (cfs)	Invert Elevation		Depth of Flow			Hydraulic Grade Line			Velocity		Cover	
		Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Hw (ft)	Dn (ft)	Up (ft)	Jnct (ft)	Dn (ft/s)	Up (ft/s)	Dn (ft)	Up (ft)
1	131.59	1389.00	1391.03	4.50	3.37	3.37	1393.50	1394.40	1394.40	8.28	10.29	-3.50	4.47

Project File:	No. Lines: 3	Run Date: 7/3/2014

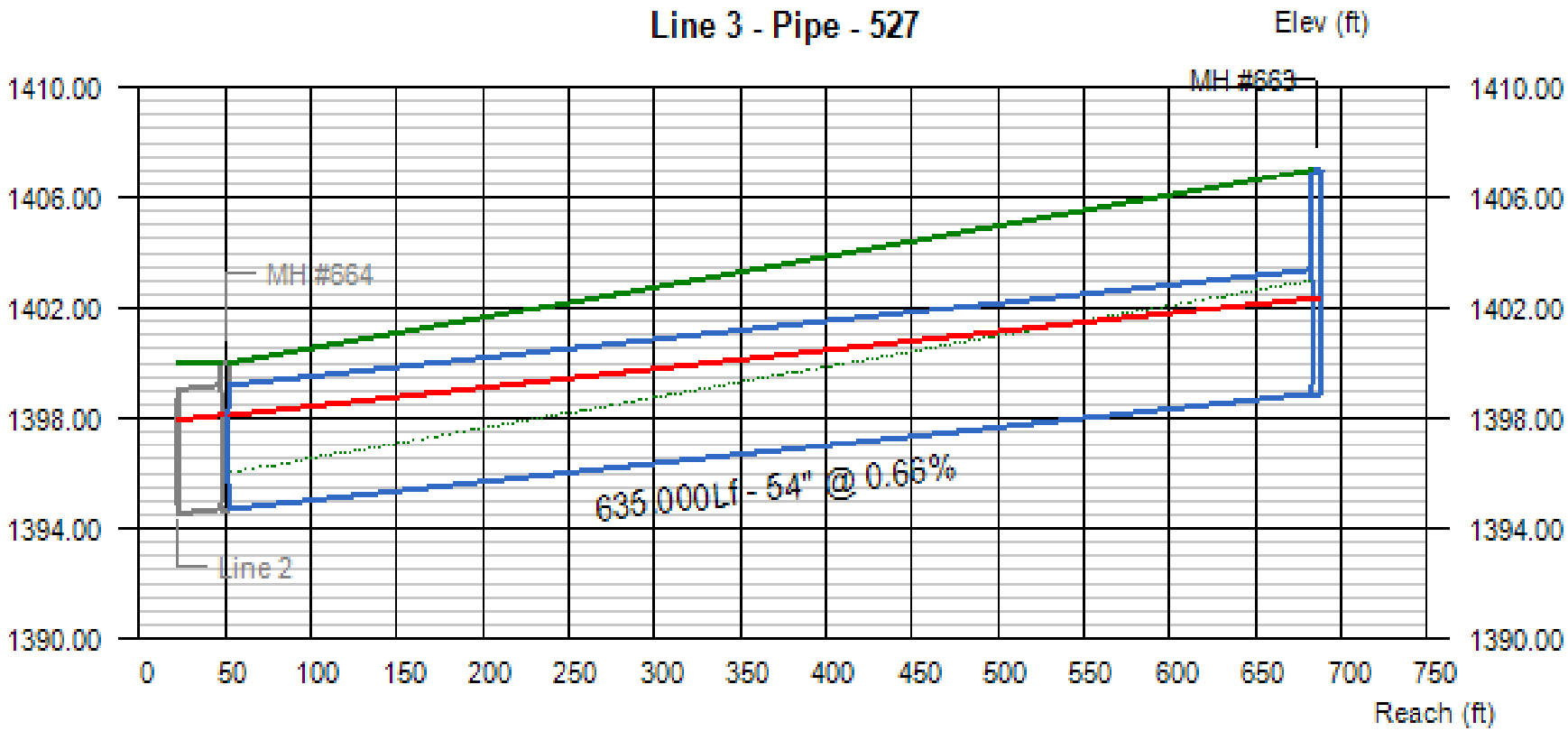
Line Profile (Line 2) - Pipe - 528



Line #	Q (cfs)	Invert Elevation Dn (ft)	Invert Elevation Up (ft)	Depth of Flow Dn (ft)	Depth of Flow Up (ft)	Depth of Flow Hw (ft)	Hydraulic Grade Line Dn (ft)	Hydraulic Grade Line Up (ft)	Hydraulic Grade Line Jnct (ft)	Velocity Dn (ft/s)	Velocity Up (ft/s)	Cover Dn (ft)	Cover Up (ft)
2	134.85	1391.03	1394.70	3.37	3.41	3.41	1394.40	1398.11	1398.11	10.54	10.42	4.47	0.80

Project File:	No. Lines: 3	Run Date: 7/3/2014

Line Profile (Line 3) - Pipe - 527



Line #	Q (cfs)	Invert Elevation		Depth of Flow			Hydraulic Grade Line			Velocity		Cover	
		Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Hw (ft)	Dn (ft)	Up (ft)	Jnct (ft)	Dn (ft/s)	Up (ft/s)	Dn (ft)	Up (ft)
3	139.50	1394.70	1398.89	3.41	3.47	3.47	1398.11	1402.36	1402.36	10.78	10.60	0.80	3.61

Project File: | No. Lines: 3 | Run Date: 7/3/2014

Storm Sewers

APPENDIX B

SUPPORTING DOCUMENTATION

AM
3/24/08 WQMP

PLOT PLAN:TRANSMITTED Case #: PP20240 Parcel: 367-100-037

5. DRT CORRECTIONS REQUIRED

FLOOD RI DEPARTMENT

5.FLOOD RI. 6 COMMENTS ON 3/24/08 WQMP REQUIRED

Comments on Conceptual Grading Plan exhibit and Water Quality Management Plan (WQMP) received on March 24, 2008

Plot Plan 20240 is a proposal to construct a Wal-Mart commercial center on 27.38 acres in the Sedco area. The project site is located on the south side of Bundy Canyon Road, east of the I-15 freeway and west of Monte Vista Drive.

The Bundy Canyon Wash, which has a 100-year flowrate of approximately 2100 cfs, traverses the site's southeastern corner. A watercourse carrying approximately 100 cubic feet per second (cfs) in a 100-year event enters the site through a culvert under Monte Vista Drive. This watercourse flows through the site and into a culvert under the I-15 Freeway in the existing condition. The developer proposes to collect these flows at Monte Vista Drive in a storm drain and convey them around the site to the area near the existing 30" Caltrans culvert under the I-15 freeway. There is an existing District facility, namely Sedco MDP Line F which outlets flows on the north side of Bundy Canyon Road just west of Sellers Road. This watercourse travels west on the north side of Bundy Canyon Road and crosses the road to a neighboring parcel to the west into a 72" Caltrans culvert.

The developer proposes to collect onsite flows and mitigate water quality with a series of grassed swales, porous landscaped detention (PLD) and an extended detention basin on the westerly end of the property. Flows entering the basin will be outletted in two separate culverts under the I-15 freeway. The two Caltrans culverts outlet near the intersection of Canyon Drive and Cherry Street on the west side of the I-15 freeway. The basin will mitigate for both increased runoff and water quality. There is lack of flood control infrastructure downstream of the site, and the area west of the I-15 freeway is prone to flooding in even minor events.

The District has reviewed the Conceptual Grading Plan exhibit and WQMP received on March 24, 2008 and has the following comments that shall be addressed prior to the issuance of conditions of approval:

Denied in LMS
4/4/08

5. DRT CORRECTIONS REQUIRED

5.FLOOD RI. 6 COMMENTS ON 3/24/08 WQMP (cont.) REQUIRED

1.Tentative Tracts 31409 and 32024, located to the east, have each been conditioned to construct channel improvements that, when completed, would protect the southeastern portion of the site and the proposed surrounding street improvements from the wash. Development of this portion of the site requires construction of the channel improvements that are to be constructed by Tracts 31409 and 32024. If this development proceeds before these improvements are constructed, Plot Plan 20240 shall construct any facilities required to protect the site from storm flows. This may include a floodplain study delineating the limits of the Bundy Canyon Wash floodplain and letters of permission from adjacent property owners for offsite construction.

2.It appears that the majority of the site drains directly to the detention basin via onsite storm drains prior to being mitigated for water quality. The extended detention basin shall be designed per standards in the Riverside County Water Quality Management Plan including all outfalls to the basin outlettting to the forebay. This shall be rectified prior to the next submittal.

3.It appears that side slopes for the basin that are adjacent to the parking/driving area are 2:1. This is unacceptable. Side slopes shall be no steeper than 4:1 whenever adjacent to roadways, sidewalks and trails. This shall be rectified prior to the next submittal.

4.The calculations provided for the Porous Landscape Detention (PLD) features are provided as typical. Meaning that they have been calculated for a typical area of 20,000 SF. This is unacceptable. Various tributary areas to the PLDs exceed this typical area. This shall be rectified prior to the next submittal.

5.Offsite collection will require permission from the adjacent property owner(s) per Ordinance 460 3.2.J. prior to the District making recommendations of approval. Below is the Ordinance for your reference:

When alternate access is required and the alternate access is off-site, or when any other public improvement is required or proposed off-site, the land divider shall do each of the following as part of the tentative map review.

5. DRT CORRECTIONS REQUIRED

5.FLOOD RI. 6 COMMENTS ON 3/24/08 WQMP (cont.) (cont.) REQUIRED

i.Provide any studies or information required to adequately evaluate the environmental impacts of constructing the off-site improvement/alignment; and,

ii.Show all proposed centerline, approximate gradients and radii on the tentative map in addition to other factors such as street widths, pavement surface, etc. for the off-site improvement/alignment; and,

iii.Provide mailing labels showing the addresses of property owners that are adjacent to the off-site improvement/alignment for hearing notification purposes; and,

iv.Provide written assurance(s) from the owner(s) of the property underlying the off-site improvement/alignment that sufficient right-of way to construct will be provided. A formal agreement or offer of dedication is not necessary to satisfy this requirement, but the owner's willingness to cooperate must be communicated in a form acceptable to the Transportation Department.

In the event that the land divider does not satisfy one or more of the requirements set forth in subsections J.i., J.ii. or J.iii., and no exception is granted, the tentative map shall be redesigned such that the off-site improvement/alignment is no longer required. If the land divider refuses or is unable to redesign, project review staff shall recommend to the appropriate Advisory Agency or Appeal Board that the tentative map be denied. In the event that the land divider does not satisfy the requirement set forth in subsection J.iv., project review staff shall note in its report the potential need to institute eminent domain proceedings and the appropriate Advisory Agency or Appeal Board may, in its discretion, act on the tentative map as designed or require that the map be redesigned to eliminate the off-site improvement/alignment.

Should you have any questions regarding this project, please call Mekbib Degaga at 951-955-1200.

Project Specific
Water Quality Management Plan

For:
Wildomar Gateway

DEVELOPMENT NO. PLOT PLAN NO. 20240
DESIGN REVIEW NO. CASE NO. PP20240

Prepared for:
Wal-Mart Real Estate Business Trust
2001 SE 10th Street
Bentonville, AR 72716-5570

Prepared by:
Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
(858) 292-7770
Peter B. Ritchey, P.E. – Project Manager

PRELIMINARY WQMP – REV
May 9, 2014

WQMP Preparation/Revision Date:
May 9, 2014

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Wal-Mart Real Estate Business Tract by Nasland Engineering for the project located in Riverside County, California.

This WQMP is intended to comply with the requirements of the City of Wildomar for PAR 12-0202 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under Riverside County Water Quality Ordinance.

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement this WQMP.

"I certify under penalty of law that the provision of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

Wal-Mart Real Estate Business Trust
2001 SE 10th Street
Bentonville, AR 72716-5570

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APPENDICES

A. CONDITIONS OF APPROVAL

B. VICINITY MAP AND SITE PLAN

C. SUPPORTING DETAIL RELATED TO HYDRAULIC CONDITIONS OF CONCERN (IF APPLICABLE)

D. EDUCATIONAL MATERIALS

E. SOILS REPORT (IF APPLICABLE)

F. TREATMENT CONTROL BMP SIZING CALCULATIONS AND DESIGN DETAILS

G. AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

H. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

I. Project Description

The project site includes a Wal-Mart Supercenter for retail and grocery sales with a building size of 185,992 square feet including a Seasonal Garden Center. This project does not include Tire and Lube Express (TLE) services. One additional commercial Out Parcel is included with a total project site of 24.61 acres. The site is located in southwest region of Riverside County in the community of Wildomar at the southwest corner of Bundy Canyon Road and Monte Vista Drive, with Interstate Route 15 to the west. Existing sewer and water facilities are located in Bundy Canyon Rd., Monte Vista Drive and Canyon Drive with storm drains in Monte Vista Drive and Interstate 15. The site topography generally slopes to the southwest with site drainage through pipes at the low point under Interstate 15. Being a retail center, site activities are those associated with this type of use, including sales of household consumer goods, delivery and stocking of products with fast food and light retail installations at the adjacent Out Parcels. There will be two truck docks at the rear of the Wal-Mart building for deliveries with product storage in the building. The bale and palette storage is proposed outside adjacent to the rear drive aisle. Sanitary sewer connections from the building are proposed to connect to the existing sewer in Canyon Drive with the connection from the grocery section including a grease interceptor. Site storm drainage will be collected and treated onsite through the use of site design and treatment control BMP's. Roof and delivery docks will be treated at their source with filter inserts. Two above ground detention basins will detain the increased developed flow to return the flow rate to pre-development conditions for conveyance through existing vegetated areas to the existing drainage structures at Interstate 15.

Project Owner: Wal-Mart Real Estate Business Trust
2001 SE 10th Street
Bentonville, AR 72716-5570

WQMP Preparer: Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
(858) 292-7770

Project Site Address: Southwest of intersection of Bundy Canyon Road & Monte Vista Drive
Wildomar, CA

Planning Area/
Community Name: Wildomar Gateway

APN Number(s): 367-100-033, 367-100-034, 367-100-035, 367-100-037

Thomas Bros. Map: Page 897, C-4

Project Watershed: Santa Ana Watershed / Santa Margarita Watershed

Sub-watershed: San Jacinto River Basin, Lake Elsinore / Cole Canyon and Murrieta Creek

Project Site Size: 24.61 AC

Standard Industrial Classification (SIC) Code: N/A

Formation of Home Owners' Association (HOA) or Property Owners Association (POA): N

Additional Permits/Approvals required for the Project

AGENCY:	Permit required:
State Department of Fish and Game, 1601 Streambed Alteration Agreement	No
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification	No
US Army Corps of Engineers, CWA section 404 permit	No
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	No

Appendix A of this project-specific WQMP includes a complete copy of the final Conditions of Approval. Appendix B of this project-specific WQMP shall include:

1. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail to allow the project site to be plotted on Co-Permittee base mapping; and
2. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Treatment Control BMPs;
- Landscaped areas;
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.);
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.);

- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation;
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated;
- Location(s) of Receiving Waters to which the project directly or indirectly discharges;
- Location of points where onsite (or tributary offsite) flows exit the property/project site;
- Proposed drainage areas boundaries, including tributary offsite areas, for each location where flows exits the property/project site. Each tributary area should be clearly denoted;
- Pre- and post-project topography.

Appendix G of this project-specific WQMP shall include copies of CC&Rs, Covenant and Agreements, and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

II. Site Characterization

Land Use Designation or Zoning: Existing R-R Zoning to be changed to C1/CP Zoning for this Proposed Development.

Current Property Use: Undeveloped

Proposed Property Use: Proposed Commercial Retail Center

Availability of Soils Report: Y

Phase 1 Site Assessment: Y

Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Lake Elsinore, HU# 802.31	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCB's, Unknown Toxicity	MUN, REC 1, REC 2, WARM, WILD	Not designated as Rare
Murrieta Creek	Phosphorus	MUN, AGR, IND, PRO, GWR, REC2, WARM, WILD	Not designated as Rare
Cole Canyon	Phosphorus	MUN, AGR, IND, PRO, REC2, WARM, WILD	Not designated as Rare

III. Pollutants of Concern

Potential Pollutants Generated by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☒ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☒	☒	☒	☒	☒	☒	☒

P = Potential
N = Not Potential
(1) A potential Pollutant if non-native landscaping exists or is proposed on-site; otherwise not expected.
(2) A potential pollutant if the project includes uncovered parking areas; otherwise not expected
(3) A potential pollutant is land use involves animal waste
(4) Specifically petroleum hydrocarbons
(5) Specifically solvents
(6) Bacterial indicators are routinely detected in pavement runoff

IV. Hydrologic Conditions of Concern

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. Under certain circumstances, changes could also result in the reduction in the amount of available sediment for transport; storm flows could fill this sediment-carrying capacity by eroding the downstream channel. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime of a Project's site would be considered a hydrologic condition of concern if the change would have a significant impact on downstream erosion compared to the pre-development condition or have significant impacts on stream habitat, alone or as part of a cumulative impact from development in the watershed.

This project-specific WQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions are met:

- **Condition A:** Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Co-Permittee.
- **Condition B:** The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development.
- **Condition C:** The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee.

This Project meets the preceding Condition A and C.

Calculations can be found in Appendix C, "Hydrology Report", that show a greatly increased amount of runoff, velocities, and volumes when comparing pre-development to post-development conditions. This is expected since the project site is being transformed from an undeveloped site to a commercial development, which drastically affects the amount impervious area.

These increases are misleading since onsite treatment control BMPs are designed to treat the flow associated with 2-year 24-hour and 10-year 24-hour rainfall events with minimal downstream runoff. Additionally, these same design elements have the capability of storing a 100-year storm event without adverse damages to the facility while dispersing downstream flows and velocities at acceptable rates.

Porous Landscape Detention (PLD) areas are designed to have sufficient storage for 2-year 24-hour and 10-year 24-hour rainfall events, as shown in Table A. Storage volumes were determined by geometric calculations based on design criteria for Bio-retention Facilities in Appendix D and required volumes calculations are location in Appendix C.

Table A: Comparison of storage volume and required volume for PLDs.

BMP #	PLD Storage Volume* (cubic feet)	10-Year-24-Hour Storm Volume (cubic feet)
BMP-1	3779.00	3179.52
BMP-2	3058.50	4572.18
BMP-3	1094.73	896.40
BMP-4	1859.39	1591.38

*2-foot depth of engineering soil media with 30% pore space.

Note that BMP-2 is undersized, which is planned in order to maximize the number of parking stalls. Overflow inlets are located in each PLD, which convey additional flow to their respective basins via underground storm drains. Since the PLDs are designed to treat smaller rainfall events, in the case of a 100-year storm these drains pass on the overflow to the on-site basins that are more than capable of storing and dispersing storm events of this level.

The infiltration basin on the western side of the project is the receiving area for the PLD overflow and sufficiently handles the flow associated with a 100-year rainfall event. Appendix C demonstrates that the calculation for the peak volume by performing the Rational Method approximately 1,000 cubic yards and that the basin design is more than capable of holding that volume at a depth of one foot, 1,145.76 cubic yards.

Towards the southern limits of the project site a sand-filter basin is planned which will treat the runoff mainly from the structure rooftop and the remaining section of the parking lot. The 100-year storm event peak volume for these drainage areas is 608.74 cubic yards, which is complied with as the volume at 3 feet of depth is 703.56 cubic yards.

V. Best Management Practices

V.1 SITE DESIGN BMPS

Project proponents shall implement Site Design concepts that achieve each of the following:

1) Minimize Urban Runoff
2) Minimize Impervious Footprint
3) Conserve Natural Areas
4) Minimize Directly Connected Impervious Areas (DCIAs)

Table 1. Site Design BMPs

			Included	
Design Concept	**Technique**	**Specific BMP**	**yes**	**no**
Site Design Concept 1	*Minimize Urban Runoff*			
		Maximize the permeable area (See Section 4.5.1 of the WQMP). -In order to minimize runoff, landscaping including native trees and shrubs are proposed in unpaved areas. Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X	
		Incorporate landscaped buffer areas between sidewalks and streets. -Landscaped buffers are proposed between sidewalks and paved parking areas. Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs. -Additional native and drought tolerant trees and shrubs are proposed for the landscape plan. Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X	
		Use natural drainage systems. -The natural downstream drainage systems shall remain in place.	X	
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration. -There are no perforated pipe or gravel filtration pit concepts at this stage of engineering design.		X

		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives. -If feasible, infiltration capabilities shall be designed into the proposed detention basin facilities during final engineering design. Inspect semi-annually at the beginning and end of the wet season. Look for standing water, slope stability, sediment accumulation, trash and debris and the presence of burrows. Remove accumulated trash and debris. Trim vegetation at the beginning and end of the wet season to prevent the establishment of woody vegetation. Remove accumulated sediment when sediment volume exceeds 10 percent of the basin volume. The developer/owner shall be responsible for implementation and inspection.	X	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required to describe BMP and how it addresses Site Design concept). -There are no other comparable site design concepts approved by the Co-Permittee at this time.	X	

Table 1. Site Design BMPs (Cont.)

			Included	
Design Concept	**Technique**	**Specific BMP**	**yes**	**no**
Site Design Concept 1	Minimize Impervious Footprint			
		Maximize the permeable area (See Section 4.5.1 of the WQMP). -In order to maximize permeable areas, landscaping including native trees and shrubs are proposed in unpaved areas. Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X	
		Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low -traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials. -No gravel or pervious walkways are planned.		X
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised. -Dimensions for parking lots and drive aisles shall be kept to a minimum to minimize paved areas. Trash and debris shall be removed from the parking lot and drive aisles. Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X	
		Reduce widths of street where off-street parking is available. -Any required streets shall be kept to minimum widths to minimize impervious surfaces.	X	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design. - No gravel or pervious walkways are planned.		X
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept). -There are no other comparable site design concepts approved by the Co-Permittee at this time.	X	

Site Design Concept 1	Conserve Natural Areas			
		Conserve natural areas (See WQMP Section 4.5.1). -Due to the scope of this commercial project, there are no apparent opportunities to conserve natural areas at this time.		X
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs. -Additional native and drought tolerant trees and shrubs are proposed for the landscape plan. Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X	
		Use natural drainage systems. -The natural downstream drainage systems shall remain in place.	X	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept). -There are no other comparable site design concepts approved by the Co-Permittee at this time.		X

Table 1. Site Design BMPs (Cont.)

			Included	
Design Concept	**Technique**	**Specific BMP**	**yes**	**no**
Site Design Concept 2	Minimize Directly Connected Impervious Areas (DCIAs)	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible. -Roof run-off will be directed to the proposed detention basin. Infiltration capacity will be designed during final engineering. Inspect semi-annually at the beginning and end of the wet season. Look for standing water, slope stability, sediment accumulation, trash and debris and the presence of burrows. Remove accumulated trash and debris. Trim vegetation at the beginning and end of the wet season to prevent the establishment of woody vegetation. Remove accumulated sediment when sediment volume exceeds 10 percent of the basin volume. The developer/owner shall be responsible for implementation and inspection.	X	
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping. -Proposed sidewalks will be designed to drain into adjacent landscaped areas during final engineering.	X	
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales. -Vegetated swales through the project site are not feasible, underground pipes are included.		X
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings. -Rural swale systems are not proposed for the site at this time.		X
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter. -Urban curb/swale systems are not proposed for the site at this time.		X
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s. -A dual drainage system is not proposed for this site at this time.		X

		Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the MS4. -The site plan proposes the shared use of driveway with the adjacent property owner to the northwest. However, due to existing conditions, there are no opportunities at this time for flare of wheel strips or draining into adjacent landscaping.		X
		Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface, or designed to drain into landscaping prior to discharging to the MS4. -There are no uncovered temporary or guest parking spaces proposed at this time.		X
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design. -Porous Landscape Detention areas are planned that are vegetated and a significant part of drainage design.	X	
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving. -There are no overflow parking spaces proposed at this time.		X
		Other comparable and equally effective design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept). -There are no other comparable site design concepts approved by the Co-Permittee at this time.		X

V.2 SOURCE CONTROL BMPS

Table 2. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	X		
Activity Restrictions	X		
Irrigation System and Landscape Maintenance -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Common Area Litter Control -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Street Sweeping Private Streets and Parking Lots -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Drainage Facility Inspection and Maintenance -Inspect semi-annually at the beginning and end of the wet season. Look for standing water, slope stability, sediment accumulation, trash and debris and the presence of burrows. Remove accumulated trash and debris. Trim vegetation at the beginning and end of the wet season to prevent the establishment when sediment volume exceeds 10 percent of the basin volume. The developer/owner shall be responsible for implementation and inspection.	X		
Structural Source Control BMPs			
MS4 Stenciling and Signage -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Landscape and Irrigation System Design -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Protect Slopes and Channels	X		
Provide Community Car Wash Racks		X	Non-proposed use.
Properly Design:			
Fueling Areas		X	Non-proposed use.
Air/Water Supply Area Drainage		X	Non-proposed use.

Trash Storage Areas -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Loading Docks -Maintenance shall be part of the regularly scheduled landscape maintenance program for the parking lot areas. The developer/owner shall be responsible for implementation and inspection.	X		
Maintenance Bays		X	Non-proposed use.
Vehicle and Equipment Wash Areas		X	Non-proposed use.
Outdoor Material Storage Areas		X	Non-proposed use.
Outdoor Work Areas or Processing Areas		X	Non-proposed use.
Provide Wash Water Controls for Food Preparation Areas		X	Non-proposed use.

Education for Property Owners, Operators, Tenants, Occupants, or Employees will consist of documentation taken from the Riverside County Flood Control website and documents included in Appendix D of this report. Because this project will employ people that map impact Urban Runoff, BMP training and education programs must be provided to all new employees within 6 months of hire date and annually thereafter.

Appendix D includes copies of the educational materials that will be used in implementing this project-specific WQMP.

V.3 TREATMENT CONTROL BMPS

Porous Landscape Detention (PLD): Sedimentation/Filtration Facility System

Porous Landscape Detention (PLD) consists of low-lying vegetation area underlain by a sand bed with an under drain pipe. A shallow surcharge zone exists for temporary storage of the V_{BMP}. During a storm, accumulated runoff ponds in the vegetated zone and gradually infiltrates into the underlying sand bed, filling the void spaces of the sand. The under drain gradually dewaters the sand bed and discharges the runoff to a nearby storm drain. Overflow into a PLD also discharges into the storm drain system via a surface overflow inlet.

Infiltration Basin

An Infiltration Basin is a flat earthen basin designed to capture the design capture volume, V_{BMP}. The storm water infiltrates through the bottom of the basin into the underlying soil cover. Flow exceeded V_{BMP} must discharge to a downstream conveyance system. Trash and sediment accumulate within the forebay as storm water passes into the basin. Infiltration basins are highly effective in removing all targeted pollutants from storm water runoff.

Sand-Filter Basin

A Sand-Filter Basin (SFB) is a basin where the entire bottom surface is constructed as a stormwater filter. Stormwater enters the basin at its forebay where trash and sediment accumulates. Flows pass into the sand filter area and are gradually filtered through the underlying sand bed. The underdrain gradually dewaters the sand bed and dischargers the filtered runoff to a nearby storm drain system. Benefits of the sand filter basin include the fact that it has medium/high removal efficiency for organic compounds, oils, and grease.

Table 3: Treatment Control BMP Selection Matrix

Pollutant of Concern		**Treatment Control BMP Categories[9]**							
		Veg. Swale /Veg. Filter Strips	**Detention Basins[2]**	**Infiltration Basins & Trenches/Porous Pavement[3][10]**	**Wet Ponds or Wetlands**	**Sand Filter or Filtration**	**Water Quality Inlets**	**Hydrodynamic Separator Systems [4]**	**Manufactured/ Proprietary Devices**
Sediment/Turbidity		H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Yes/No?	Yes			**X**		**X**			
Nutrients		L	M	H/M	H/M	L/M	L	L	U
Yes/No?	Yes			**X**		**X**			
Organic Compounds		U	U	U	U	H/M	L	L	U
Yes/No?	Yes			**X**		**X**			
Trash & Debris		L	M	U	U	H/M	M	H/M	U
Yes/No?	Yes			**X**		**X**			
Oxygen Demanding Substances		L	M	H/M	H/M	H/M	L	L	U
Yes/No?	Yes			**X**		**X**			
Bacteria & Viruses		U	U	H/M	U	H/M	L	L	U
Yes/No?	Yes			**X**		**X**			
Oils & Grease		H/M	M	U	U	H/M	M	L/M	U
Yes/No?	Yes			**X**		**X**			
Pesticides (non-soil bound)		U	U	U	U	U	L	L	U
Yes/No?	Yes			**X**		**X**			
Metals		H/M	M	H	H	H	L	L	U
Yes/No?	Yes			**X**		**X**			

Abbreviations:

L: Low removal efficiency H/M: High or medium removal efficiency U: Unknown removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.

(3) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.

(4) Includes infiltration basins, infiltration trenches, and porous pavements.

(5) Includes permanent pool wet ponds and constructed wetlands.

(6) Includes sand filters and media filters.

(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.

(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP, or newly developed/emerging stormwater treatment technologies.

(9) Project proponents should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project proponents may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.

(10) Note: Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement) must include a copy of the property/project soils report as Appendix E to the project-specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

V.4 EQUIVALENT TREATMENT CONTROL ALTERNATIVES

Not Applicable.

V.5 REGIONALLY-BASED TREATMENT CONTROL BMPS

Not Applicable.

VI. Operation and Maintenance Responsibility for Treatment Control BMPs

Wal-Mart Real Estate Business Trust will enter agreement to be responsible for operation, maintenance, and funding of all Stormwater BMPs on-site. A formal agreement has not been completed at this time, but will be prepared prior to permitting and construction.

VII. Funding

Wal-Mart Real Estate Business Trust will enter agreement to be responsible for operation, maintenance, and funding of all Stormwater BMPs on-site. A formal agreement has not been completed at this time, but will be prepared prior to permitting and construction.

Appendix A

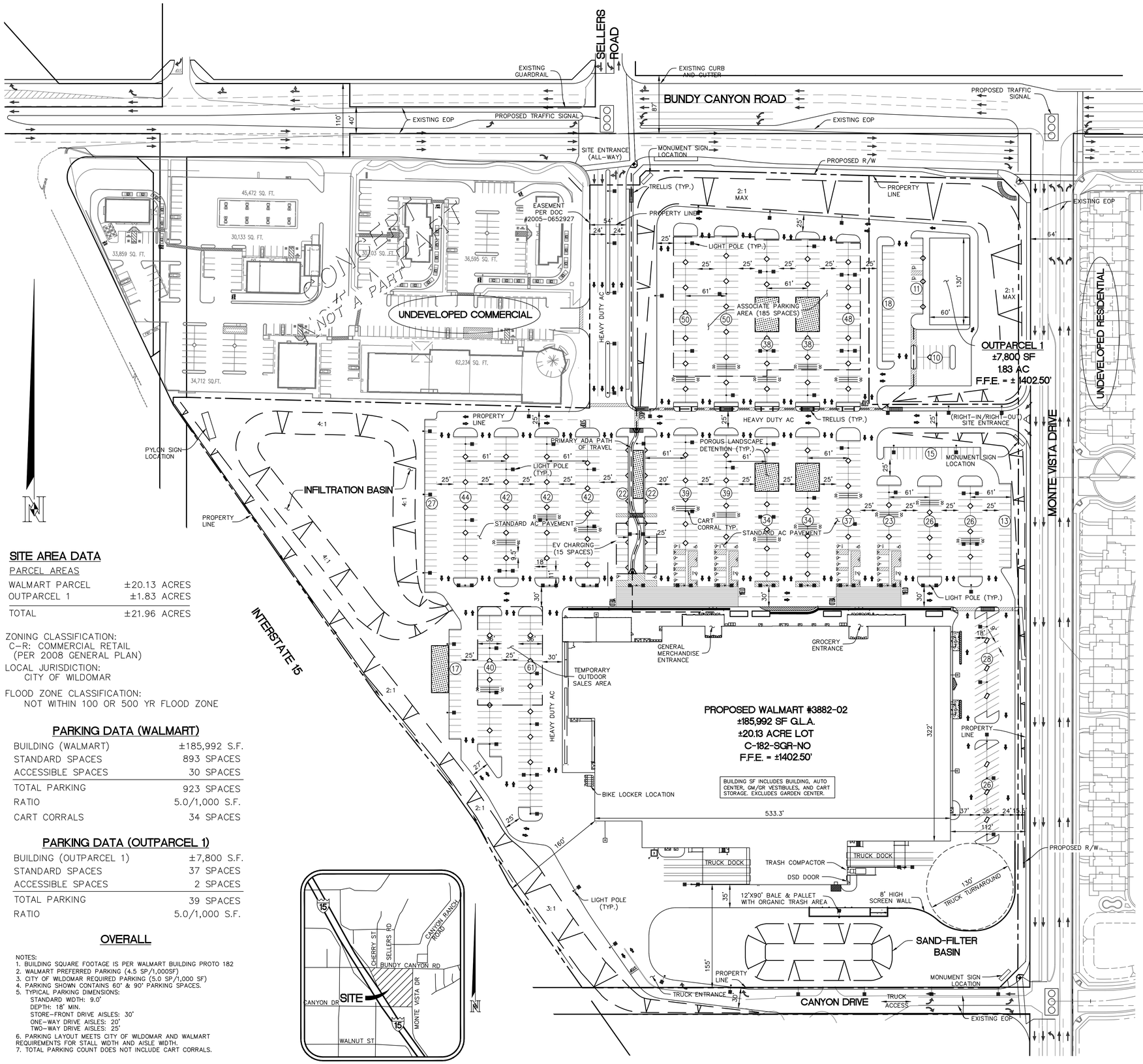
Conditions of Approval

Planning Commission Resolution _____

Dated _____

Appendix B

Vicinity Map and Site Plan



SITE AREA DATA

PARCEL AREAS

WALMART PARCEL	±20.13 ACRES
OUTPARCEL 1	±1.83 ACRES
TOTAL	±21.96 ACRES

ZONING CLASSIFICATION:
C-R: COMMERCIAL RETAIL
(PER 2008 GENERAL PLAN)

LOCAL JURISDICTION:
CITY OF WILDOMAR

FLOOD ZONE CLASSIFICATION:
NOT WITHIN 100 OR 500 YR FLOOD ZONE

PARKING DATA (WALMART)

BUILDING (WALMART)	±185,992 S.F.
STANDARD SPACES	893 SPACES
ACCESSIBLE SPACES	30 SPACES
TOTAL PARKING	923 SPACES
RATIO	5.0/1,000 S.F.
CART CORRALS	34 SPACES

PARKING DATA (OUTPARCEL 1)

BUILDING (OUTPARCEL 1)	±7,800 S.F.
STANDARD SPACES	37 SPACES
ACCESSIBLE SPACES	2 SPACES
TOTAL PARKING	39 SPACES
RATIO	5.0/1,000 S.F.

OVERALL

NOTES:
1. BUILDING SQUARE FOOTAGE IS PER WALMART BUILDING PROTO 182
2. WALMART PREFERRED PARKING (4.5 SP/1,000SF)
3. CITY OF WILDOMAR REQUIRED PARKING (5.0 SP/1,000 SF)
4. PARKING SHOWN CONTAINS 60' & 90' PARKING SPACES.
5. TYPICAL PARKING DIMENSIONS:
   STANDARD WIDTH: 9.0'
   DEPTH: 18' MIN.
   STORE-FRONT DRIVE AISLES: 30'
   ONE-WAY DRIVE AISLES: 20'
   TWO-WAY DRIVE AISLES: 25'
6. PARKING LAYOUT MEETS CITY OF WILDOMAR AND WALMART REQUIREMENTS FOR STALL WIDTH AND AISLE WIDTH.
7. TOTAL PARKING COUNT DOES NOT INCLUDE CART CORRALS.

PROPOSED OVERALL PARKING RATIO: 5.0/1000

SITE VICINITY MAP
NO SCALE

ZONING/LAND USE/LAND DEVELOPMENT/REGULATIONS:
THE SITE IS CURRENTLY ZONED R-R, RURAL-RESIDENTIAL.
FUTURE LAND USE DESIGNATION: C-R COMMERCIAL-RETAIL (2008 MASTER PLAN)
ANNEXATION: NOT NEEDED
ENTITLEMENT REVIEW PROCESS: THE SCOPE OF WORK ASSOCIATED WITH THIS DEVELOPMENT INCLUDES BUILDING STRUCTURE, SIGN PLACEMENT, OFF-SITE STREET IMPROVEMENT, BALE AND PALLET RECYCLING AREA, ORGANIC WASTE AREA, SCREEN WALLS, TENANT PAD PREPARATION, AND UTILITY EXTENSIONS.
OUTDOOR STORAGE, DISPLAY AND SALES: METAL STORAGE CONTAINERS ARE SUBJECT TO APPROVAL OF A PLOT PLAN. OPEN STORAGE OF MATERIAL AND EQUIPMENT PERMITTED IN THE REAR AND SHALL BE ENCLOSED WITH A VISUALLY SCREENING FENCE.
LANDSCAPING: PER CITY OF WILDOMAR LANDSCAPING REQUIREMENTS, PERCENTAGE OF PARKING AREA TO BE SHADED FOR PARKING LOTS OF 50+ SPACES TO BE 50% MINIMUM. THE PERCENTAGE OF PARKING AREA REQUIRED TO BE SHADED SHALL BE BASED ON THE NUMBER OF UNCOVERED PARKING SPACES; DRIVEWAYS AND AISLES ARE EXCLUDED.
SIGNS: SIGNS ARE ALLOWED WITH PROPER PERMIT APPROVALS.
ARCHITECTURAL REVIEW: ARCHITECTURAL REVIEW IS REQUIRED FOR THE PROPOSED BUILDING STRUCTURE. A DSD DOOR IS SHOWN AT THE REAR TO ACCOMMODATE THE PROPOSED BALE AND PALLET RECYCLING AREA. AOR SHALL CONFIRM BUILDING SIGNAGE REQUIREMENTS.
A PARKING RATIO OF AT LEAST 5.0/1000 S.F. IS REQUIRED PER CITY OF WILDOMAR MUNICIPAL CODE. THE PROPOSED RATIO WILL BE 5.0 FOR WALMART PARKING. THIS RATIO MEETS CITY OF WILDOMAR AND WALMART GUIDELINE REQUIREMENTS. CART CROSSOVERS ARE PROPOSED AND EXCLUDED FROM THE TOTAL PARKING COUNT. A 12'X90' BALE AND PALLET AND ORGANIC WASTE ARE PROPOSED AT THE REAR OF THE BUILDING. PROPER SCREENING WILL BE REQUIRED PER CITY OF WILDOMAR MUNICIPAL CODE AND IS SUBJECT TO APPROVAL.
SETBACK REQUIREMENTS: BUILDING SET BACKS ARE REQUIRED PER MUNICIPAL CODE AND ARE TO BE MAINTAINED AT 25' FOR FRONT, REAR, AND SIDE. BUILDING HEIGHT MAXIMUM LIMIT OF 40' EXISTS FOR THIS PROPERTY PER MUNICIPAL CODE.
OUTDOOR LIGHTING SHALL BE DIRECTED AWAY FROM ADJACENT PROPERTIES. OUTDOOR LIGHTING SHALL COMPLY WITH THE STATE OF CALIFORNIA'S BUILDING ENERGY EFFICIENT STANDARDS OF TITLE 24 OF THE CALIFORNIA BUILDING CODE. A PHOTOMETRIC SURVEY IS PROVIDED.
OUTPARCEL RESTRICTIONS: NONE EXIST AT THIS TIME. ONE OUTPARCEL IS PROPOSED; WALMART SHALL PROVIDE A ROUGH GRADED PAD WITH UTILITY STUB OUTS. PARKING RATIO REQUIRED WILL BE DEPENDENT ON THE TYPE OF BUSINESS PROPOSED AND IS SUBJECT TO THE RESPECTIVE MUNICIPAL CODE REQUIREMENTS.

ON-SITE / SURVEY:
WILDOMAR PRESERVATION REQUIREMENTS: N/A
A GEOTECHNICAL REPORT: A GEOTECHNICAL REPORT WAS COMPLETED ON MAY 3, 2005. AN UPDATED REPORT IS IN PROGRESS.
ACCESS OPPORTUNITIES: 2 PROPOSED ALL-WAY ACCESS POINTS ARE PROPOSED FOR THIS DEVELOPMENT. THE PROPOSED SITE ACCESS CONSISTS OF ONE SIGNALIZED INTERSECTION ALONG BUNDY CANYON ROAD AND A NON-SIGNALIZED, RIGHT IN/RIGHT OUT, ACCESS POINT ALONG MONTE VISTA AVE. THE SITE ALSO INCLUDES A SIGNALIZED TRUCK ACCESS ENTRANCE AT THE INTERSECTION OF MONTE VISTA DRIVE AND CANYON DRIVE. THE REAR RIGHT IN/ LEFT OUT TRUCK ACCESS IS LOCATED AT THE END OF CANYON DRIVE AND CAN BE ACCESSED FROM MONTE VISTA DRIVE. A 130' TRUCK TURNAROUND AREA IS PROPOSED WITH HEAVY DUTY PCC PAVING LOCATED AT THE VICINITY OF THE TRUCK DOCK.
BASE INFORMATION: TOPOGRAPHIC SURVEY DATED 4/18/13.
APN# 367-100-033, 367-100-034, 367-100-035, 367-100-037.
NO UNUSUAL COST IMPACTS ARE ANTICIPATED DUE TO EXISTING SITE TOPOGRAPHY.
FLOODPLAIN: FLOOD CONTROL ZONE 7.
STORMWATER REQUIREMENTS INCLUDE SWPPP, WQMP, AND HYDROLOGY STUDY SUBMITTALS.
REQUIRED PERMITS AND AGENCIES: SEE REQUIRED PERMITS SECTION BELOW.

OFF-SITE:
ADJACENT PROPERTY OWNERS WITHIN 1000' RADIUS: RESIDENTIAL, CORNER STONE CHRISTIAN CHURCH, ELSINOR HIGH SCHOOL, PIZZA FACTORY, FAT CAT TAVERN, CIRCLE K, JACK IN THE BOX, AM-PM.
ADDITIONAL ROW ACQUISITIONS: R/W ACQUISITION IS REQUIRED FOR STREET IMPROVEMENTS.
OFF-SITE IMPROVEMENTS ARE ANTICIPATED. STREET IMPROVEMENTS ARE PROPOSED ON BUNDY CANYON ROAD, MONTE VISTA DRIVE, AND CANYON DRIVE. IMPROVEMENTS INCLUDE CURB, SIDEWALK, AC PAVEMENT, AND STRIPING. TRAFFIC SIGNALS ARE PROVIDED AT THE INTERSECTION OF MONTE VISTA DRIVE AND BUNDY CANYON ROAD, AT THE FRONT MAIN ENTRANCE ALONG BUNDY CANYON ROAD AND SELLERS ROAD, AND AT THE TRUCK ENTRANCE AT THE INTERSECTION OF MONTE VISTA DRIVE AND CANYON DRIVE.
UTILITY CONNECTION FEES: UTILITY CONNECTION FEES IS ANTICIPATED FOR WATER, SEWER, GAS, ELECTRIC.
SOLID WASTE DISPOSAL FEES: N/A
ACCESS TO SIDEWALKS OF ADJACENT PROPERTIES: ADEQUATE SIDEWALK ACCESS TO PUBLIC RIGHT OF WAY IS PROPOSED FOR MONTE VISTA DRIVE AND BUNDY CANYON ROAD.
UTILITY EXTENSIONS: UTILITY EXTENSIONS ARE PROPOSED
EXISTING DRAINAGE PROBLEM AREAS: EXISTING TERRAIN HAS ONSITE CHANNEL DIRECTED TOWARDS INLETS RUNNING UNDER INTERSTATE 15.

UTILITIES:
WATER AVAILABILITY: 10" PVC WATER SERVICE EXISTS 18' NORTH OF THE BUNDY CANYON ROAD CENTERLINE, 12" PVC SERVICE 7' WEST OF MONTE VISTA DRIVE CENTERLINE, AND 6" PVC SERVICE 15' NORTH OF CANYON DRIVE CENTERLINE.
SEWER AVAILABILITY: 12" CLAY PVC SEWER SERVICE IS LOCATED 5' SOUTH OF BUNDY CANYON ROAD CENTERLINE AND 8" CLAY PVC LOCATED 5' SOUTH OF CANYON DRIVE CENTERLINE.
LIFT STATION: A SEWER LIFT STATION IS NOT ANTICIPATED.
DRAINAGE OUTFALL: MAJORITY OF THE ONSITE PARKING LOT DRAINAGE IS DIRECTED TO VARIOUS POROUS LANDSCAPE DETENTION AREAS THAT TREAT THE STORM WATER RUNOFF AND ROUTE OVERFLOW TO AN INFILTRATION BASIN. THE RUNOFF FROM THE REMAINING AREA, INCLUDING THE ROOF SURFACE, IS DIRECTED TO AN EXTENDED DETENTION BASIN AT THE SOUTHERN LIMITS OF THE PROJECT SITE.
ELECTRICITY: OVERHEAD ELECTRICAL LINES ARE LOCATED ON THE SOUTH SIDE OF BUNDY CANYON AND THE WEST SIDE OF MONTE VISTA DRIVE.
CABLE TV: CABLE TV SERVICE IS PROPOSED
NATURAL GAS: EXISTING GAS SERVICE IS LOCATED 13' NORTH OF BUNDY CANYON ROAD CENTERLINE.

REQUIRED PERMITS:
GRADING: CITY OF WILDOMAR DEPARTMENT OF PUBLIC WORKS
BUILDING: CITY OF WILDOMAR BUILDING DEPARTMENT
SWPPP/NOI: SWPPP IS REQUIRED PER STATE WATER RESOURCES CONTROL BOARD DIVISION OF WATER QUALITY, CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
UTILITY CONNECTION:
WATER – ELSINORE VALLEY MUNICIPAL WATER DISTRICT
SEWER – ELSINORE VALLEY MUNICIPAL WATER DISTRICT
STORM DRAIN – CITY OF WILDOMAR
ELECTRICITY – SOUTHERN CALIFORNIA EDISON
GAS – SOUTHERN CALIFORNIA EDISON
TELEPHONE – VERIZON

DEVIATIONS:
THERE ARE NO DEVIATIONS FROM THE PUBLIC WORKS CODES ANTICIPATED FOR THIS PROJECT.

PRELIMINARY SITE PLAN

60 0 60 120 180 240
SCALE 1" = 60'

REVISIONS	BY

NASLAND ENGINEERING
CIVIL ENGINEERING • SURVEYING • LAND PLANNING
4740 Ruffner Street, San Diego, California, 92111 • 858-292-7770

#3882-02 WILDOMAR, CA WALMART
CITY WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA
WALMART STORES, INC.
BENTONVILLE, AR

DRAWN	SH
CHECKED	PR
DATE	05/09/2014
SCALE	AS SHOWN
JOB No.	310-040.1
SHEET	CP-01

1 OF X SHEET

Appendix C

Supporting Detail Related to Hydraulic Conditions of Concern

On-Site Hydrology

For

Proposed Wal-Mart #3882-02
I-15 & Bundy Canyon Road
Wildomar, CA

Prepared By:

Wal-Mart Real Estate Business Trust
2001 SE 10th Street
Bentonville, AR 72716-5570

Prepared By:

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
858-292-7770

May 9, 2014

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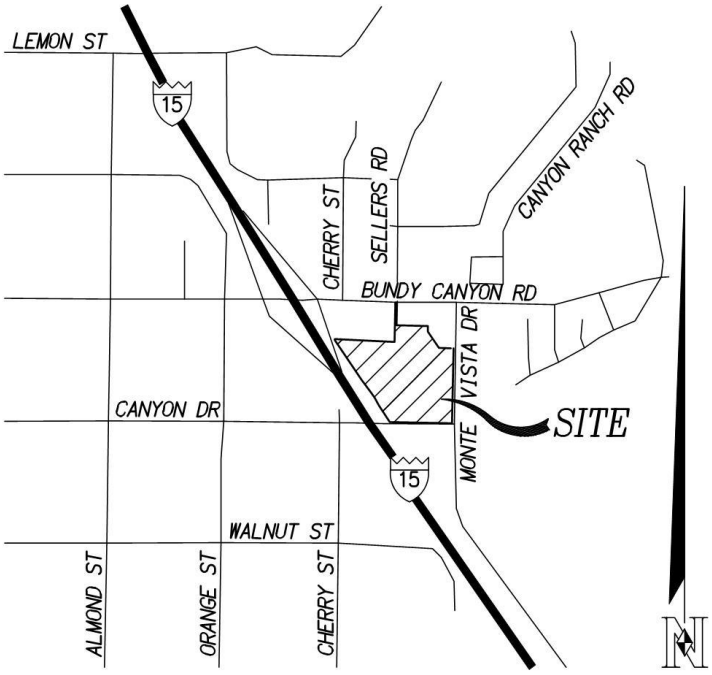
VICINITY MAP



VICINITY MAP
NO SCALE

PROJECT DESCRIPTION:

The project proposes an 185,992 square foot Wal-Mart along with an additional 7,800 square foot outparcel. In addition to the new retail stores, the project proposes a multiple porous landscape detention areas, an infiltration basin, and a sand filter basin. These storm water facilities are proposed in order to handle the increased runoff associated with transforming the undeveloped site to a commercial site with impervious areas. Existing drainage flows from the northeastern corner to the western side of the project site towards a 24" and 30" AP storm drain that runs underneath I-15. The site is located on the eastern side of Interstate 15 on the southwestern corner of the intersection of Bundy Canyon Road and Monte Vista Drive in the City of Wildomar within the County of Riverside, California (see Vicinity Map).

This Hydrology Study was prepared for this proposed project to correctly verify that the existing storm drain system will still be adequate after the construction of the proposed project. **The proposed facilities are designed for the flow and volume associated with a 100-year storm event.** Below is a summary of the above mentioned detailed Hydrology Study.

EXISTING DRAINAGE PATTERNS:

This site is currently undeveloped with all of its native soil exposed, which based on Riverside County Flood Control and Water Conservation District Plate C-1.51, can be classified as Type C soil group. The topography slopes downwards towards two inlets running underneath I-15, a 24" AP and a 30" AP. The 25 plus acres site can be divided into 3 major drainage basin areas, with only 2.5 acres (Basin 1) directed towards the 24" AP. Basins 2 and 3 cover the remainder of the site and have a conveyance points near the pipe inlet. Refer to Appendix A for supporting calculations and details for the existing conditions.

PROPOSED DRAINAGE SYSTEM:

In order to accurately analyze the proposed on-site drainage conditions, the site is broken down in to 12 sub-basins. Each basin has different drainage characteristics including: slope, percentage pervious, BMP features, and conveyance steps. Within Basins D-2, D-4, D-5, and D-6 are porous landscape detention (PLD) areas that are designed to treat runoff associated with 2-year and 10-year storms. Overflow inlets are included in each PLD in order to handle runoff from larger storm events, which are then conveyed via storm drain to an on-site infiltration basin for further storage and treatment. Refer to the *Water Quality Management Plan* (WQMP) for details.

Other drainage basins are directed to a sand-filter basin that treats runoff from small storm events as well. Both the infiltration basin and sand-filter basin include a 24"x24" catch basin, which are designed to limit the downstream runoff of large storm events, including the 100-year design storm. Overflow from both basins are routed via pipes towards the existing 30" AP inlet, which currently gathers over 90% of the existing sites drainage, at rates less than existing 100-year conditions. For complete analysis of the proposed drainage areas and storm drain pipe sizes refer to Appendix B.

METHODOLOGY:

For the hydrology analysis, the Advanced Engineering Software (AES) has been used, along with the Rational Method and Synthetic Unit Hydrograph Method outlined in the <u>County of Riverside Flood Control and Water Conservation District Hydrology Manual</u>, April 1978 edition. By using these resources the maximum on-site run-off value can be determined for pre- and post-construction conditions.

The 2-year, 10-year, 25-year, 50-year and 100-year storm runoffs for the basin inflows were calculated using the Rational Formula Method, per the Riverside County Hydrology Manual.

The peak flow rate formula (Q = CIA) was used to calculate the runoffs.

Q = Peak flow rate in cubic feet per second.
C = Runoff coefficient expressed as a percentage of rainfall which becomes runoff.

I = Average rainfall intensity in inches per hour for a storm duration equal to the time of concentration of the contributing drainage area.
Tc = Time of concentration – 5 minute minimum.
A = Area of basin in acres.

The runoff coefficient (C) was calculated using the formula listed on page D-3 of the Riverside County Hydrology Manual or Plate D-5.2:

$$C = 0.9[A_i + \left(I - \frac{F_p}{I}\right) A_p]$$

A_i is equal to the decimal percent of the impervious area of the basin.

A_p is equal to the decimal percent of pervious area or ($1-A_i$)

I is equal to the rainfall intensity, calculated as described below.

F_p is equal to the infiltration rate of the site soil, as calculated per Plates D-5.5 and D-5.7 by using Soil Type B, Open Brush Good Cover.

The rainfall intensity (I) was calculated for 2, 10, 25, 50, and 100-year storms by first finding the 2-Year-1-Hour Precipitation and 100-Year-1-Hour Precipitation by plotting the site location on Plates D-4.3 and D-4.4, respectively. This information was then plotted on Plate D-4.5 in order to interpolate the 25-Year-1-Hour and 50-Year-1-Hour Precipitation. The site location was then plotted onto Plate D-4.6 in order to find the slope of intensity-duration curve, which was then plotted on Plate D-4.7 in order to obtain the rainfall intensity for the 25, 50, and 100 year storms.

The time of concentration (Tc) was calculated by first defining the basin areas and their respective length of flow, elevation difference, and percent impervious. This data was then plotted onto Plate D-3 in order to obtain the time of concentration for each drainage basin, included in Appendix A (existing) and B (proposed). Certain basin areas were routed through pipes, in addition to sheet flow, to reach the final discharge point so additional time needed to be taken into consideration. Outputs from AES 2008 were referenced in determining the required pipe sizes. In situations where these pipes are joined together with others, an equation was required to find the resulting time of concentration and flow of the combination. This equation was presented within the Advanced Engineering Software (AES) programming:

If $Q_B > Q_A$:

$T_{post} = T_B$

$$Q_{post} = Q_B + Q_A(T_B/T_A)$$

Results of this process are presented in the "Calculation" section, which demonstrate the maximum flow rates directed to the existing inlets running underneath I-15 and the maximum flow rates entering each of the basins. Each basin is required, by storm water quality standards, to discharge runoff produced by any event greater than a 10-year storm, so grated inlets are necessary to convey runoff to the existing 30" AP inlet. Appendix D includes flow rates for the proposed catch basin at increasing water surface elevations. These values and other basin characteristics are then inputted into AES to provide outfall flows for the entire proposed

hydrologic system. Hydrographs for 100-year 1-hour, 3-hour, 6-hour, and 24-hours are also included in the AES analysis.

SUMMARY OF RESULTS:

SUMMARY OF RESULTS FOR EXISTING CONDITIONS

Discharge Point #1 (24" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	3.79	3.43
Q_{50} (cfs)	4.55	4.08
Q_{100} (cfs)	4.87	4.66

Discharge Point #2 (30" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	22.92	21.27
Q_{50} (cfs)	27.55	25.52
Q_{100} (cfs)	30.72	29.26

SUMMARY OF RESULTS FOR PROPOSED CONDITIONS

Discharge Point #1 (Infiltration Basin):

Discharge Flow Rate	Basin Inflow (Rational Method)	Basin Inflow (AES)	Basin Discharge (AES)
Q_{25} (cfs)	37.75	38.09	-
Q_{50} (cfs)	43.32	43.99	-
Q_{100} (cfs)	46.86	49.10	8.30

Discharge Point #2 (Extended Detention Basin):

Discharge Flow Rate	Basin Inflow (Rational Method)	Basin Inflow (AES)	Basin Discharge (AES)
Q_{25} (cfs)	25.54	21.64	-
Q_{50} (cfs)	29.30	25.08	-
Q_{100} (cfs)	31.37	28.08	7.43

Note: Basin discharge values are the maximum discharge of the 100 year – 1hr, 3hr, 6hr, or 24hr storm event.

CALCULATIONS:

Site Characteristics and Assumptions:

- Hydrologic Soil Group C – See Geotechnical Report in the Water Quality Management Plan and Plate C-1.51.
- Existing Percent Impervious = 0%
- Proposed Percent Impervious = Approximately 90%
- See Attached Hydrology Maps for Basin Location and properties.
- Assume T_c = 5.00 minutes minimum if T_c is less than 5.00 minutes.

Hydrology - Existing Conditions					
Variable	**Basin 1**	**Basin 2**	**Basin 3**	**24" AP**	**30" AP**
A_{sf}	110,882	687,910	316,120	110,882	1,004,030
A_{ac}	2.546	15.792	7.257	2.55	23.05
A_p	110882	687910	316120	110,882	1,004,030
A_i	0	0	0	0	0
$A_{\%i}$	0.00	0.00	0.00	0.00	0.00
L	355	1440	1190	355	N/A
H	9	45	13	9	N/A
T_c	15.5	26	34	16	30.00
V	0.38	0.92	0.58	0.38	0.75
I_2	1.20	0.90	0.80	1.00	N/A
I_{10}	1.95	1.50	1.35	1.40	N/A
I_{25}	2.40	1.85	1.60	2.05	N/A
I_{50}	2.75	2.10	1.85	2.75	N/A
I_{100}	2.90	2.30	2.00	2.90	N/A
C_2	0.48	0.42	0.39	0.48	N/A
C_{10}	0.58	0.53	0.5	0.58	N/A
C_{25}	0.62	0.57	0.54	0.62	N/A
C_{50}	0.65	0.60	0.57	0.65	N/A
C_{100}	0.66	0.61	0.59	0.66	N/A
Q_2	**1.47**	**5.97**	**2.26**	**1.47**	**8.23**
Q_{10}	**2.88**	**12.55**	**4.90**	**2.88**	**17.45**
Q_{25}	**3.79**	**16.65**	**6.27**	**3.79**	**22.92**
Q_{50}	**4.55**	**19.90**	**7.65**	**4.55**	**27.55**
Q_{100}	**4.87**	**22.16**	**8.56**	**4.87**	**30.72**

A_{sf}	Area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Existing Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	Q_{XX}=C_{XX} x I_{XX} x A_{ac}

Hydrology - Proposed Conditions - Drainage to Western Infiltration Basin							
Variable	**D-1 and D-2**	**D-3 and D-4**	**D-5**	**D-6**	**D-7**	**D-8**	**Total**
A_{sf}	130,768	173,100	29,300	67,951	88,200	124,000	613,319
A_{ac}	3.002	3.974	0.673	1.560	2.025	2.847	14
A_p	31680	12450	0	10343	88200	0	142,673
A_i	99,088	160,650	29,300	57,608	0	124,000	470,646
$A_{\%i}$	0.76	0.93	1.00	0.85	0.00	1.00	N/A
L	240	235	240	315	0	450	N/A
H	31	10	3.5	4	0	6	N/A
T_c	6.49	7.37	7.26	8.18	5	8	N/A
V	0.62	0.53	0.55	0.64	0.00	0.94	N/A
I_2	1.80	1.75	1.75	1.75	2.05	1.65	N/A
I_{10}	2.55	2.80	2.80	2.8	3.3	2.65	N/A
I_{25}	3.7	3.4	3.4	3.4	4.1	3.2	N/A
I_{50}	4.2	3.9	3.9	3.9	4.6	3.7	N/A
I_{100}	4.55	4.2	4.2	4.2	4.9	4	N/A
C_2	0.85	0.88	0.90	0.86	0.65	0.90	N/A
C_{10}	0.87	0.89	0.90	0.87	0.74	0.90	N/A
C_{25}	0.88	0.89	0.90	0.88	0.77	0.90	N/A
C_{50}	0.88	0.89	0.90	0.88	0.79	0.90	N/A
C_{100}	0.88	0.89	0.90	0.88	0.80	0.90	N/A
Q_2	**4.60**	**6.11**	**1.06**	**2.34**	**2.70**	**4.23**	**18.85**
Q_{10}	**6.63**	**9.87**	**1.70**	**3.81**	**4.97**	**6.79**	**29.50**
Q_{25}	**9.73**	**12.01**	**2.06**	**4.65**	**6.43**	**8.20**	**37.75**
Q_{50}	**11.09**	**13.80**	**2.36**	**5.35**	**7.34**	**9.48**	**43.32**
Q_{100}	**12.03**	**14.87**	**2.54**	**5.77**	**7.89**	**10.25**	**46.82**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

*Total Runnof Rate is determined from calculations of conveyance, not summation of peak runoff rates.

Hydrology - Proposed Conditions - Drainage to Southern Sand-Filter Basin						
Variable	**D-9**	**D-10**	**D-11**	**D-12**	**D-13**	**Totals**
A_{sf}	91,475	91,475	68,900	50,588	68,420	370,858
A_{ac}	2.10	2.10	1.58	1.16	1.57	8.5
A_p	0	0	0	6100	68,420	74,520
A_i	91,475	91,475	68,900	44,488	0	296,338
$A_{\%i}$	1.00	1.00	1.00	0.88	0.00	0.80
T_c	9.63	8.68	9.73	8.14	5.00	N/A
I_2	1.75	1.75	1.55	1.7	2.05	N/A
I_{10}	2.80	2.80	2.5	2.7	3.3	N/A
I_{25}	3.4	3.4	3	3.35	4.1	N/A
I_{50}	3.9	3.9	3.45	3.85	4.6	N/A
I_{100}	4.2	4.2	3.7	4	4.9	N/A
C_2	0.90	0.90	0.90	0.86	0.65	N/A
C_{10}	0.90	0.90	0.90	0.88	0.74	N/A
C_{25}	0.90	0.90	0.90	0.88	0.77	N/A
C_{50}	0.90	0.90	0.90	0.88	0.79	N/A
C_{100}	0.90	0.90	0.90	0.88	0.80	N/A
Q_2	**3.31**	**3.31**	**2.21**	**1.71**	**2.09**	**12.62**
Q_{10}	**5.29**	**5.29**	**3.56**	**2.75**	**3.86**	**20.75**
Q_{25}	**6.43**	**6.43**	**4.27**	**3.43**	**4.99**	**25.54**
Q_{50}	**7.37**	**7.37**	**4.91**	**3.95**	**5.70**	**29.30**
Q_{100}	**7.94**	**7.94**	**5.27**	**4.11**	**6.12**	**31.37**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

CONCLUSION:

The proposed expansion creates a significant increase in the downstream runoff due to the fact that the project site is being transformed from a completely undeveloped area to a developed-commercial site, but in order to minimize the downstream flow rates multiple basins and treatment BMPs are incorporated.

These elements include porous landscape detention (PLD) areas throughout the parking lot, an infiltration basin, and sand-filter basin. Proper sizing of these treatment control BMPs are included within the *Water Quality Management Plan*, which proves the PLDs are capable of treating the runoff and volume associated with 2-year and 10-year storm events.

The infiltration basin is capable of handling the runoff and volume of a 100-year storm, which is shown below in Table A. This basin collects a large portion of drainage from the parking lot area and has storage of 1145.76 CY at a depth of 1 foot, which is larger than the required peak volume of approximately 1000 CY.

Table A: Volume Capacity of Infiltration Basin

WSE (ft)	1391	1391.25	1391.50	1391.75	1392	1392.25	1392.50
Basin Depth (ft)	0	0.25	0.5	0.75	1	1.25	1.5
Surface Area (SF)	29,500	30,200	30,900	31,675	32,425	33,200	33,950
Volume (CY)	0	276.16	559.13	848.98	1145.76	1449.53	1760.36

The sand-filter basin towards the southern limits of the project site treats 2-year and 10-year 24-hour storms events, as described in the *Water Quality Management Plan*. Table B shows the basin is capable of containing the 100-year storm event, peak volume of 667 CY.

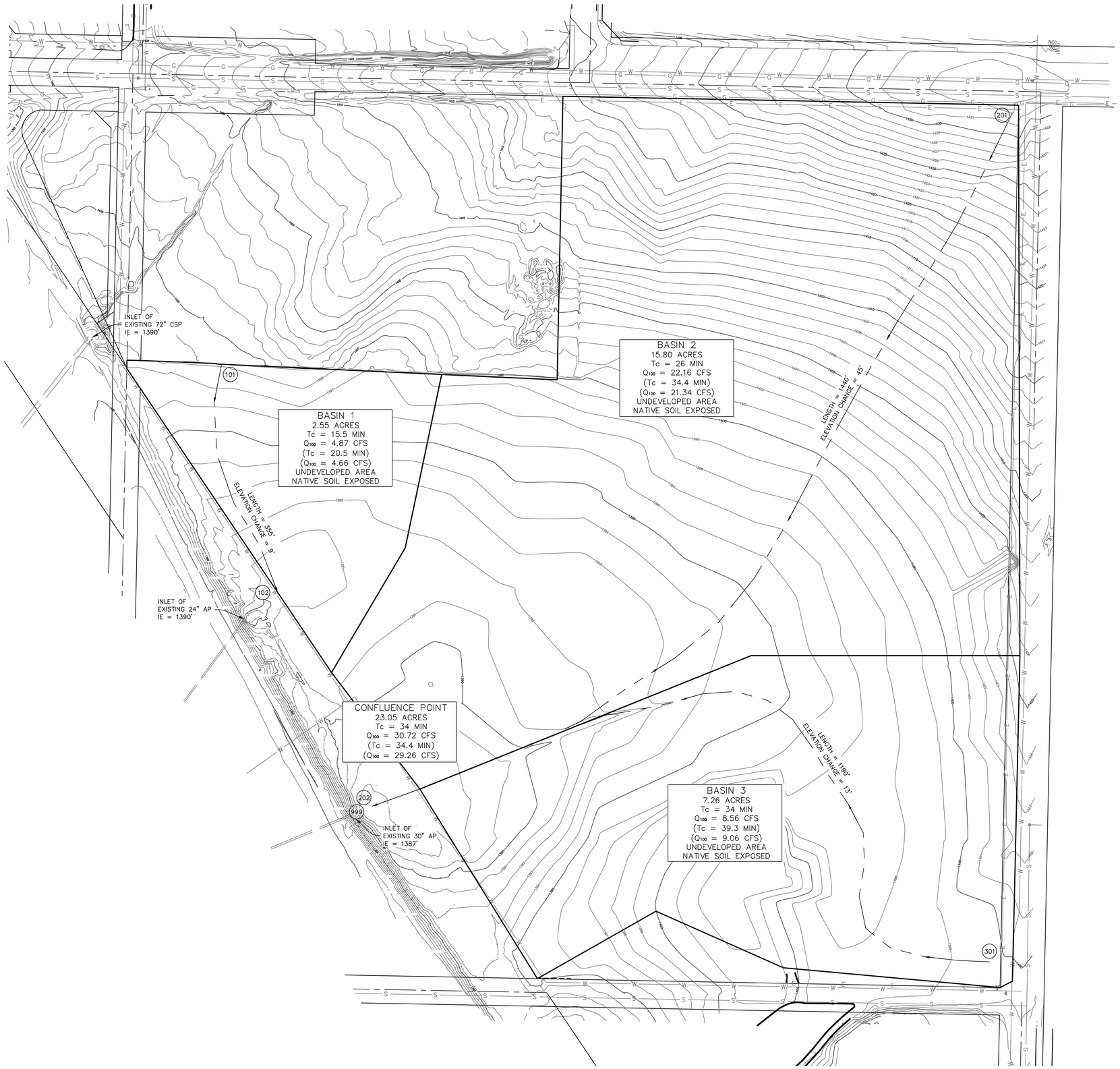
Table B: Volume Capacity of Sand-Filter Basin

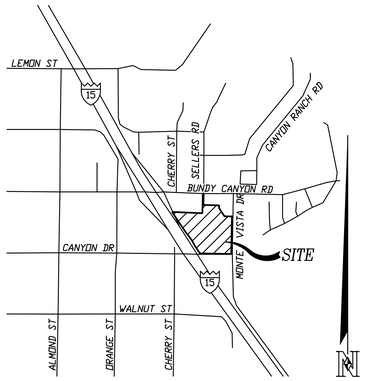
WSE (ft)	1394.00	1394.50	1395.00	1395.50	1396.00	1396.50	1397.00	1397.50	1398.00
Basin Depth (ft)	0	0.5	1	1.5	2	2.5	3	3.5	4
Surface Area (SF)	4,025	4,765	5,530	6,325	7,140	7,980	8,850	9,740	10,660
Volume (CY)	0	81.11	176.09	285.39	409.43	548.68	703.56	874.61	1062.34

Additionally, both basins include a 24”x24” catch basin to limit the downstream flow rates to below existing conditions, which is proven by the AES outputs and in the above section - “Summary of Results”.

APPENDIX A

EXISTING BASIN CONDITIONS
25, 50, 100 YEAR EVENTS





VICINITY MAP

NO SCALE

LEGEND:

Tc = 8.0 MIN
Q_{100} = 20 CFS — RATIONAL METHOD HAND CALCULATION

(Tc = 7.0 MIN)
(Q_{100} = 18 CFS) — AES CALCULATION

(101) — AES RELATED NODE NUMBER

N

DRAINAGE MANAGEMENT AREAS FOR EXISTING CONDITIONS

60 0 60 120 180 240

SCALE 1" = 60'

REVISIONS BY

NASLAND ENGINEERING
CIVIL ENGINEERING • SURVEYING • LAND PLANNING
4740 Ruffner Street, San Diego, California, 92111 • 858-292-7770

#3882-02 WILDOMAR, CA WALMART
CITY WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA
WALMART STORES, INC.
BENTONVILLE, AR

DRAWN	SH
CHECKED	PR
DATE	05/07/2014
SCALE	AS SHOWN
JOB No.	310-040.1
SHEET	EX-01

1 OF 2 SHEET

RATIONAL METHOD CALCULATIONS:

Hydrology - Existing Conditions					
Variable	**Basin 1**	**Basin 2**	**Basin 3**	**24" AP**	**30" AP**
A_{sf}	110,882	687,910	316,120	110,882	1,004,030
A_{ac}	2.546	15.792	7.257	2.55	23.05
A_p	110882	687910	316120	110,882	1,004,030
A_i	0	0	0	0	0
$A_{\%i}$	0.00	0.00	0.00	0.00	0.00
L	355	1440	1190	355	N/A
H	9	45	13	9	N/A
T_c	15.5	26	34	16	30.00
V	0.38	0.92	0.58	0.38	0.75
I_2	1.20	0.90	0.80	1.00	N/A
I_{10}	1.95	1.50	1.35	1.40	N/A
I_{25}	2.40	1.85	1.60	2.05	N/A
I_{50}	2.75	2.10	1.85	2.75	N/A
I_{100}	2.90	2.30	2.00	2.90	N/A
C_2	0.48	0.42	0.39	0.48	N/A
C_{10}	0.58	0.53	0.5	0.58	N/A
C_{25}	0.62	0.57	0.54	0.62	N/A
C_{50}	0.65	0.60	0.57	0.65	N/A
C_{100}	0.66	0.61	0.59	0.66	N/A
Q_2	**1.47**	**5.97**	**2.26**	**1.47**	**8.23**
Q_{10}	**2.88**	**12.55**	**4.90**	**2.88**	**17.45**
Q_{25}	**3.79**	**16.65**	**6.27**	**3.79**	**22.92**
Q_{50}	**4.55**	**19.90**	**7.65**	**4.55**	**27.55**
Q_{100}	**4.87**	**22.16**	**8.56**	**4.87**	**30.72**

A_{sf}	Area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Existing Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Existing Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Existing Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	Q_{XX}=C_{XX} x I_{XX} x A_{ac}

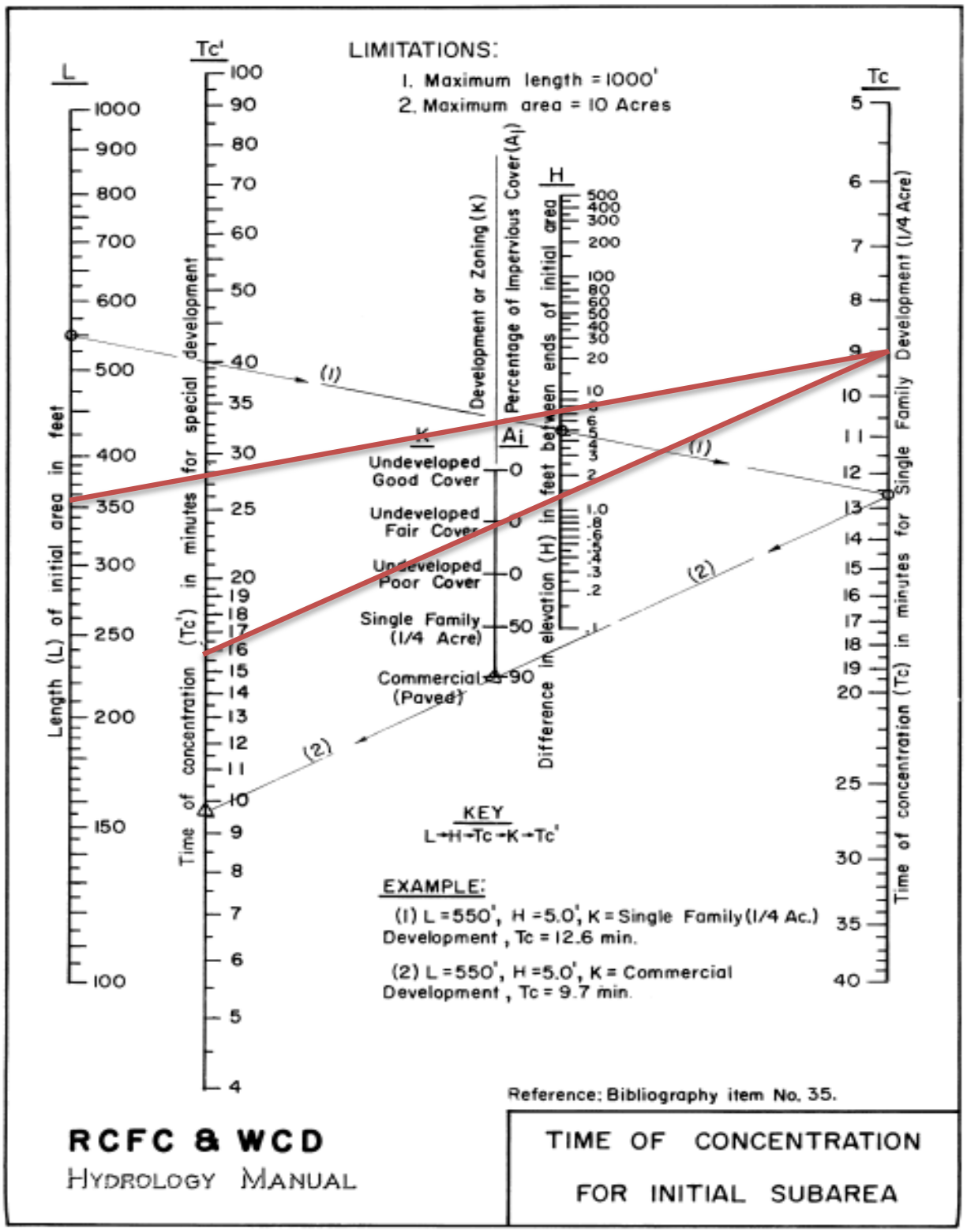


PLATE D-3

BASIN 1

ADVANCED ENGINEERING SOFTWARE (AES) SUMMARY AND OUTPUT

Discharge Point #1 (24" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	3.79	3.43
Q_{50} (cfs)	4.55	4.08
Q_{100} (cfs)	4.87	4.66

Discharge Point #2 (30" AP):

Discharge Flow Rate	Rational Method Calcs	AES Aided Calcs
Q_{25} (cfs)	22.92	21.27
Q_{50} (cfs)	27.55	25.52
Q_{100} (cfs)	30.72	29.26

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                        BASIN 1 - 25 YEAR STORM EVENT

----------------------------------------------------------------------------
  FILE NAME: EXIST25.DAT
  TIME/DATE OF STUDY: 14:22 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  UPSTREAM ELEVATION(FEET) =   1399.00
  DOWNSTREAM ELEVATION(FEET) =   1390.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  TC = 0.937*[(  355.00**3)/(     9.00)]**.2 =   20.475
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.952
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6886
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      2.55   TOTAL RUNOFF(CFS) =      3.43
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     20.47
  PEAK FLOW RATE(CFS)   =       3.43
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
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                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                        BASIN 1 - 50 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST50.DAT
  TIME/DATE OF STUDY: 14:23 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  UPSTREAM ELEVATION(FEET) =   1399.00
  DOWNSTREAM ELEVATION(FEET) =   1390.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  TC = 0.937*[(  355.00**3)/(     9.00)]**.2 =   20.475
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.252
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7109
```

```
****************************************************************************
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                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                       BASIN 1 - 100 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST100.DAT
  TIME/DATE OF STUDY: 14:23 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  UPSTREAM ELEVATION(FEET) =   1399.00
  DOWNSTREAM ELEVATION(FEET) =   1390.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  TC = 0.937*[(  355.00**3)/(     9.00)]**.2 =   20.475
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.513
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7268
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.66
  TOTAL AREA(ACRES) =      2.55   TOTAL RUNOFF(CFS) =      4.66
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     20.47
  PEAK FLOW RATE(CFS)   =       4.66
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.08
  TOTAL AREA(ACRES) =      2.55   TOTAL RUNOFF(CFS) =      4.08
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     20.47
  PEAK FLOW RATE(CFS)   =       4.08
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
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                          Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

               BASIN 2 AND 3 CONVEYANCE - 25 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST2-25.DAT
  TIME/DATE OF STUDY: 14:32 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1440.00
  UPSTREAM ELEVATION(FEET) =   1432.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.937*[( 1440.00**3)/(    45.00)]**.2 =   34.380
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.522
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6458
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     15.53
  TOTAL AREA(ACRES) =     15.80   TOTAL RUNOFF(CFS) =     15.53

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 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.) =   34.38
  RAINFALL INTENSITY(INCH/HR) =   1.52
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.53

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1400.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.937*[( 1190.00**3)/(    13.00)]**.2 =   39.307
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.427
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6339
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.57
  TOTAL AREA(ACRES) =      7.26   TOTAL RUNOFF(CFS) =      6.57

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    203.00 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.) =   39.31
  RAINFALL INTENSITY(INCH/HR) =   1.43
  TOTAL STREAM AREA(ACRES) =     7.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.57

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.53    34.38        1.522         15.80
      2        6.57    39.31        1.427          7.26

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.27    34.38       1.522
      2       21.13    39.31       1.427
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.27   Tc(MIN.) =   34.38
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       23.1  TC(MIN.) =     34.38
  PEAK FLOW RATE(CFS)   =      21.27
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       21.27      34.38
  2       21.13      39.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

                BASIN 2 AND 3 CONVEYANCE - 50 YEAR STORM EVENT

----------------------------------------------------------------------------
  FILE NAME: EXIST2-50.DAT
  TIME/DATE OF STUDY: 14:33 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1440.00
  UPSTREAM ELEVATION(FEET) =   1432.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.937*[( 1440.00**3)/(    45.00)]**.2 =   34.380
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.756
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6711
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =     18.62
  TOTAL AREA(ACRES) =     15.80   TOTAL RUNOFF(CFS) =     18.62

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 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.) =   34.38
  RAINFALL INTENSITY(INCH/HR) =   1.76
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.62

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1400.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.937*[( 1190.00**3)/(    13.00)]**.2 =   39.307
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.647
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6599
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.89
  TOTAL AREA(ACRES) =      7.26   TOTAL RUNOFF(CFS) =      7.89

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    203.00 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.) =   39.31
  RAINFALL INTENSITY(INCH/HR) =   1.65
  TOTAL STREAM AREA(ACRES) =     7.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.62    34.38        1.756         15.80
      2        7.89    39.31        1.647          7.26

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       25.52    34.38       1.756
      2       25.35    39.31       1.647

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.52   Tc(MIN.) =   34.38
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       23.1  TC(MIN.) =     34.38
  PEAK FLOW RATE(CFS)   =      25.52
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       25.52      34.38
  2       25.35      39.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                         Analysis prepared by:

                              SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

               BASIN 2 AND 3 CONVEYANCE - 100 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: EXIST2-100.DAT
  TIME/DATE OF STUDY: 14:34 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1440.00
  UPSTREAM ELEVATION(FEET) =   1432.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.937*[( 1440.00**3)/(    45.00)]**.2 =   34.380
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.960
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6893
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     21.34
  TOTAL AREA(ACRES) =     15.80   TOTAL RUNOFF(CFS) =     21.34

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 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.) =   34.38
  RAINFALL INTENSITY(INCH/HR) =   1.96
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.34

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1400.00
  DOWNSTREAM ELEVATION(FEET) =   1387.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.937*[( 1190.00**3)/(    13.00)]**.2 =   39.307
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.838
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6787
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      9.06
  TOTAL AREA(ACRES) =      7.26   TOTAL RUNOFF(CFS) =      9.06

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    203.00 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.) =   39.31
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =     7.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.06

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.34    34.38        1.960         15.80
      2        9.06    39.31        1.838          7.26

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       29.26    34.38       1.960
      2       29.07    39.31       1.838
```

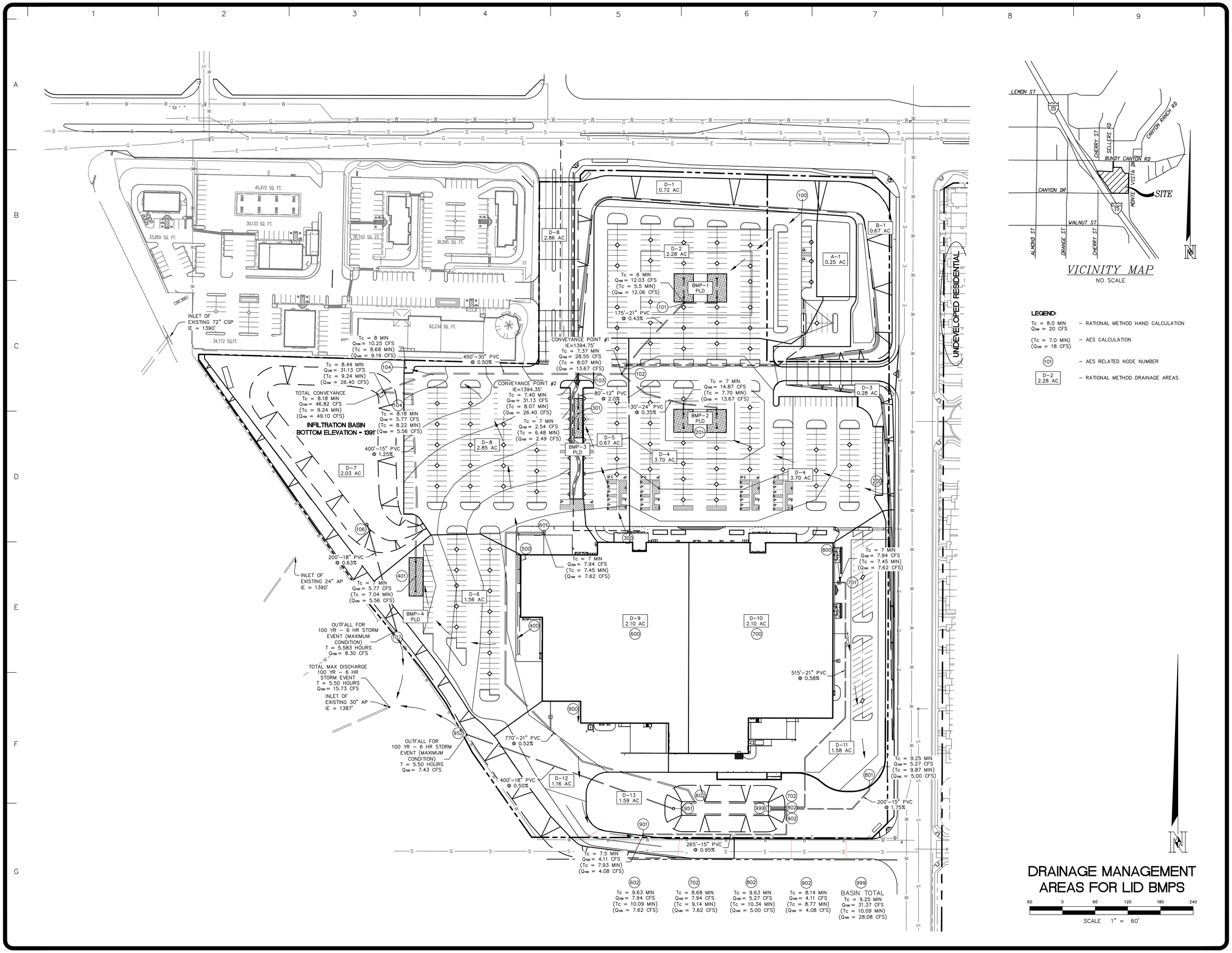
```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.26   Tc(MIN.) =   34.38
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1440.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       23.1  TC(MIN.) =     34.38
  PEAK FLOW RATE(CFS)   =      29.26
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       29.26      34.38
  2       29.07      39.31
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

APPENDIX B

PROPOSED BASIN CONDITIONS
25, 50, 100 YEAR EVENTS

RESULTS FROM ADVANCED ENGINEERING SOFTWARE (AES) OUTPUTS AND HAND CALCULATED RATIONAL METHOD ANALYSIS



REVISIONS	BY

NASLAND ENGINEERING
CIVIL ENGINEERING • SURVEYING • LAND PLANNING
4740 Ruffner Street, San Diego, California, 92111 • 858-292-7770

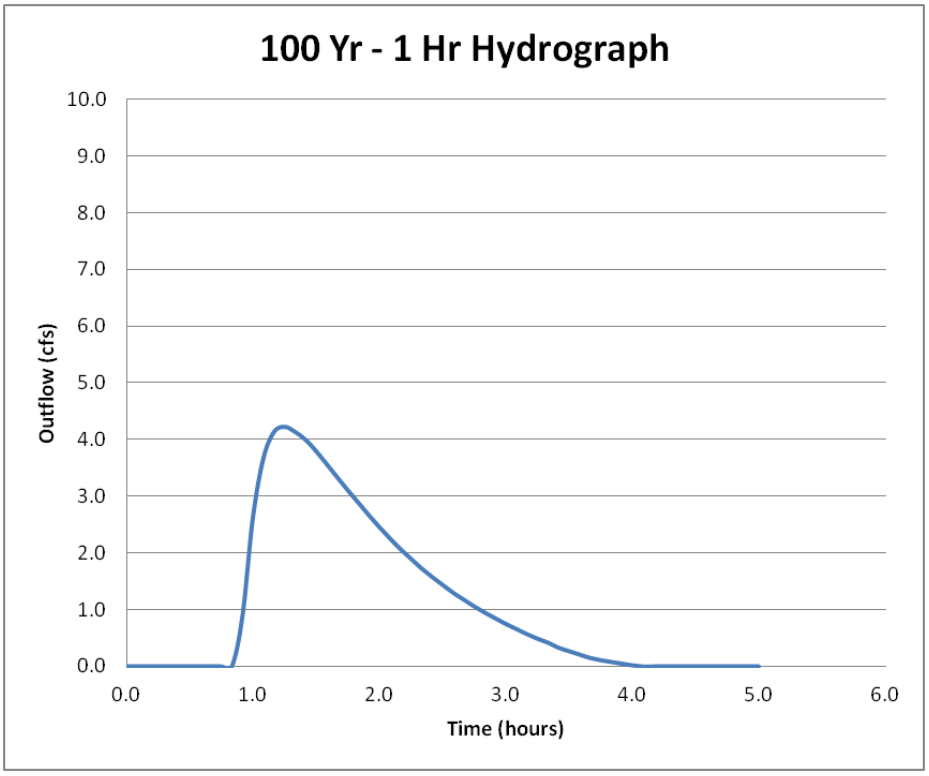
#3882-02 WILDOMAR, CA WALMART
CITY WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA
WALMART STORES, INC.
BENTONVILLE, AR

DRAWN	SH
CHECKED	PR
DATE	05/09/2014
SCALE	AS SHOWN
JOB No.	310-040.1
SHEET	EX-02

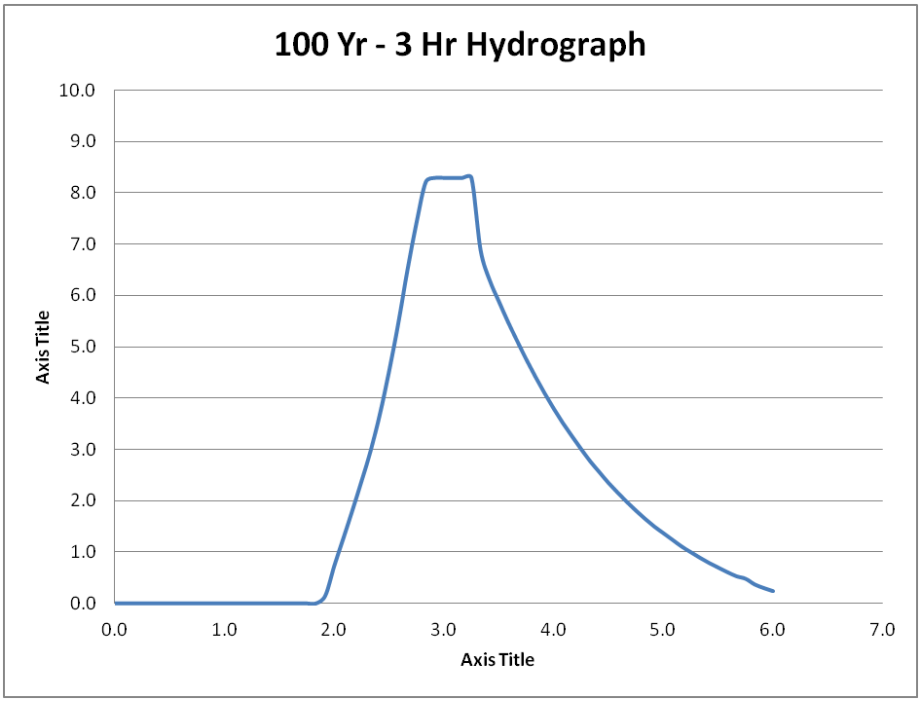
2 OF 2 SHEET

INFILTRATION BASIN DISCHARGE HYDROGRAPHS:

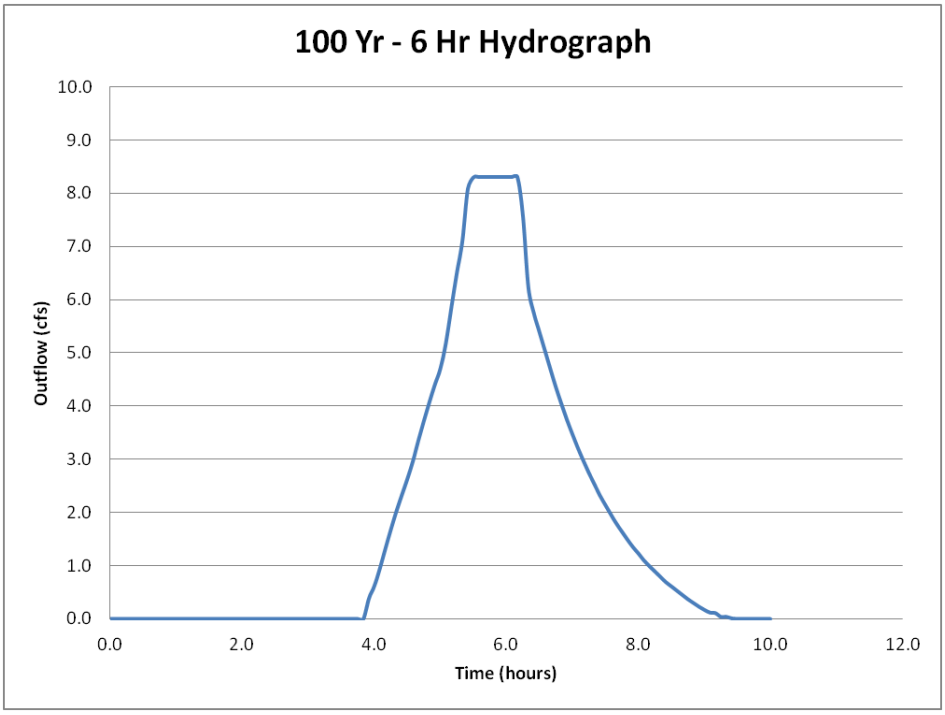
100 YR – 1 HR STORM EVENT: MAX Q = 4.23 CFS AT 1.250 HOURS



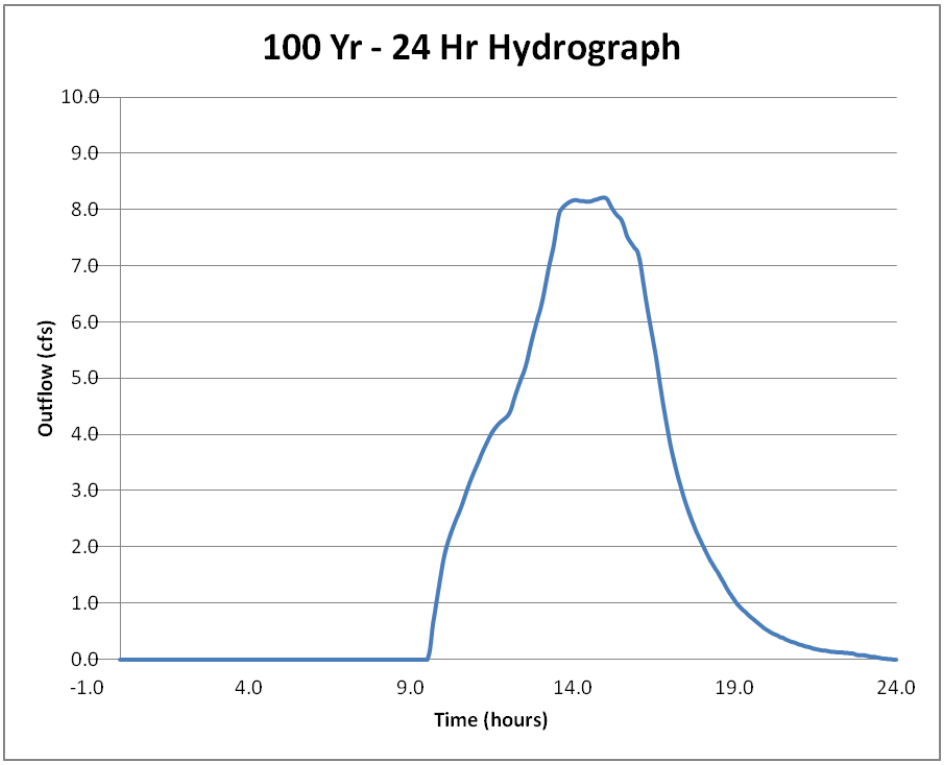
100 YR – 3 HR STORM EVENT: MAX Q = 8.30 CFS AT 3.00 HOURS



100 YR – 6 HR STORM EVENT: MAX Q = 8.30 CFS AT 5.583 HOURS



100 YR – 24 HR STORM EVENT: MAX Q = 8.22 CFS AT 15.000 HOURS



DRAINAGE AREAS DIRECTED TOWARDS INFILTRATION BASIN ON WESTERN LIMITS OF PROJECT SITE (RATIONAL METHOD):

Hydrology - Proposed Conditions - Drainage to Western Infiltration Basin							
Variable	**D-1 and D-2**	**D-3 and D-4**	**D-5**	**D-6**	**D-7**	**D-8**	**Total**
A_{sf}	130,768	173,100	29,300	67,951	88,200	124,000	613,319
A_{ac}	3.002	3.974	0.673	1.560	2.025	2.847	14
A_p	31680	12450	0	10343	88200	0	142,673
A_i	99,088	160,650	29,300	57,608	0	124,000	470,646
$A_{\%i}$	0.76	0.93	1.00	0.85	0.00	1.00	N/A
L	240	235	240	315	0	450	N/A
H	31	10	3.5	4	0	6	N/A
T_c	6.49	7.37	7.26	8.18	5	8	N/A
V	0.62	0.53	0.55	0.64	0.00	0.94	N/A
I_2	1.80	1.75	1.75	1.75	2.05	1.65	N/A
I_{10}	2.55	2.80	2.80	2.8	3.3	2.65	N/A
I_{25}	3.7	3.4	3.4	3.4	4.1	3.2	N/A
I_{50}	4.2	3.9	3.9	3.9	4.6	3.7	N/A
I_{100}	4.55	4.2	4.2	4.2	4.9	4	N/A
C_2	0.85	0.88	0.90	0.86	0.65	0.90	N/A
C_{10}	0.87	0.89	0.90	0.87	0.74	0.90	N/A
C_{25}	0.88	0.89	0.90	0.88	0.77	0.90	N/A
C_{50}	0.88	0.89	0.90	0.88	0.79	0.90	N/A
C_{100}	0.88	0.89	0.90	0.88	0.80	0.90	N/A
Q_2	**4.60**	**6.11**	**1.06**	**2.34**	**2.70**	**4.23**	**18.85**
Q_{10}	**6.63**	**9.87**	**1.70**	**3.81**	**4.97**	**6.79**	**29.50**
Q_{25}	**9.73**	**12.01**	**2.06**	**4.65**	**6.43**	**8.20**	**37.75**
Q_{50}	**11.09**	**13.80**	**2.36**	**5.35**	**7.34**	**9.48**	**43.32**
Q_{100}	**12.03**	**14.87**	**2.54**	**5.77**	**7.89**	**10.25**	**46.82**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

*Total Runnof Rate is determined from calculations of conveyance, not summation of peak runoff rates.

NOTE: Total flow quantities represent discharge into the basin area. Hydrographs in above pages show the maximum flow rate discharged from the basin into the existing downstream system.

TIME OF CONCENTRATION ADJUSTMENTS FOR SHEET AND PIPE FLOW:

Sheet Flow					
Basin	Description	L (ft)	Delta (ft)	Slope (%)	Ti (min)
D-1 / 2	Pavement/Land	180	3	1.67	6
D-3 / 4	Pavement/Land	305	5	1.64	7
D-5	Pavement	240	3.5	1.46	7
D-6	Pavement	315	5	1.27	7
D-7*	Landscape	-	-	-	5
D-8	Pavement	450	6	1.33	8

*D-7 time of concrentation assumed as minimum of 5 minutes.

Channelized Flow					
Basin	Description	L (ft)	Slope (%)	V (fps)	Ti (min)
D-1 / 2	Pipe Flow (21")	175	0.43	6.01	0.49
D-3 / 4	Pipe Flow (24")	130	0.35	5.81	0.37
D-5	Pipe Flow (12")	80	2	5.14	0.26
Convey #2	Pipe Flow (30")	400	0.5	6.38	1.04
D-6	Pipe Flow (15")	400	1.25	5.66	1.18

ADJUSTMENTS FOR CONVEYANCE OF SEPARATE STREAMS:

Conveyance Calculations for 100-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	12.03	14.87	7.37292	28.55
2	Above and D-5	7.259403	7.37292	2.54	28.55	7.37292	31.13
3	Add D-6	8.18	7.37292	5.77	31.13	8.177856	36.34
4	Add D-8	8	8.177856	10.25	36.34	8.177856	46.82

Conveyance Calculations for 50-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	11.09	13.80	7.37292	26.40
2	Above and D-5	7.259403	7.37292	2.36	26.40	7.37292	28.80
3	Add D-6	8.18	7.37292	5.35	28.80	8.177856	33.63
4	Add D-8	8	8.177856	9.48	33.63	8.177856	43.32

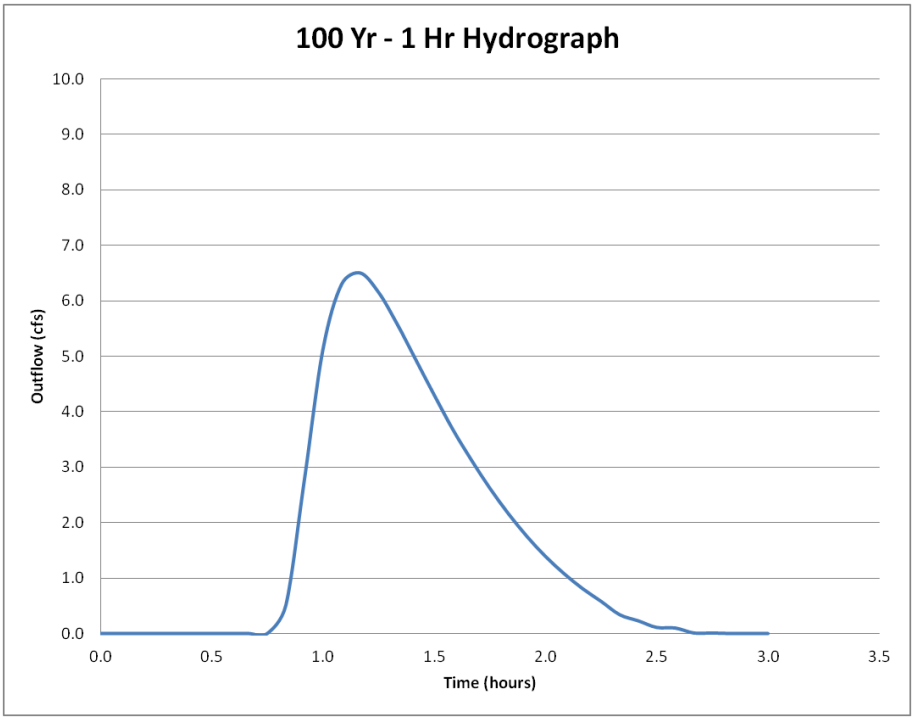
Conveyance Calculations for 25-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	9.73	12.01	7.37292	23.08
2	Above and D-5	7.259403	7.37292	2.06	23.08	7.37292	25.17
3	Add D-6	8.18	7.37292	4.65	25.17	8.177856	29.36
4	Add D-8	8	8.177856	8.20	29.36	8.177856	37.75

Conveyance Calculations for 10-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	6.63	9.87	7.37292	17.40
2	Above and D-5	7.259403	7.37292	1.70	17.40	7.37292	19.12
3	Add D-6	8.18	7.37292	3.81	19.12	8.177856	22.56
4	Add D-8	8	8.177856	6.79	22.56	8.177856	29.50

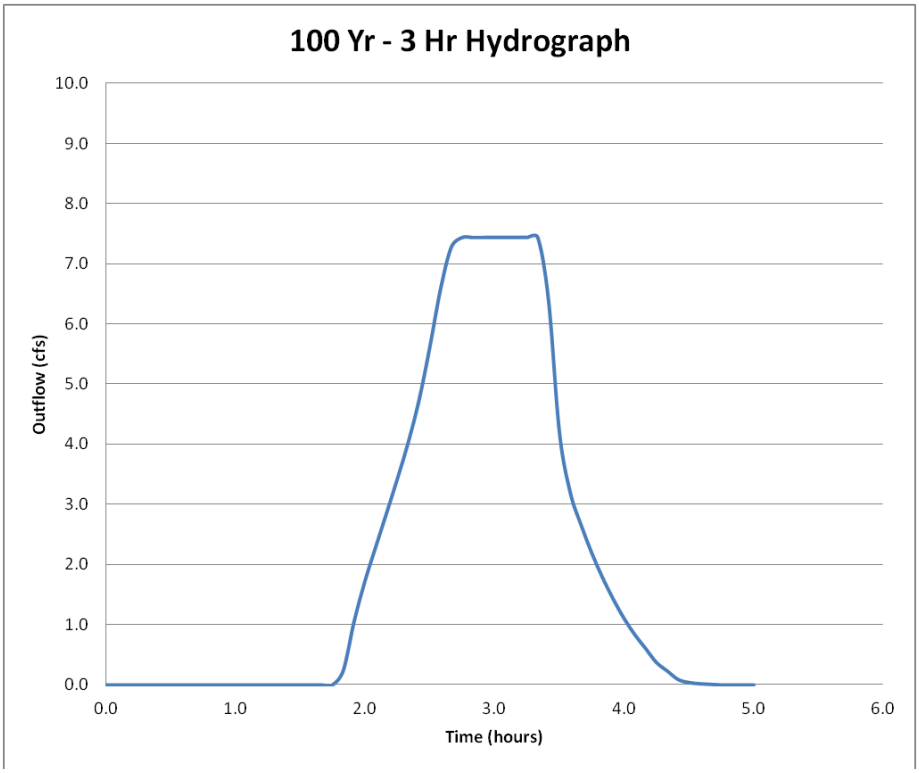
Conveyance Calculations for 2-Year Storm Event							
Point	Description	Ta (min)	Tb (min)	Qa (cfs)	Qb(cfs)	T'c (min)	Q' (cfs)
1	D-1/2 and D-3/4	6.485302	7.37292	4.60	6.11	7.37292	11.34
2	Above and D-5	7.259403	7.37292	1.06	11.34	7.37292	12.42
3	Add D-6	8.18	7.37292	2.34	12.42	8.177856	14.52
4	Add D-8	8	8.177856	4.23	14.52	8.177856	18.85

SAND-FILTER BASIN DISCHARGE HYDROGRAPHS:

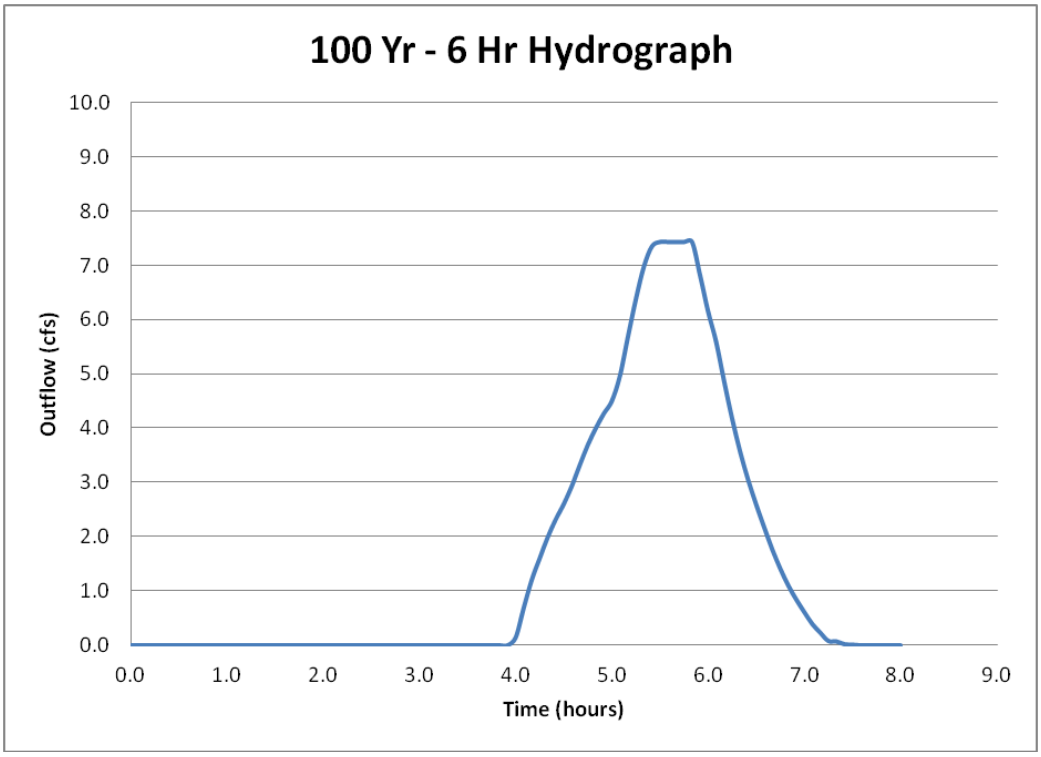
100 YR – 1 HR STORM EVENT: MAX Q = 6.50 CFS AT 1.167 HOURS



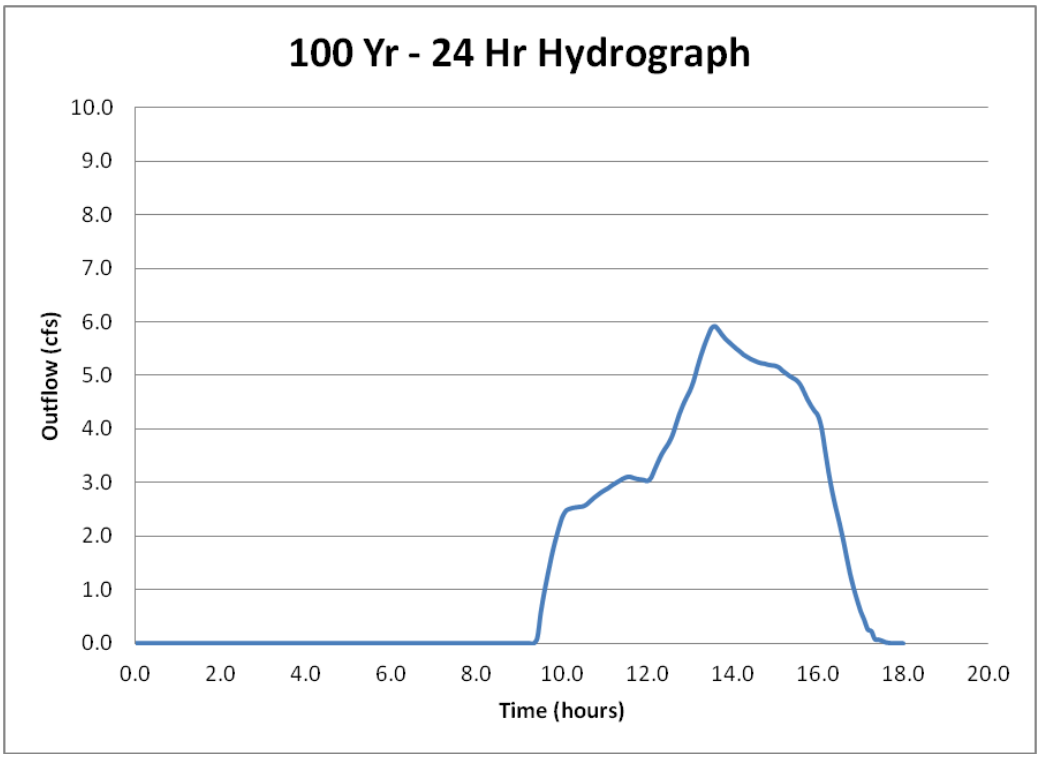
100 YR – 3 HR STORM EVENT: MAX Q = 7.43 CFS AT 2.750 HOURS



100 YR – 6 HR STORM EVENT: MAX Q = 7.43 CFS AT 5.500 HOURS



100 YR – 24 HR STORM EVENT: MAX Q = 5.92 CFS AT 13.583 HOURS



DRAINAGE AREAS DIRECTED TOWARDS SAND-FILTER BASIN ON SOUTHERN LIMITS OF PROJECT SITE (RATIONAL METHOD):

Hydrology - Proposed Conditions - Drainage to Southern Sand-Filter Basin						
Variable	**D-9**	**D-10**	**D-11**	**D-12**	**D-13**	**Totals**
A_{sf}	91,475	91,475	68,900	50,588	68,420	370,858
A_{ac}	2.10	2.10	1.58	1.16	1.57	8.5
A_p	0	0	0	6100	68,420	74,520
A_i	91,475	91,475	68,900	44,488	0	296,338
$A_{\%i}$	1.00	1.00	1.00	0.88	0.00	0.80
T_c	9.63	8.68	9.73	8.14	5.00	N/A
I_2	1.75	1.75	1.55	1.7	2.05	N/A
I_{10}	2.80	2.80	2.5	2.7	3.3	N/A
I_{25}	3.4	3.4	3	3.35	4.1	N/A
I_{50}	3.9	3.9	3.45	3.85	4.6	N/A
I_{100}	4.2	4.2	3.7	4	4.9	N/A
C_2	0.90	0.90	0.90	0.86	0.65	N/A
C_{10}	0.90	0.90	0.90	0.88	0.74	N/A
C_{25}	0.90	0.90	0.90	0.88	0.77	N/A
C_{50}	0.90	0.90	0.90	0.88	0.79	N/A
C_{100}	0.90	0.90	0.90	0.88	0.80	N/A
Q_2	**3.31**	**3.31**	**2.21**	**1.71**	**2.09**	**12.62**
Q_{10}	**5.29**	**5.29**	**3.56**	**2.75**	**3.86**	**20.75**
Q_{25}	**6.43**	**6.43**	**4.27**	**3.43**	**4.99**	**25.54**
Q_{50}	**7.37**	**7.37**	**4.91**	**3.95**	**5.70**	**29.30**
Q_{100}	**7.94**	**7.94**	**5.27**	**4.11**	**6.12**	**31.37**

A_{sf}	Area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_{ac}	Area of the basin (Ac)	Calculated per Proposed Conditions Hydrology Plan
A_p	Permeable area of the basin (SF)	Calculated per Proposed Conditions Hydrology Plan
A_i	Impermeable area of the basin (SF)	A_{sf} - A_p
$A_{\%i}$	Impermeable decimal percentage of the basin	A_i / A_{sf}
L	Length of longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
H	Change in elevation along longest basin flow (LF)	Calculated per Proposed Conditions Hydrology Plan
T_c	Time of concentration (minutes)	Calculated per plate D-3.
V	Velocity (fps)	Calculated by dividing L/T_c
I_{XX}	Storm Insensity for XX Year Storm (in/hr)	Calculated per Plate D4.7, D4.8, D4.9
C_{XX}	Runoff Coefficient for XX Year Storm	Calculated per runoff coefficient formula on page D-3
Q_{XX}	Peak Runoff Rate for XX Year Storm (CFS)	$Q_{XX}=C_{XX} \times I_{XX} \times A_{ac}$

NOTE: Total flow quantities represent discharge into the basin area. Hydrographs in above pages show the maximum flow rate discharged from the basin into the existing downstream system.

TIME OF CONCENTRATION ADJUSTMENTS FOR SHEET AND PIPE FLOW:

Sheet Flow					
Basin	Description	L (ft)	Delta (ft)	Slope (%)	Ti (min)
D-9	Roof	300	3	1.00	7
D-10	Roof	300	3	1.00	7
D-11	Pavement	450	3.5	0.78	9.25
D-12	Pavement	350	3.5	1.00	7.5
D-13	Landscaping	-	-	-	5

*D-10 time of concrentation assumed as minimum of 5 minutes.

Channelized Flow					
Basin	Description	L (ft)	Slope (%)	Velocity (f	Ti (min)
D-9	Pipe Flow (21")	770	0.52	4.88	2.6297814
D-10	Pipe Flow (21")	515	0.58	5.1	1.6830065
D-11	Pipe Flow (15")	200	1.75	6.95	0.4796163
D-12	Pipe Flow (15")	265	1.75	6.95	0.6354916

TIME OF CONCENTRATION FOR INDIVIDUAL BASIN AREAS

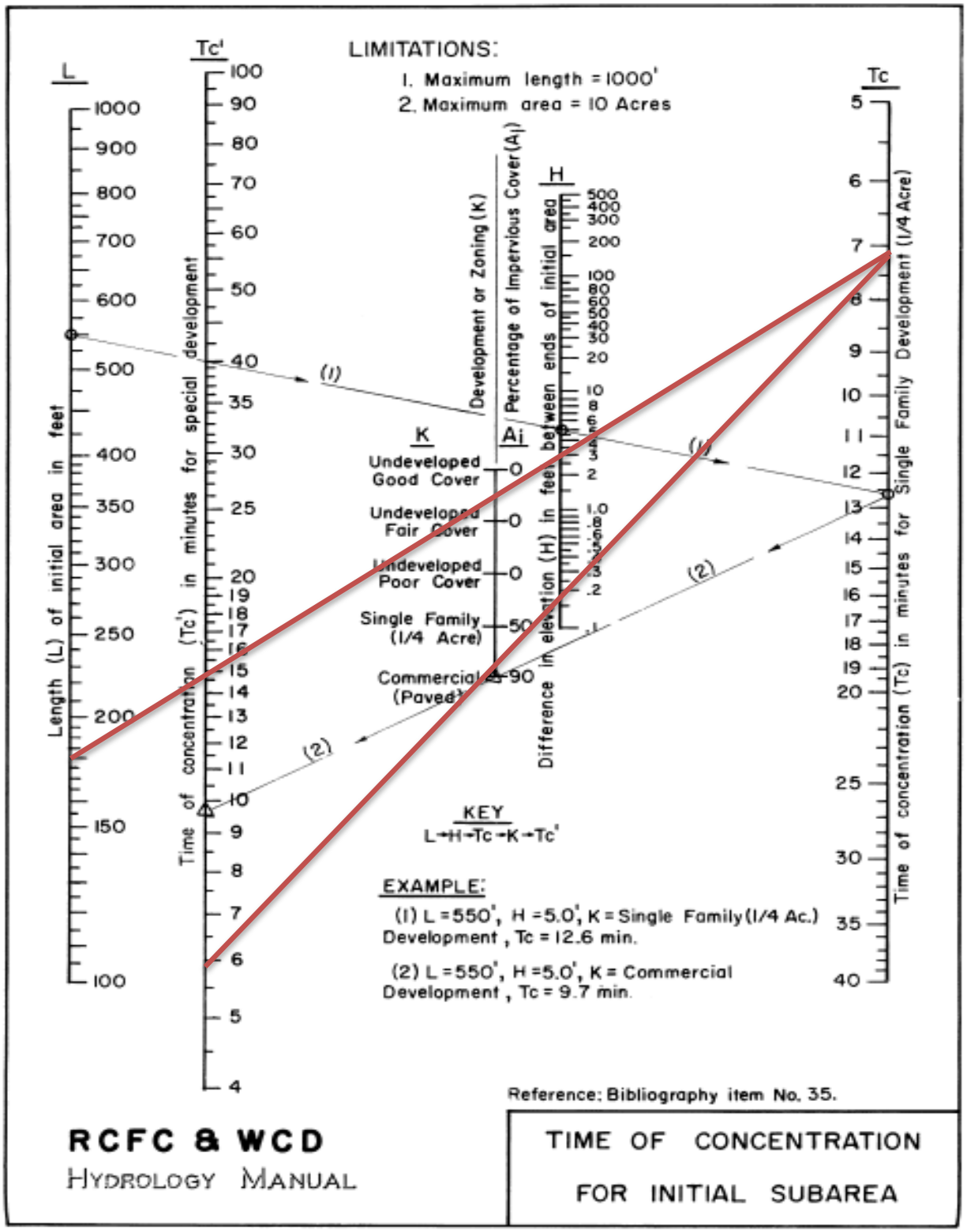


PLATE D-3

BASIN D-1 AND D-2

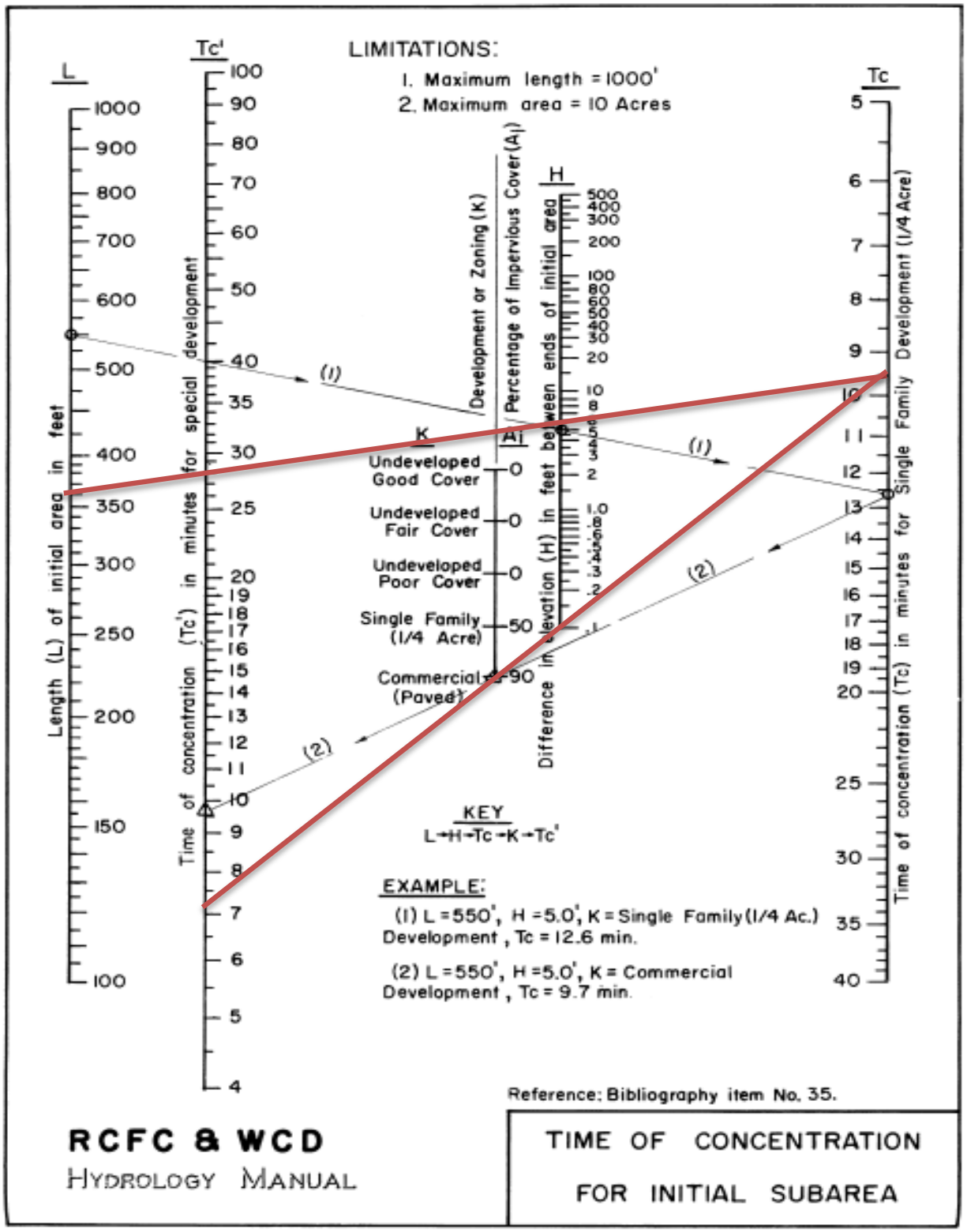


PLATE D-3

BASIN D-3 AND D-4

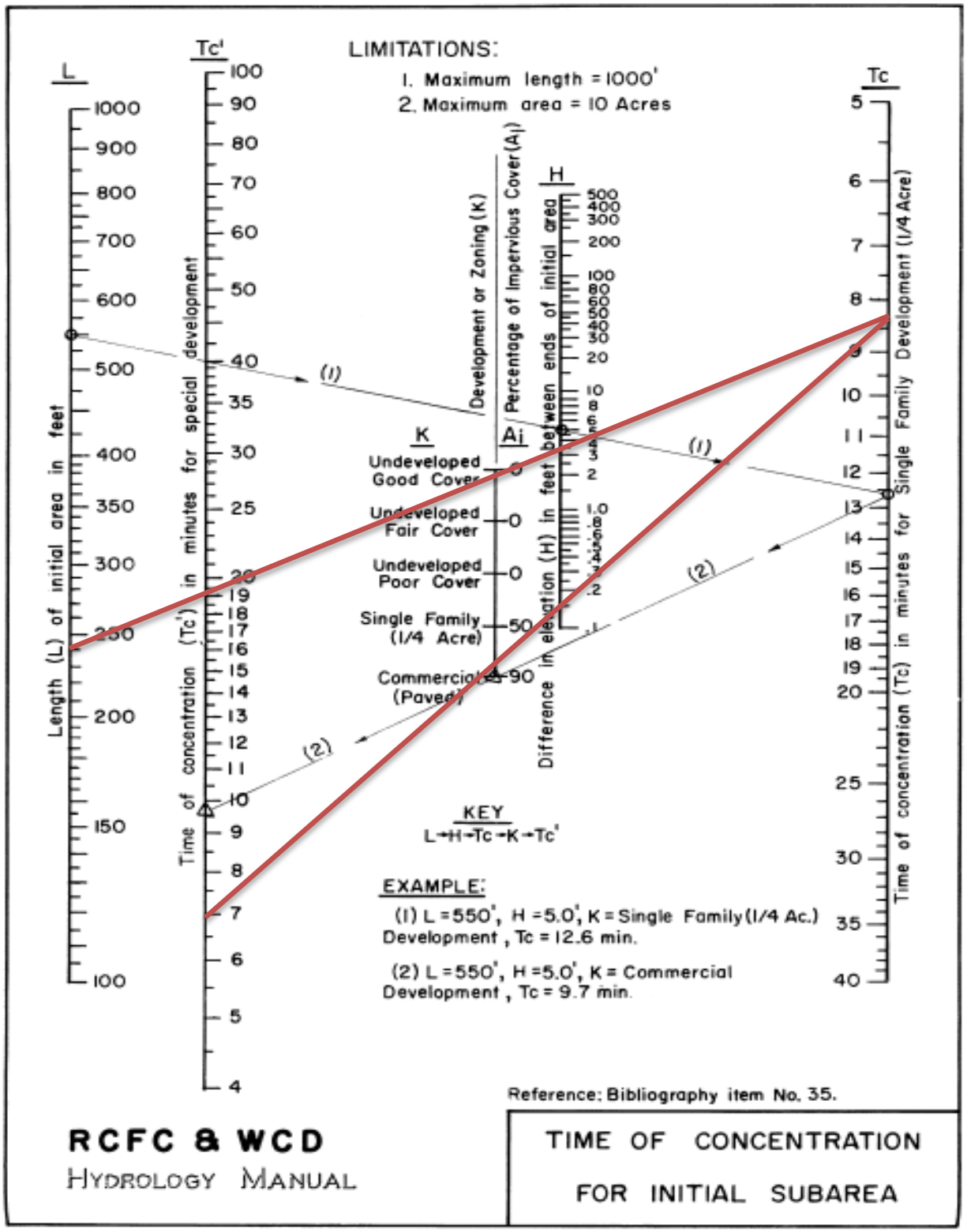


PLATE D-3

BASIN D-5

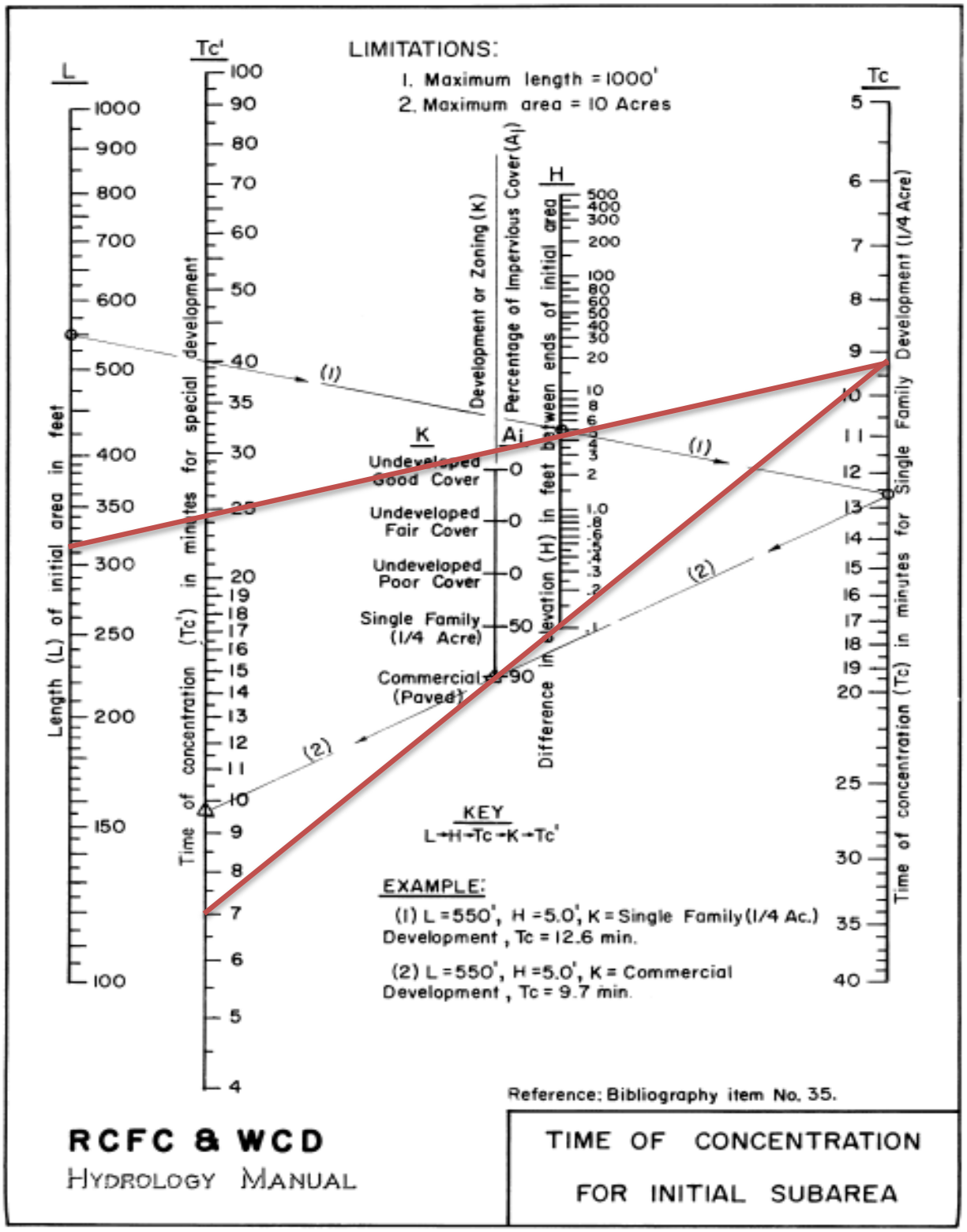


PLATE D-3

BASIN D-6

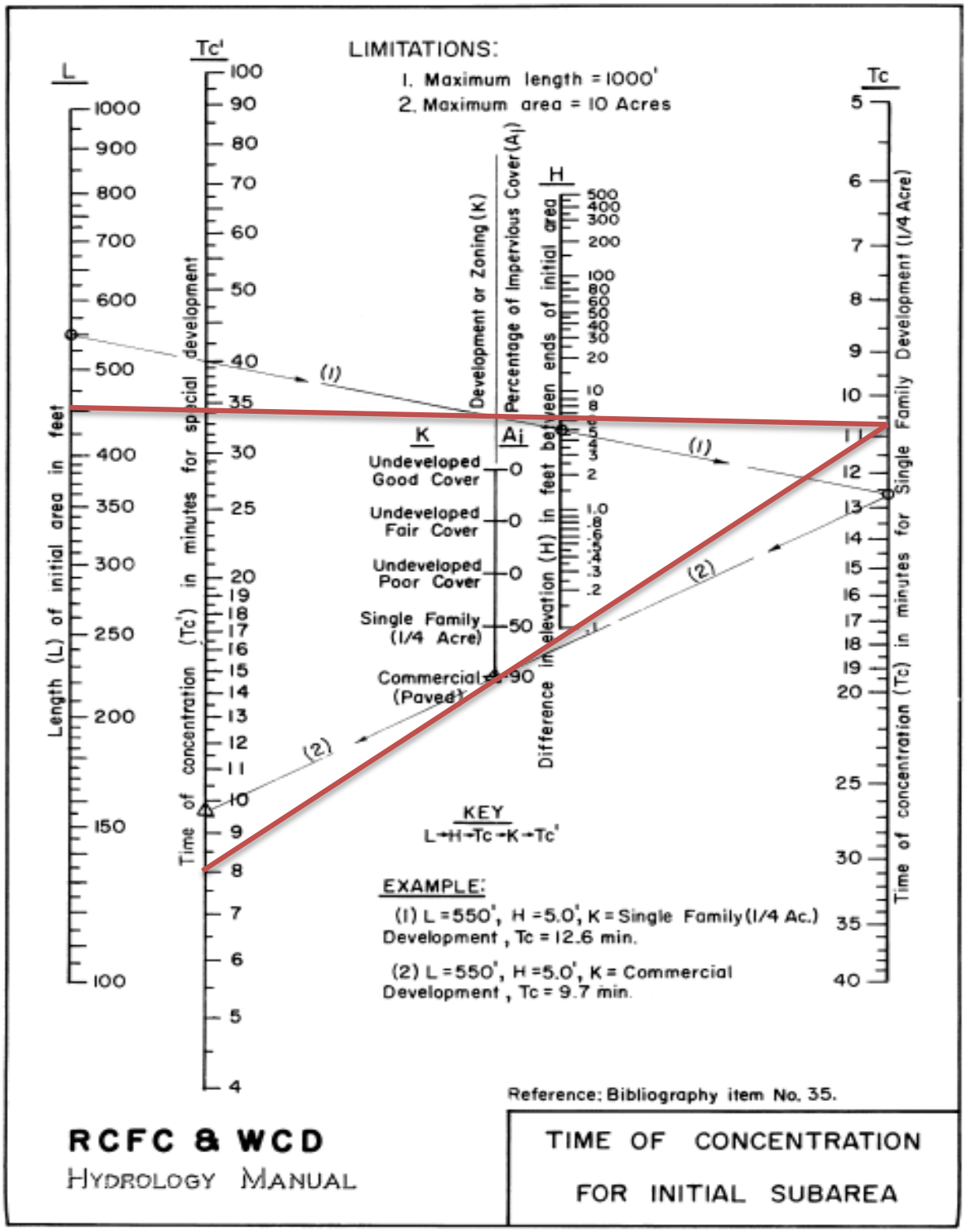


PLATE D-3

BASIN D-8

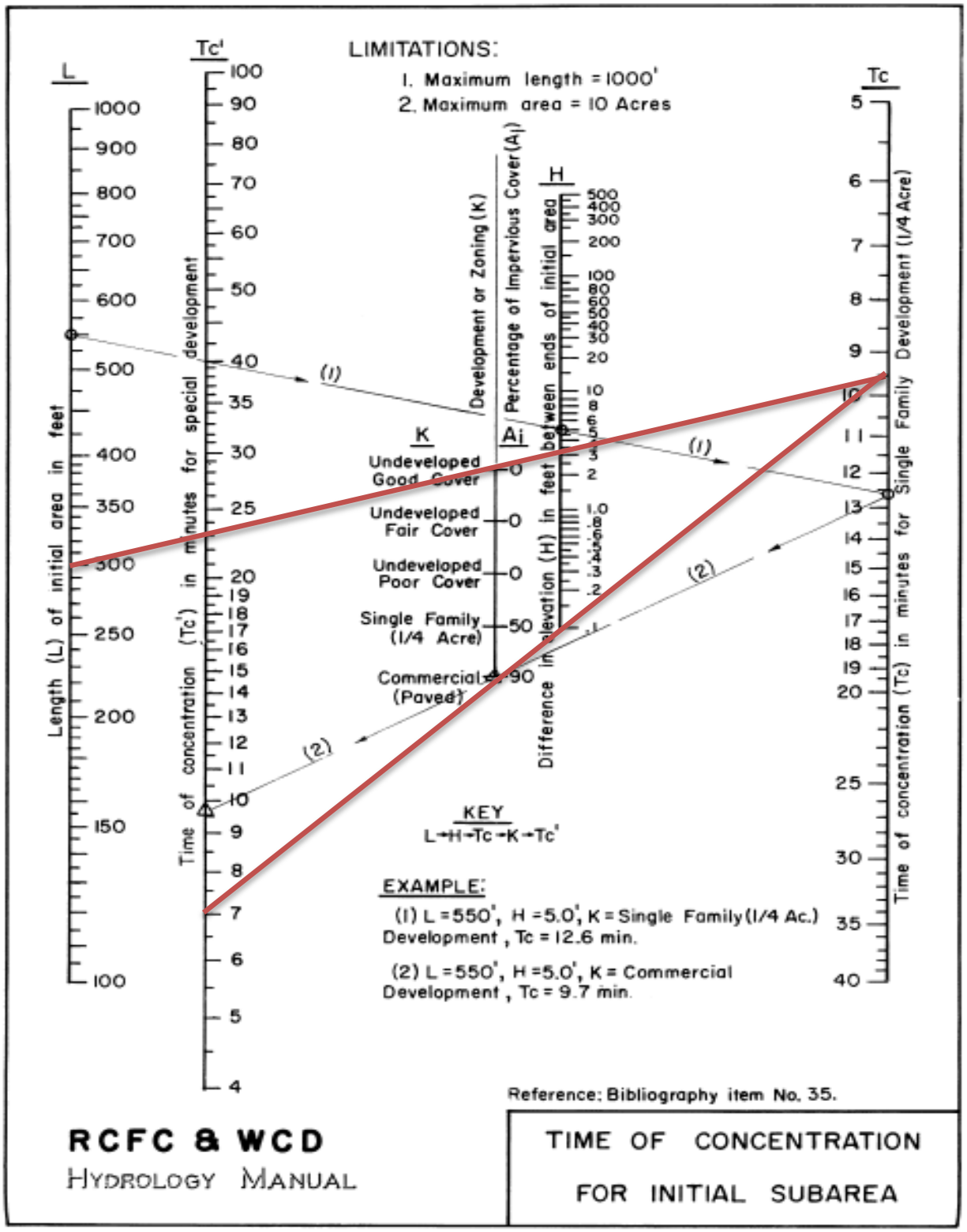


PLATE D-3

BASIN D-9 AND D-10

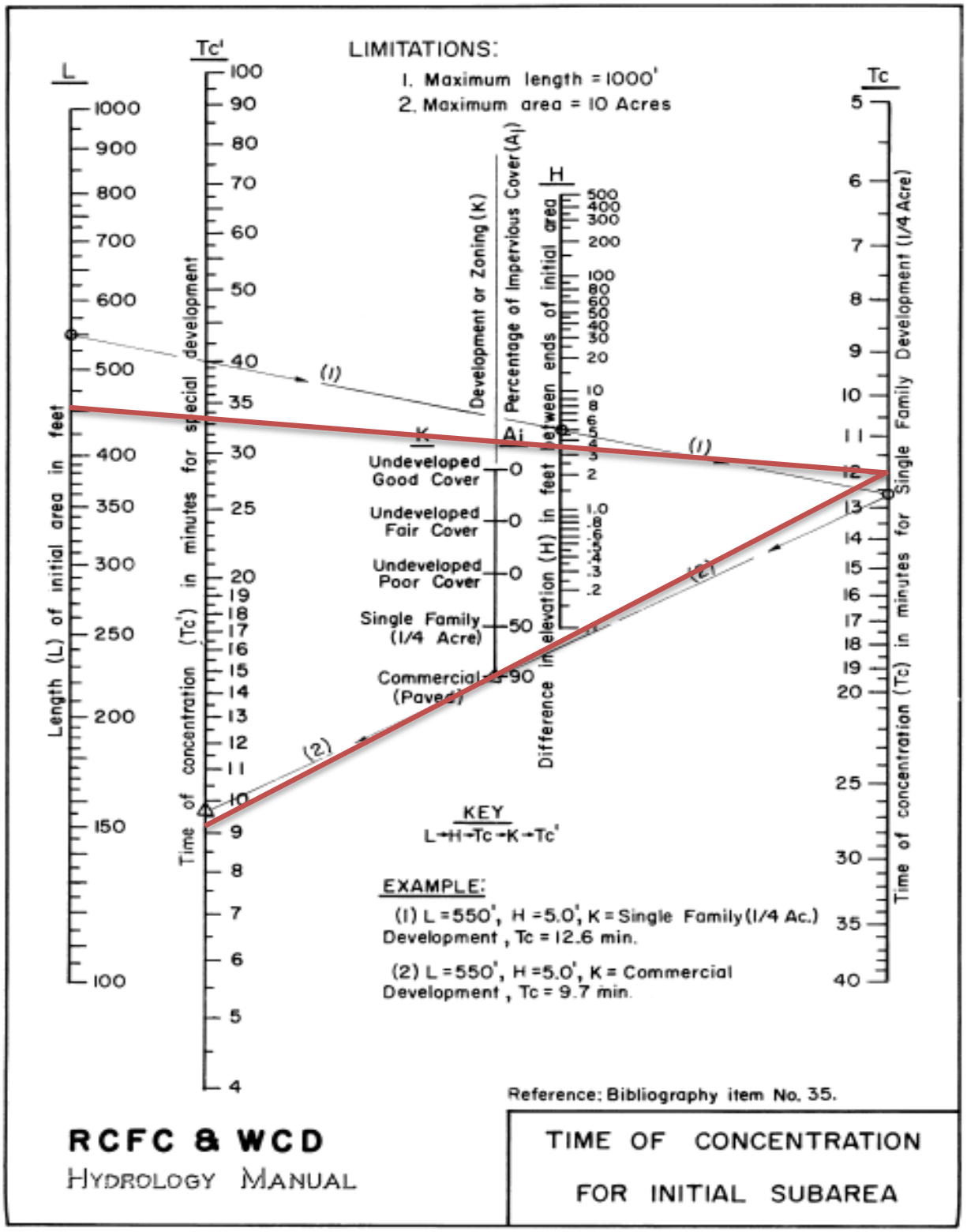


PLATE D-3

BASIN D-11

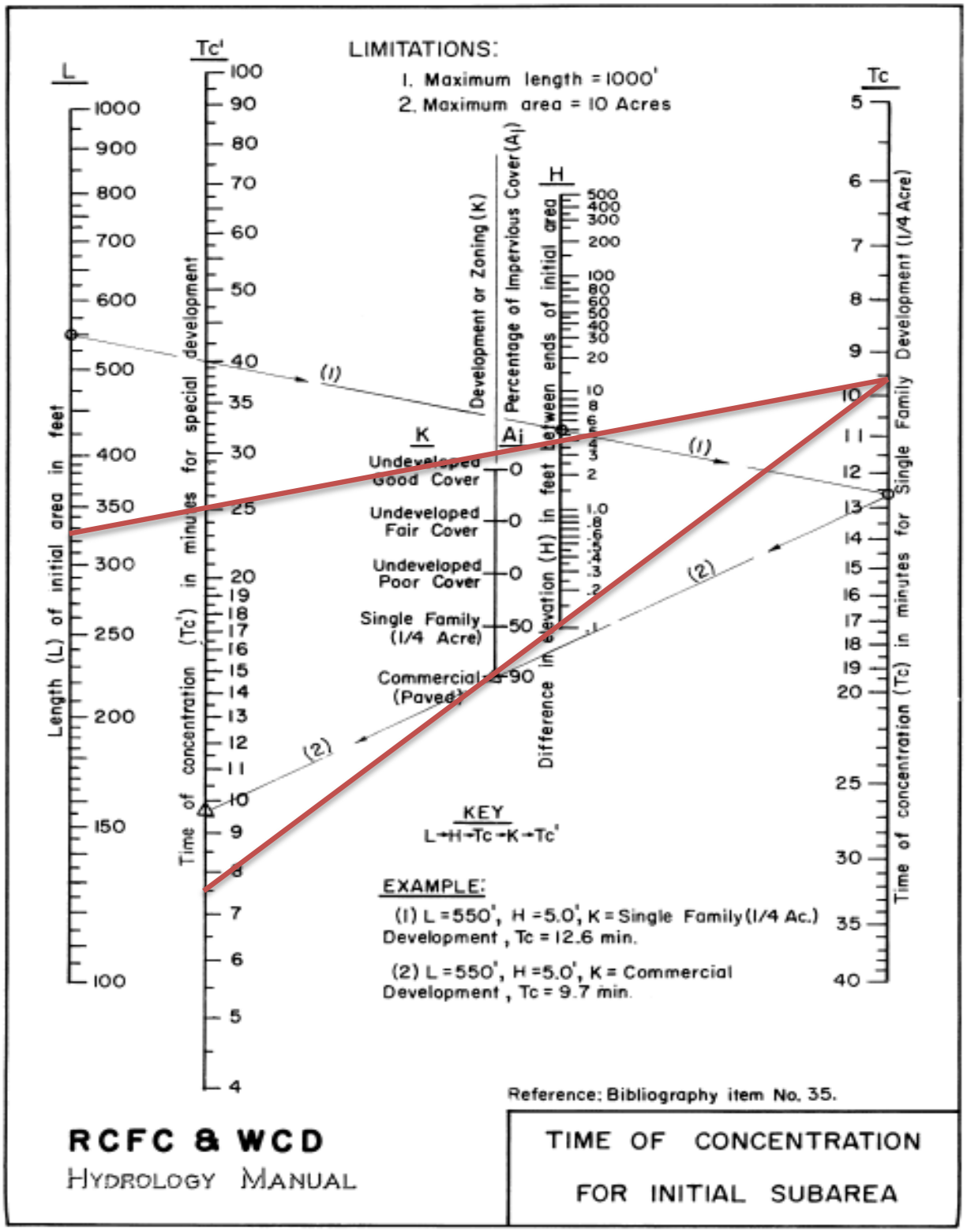


PLATE D-3

BASIN D-12

ADVANCED ENGINEERING SOFTWARE (AES) SUMMARY AND OUTPUT

INFILTRATION BASIN ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO INFILTRATION BASIN - 25 YEAR STORM


----------------------------------------------------------------------------
  FILE NAME: AREA1.DAT
  TIME/DATE OF STUDY: 15:04 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.850
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  UPSTREAM ELEVATION(FEET) =   1402.00
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  180.00**3)/(     3.00)]**.2 =    5.487
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.672
  *USER SPECIFIED(GLOBAL):
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      9.36
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =      9.36

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.36
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    5.99
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 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.) =    5.99
  RAINFALL INTENSITY(INCH/HR) =   3.52
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.36

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   375.00
  UPSTREAM ELEVATION(FEET) =   1403.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  375.00**3)/(     5.00)]**.2 =    7.695
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.122
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     10.61
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     10.61

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1395.50  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.10
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   3.05
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.61

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  250.00**3)/(     3.50)]**.2 =    6.479
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.391
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      1.93
  TOTAL AREA(ACRES) =      0.67   TOTAL RUNOFF(CFS) =      1.93

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.93
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   3.31
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.93

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.36     5.99        3.520          3.00
      2       10.61     8.10        3.047          4.00
      3        1.93     6.82        3.307          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.91     5.99       3.520
      2       19.67     6.82       3.307
      3       20.50     8.10       3.047

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.50   Tc(MIN.) =    8.10
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1394.75  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.50
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   2.84
  TOTAL STREAM AREA(ACRES) =     7.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.50

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  300.00**3)/(     4.00)]**.2 =    7.038
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.259
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
```

```
  SUBAREA RUNOFF(CFS) =      4.32
  TOTAL AREA(ACRES) =      1.56   TOTAL RUNOFF(CFS) =      4.32

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.50  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.32
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =    8.27
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    104.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.27
  RAINFALL INTENSITY(INCH/HR) =   3.02
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.32

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1396.00
  ELEVATION DIFFERENCE(FEET) =      6.50
  TC = 0.303*[(  500.00**3)/(     6.50)]**.2 =    8.677
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.947
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      7.14
  TOTAL AREA(ACRES) =      2.85   TOTAL RUNOFF(CFS) =      7.14

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   2.95
  TOTAL STREAM AREA(ACRES) =     2.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.14

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.91     7.26        3.211          7.67
      1       19.67     8.09        3.049          7.67
      1       20.50     9.36        2.842          7.67
      2        4.32     8.27        3.016          1.56
      3        7.14     8.68        2.947          2.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.68     7.26       3.211
      2       30.55     8.09       3.049
      3       30.59     8.27       3.016
      4       30.38     8.68       2.947
      5       31.46     9.36       2.842

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.46   Tc(MIN.) =    9.36
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    555.00 TO NODE    103.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.840
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      6.63
  TOTAL AREA(ACRES) =      2.03   TOTAL RUNOFF(CFS) =      6.63
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       6.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO INFILTRATION BASIN - 50 YEAR STORM


----------------------------------------------------------------------------
  FILE NAME: AREA1.DAT
  TIME/DATE OF STUDY: 15:04 05/01/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.850
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  UPSTREAM ELEVATION(FEET) =   1402.00
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  180.00**3)/(     3.00)]**.2 =    5.487
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.237
  *USER SPECIFIED(GLOBAL):
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     10.80
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =     10.80

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.80
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.98
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 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.) =    5.98
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.80

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   375.00
  UPSTREAM ELEVATION(FEET) =   1403.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  375.00**3)/(     5.00)]**.2 =    7.695
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.602
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     12.25
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     12.25

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1395.50  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.25
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    8.08
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   3.52
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.25

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  250.00**3)/(     3.50)]**.2 =    6.479
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.912
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.67   TOTAL RUNOFF(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.81
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    6.81
  RAINFALL INTENSITY(INCH/HR) =   3.82
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.23

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.80     5.98        4.066          3.00
      2       12.25     8.08        3.520          4.00
      3        2.23     6.81        3.819          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       21.83     5.98       4.066
      2       22.71     6.81       3.819
      3       23.65     8.08       3.520

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.65   Tc(MIN.) =    8.08
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1394.75  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.65
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    9.27
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.27
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =     7.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.65

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  300.00**3)/(     4.00)]**.2 =    7.038
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.760
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
```

```
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.56   TOTAL RUNOFF(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.50  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    104.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.24
  RAINFALL INTENSITY(INCH/HR) =   3.49
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1396.00
  ELEVATION DIFFERENCE(FEET) =      6.50
  TC = 0.303*[(  500.00**3)/(     6.50)]**.2 =    8.677
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.400
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      8.24
  TOTAL AREA(ACRES) =      2.85   TOTAL RUNOFF(CFS) =      8.24

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   3.40
  TOTAL STREAM AREA(ACRES) =     2.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.24

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.83     7.18        3.723          7.67
      1       22.71     8.01        3.533          7.67
      1       23.65     9.27        3.295          7.67
      2        4.99     8.24        3.486          1.56
      3        8.24     8.68        3.400          2.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       33.00     7.18       3.723
      2       35.16     8.01       3.533
      3       35.21     8.24       3.486
      4       35.25     8.68       3.400
      5       36.35     9.27       3.295

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.35   Tc(MIN.) =    9.27
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    555.00 TO NODE    103.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.430
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      7.64
  TOTAL AREA(ACRES) =      2.03   TOTAL RUNOFF(CFS) =      7.64
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       7.64
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO INFILTRATION BASIN - 100 YEAR STORM


----------------------------------------------------------------------------
  FILE NAME: AREA1.DAT
  TIME/DATE OF STUDY: 09:41 04/29/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.850
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  UPSTREAM ELEVATION(FEET) =   1402.00
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  180.00**3)/(     3.00)]**.2 =    5.487
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.729
  *USER SPECIFIED(GLOBAL):
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     12.06
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =     12.06

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.06
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.97
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 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.) =    5.97
  RAINFALL INTENSITY(INCH/HR) =   4.54
  TOTAL STREAM AREA(ACRES) =     3.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.06

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   375.00
  UPSTREAM ELEVATION(FEET) =   1403.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  375.00**3)/(     5.00)]**.2 =    7.695
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.020
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =     13.67
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     13.67

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1395.50  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.67
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    8.07
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.07
  RAINFALL INTENSITY(INCH/HR) =   3.93
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.67

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  250.00**3)/(     3.50)]**.2 =    6.479
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.366
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.67   TOTAL RUNOFF(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.00  DOWNSTREAM(FEET) =  1394.75
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.49
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.80
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   4.26
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.06     5.97        4.540          3.00
      2       13.67     8.07        3.930          4.00
      3        2.49     6.80        4.265          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       24.36     5.97       4.540
      2       25.34     6.80       4.265
      3       26.40     8.07       3.930

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.40   Tc(MIN.) =    8.07
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1394.75  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.40
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   3.68
  TOTAL STREAM AREA(ACRES) =     7.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.40

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1398.50
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  300.00**3)/(     4.00)]**.2 =    7.038
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.196
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
```

```
  SUBAREA RUNOFF(CFS) =      5.56
  TOTAL AREA(ACRES) =      1.56   TOTAL RUNOFF(CFS) =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1396.50  DOWNSTREAM(FEET) =  1392.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.56
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    104.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.22
  RAINFALL INTENSITY(INCH/HR) =   3.90
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.56

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1396.00
  ELEVATION DIFFERENCE(FEET) =      6.50
  TC = 0.303*[(  500.00**3)/(     6.50)]**.2 =    8.677
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.795
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      9.19
  TOTAL AREA(ACRES) =      2.85   TOTAL RUNOFF(CFS) =      9.19

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    104.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =     2.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.19

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.36     7.16        4.162          7.67
      1       25.34     7.98        3.950          7.67
      1       26.40     9.24        3.681          7.67
      2        5.56     8.22        3.896          1.56
      3        9.19     8.68        3.795          2.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       36.79     7.16       4.162
      2       39.20     7.98       3.950
      3       39.26     8.22       3.896
      4       39.39     8.68       3.795
      5       40.57     9.24       3.681

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.57   Tc(MIN.) =    9.24
  TOTAL AREA(ACRES) =       12.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =     955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    555.00 TO NODE    103.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.944
  *USER SPECIFIED(GLOBAL):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SUBAREA RUNOFF(CFS) =      8.53
  TOTAL AREA(ACRES) =      2.03   TOTAL RUNOFF(CFS) =      8.53
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      5.00
  PEAK FLOW RATE(CFS)   =       8.53
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

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

              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-1HR


----------------------------------------------------------------------------
  FILE NAME: TRIAL101.DAT
  TIME/DATE OF STUDY: 07:53 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  1.50 INCHES
         RCFC&WCD 1-Hour Storm (5-Minute period) SELECTED
         (SLOPE OF INTENSITY-DURATION CURVE = 0.48)
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  83.333


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                13.994                 20.309
        2                59.664                 66.279
        3                78.792                 27.760
        4                86.766                 11.572
```

5	91.428	6.766
6	94.514	4.479
7	96.650	3.099
8	98.044	2.024
9	98.699	0.950
10	99.289	0.857
11	99.716	0.619
12	99.929	0.310
13	100.000	0.103

♀
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0669	0.0083	0.0586
2	0.0707	0.0083	0.0624
3	0.0751	0.0083	0.0668
4	0.0829	0.0083	0.0745
5	0.0874	0.0083	0.0791
6	0.0994	0.0083	0.0911
7	0.1167	0.0083	0.1084
8	0.1282	0.0083	0.1199
9	0.1929	0.0083	0.1846
10	0.3979	0.0083	0.3896
11	0.1079	0.0083	0.0996
12	0.0739	0.0083	0.0656

TOTAL STORM RAINFALL(INCHES) = 1.50
TOTAL SOIL-LOSS(INCHES) = 0.10
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.40

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.1000
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.3993

♀
==========

1 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 10.0 20.0 30.0 40.0
0.083	0.0082	1.19	VQ . . . .
0.167	0.0437	5.15	.V Q . . . .
0.250	0.0927	7.12	. V Q . . . .
0.333	0.1502	8.35	. V Q . . . .
0.417	0.2157	9.52	. V Q. . . .
0.500	0.2889	10.62	. V Q . . .
0.583	0.3729	12.21	. V Q . . .
0.667	0.4706	14.17	. . VQ . . .
0.750	0.5877	17.01	. . VQ . . .
0.833	0.7680	26.17	. . .V Q . .
0.917	1.0162	36.04	. . . V. Q .
1.000	1.1733	22.81	. . . Q . V .
1.083	1.2706	14.13	. . Q . . V .

```
   1.167      1.3206      7.25  .      Q  .         .         .      V  .
   1.250      1.3499      4.25  .   Q     .         .         .       V .
   1.333      1.3689      2.77  . Q       .         .         .        V.
   1.417      1.3811      1.77  .Q        .         .         .        V.
   1.500      1.3883      1.05  .Q        .         .         .        V.
   1.583      1.3933      0.72  Q         .         .         .        V.
   1.667      1.3965      0.46  Q         .         .         .        V.
   1.750      1.3983      0.26  Q         .         .         .        V.
   1.833      1.3990      0.11  Q         .         .         .        V.
   1.917      1.3992      0.03  Q         .         .         .        V.
   2.000      1.3993      0.01  Q         .         .         .         V
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   =======================                 =========
             0%                              120.0
            10%                               70.0
            20%                               55.0
            30%                               35.0
            40%                               20.0
            50%                               15.0
            60%                               15.0
            70%                               10.0
            80%                                5.0
            90%                                5.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ==============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                  -----------             |   (and volume)
                 |           |    |       |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                        |         |  dead   |   basin outlet
                        V         | storage |
                     OUTFLOW       ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.721
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.70
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.20	1.091

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.003	1.19	0.70	0.00	0.0	0.000
0.167	0.034	5.15	0.70	0.00	0.0	0.000
0.250	0.078	7.12	0.70	0.00	0.0	0.000
0.333	0.131	8.35	0.70	0.00	0.0	0.000
0.417	0.192	9.52	0.70	0.00	0.0	0.000
0.500	0.260	10.62	0.70	0.00	0.0	0.000
0.583	0.339	12.21	0.70	0.00	0.0	0.000
0.667	0.432	14.17	0.70	0.00	0.0	0.000
0.750	0.544	17.01	0.70	0.00	0.0	0.000
0.833	0.720	26.17	0.70	0.00	0.0	0.000
DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) =					0.9 (less LOSS)	
REMAINING UNIT FLOW IS		35.2 CFS.				
0.917	0.721	36.04	0.70	0.04	1.1	0.235
1.000	0.721	22.81	0.70	0.05	2.8	0.367
1.083	0.721	14.13	0.70	0.06	3.8	0.434
1.167	0.721	7.25	0.70	0.07	4.2	0.450
1.250	0.721	4.25	0.70	0.07	4.2	0.445
1.333	0.721	2.77	0.70	0.06	4.1	0.431
1.417	0.721	1.77	0.70	0.06	4.0	0.411
1.500	0.721	1.05	0.70	0.06	3.8	0.387
1.583	0.721	0.72	0.70	0.05	3.5	0.363
1.667	0.721	0.46	0.70	0.05	3.3	0.339
1.750	0.721	0.26	0.70	0.05	3.1	0.314
1.833	0.721	0.11	0.70	0.04	2.9	0.291
1.917	0.721	0.03	0.70	0.04	2.6	0.268
2.000	0.721	0.01	0.70	0.04	2.4	0.246
2.083	0.721	0.00	0.70	0.03	2.2	0.226
2.167	0.721	0.00	0.70	0.03	2.0	0.207
2.250	0.721	0.00	0.70	0.03	1.9	0.189
2.333	0.721	0.00	0.70	0.03	1.7	0.173
2.417	0.721	0.00	0.70	0.02	1.6	0.157
2.500	0.721	0.00	0.70	0.02	1.4	0.143
2.583	0.721	0.00	0.70	0.02	1.3	0.129
2.667	0.721	0.00	0.70	0.02	1.2	0.116
2.750	0.721	0.00	0.70	0.02	1.0	0.104
2.833	0.721	0.00	0.70	0.01	0.9	0.093
2.917	0.721	0.00	0.70	0.01	0.8	0.082
3.000	0.721	0.00	0.70	0.01	0.7	0.073
3.083	0.721	0.00	0.70	0.01	0.6	0.063
3.167	0.721	0.00	0.70	0.01	0.6	0.055
3.250	0.721	0.00	0.70	0.01	0.5	0.047
3.333	0.721	0.00	0.70	0.01	0.4	0.039

3.417	0.721	0.00	0.70	0.00	0.3	0.032
3.500	0.721	0.00	0.70	0.00	0.3	0.025
3.583	0.721	0.00	0.70	0.00	0.2	0.019
3.667	0.721	0.00	0.70	0.00	0.2	0.013
3.750	0.721	0.00	0.70	0.00	0.1	0.008
3.833	0.721	0.00	0.70	0.00	0.0	0.002
3.917	0.719	0.00	0.70	0.00	0.0	0.000
4.000	0.714	0.00	0.70	0.00	0.0	0.000
4.083	0.709	0.00	0.70	0.00	0.0	0.000
4.167	0.704	0.00	0.70	0.00	0.0	0.000
4.250	0.699	0.00	0.70	0.00	0.0	0.000
4.333	0.694	0.00	0.70	0.00	0.0	0.000
4.417	0.690	0.00	0.70	0.00	0.0	0.000
4.500	0.685	0.00	0.70	0.00	0.0	0.000
4.583	0.680	0.00	0.70	0.00	0.0	0.000
4.667	0.675	0.00	0.70	0.00	0.0	0.000
4.750	0.670	0.00	0.70	0.00	0.0	0.000
4.833	0.665	0.00	0.70	0.00	0.0	0.000
4.917	0.661	0.00	0.70	0.00	0.0	0.000
5.000	0.656	0.00	0.70	0.00	0.0	0.000
5.083	0.651	0.00	0.70	0.00	0.0	0.000
5.167	0.646	0.00	0.70	0.00	0.0	0.000
5.250	0.641	0.00	0.70	0.00	0.0	0.000
5.333	0.637	0.00	0.70	0.00	0.0	0.000
5.417	0.632	0.00	0.70	0.00	0.0	0.000
5.500	0.627	0.00	0.70	0.00	0.0	0.000
5.583	0.622	0.00	0.70	0.00	0.0	0.000
5.667	0.617	0.00	0.70	0.00	0.0	0.000
5.750	0.612	0.00	0.70	0.00	0.0	0.000
5.833	0.608	0.00	0.70	0.00	0.0	0.000
5.917	0.603	0.00	0.70	0.00	0.0	0.000

```
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =      1.399 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =      0.454 AF
    LOSS    VOLUME =      0.945 AF
```

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****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================
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```
        MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
        STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
        VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
        EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
        OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
        UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
        (0.938)(DIAMETER):


        PIPELENGTH(FT) =     200.00     MANNINGS FACTOR = 0.013
        UPSTREAM ELEVATION(FT) =    1390.25
        DOWNSTREAM ELEVATION(FT) =    1389.00
        PIPE DIAMETER(FT) =   1.50



        NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:
```

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	1.11	3.23	0.88	0.000
1.000	2.84	4.26	2.63	0.000
1.083	3.79	4.57	3.68	0.000
1.167	4.18	4.71	4.14	0.000
1.250	4.23	4.72	4.23	0.000
1.333	4.14	4.70	4.15	0.000
1.417	3.98	4.64	4.00	0.000
1.500	3.77	4.57	3.80	0.000
1.583	3.55	4.50	3.57	0.000
1.667	3.32	4.44	3.34	0.000
1.750	3.09	4.35	3.11	0.000
1.833	2.86	4.27	2.89	0.000
1.917	2.64	4.19	2.67	0.000
2.000	2.43	4.10	2.46	0.000
2.083	2.23	4.00	2.26	0.000
2.167	2.05	3.89	2.07	0.000
2.250	1.87	3.79	1.90	0.000
2.333	1.71	3.70	1.73	0.000
2.417	1.56	3.59	1.58	0.000
2.500	1.42	3.49	1.44	0.000
2.583	1.28	3.39	1.30	0.000
2.667	1.16	3.28	1.18	0.000
2.750	1.04	3.16	1.06	0.000
2.833	0.93	3.06	0.95	0.000
2.917	0.83	2.96	0.85	0.000
3.000	0.73	2.84	0.75	0.000
3.083	0.64	2.73	0.66	0.000
3.167	0.56	2.62	0.57	0.000
3.250	0.48	2.52	0.49	0.000
3.333	0.40	2.38	0.42	0.000
3.417	0.33	1.97	0.33	0.000
3.500	0.27	1.59	0.27	0.000
3.583	0.21	1.23	0.21	0.000
3.667	0.15	0.89	0.15	0.000
3.750	0.10	0.57	0.11	0.000
3.833	0.05	0.50	0.08	0.000
3.917	0.01	0.50	0.05	0.000
4.000	0.00	0.00	0.02	0.000
4.083	0.00	0.00	0.00	0.000
4.167	0.00	0.00	0.00	0.000
4.250	0.00	0.00	0.00	0.000
4.333	0.00	0.00	0.00	0.000
4.417	0.00	0.00	0.00	0.000
4.500	0.00	0.00	0.00	0.000
4.583	0.00	0.00	0.00	0.000
4.667	0.00	0.00	0.00	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000

5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-3HR


----------------------------------------------------------------------------
  FILE NAME: TRIAL103.DAT
  TIME/DATE OF STUDY: 07:37 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  2.55 INCHES
         RCFC&WCD 3-Hour Storm (10-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  10.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 166.667


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                36.829                26.724
        2                82.779                33.343
        3                92.971                 7.396
        4                97.347                 3.175
        5                98.994                 1.195
```

6	99.522	0.383
7	99.809	0.208
8	99.952	0.104
9	100.000	0.035

♀
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0663	0.0167	0.0496
2	0.0663	0.0167	0.0496
3	0.0841	0.0167	0.0675
4	0.0841	0.0167	0.0675
5	0.0841	0.0167	0.0675
6	0.0867	0.0167	0.0700
7	0.1122	0.0167	0.0955
8	0.1071	0.0167	0.0904
9	0.1351	0.0167	0.1185
10	0.1300	0.0167	0.1134
11	0.1632	0.0167	0.1465
12	0.1504	0.0167	0.1338
13	0.1861	0.0167	0.1695
14	0.2167	0.0167	0.2001
15	0.3595	0.0167	0.3429
16	0.3595	0.0167	0.3429
17	0.0969	0.0167	0.0802
18	0.0612	0.0167	0.0445

TOTAL STORM RAINFALL(INCHES) = 2.55
TOTAL SOIL-LOSS(INCHES) = 0.30
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.25

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.3000
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.2487

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3 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 7.5 15.0 22.5 30.0
0.083	0.0091	1.33	VQ . . . .
0.167	0.0183	1.33	VQ . . . .
0.250	0.0388	2.98	V Q . . . .
0.333	0.0593	2.98	V Q . . . .
0.417	0.0857	3.83	.V Q . . . .
0.500	0.1120	3.83	.V Q . . . .
0.583	0.1435	4.58	. V Q . . . .
0.667	0.1751	4.58	. V Q . . . .
0.750	0.2079	4.77	. V Q . . . .
0.833	0.2408	4.77	. V Q . . . .
0.917	0.2746	4.91	. V Q . . . .
1.000	0.3084	4.91	. VQ . . . .

```
   1.083      0.3478      5.71  .     VQ  .         .         .         .
   1.167      0.3871      5.71  .     VQ  .         .         .         .
   1.250      0.4316      6.46  .      VQ .         .         .         .
   1.333      0.4760      6.46  .       Q .         .         .         .
   1.417      0.5259      7.24  .        Q.         .         .         .
   1.500      0.5757      7.24  .        QV         .         .         .
   1.583      0.6314      8.08  .         QV        .         .         .
   1.667      0.6871      8.08  .         Q V       .         .         .
   1.750      0.7492      9.02  .         . QV      .         .         .
   1.833      0.8114      9.02  .         . Q V     .         .         .
   1.917      0.8792      9.84  .         .  Q V    .         .         .
   2.000      0.9470      9.84  .         .  Q  V   .         .         .
   2.083      1.0202     10.64  .         .   Q   V .         .         .
   2.167      1.0935     10.64  .         .   Q    V.         .         .
   2.250      1.1807     12.66  .         .     Q   .V        .         .
   2.333      1.2679     12.66  .         .     Q   . V       .         .
   2.417      1.3903     17.77  .         .         .  QV     .         .
   2.500      1.5127     17.77  .         .         .  Q  V   .         .
   2.583      1.6702     22.87  .         .         .        VQ         .
   2.667      1.8277     22.87  .         .         .         Q V       .
   2.750      1.9451     17.05  .         .         . Q       .   V     .
   2.833      2.0625     17.05  .         .         . Q       .     V   .
   2.917      2.1165      7.84  .         Q         .         .      V  .
   3.000      2.1705      7.84  .         Q         .         .       V .
   3.083      2.1960      3.71  .   Q     .         .         .        V.
   3.167      2.2215      3.71  .   Q     .         .         .        V.
   3.250      2.2297      1.19  .Q        .         .         .        V.
   3.333      2.2379      1.19  .Q        .         .         .        V.
   3.417      2.2411      0.47  Q         .         .         .        V.
   3.500      2.2443      0.47  Q         .         .         .        V.
   3.583      2.2457      0.20  Q         .         .         .        V.
   3.667      2.2471      0.20  Q         .         .         .        V.
   3.750      2.2476      0.08  Q         .         .         .        V.
   3.833      2.2482      0.08  Q         .         .         .        V.
   3.917      2.2484      0.03  Q         .         .         .        V.
   4.000      2.2486      0.03  Q         .         .         .        V.
   4.083      2.2486      0.01  Q         .         .         .        V.
   4.167      2.2487      0.01  Q         .         .         .        V.
----------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ========================                =========
             0%                              250.0
            10%                              180.0
            20%                              150.0
            30%                              100.0
            40%                               60.0
            50%                               40.0
            60%                               30.0
            70%                               30.0
            80%                               10.0
            90%                               10.0


 ****************************************************************************
   FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
 ----------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ============================================================================
```

```
  INFLOW
(STREAM 1)
     |
     |
     V                 __effective depth
 -----------           |   (and volume)
|           |    |     |
|           |    |....V........
| detention |<-->|           outflow
|   basin   |    |.........______
 -----------     |    ^    |  \
     |           |  dead   |   basin outlet
     V           | storage |
  OUTFLOW         ---------
(STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.710
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.70

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.20	1.091

==========
MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.004	1.33	0.70	0.00	0.0	0.000
0.167	0.009	1.33	0.70	0.00	0.0	0.000
0.250	0.024	2.98	0.70	0.00	0.0	0.000
0.333	0.040	2.98	0.70	0.00	0.0	0.000
0.417	0.062	3.83	0.70	0.00	0.0	0.000
0.500	0.083	3.83	0.70	0.00	0.0	0.000
0.583	0.110	4.58	0.70	0.00	0.0	0.000
0.667	0.137	4.58	0.70	0.00	0.0	0.000
0.750	0.165	4.77	0.70	0.00	0.0	0.000
0.833	0.193	4.77	0.70	0.00	0.0	0.000
0.917	0.222	4.91	0.70	0.00	0.0	0.000
1.000	0.251	4.91	0.70	0.00	0.0	0.000
1.083	0.285	5.71	0.70	0.00	0.0	0.000
1.167	0.320	5.71	0.70	0.00	0.0	0.000
1.250	0.359	6.46	0.70	0.00	0.0	0.000

1.333	0.399	6.46	0.70	0.00	0.0	0.000
1.417	0.444	7.24	0.70	0.00	0.0	0.000
1.500	0.489	7.24	0.70	0.00	0.0	0.000
1.583	0.540	8.08	0.70	0.00	0.0	0.000
1.667	0.591	8.08	0.70	0.00	0.0	0.000
1.750	0.648	9.02	0.70	0.00	0.0	0.000
1.833	0.705	9.02	0.70	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 1.4 (less LOSS)
REMAINING UNIT FLOW IS 8.5 CFS.

1.917	0.710	9.84	0.70	0.01	0.3	0.056
2.000	0.710	9.84	0.70	0.02	0.8	0.114
2.083	0.710	10.64	0.70	0.03	1.4	0.173
2.167	0.710	10.64	0.70	0.04	1.9	0.228
2.250	0.710	12.66	0.70	0.05	2.5	0.294
2.333	0.710	12.66	0.70	0.06	3.1	0.355
2.417	0.710	17.77	0.70	0.07	3.8	0.447
2.500	0.710	17.77	0.70	0.08	4.6	0.532
2.583	0.710	22.87	0.70	0.10	5.6	0.647
2.667	0.710	22.87	0.70	0.12	6.6	0.754
2.750	0.710	17.05	0.70	0.14	7.5	0.814
2.833	0.710	17.05	0.70	0.21	8.8	0.866
2.917	0.710	7.84	0.70	0.19	9.4	0.850
3.000	0.710	7.84	0.70	0.17	8.9	0.838
3.083	0.710	3.71	0.70	0.12	8.2	0.803
3.167	0.710	3.71	0.70	0.12	7.4	0.772
3.250	0.710	1.19	0.70	0.11	7.1	0.727
3.333	0.710	1.19	0.70	0.11	6.7	0.684
3.417	0.710	0.47	0.70	0.10	6.3	0.639
3.500	0.710	0.47	0.70	0.09	5.8	0.597
3.583	0.710	0.20	0.70	0.09	5.5	0.556
3.667	0.710	0.20	0.70	0.08	5.1	0.518
3.750	0.710	0.08	0.70	0.07	4.7	0.481
3.833	0.710	0.08	0.70	0.07	4.4	0.447
3.917	0.710	0.03	0.70	0.06	4.1	0.414
4.000	0.710	0.03	0.70	0.06	3.8	0.384
4.083	0.710	0.01	0.70	0.06	3.5	0.355
4.167	0.710	0.01	0.70	0.05	3.2	0.328
4.250	0.710	0.00	0.70	0.05	3.0	0.302
4.333	0.710	0.00	0.70	0.04	2.7	0.279
4.417	0.710	0.00	0.70	0.04	2.5	0.256
4.500	0.710	0.00	0.70	0.04	2.3	0.236
4.583	0.710	0.00	0.70	0.03	2.1	0.216
4.667	0.710	0.00	0.70	0.03	2.0	0.198
4.750	0.710	0.00	0.70	0.03	1.8	0.181
4.833	0.710	0.00	0.70	0.03	1.6	0.165
4.917	0.710	0.00	0.70	0.02	1.5	0.150
5.000	0.710	0.00	0.70	0.02	1.3	0.135
5.083	0.710	0.00	0.70	0.02	1.2	0.122
5.167	0.710	0.00	0.70	0.02	1.1	0.110
5.250	0.710	0.00	0.70	0.02	1.0	0.098
5.333	0.710	0.00	0.70	0.01	0.9	0.087
5.417	0.710	0.00	0.70	0.01	0.8	0.077
5.500	0.710	0.00	0.70	0.01	0.7	0.068
5.583	0.710	0.00	0.70	0.01	0.6	0.059
5.667	0.710	0.00	0.70	0.01	0.5	0.050
5.750	0.710	0.00	0.70	0.01	0.4	0.043
5.833	0.710	0.00	0.70	0.01	0.4	0.035
5.917	0.710	0.00	0.70	0.00	0.3	0.028

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 2.249 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 1.172 AF

LOSS VOLUME = 1.076 AF

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****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================
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MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 200.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1390.25
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.27	1.57	0.15	0.000
2.000	0.81	2.93	0.74	0.000
2.083	1.36	3.44	1.28	0.000
2.167	1.90	3.80	1.83	0.000
2.250	2.47	4.12	2.40	0.000
2.333	3.07	4.35	3.00	0.000
2.417	3.79	4.58	3.71	0.000
2.500	4.63	4.83	4.54	0.000
2.583	5.57	5.02	5.47	0.000
2.667	6.62	5.21	6.51	0.000
2.750	7.53	5.31	7.44	0.000

2.833	8.81	5.36	8.22	0.004
2.917	9.42	5.36	8.30	0.011
3.000	8.95	5.36	8.30	0.016
3.083	8.16	5.36	8.30	0.015
3.167	7.44	5.36	8.30	0.009
3.250	7.08	5.36	8.30	0.000
3.333	6.67	5.22	6.89	0.000
3.417	6.25	5.15	6.30	0.000
3.500	5.85	5.08	5.89	0.000
3.583	5.45	4.99	5.49	0.000
3.667	5.08	4.93	5.12	0.000
3.750	4.72	4.85	4.76	0.000
3.833	4.39	4.77	4.42	0.000
3.917	4.07	4.67	4.10	0.000
4.000	3.77	4.57	3.80	0.000
4.083	3.49	4.49	3.52	0.000
4.167	3.23	4.41	3.26	0.000
4.250	2.98	4.31	3.01	0.000
4.333	2.75	4.23	2.77	0.000
4.417	2.53	4.15	2.56	0.000
4.500	2.33	4.05	2.35	0.000
4.583	2.14	3.94	2.16	0.000
4.667	1.96	3.84	1.98	0.000
4.750	1.79	3.74	1.81	0.000
4.833	1.63	3.64	1.65	0.000
4.917	1.48	3.54	1.50	0.000
5.000	1.35	3.43	1.37	0.000
5.083	1.22	3.33	1.24	0.000
5.167	1.10	3.22	1.11	0.000
5.250	0.98	3.11	1.00	0.000
5.333	0.88	3.01	0.89	0.000
5.417	0.78	2.90	0.79	0.000
5.500	0.68	2.78	0.70	0.000
5.583	0.60	2.67	0.61	0.000
5.667	0.52	2.57	0.53	0.000
5.750	0.44	2.47	0.45	0.000
5.833	0.37	2.16	0.37	0.000
5.917	0.30	1.77	0.30	0.000
6.000	0.24	1.39	0.24	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                           Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-6HR
----------------------------------------------------------------------------
  FILE NAME: TRIAL106.DAT
  TIME/DATE OF STUDY: 07:39 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  3.40 INCHES
         RCFC&WCD 6-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                17.139
        2                98.621                 6.715
        3                99.599                 0.236
        4                99.839                 0.058
        5                99.960                 0.029
        6               100.000                 0.010
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.1224	0.0500	0.0724
2	0.1462	0.0500	0.0962
3	0.1632	0.0500	0.1132
4	0.1666	0.0500	0.1166
5	0.1802	0.0500	0.1302
6	0.1972	0.0500	0.1472
7	0.2312	0.0500	0.1812
8	0.3060	0.0500	0.2560
9	0.3944	0.0500	0.3444
10	0.4896	0.0500	0.4396
11	0.8534	0.0500	0.8034
12	0.1496	0.0500	0.0996

TOTAL STORM RAINFALL(INCHES) = 3.40
TOTAL SOIL-LOSS(INCHES) = 0.60
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.80

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.6000
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.7984

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6 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0085	1.24	V Q . . . .
0.167	0.0171	1.24	V Q . . . .
0.250	0.0256	1.24	V Q . . . .
0.333	0.0342	1.24	V Q . . . .
0.417	0.0427	1.24	V Q . . . .
0.500	0.0513	1.24	V Q . . . .
0.583	0.0660	2.13	V Q . . . .
0.667	0.0807	2.13	V Q . . . .
0.750	0.0954	2.13	V Q . . . .
0.833	0.1101	2.13	V Q . . . .
0.917	0.1248	2.13	V Q . . . .
1.000	0.1395	2.13	V Q . . . .
1.083	0.1574	2.60	. V Q . . . .
1.167	0.1753	2.60	. V Q . . . .
1.250	0.1933	2.60	. V Q . . . .
1.333	0.2112	2.60	. V Q . . . .
1.417	0.2291	2.60	. V Q . . . .
1.500	0.2471	2.60	. V Q . . . .
1.583	0.2662	2.79	. V Q . . . .
1.667	0.2854	2.79	. VQ . . . .
1.750	0.3046	2.79	. VQ . . . .
1.833	0.3238	2.79	. VQ . . . .
1.917	0.3430	2.79	. VQ . . . .

```
2.000      0.3622      2.79  .    Q    .         .         .         .
2.083      0.3832      3.05  .    VQ   .         .         .         .
2.167      0.4041      3.05  .    VQ   .         .         .         .
2.250      0.4251      3.05  .     Q   .         .         .         .
2.333      0.4461      3.05  .     Q   .         .         .         .
2.417      0.4671      3.05  .     Q   .         .         .         .
2.500      0.4881      3.05  .     Q   .         .         .         .
2.583      0.5118      3.43  .     QV  .         .         .         .
2.667      0.5354      3.43  .     QV  .         .         .         .
2.750      0.5591      3.43  .     QV  .         .         .         .
2.833      0.5828      3.43  .     Q V .         .         .         .
2.917      0.6064      3.43  .     Q V .         .         .         .
3.000      0.6301      3.43  .     Q  V.         .         .         .
3.083      0.6585      4.14  .       QV.         .         .         .
3.167      0.6870      4.14  .       QV.         .         .         .
3.250      0.7155      4.14  .       Q V         .         .         .
3.333      0.7440      4.14  .       Q V         .         .         .
3.417      0.7725      4.14  .       Q  V        .         .         .
3.500      0.8010      4.14  .       Q  V        .         .         .
3.583      0.8399      5.65  .         .QV       .         .         .
3.667      0.8788      5.65  .         .QV       .         .         .
3.750      0.9177      5.65  .         .Q V      .         .         .
3.833      0.9566      5.65  .         .Q V      .         .         .
3.917      0.9956      5.65  .         .Q  V     .         .         .
4.000      1.0345      5.65  .         .Q  V     .         .         .
4.083      1.0874      7.68  .         .    Q    .         .         .
4.167      1.1402      7.68  .         .    QV   .         .         .
4.250      1.1931      7.68  .         .    Q V  .         .         .
4.333      1.2460      7.68  .         .    Q V  .         .         .
4.417      1.2989      7.68  .         .    Q  V .         .         .
4.500      1.3517      7.68  .         .    Q   V.         .         .
4.583      1.4201      9.92  .         .        QV         .         .
4.667      1.4884      9.92  .         .        Q V        .         .
4.750      1.5568      9.92  .         .        Q  V       .         .
4.833      1.6251      9.92  .         .        Q   V      .         .
4.917      1.6934      9.92  .         .        Q    V     .         .
5.000      1.7618      9.92  .         .        Q     V    .         .
5.083      1.8777     16.82  .         .         .     V   .  Q      .
5.167      1.9935     16.82  .         .         .       V .  Q      .
5.250      2.1094     16.82  .         .         .         V  Q      .
5.333      2.2253     16.82  .         .         .          V Q      .
5.417      2.3411     16.82  .         .         .            Q      .
5.500      2.4570     16.82  .         .         .            Q V    .
5.583      2.5068      7.23  .         .   Q     .         .    V    .
5.667      2.5566      7.23  .         .   Q     .         .     V   .
5.750      2.6065      7.23  .         .   Q     .         .      V  .
5.833      2.6563      7.23  .         .   Q     .         .      V  .
5.917      2.7061      7.23  .         .   Q     .         .       V .
6.000      2.7559      7.23  .         .   Q     .         .        V.
6.083      2.7621      0.90 .Q         .         .         .        V.
6.167      2.7683      0.90 .Q         .         .         .        V.
6.250      2.7745      0.90 .Q         .         .         .        V.
6.333      2.7806      0.90 .Q         .         .         .        V.
6.417      2.7868      0.90 .Q         .         .         .        V.
6.500      2.7930      0.90 .Q         .         .         .        V.
6.583      2.7936      0.09 Q          .         .         .        V.
6.667      2.7942      0.09 Q          .         .         .        V.
6.750      2.7948      0.09 Q          .         .         .        V.
6.833      2.7954      0.09 Q          .         .         .        V.
6.917      2.7960      0.09 Q          .         .         .        V.
7.000      2.7966      0.09 Q          .         .         .        V.
7.083      2.7968      0.03 Q          .         .         .        V.
7.167      2.7970      0.03 Q          .         .         .        V.
```

```
   7.250      2.7973      0.03  Q         .         .         .        V.
   7.333      2.7975      0.03  Q         .         .         .        V.
   7.417      2.7977      0.03  Q         .         .         .        V.
   7.500      2.7980      0.03  Q         .         .         .        V.
   7.583      2.7980      0.01  Q         .         .         .        V.
   7.667      2.7981      0.01  Q         .         .         .        V.
   7.750      2.7982      0.01  Q         .         .         .        V.
   7.833      2.7983      0.01  Q         .         .         .        V.
   7.917      2.7983      0.01  Q         .         .         .        V.
   8.000      2.7984      0.01  Q         .         .         .        V.
   8.083      2.7984      0.00  Q         .         .         .        V.
   8.167      2.7984      0.00  Q         .         .         .        V.
   8.250      2.7984      0.00  Q         .         .         .        V.
   8.333      2.7984      0.00  Q         .         .         .        V.
   8.417      2.7984      0.00  Q         .         .         .        V.
   8.500      2.7984      0.00  Q         .         .         .         V
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   =======================                 =========
             0%                              510.0
            10%                              330.0
            20%                              210.0
            30%                              150.0
            40%                              120.0
            50%                               60.0
            60%                               30.0
            70%                               30.0
            80%                               30.0
            90%                               30.0


 ****************************************************************************
   FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
 ----------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                  -----------             |   (and volume)
                 |           |    |    |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                        |         |  dead   |   basin outlet
                        V         | storage |
                     OUTFLOW       ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
```

DEAD STORAGE(AF) = 0.710
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.70

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.21	1.091

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.004	1.24	0.70	0.00	0.0	0.000
0.167	0.007	1.24	0.70	0.00	0.0	0.000
0.250	0.011	1.24	0.70	0.00	0.0	0.000
0.333	0.015	1.24	0.70	0.00	0.0	0.000
0.417	0.019	1.24	0.70	0.00	0.0	0.000
0.500	0.022	1.24	0.70	0.00	0.0	0.000
0.583	0.032	2.13	0.70	0.00	0.0	0.000
0.667	0.042	2.13	0.70	0.00	0.0	0.000
0.750	0.052	2.13	0.70	0.00	0.0	0.000
0.833	0.062	2.13	0.70	0.00	0.0	0.000
0.917	0.072	2.13	0.70	0.00	0.0	0.000
1.000	0.082	2.13	0.70	0.00	0.0	0.000
1.083	0.095	2.60	0.70	0.00	0.0	0.000
1.167	0.108	2.60	0.70	0.00	0.0	0.000
1.250	0.121	2.60	0.70	0.00	0.0	0.000
1.333	0.134	2.60	0.70	0.00	0.0	0.000
1.417	0.147	2.60	0.70	0.00	0.0	0.000
1.500	0.160	2.60	0.70	0.00	0.0	0.000
1.583	0.175	2.79	0.70	0.00	0.0	0.000
1.667	0.189	2.79	0.70	0.00	0.0	0.000
1.750	0.203	2.79	0.70	0.00	0.0	0.000
1.833	0.218	2.79	0.70	0.00	0.0	0.000
1.917	0.232	2.79	0.70	0.00	0.0	0.000
2.000	0.246	2.79	0.70	0.00	0.0	0.000
2.083	0.263	3.05	0.70	0.00	0.0	0.000
2.167	0.279	3.05	0.70	0.00	0.0	0.000
2.250	0.295	3.05	0.70	0.00	0.0	0.000
2.333	0.311	3.05	0.70	0.00	0.0	0.000
2.417	0.327	3.05	0.70	0.00	0.0	0.000
2.500	0.344	3.05	0.70	0.00	0.0	0.000
2.583	0.362	3.43	0.70	0.00	0.0	0.000
2.667	0.381	3.43	0.70	0.00	0.0	0.000
2.750	0.400	3.43	0.70	0.00	0.0	0.000
2.833	0.419	3.43	0.70	0.00	0.0	0.000
2.917	0.438	3.43	0.70	0.00	0.0	0.000
3.000	0.457	3.43	0.70	0.00	0.0	0.000
3.083	0.480	4.14	0.70	0.00	0.0	0.000

3.167	0.504	4.14	0.70	0.00	0.0	0.000
3.250	0.527	4.14	0.70	0.00	0.0	0.000
3.333	0.551	4.14	0.70	0.00	0.0	0.000
3.417	0.575	4.14	0.70	0.00	0.0	0.000
3.500	0.598	4.14	0.70	0.00	0.0	0.000
3.583	0.633	5.65	0.70	0.00	0.0	0.000
3.667	0.667	5.65	0.70	0.00	0.0	0.000
3.750	0.701	5.65	0.70	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 2.0 (less LOSS)
REMAINING UNIT FLOW IS 3.6 CFS.

3.833	0.710	5.65	0.70	0.00	0.1	0.024
3.917	0.710	5.65	0.70	0.01	0.4	0.056
4.000	0.710	5.65	0.70	0.01	0.7	0.085
4.083	0.710	7.68	0.70	0.02	1.0	0.126
4.167	0.710	7.68	0.70	0.03	1.4	0.165
4.250	0.710	7.68	0.70	0.03	1.7	0.201
4.333	0.710	7.68	0.70	0.04	2.1	0.235
4.417	0.710	7.68	0.70	0.04	2.4	0.267
4.500	0.710	7.68	0.70	0.05	2.7	0.296
4.583	0.710	9.92	0.70	0.05	3.0	0.339
4.667	0.710	9.92	0.70	0.06	3.4	0.379
4.750	0.710	9.92	0.70	0.06	3.8	0.417
4.833	0.710	9.92	0.70	0.07	4.1	0.452
4.917	0.710	9.92	0.70	0.08	4.4	0.485
5.000	0.710	9.92	0.70	0.08	4.7	0.516
5.083	0.710	16.82	0.70	0.09	5.2	0.591
5.167	0.710	16.82	0.70	0.10	5.9	0.661
5.250	0.710	16.82	0.70	0.11	6.6	0.727
5.333	0.710	16.82	0.70	0.12	7.2	0.789
5.417	0.710	16.82	0.70	0.18	8.2	0.844
5.500	0.710	16.82	0.70	0.24	9.7	0.888
5.583	0.710	7.23	0.70	0.20	10.0	0.864
5.667	0.710	7.23	0.70	0.18	9.3	0.845
5.750	0.710	7.23	0.70	0.16	8.7	0.830
5.833	0.710	7.23	0.70	0.14	8.3	0.818
5.917	0.710	7.23	0.70	0.13	7.9	0.809
6.000	0.710	7.23	0.70	0.12	7.7	0.801
6.083	0.710	0.90	0.70	0.12	7.3	0.752
6.167	0.710	0.90	0.70	0.11	6.9	0.706
6.250	0.710	0.90	0.70	0.10	6.5	0.662
6.333	0.710	0.90	0.70	0.10	6.1	0.622
6.417	0.710	0.90	0.70	0.09	5.7	0.584
6.500	0.710	0.90	0.70	0.09	5.4	0.549
6.583	0.710	0.09	0.70	0.08	5.0	0.510
6.667	0.710	0.09	0.70	0.07	4.6	0.474
6.750	0.710	0.09	0.70	0.07	4.3	0.440
6.833	0.710	0.09	0.70	0.06	4.0	0.408
6.917	0.710	0.09	0.70	0.06	3.7	0.378
7.000	0.710	0.09	0.70	0.05	3.4	0.350
7.083	0.710	0.03	0.70	0.05	3.2	0.324
7.167	0.710	0.03	0.70	0.05	2.9	0.299
7.250	0.710	0.03	0.70	0.04	2.7	0.275
7.333	0.710	0.03	0.70	0.04	2.5	0.254
7.417	0.710	0.03	0.70	0.04	2.3	0.233
7.500	0.710	0.03	0.70	0.03	2.1	0.214
7.583	0.710	0.01	0.70	0.03	1.9	0.196
7.667	0.710	0.01	0.70	0.03	1.8	0.179
7.750	0.710	0.01	0.70	0.03	1.6	0.163
7.833	0.710	0.01	0.70	0.02	1.5	0.148
7.917	0.710	0.01	0.70	0.02	1.3	0.134
8.000	0.710	0.01	0.70	0.02	1.2	0.121
8.083	0.710	0.00	0.70	0.02	1.1	0.109
8.167	0.710	0.00	0.70	0.02	1.0	0.097

8.250	0.710	0.00	0.70	0.01	0.9	0.087
8.333	0.710	0.00	0.70	0.01	0.8	0.076
8.417	0.710	0.00	0.70	0.01	0.7	0.067
8.500	0.710	0.00	0.70	0.01	0.6	0.058
8.583	0.710	0.00	0.70	0.01	0.5	0.050
8.667	0.710	0.00	0.70	0.01	0.4	0.042
8.750	0.710	0.00	0.70	0.01	0.4	0.035
8.833	0.710	0.00	0.70	0.00	0.3	0.028
8.917	0.710	0.00	0.70	0.00	0.2	0.021
9.000	0.710	0.00	0.70	0.00	0.2	0.015
9.083	0.710	0.00	0.70	0.00	0.1	0.010
9.167	0.710	0.00	0.70	0.00	0.1	0.004
9.250	0.709	0.00	0.70	0.00	0.0	0.000
9.333	0.705	0.00	0.70	0.00	0.0	0.000
9.417	0.700	0.00	0.70	0.00	0.0	0.000
9.500	0.695	0.00	0.70	0.00	0.0	0.000
9.583	0.690	0.00	0.70	0.00	0.0	0.000
9.667	0.685	0.00	0.70	0.00	0.0	0.000
9.750	0.681	0.00	0.70	0.00	0.0	0.000
9.833	0.676	0.00	0.70	0.00	0.0	0.000
9.917	0.671	0.00	0.70	0.00	0.0	0.000
10.000	0.666	0.00	0.70	0.00	0.0	0.000
10.083	0.661	0.00	0.70	0.00	0.0	0.000
10.167	0.656	0.00	0.70	0.00	0.0	0.000
10.250	0.652	0.00	0.70	0.00	0.0	0.000
10.333	0.647	0.00	0.70	0.00	0.0	0.000
10.417	0.642	0.00	0.70	0.00	0.0	0.000
10.500	0.637	0.00	0.70	0.00	0.0	0.000
10.583	0.632	0.00	0.70	0.00	0.0	0.000
10.667	0.628	0.00	0.70	0.00	0.0	0.000
10.750	0.623	0.00	0.70	0.00	0.0	0.000
10.833	0.618	0.00	0.70	0.00	0.0	0.000
10.917	0.613	0.00	0.70	0.00	0.0	0.000
11.000	0.608	0.00	0.70	0.00	0.0	0.000
11.083	0.603	0.00	0.70	0.00	0.0	0.000
11.167	0.599	0.00	0.70	0.00	0.0	0.000
11.250	0.594	0.00	0.70	0.00	0.0	0.000
11.333	0.589	0.00	0.70	0.00	0.0	0.000
11.417	0.584	0.00	0.70	0.00	0.0	0.000
11.500	0.579	0.00	0.70	0.00	0.0	0.000
11.583	0.574	0.00	0.70	0.00	0.0	0.000
11.667	0.570	0.00	0.70	0.00	0.0	0.000
11.750	0.565	0.00	0.70	0.00	0.0	0.000
11.833	0.560	0.00	0.70	0.00	0.0	0.000
11.917	0.555	0.00	0.70	0.00	0.0	0.000
12.000	0.550	0.00	0.70	0.00	0.0	0.000

```
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =      2.798 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =      1.554 AF
    LOSS    VOLUME =      1.245 AF


****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================


         MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
         STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
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VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 200.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1390.25
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000
3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000

3.833	0.11	0.67	0.00	0.000
3.917	0.38	2.22	0.38	0.000
4.000	0.67	2.75	0.62	0.000
4.083	1.00	3.12	0.95	0.000
4.167	1.38	3.46	1.32	0.000
4.250	1.73	3.71	1.68	0.000
4.333	2.06	3.90	2.02	0.000
4.417	2.37	4.07	2.33	0.000
4.500	2.66	4.20	2.63	0.000
4.583	3.00	4.32	2.96	0.000
4.667	3.40	4.46	3.35	0.000
4.750	3.76	4.57	3.72	0.000
4.833	4.11	4.68	4.07	0.000
4.917	4.43	4.78	4.40	0.000
5.000	4.73	4.85	4.70	0.000
5.083	5.23	4.95	5.18	0.000
5.167	5.92	5.09	5.85	0.000
5.250	6.56	5.20	6.50	0.000
5.333	7.17	5.28	7.10	0.000
5.417	8.19	5.35	8.08	0.000
5.500	9.67	5.36	8.29	0.009
5.583	10.01	5.36	8.30	0.021
5.667	9.29	5.36	8.30	0.028
5.750	8.72	5.36	8.30	0.031
5.833	8.27	5.36	8.30	0.031
5.917	7.91	5.36	8.30	0.028
6.000	7.66	5.36	8.30	0.023
6.083	7.34	5.36	8.30	0.017
6.167	6.89	5.36	8.30	0.007
6.250	6.47	5.31	7.58	0.000
6.333	6.07	5.12	6.22	0.000
6.417	5.70	5.05	5.74	0.000
6.500	5.35	4.97	5.39	0.000
6.583	5.00	4.91	5.04	0.000
6.667	4.65	4.84	4.69	0.000
6.750	4.32	4.75	4.35	0.000
6.833	4.01	4.65	4.04	0.000
6.917	3.71	4.55	3.74	0.000
7.000	3.44	4.47	3.47	0.000
7.083	3.18	4.39	3.21	0.000
7.167	2.94	4.30	2.97	0.000
7.250	2.71	4.22	2.74	0.000
7.333	2.50	4.14	2.53	0.000
7.417	2.30	4.03	2.32	0.000
7.500	2.11	3.93	2.14	0.000
7.583	1.94	3.83	1.96	0.000
7.667	1.77	3.73	1.79	0.000
7.750	1.62	3.63	1.64	0.000
7.833	1.47	3.53	1.49	0.000
7.917	1.34	3.43	1.35	0.000
8.000	1.21	3.32	1.23	0.000
8.083	1.09	3.21	1.10	0.000
8.167	0.98	3.10	0.99	0.000
8.250	0.87	3.00	0.89	0.000
8.333	0.77	2.89	0.79	0.000
8.417	0.68	2.77	0.69	0.000
8.500	0.59	2.66	0.61	0.000
8.583	0.51	2.56	0.53	0.000
8.667	0.43	2.47	0.45	0.000
8.750	0.36	2.13	0.37	0.000
8.833	0.30	1.74	0.30	0.000
8.917	0.23	1.37	0.23	0.000
9.000	0.17	1.02	0.17	0.000

9.083	0.12	0.70	0.12	0.000
9.167	0.07	0.50	0.11	0.000
9.250	0.02	0.50	0.04	0.000
9.333	0.00	0.00	0.04	0.000
9.417	0.00	0.00	0.01	0.000
9.500	0.00	0.00	0.00	0.000
9.583	0.00	0.00	0.00	0.000
9.667	0.00	0.00	0.00	0.000
9.750	0.00	0.00	0.00	0.000
9.833	0.00	0.00	0.00	0.000
9.917	0.00	0.00	0.00	0.000
10.000	0.00	0.00	0.00	0.000
10.083	0.00	0.00	0.00	0.000
10.167	0.00	0.00	0.00	0.000
10.250	0.00	0.00	0.00	0.000
10.333	0.00	0.00	0.00	0.000
10.417	0.00	0.00	0.00	0.000
10.500	0.00	0.00	0.00	0.000
10.583	0.00	0.00	0.00	0.000
10.667	0.00	0.00	0.00	0.000
10.750	0.00	0.00	0.00	0.000
10.833	0.00	0.00	0.00	0.000
10.917	0.00	0.00	0.00	0.000
11.000	0.00	0.00	0.00	0.000
11.083	0.00	0.00	0.00	0.000
11.167	0.00	0.00	0.00	0.000
11.250	0.00	0.00	0.00	0.000
11.333	0.00	0.00	0.00	0.000
11.417	0.00	0.00	0.00	0.000
11.500	0.00	0.00	0.00	0.000
11.583	0.00	0.00	0.00	0.000
11.667	0.00	0.00	0.00	0.000
11.750	0.00	0.00	0.00	0.000
11.833	0.00	0.00	0.00	0.000
11.917	0.00	0.00	0.00	0.000
12.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-24HR
----------------------------------------------------------------------------
  FILE NAME: TRIAL124.DAT
  TIME/DATE OF STUDY: 07:40 05/07/2014


****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      12.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.010
         USER-ENTERED RAINFALL =  7.80 INCHES
         RCFC&WCD 24-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                17.139
        2                98.621                 6.715
        3                99.599                 0.236
        4                99.839                 0.058
        5                99.960                 0.029
        6               100.000                 0.010
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0390	0.0331	0.0058
2	0.0546	0.0464	0.0082
3	0.0468	0.0398	0.0070
4	0.0546	0.0464	0.0082
5	0.0624	0.0530	0.0094
6	0.0780	0.0663	0.0117
7	0.0780	0.0663	0.0117
8	0.0858	0.0729	0.0129
9	0.1014	0.0862	0.0152
10	0.1170	0.0866	0.0304
11	0.1014	0.0833	0.0181
12	0.1248	0.0801	0.0447
13	0.1404	0.0770	0.0634
14	0.1560	0.0738	0.0822
15	0.1638	0.0708	0.0930
16	0.1950	0.0678	0.1272
17	0.2340	0.0648	0.1692
18	0.2574	0.0619	0.1955
19	0.3042	0.0590	0.2452
20	0.3354	0.0562	0.2792
21	0.2340	0.0534	0.1806
22	0.3120	0.0507	0.2613
23	0.2964	0.0481	0.2483
24	0.2730	0.0455	0.2275
25	0.3978	0.0430	0.3548
26	0.4446	0.0405	0.4041
27	0.5304	0.0381	0.4923
28	0.3588	0.0357	0.3231
29	0.4134	0.0334	0.3800
30	0.3978	0.0312	0.3666
31	0.3666	0.0290	0.3376
32	0.2964	0.0269	0.2694
33	0.0624	0.0249	0.0375
34	0.0468	0.0230	0.0238
35	0.0780	0.0211	0.0569
36	0.0702	0.0193	0.0509
37	0.0624	0.0175	0.0449
38	0.0390	0.0159	0.0231
39	0.0546	0.0143	0.0403
40	0.0390	0.0128	0.0262
41	0.0468	0.0115	0.0353
42	0.0390	0.0102	0.0288
43	0.0390	0.0090	0.0300
44	0.0390	0.0079	0.0311
45	0.0390	0.0070	0.0320
46	0.0312	0.0062	0.0250
47	0.0312	0.0055	0.0257
48	0.0312	0.0051	0.0261

TOTAL STORM RAINFALL(INCHES) = 7.80
TOTAL SOIL-LOSS(INCHES) = 1.98
TOTAL EFFECTIVE RAINFALL(INCHES) = 5.82

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.9786

TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.8183

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0007	0.10	Q	.	.	.	.
0.167	0.0014	0.10	Q	.	.	.	.
0.250	0.0021	0.10	Q	.	.	.	.
0.333	0.0028	0.10	Q	.	.	.	.
0.417	0.0035	0.10	Q	.	.	.	.
0.500	0.0041	0.10	Q	.	.	.	.
0.583	0.0054	0.18	Q	.	.	.	.
0.667	0.0066	0.18	Q	.	.	.	.
0.750	0.0079	0.18	Q	.	.	.	.
0.833	0.0091	0.18	Q	.	.	.	.
0.917	0.0103	0.18	Q	.	.	.	.
1.000	0.0116	0.18	Q	.	.	.	.
1.083	0.0128	0.18	Q	.	.	.	.
1.167	0.0140	0.18	Q	.	.	.	.
1.250	0.0152	0.18	Q	.	.	.	.
1.333	0.0164	0.18	Q	.	.	.	.
1.417	0.0177	0.18	Q	.	.	.	.
1.500	0.0189	0.18	Q	.	.	.	.
1.583	0.0202	0.19	Q	.	.	.	.
1.667	0.0215	0.19	Q	.	.	.	.
1.750	0.0228	0.19	Q	.	.	.	.
1.833	0.0241	0.19	Q	.	.	.	.
1.917	0.0254	0.19	Q	.	.	.	.
2.000	0.0267	0.19	Q	.	.	.	.
2.083	0.0282	0.22	Q	.	.	.	.
2.167	0.0297	0.22	Q	.	.	.	.
2.250	0.0312	0.22	Q	.	.	.	.
2.333	0.0327	0.22	Q	.	.	.	.
2.417	0.0342	0.22	Q	.	.	.	.
2.500	0.0357	0.22	Q	.	.	.	.
2.583	0.0375	0.27	Q	.	.	.	.
2.667	0.0394	0.27	Q	.	.	.	.
2.750	0.0412	0.27	Q	.	.	.	.
2.833	0.0430	0.27	Q	.	.	.	.
2.917	0.0449	0.27	Q	.	.	.	.
3.000	0.0467	0.27	Q	.	.	.	.
3.083	0.0486	0.28	Q	.	.	.	.
3.167	0.0506	0.28	Q	.	.	.	.
3.250	0.0525	0.28	Q	.	.	.	.
3.333	0.0545	0.28	Q	.	.	.	.
3.417	0.0564	0.28	Q	.	.	.	.
3.500	0.0584	0.28	Q	.	.	.	.
3.583	0.0604	0.30	Q	.	.	.	.
3.667	0.0625	0.30	Q	.	.	.	.
3.750	0.0646	0.30	Q	.	.	.	.
3.833	0.0667	0.30	Q	.	.	.	.
3.917	0.0688	0.30	Q	.	.	.	.
4.000	0.0709	0.30	Q	.	.	.	.
4.083	0.0733	0.35	Q	.	.	.	.

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4.167      0.0757      0.35  Q          .          .          .          .
4.250      0.0781      0.35  Q          .          .          .          .
4.333      0.0805      0.35  Q          .          .          .          .
4.417      0.0829      0.35  Q          .          .          .          .
4.500      0.0854      0.35  Q          .          .          .          .
4.583      0.0897      0.63  VQ         .          .          .          .
4.667      0.0940      0.63  VQ         .          .          .          .
4.750      0.0983      0.63  VQ         .          .          .          .
4.833      0.1026      0.63  VQ         .          .          .          .
4.917      0.1070      0.63  VQ         .          .          .          .
5.000      0.1113      0.63  VQ         .          .          .          .
5.083      0.1149      0.52  VQ         .          .          .          .
5.167      0.1184      0.52  VQ         .          .          .          .
5.250      0.1220      0.52  VQ         .          .          .          .
5.333      0.1256      0.52  VQ         .          .          .          .
5.417      0.1291      0.52  VQ         .          .          .          .
5.500      0.1327      0.52  VQ         .          .          .          .
5.583      0.1389      0.90  VQ         .          .          .          .
5.667      0.1450      0.90  VQ         .          .          .          .
5.750      0.1512      0.90   Q         .          .          .          .
5.833      0.1574      0.90   Q         .          .          .          .
5.917      0.1635      0.90   Q         .          .          .          .
6.000      0.1697      0.90   Q         .          .          .          .
6.083      0.1793      1.39  .VQ        .          .          .          .
6.167      0.1889      1.39  .VQ        .          .          .          .
6.250      0.1985      1.39  .VQ        .          .          .          .
6.333      0.2081      1.39  .VQ        .          .          .          .
6.417      0.2177      1.39  .VQ        .          .          .          .
6.500      0.2273      1.39  .VQ        .          .          .          .
6.583      0.2400      1.85  .V Q       .          .          .          .
6.667      0.2527      1.85  .V Q       .          .          .          .
6.750      0.2655      1.85  .V Q       .          .          .          .
6.833      0.2782      1.85  .V Q       .          .          .          .
6.917      0.2909      1.85  .V Q       .          .          .          .
7.000      0.3036      1.85  . VQ       .          .          .          .
7.083      0.3185      2.16  . V Q      .          .          .          .
7.167      0.3334      2.16  . V Q      .          .          .          .
7.250      0.3483      2.16  . V Q      .          .          .          .
7.333      0.3632      2.16  . V Q      .          .          .          .
7.417      0.3782      2.16  . V Q      .          .          .          .
7.500      0.3931      2.16  . V Q      .          .          .          .
7.583      0.4126      2.83  . V  Q     .          .          .          .
7.667      0.4320      2.83  . V  Q     .          .          .          .
7.750      0.4515      2.83  .  V Q     .          .          .          .
7.833      0.4710      2.83  .  V Q     .          .          .          .
7.917      0.4905      2.83  .  V Q     .          .          .          .
8.000      0.5100      2.83  .  V Q     .          .          .          .
8.083      0.5361      3.78  .  V   Q   .          .          .          .
8.167      0.5621      3.78  .  V   Q   .          .          .          .
8.250      0.5882      3.78  .   V  Q   .          .          .          .
8.333      0.6142      3.78  .   V  Q   .          .          .          .
8.417      0.6403      3.78  .   V  Q   .          .          .          .
8.500      0.6664      3.78  .   V  Q   .          .          .          .
8.583      0.6975      4.53  .   V    Q.          .          .          .
8.667      0.7287      4.53  .    V   Q.          .          .          .
8.750      0.7599      4.53  .    V   Q.          .          .          .
8.833      0.7910      4.53  .    V   Q.          .          .          .
8.917      0.8222      4.53  .    V   Q.          .          .          .
9.000      0.8534      4.53  .    V   Q.          .          .          .
9.083      0.8917      5.57  .     V   .Q         .          .          .
9.167      0.9300      5.57  .     V   .Q         .          .          .
9.250      0.9684      5.57  .     V   .Q         .          .          .
9.333      1.0067      5.57  .     V   .Q         .          .          .
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 9.417      1.0450      5.57  .      V  .Q        .         .         .
 9.500      1.0834      5.57  .      V  .Q        .         .         .
 9.583      1.1281      6.49  .      V  . Q       .         .         .
 9.667      1.1728      6.49  .       V . Q       .         .         .
 9.750      1.2175      6.49  .       V . Q       .         .         .
 9.833      1.2622      6.49  .       V . Q       .         .         .
 9.917      1.3069      6.49  .       V . Q       .         .         .
10.000      1.3517      6.49  .        V. Q       .         .         .
10.083      1.3864      5.04  .        VQ         .         .         .
10.167      1.4211      5.04  .        VQ         .         .         .
10.250      1.4559      5.04  .         Q         .         .         .
10.333      1.4906      5.04  .         Q         .         .         .
10.417      1.5254      5.04  .         Q         .         .         .
10.500      1.5601      5.04  .         Q         .         .         .
10.583      1.5999      5.78  .         VQ        .         .         .
10.667      1.6397      5.78  .          Q        .         .         .
10.750      1.6795      5.78  .          Q        .         .         .
10.833      1.7193      5.78  .          Q        .         .         .
10.917      1.7591      5.78  .          QV       .         .         .
11.000      1.7989      5.78  .          QV       .         .         .
11.083      1.8407      6.08  .         . Q       .         .         .
11.167      1.8826      6.08  .         . Q       .         .         .
11.250      1.9244      6.08  .         . QV      .         .         .
11.333      1.9663      6.08  .         . QV      .         .         .
11.417      2.0082      6.08  .         . QV      .         .         .
11.500      2.0500      6.08  .         . Q V     .         .         .
11.583      2.0889      5.65  .         .Q  V     .         .         .
11.667      2.1278      5.65  .         .Q  V     .         .         .
11.750      2.1667      5.65  .         .Q  V     .         .         .
11.833      2.2057      5.65  .         .Q   V    .         .         .
11.917      2.2446      5.65  .         .Q   V    .         .         .
12.000      2.2835      5.65  .         .Q   V    .         .         .
12.083      2.3364      7.69  .         .    QV   .         .         .
12.167      2.3894      7.69  .         .    QV   .         .         .
12.250      2.4424      7.69  .         .    QV   .         .         .
12.333      2.4953      7.69  .         .    Q V  .         .         .
12.417      2.5483      7.69  .         .    Q V  .         .         .
12.500      2.6013      7.69  .         .    Q V  .         .         .
12.583      2.6659      9.39  .         .       Q .         .         .
12.667      2.7306      9.39  .         .       Q .         .         .
12.750      2.7952      9.39  .         .       QV.         .         .
12.833      2.8598      9.39  .         .       QV.         .         .
12.917      2.9245      9.39  .         .       Q V         .         .
13.000      2.9891      9.39  .         .       Q V         .         .
13.083      3.0667     11.26  .         .         .VQ       .         .
13.167      3.1442     11.26  .         .         .VQ       .         .
13.250      3.2217     11.26  .         .         . Q       .         .
13.333      3.2993     11.26  .         .         . Q       .         .
13.417      3.3768     11.26  .         .         . QV      .         .
13.500      3.4543     11.26  .         .         . QV      .         .
13.583      3.5161      8.97  .         .      Q  .   V     .         .
13.667      3.5779      8.97  .         .      Q  .   V     .         .
13.750      3.6396      8.97  .         .      Q  .    V    .         .
13.833      3.7014      8.97  .         .      Q  .    V    .         .
13.917      3.7632      8.97  .         .      Q  .    V    .         .
14.000      3.8249      8.97  .         .      Q  .     V   .         .
14.083      3.8858      8.83  .         .      Q  .     V   .         .
14.167      3.9466      8.83  .         .      Q  .      V  .         .
14.250      4.0075      8.83  .         .      Q  .      V  .         .
14.333      4.0683      8.83  .         .      Q  .      V  .         .
14.417      4.1291      8.83  .         .      Q  .       V .         .
14.500      4.1900      8.83  .         .      Q  .       V .         .
14.583      4.2516      8.95  .         .      Q  .        V.         .
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14.667      4.3133      8.95  .         .      Q  .        V.         .
14.750      4.3750      8.95  .         .      Q  .         V         .
14.833      4.4367      8.95  .         .      Q  .         V         .
14.917      4.4983      8.95  .         .      Q  .         V         .
15.000      4.5600      8.95  .         .      Q  .          V        .
15.083      4.6177      8.37  .         .     Q   .         .V        .
15.167      4.6753      8.37  .         .     Q   .         . V       .
15.250      4.7330      8.37  .         .     Q   .         . V       .
15.333      4.7907      8.37  .         .     Q   .         . V       .
15.417      4.8484      8.37  .         .     Q   .         .  V      .
15.500      4.9060      8.37  .         .     Q   .         .  V      .
15.583      4.9543      7.01  .         .   Q     .         .   V     .
15.667      5.0026      7.01  .         .   Q     .         .   V     .
15.750      5.0508      7.01  .         .   Q     .         .   V     .
15.833      5.0991      7.01  .         .   Q     .         .    V    .
15.917      5.1473      7.01  .         .   Q     .         .    V    .
16.000      5.1956      7.01  .         .   Q     .         .    V    .
16.083      5.2133      2.57  .    Q    .         .         .    V    .
16.167      5.2310      2.57  .    Q    .         .         .    V    .
16.250      5.2486      2.57  .    Q    .         .         .     V   .
16.333      5.2663      2.57  .    Q    .         .         .     V   .
16.417      5.2840      2.57  .    Q    .         .         .     V   .
16.500      5.3017      2.57  .    Q    .         .         .     V   .
16.583      5.3069      0.76  .Q        .         .         .     V   .
16.667      5.3121      0.76  .Q        .         .         .     V   .
16.750      5.3173      0.76  .Q        .         .         .     V   .
16.833      5.3226      0.76  .Q        .         .         .     V   .
16.917      5.3278      0.76  .Q        .         .         .     V   .
17.000      5.3330      0.76  .Q        .         .         .     V   .
17.083      5.3411      1.17  . Q       .         .         .     V   .
17.167      5.3492      1.17  . Q       .         .         .     V   .
17.250      5.3573      1.17  . Q       .         .         .     V   .
17.333      5.3653      1.17  . Q       .         .         .     V   .
17.417      5.3734      1.17  . Q       .         .         .     V   .
17.500      5.3815      1.17  . Q       .         .         .     V   .
17.583      5.3903      1.27  . Q       .         .         .      V  .
17.667      5.3990      1.27  . Q       .         .         .      V  .
17.750      5.4078      1.27  . Q       .         .         .      V  .
17.833      5.4166      1.27  . Q       .         .         .      V  .
17.917      5.4254      1.27  . Q       .         .         .      V  .
18.000      5.4341      1.27  . Q       .         .         .      V  .
18.083      5.4419      1.13  . Q       .         .         .      V  .
18.167      5.4497      1.13  . Q       .         .         .      V  .
18.250      5.4575      1.13  . Q       .         .         .      V  .
18.333      5.4653      1.13  . Q       .         .         .      V  .
18.417      5.4730      1.13  . Q       .         .         .      V  .
18.500      5.4808      1.13  . Q       .         .         .      V  .
18.583      5.4857      0.71  .Q        .         .         .      V  .
18.667      5.4906      0.71  .Q        .         .         .      V  .
18.750      5.4956      0.71  .Q        .         .         .      V  .
18.833      5.5005      0.71  .Q        .         .         .      V  .
18.917      5.5054      0.71  .Q        .         .         .      V  .
19.000      5.5103      0.71  .Q        .         .         .      V  .
19.083      5.5162      0.86  .Q        .         .         .      V  .
19.167      5.5222      0.86  .Q        .         .         .      V  .
19.250      5.5281      0.86  .Q        .         .         .       V .
19.333      5.5340      0.86  .Q        .         .         .       V .
19.417      5.5399      0.86  .Q        .         .         .       V .
19.500      5.5459      0.86  .Q        .         .         .       V .
19.583      5.5509      0.73  .Q        .         .         .       V .
19.667      5.5559      0.73  .Q        .         .         .       V .
19.750      5.5609      0.73  .Q        .         .         .       V .
19.833      5.5660      0.73  .Q        .         .         .       V .
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 19.917      5.5710      0.73  .Q         .         .         .       V .
 20.000      5.5760      0.73  .Q         .         .         .       V .
 20.083      5.5815      0.79  .Q         .         .         .       V .
 20.167      5.5869      0.79  .Q         .         .         .       V .
 20.250      5.5924      0.79  .Q         .         .         .       V .
 20.333      5.5979      0.79  .Q         .         .         .       V .
 20.417      5.6033      0.79  .Q         .         .         .       V .
 20.500      5.6088      0.79  .Q         .         .         .       V .
 20.583      5.6139      0.74  .Q         .         .         .       V .
 20.667      5.6190      0.74  .Q         .         .         .       V .
 20.750      5.6241      0.74  .Q         .         .         .       V .
 20.833      5.6292      0.74  .Q         .         .         .       V .
 20.917      5.6343      0.74  .Q         .         .         .       V .
 21.000      5.6394      0.74  .Q         .         .         .       V .
 21.083      5.6444      0.72  .Q         .         .         .       V .
 21.167      5.6493      0.72  .Q         .         .         .       V .
 21.250      5.6543      0.72  .Q         .         .         .       V .
 21.333      5.6592      0.72  .Q         .         .         .       V .
 21.417      5.6642      0.72  .Q         .         .         .       V .
 21.500      5.6691      0.72  .Q         .         .         .       V .
 21.583      5.6742      0.74  .Q         .         .         .        V.
 21.667      5.6794      0.74  .Q         .         .         .        V.
 21.750      5.6845      0.74  .Q         .         .         .        V.
 21.833      5.6896      0.74  .Q         .         .         .        V.
 21.917      5.6947      0.74  .Q         .         .         .        V.
 22.000      5.6999      0.74  .Q         .         .         .        V.
 22.083      5.7052      0.77  .Q         .         .         .        V.
 22.167      5.7104      0.77  .Q         .         .         .        V.
 22.250      5.7157      0.77  .Q         .         .         .        V.
 22.333      5.7210      0.77  .Q         .         .         .        V.
 22.417      5.7263      0.77  .Q         .         .         .        V.
 22.500      5.7316      0.77  .Q         .         .         .        V.
 22.583      5.7361      0.65  .Q         .         .         .        V.
 22.667      5.7406      0.65  .Q         .         .         .        V.
 22.750      5.7451      0.65  .Q         .         .         .        V.
 22.833      5.7496      0.65  .Q         .         .         .        V.
 22.917      5.7541      0.65  .Q         .         .         .        V.
 23.000      5.7586      0.65  .Q         .         .         .        V.
 23.083      5.7629      0.62  .Q         .         .         .        V.
 23.166      5.7671      0.62  .Q         .         .         .        V.
 23.250      5.7714      0.62  .Q         .         .         .        V.
 23.333      5.7756      0.62  .Q         .         .         .        V.
 23.416      5.7799      0.62  .Q         .         .         .        V.
 23.500      5.7842      0.62  .Q         .         .         .        V.
 23.583      5.7885      0.63  .Q         .         .         .        V.
 23.666      5.7928      0.63  .Q         .         .         .        V.
 23.750      5.7971      0.63  .Q         .         .         .        V.
 23.833      5.8015      0.63  .Q         .         .         .        V.
 23.916      5.8058      0.63  .Q         .         .         .        V.
 24.000      5.8101      0.63  .Q         .         .         .        V.
 24.083      5.8114      0.18  Q          .         .         .        V.
 24.166      5.8127      0.18  Q          .         .         .        V.
 24.250      5.8139      0.18  Q          .         .         .        V.
 24.333      5.8152      0.18  Q          .         .         .        V.
 24.416      5.8165      0.18  Q          .         .         .        V.
 24.500      5.8177      0.18  Q          .         .         .        V.
 24.583      5.8178      0.01  Q          .         .         .        V.
 24.666      5.8179      0.01  Q          .         .         .        V.
 24.750      5.8179      0.01  Q          .         .         .        V.
 24.833      5.8180      0.01  Q          .         .         .        V.
 24.916      5.8180      0.01  Q          .         .         .        V.
 25.000      5.8181      0.01  Q          .         .         .        V.
-------------------------------------------------------------------------------
```

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1500.0
10%	720.0
20%	540.0
30%	480.0
40%	450.0
50%	360.0
60%	240.0
70%	180.0
80%	60.0
90%	30.0

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================

                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                 __effective depth
                 -----------             |   (and volume)
                |           |    |    |
                |           |    |....V........
                | detention |<-->|           outflow
                |   basin   |    |.........______
                 -----------     |    ^    |  \
                       |         |  dead   |   basin outlet
                       V         | storage |
                    OUTFLOW       ---------
                  (STREAM 1)


        ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
        THROUGH A FLOW-THROUGH DETENTION BASIN
        SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
          DEAD STORAGE(AF) =      0.710
          SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
          SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
          DETENTION BASIN CONSTANT LOSS RATE(CFS) =    0.70
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.12	7.60	0.804
3	0.25	10.75	0.898
4	0.38	13.17	0.994
5	0.50	15.21	1.091

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.10	0.10	0.00	0.0	0.000
0.167	0.000	0.10	0.20	0.00	0.0	0.000
0.250	0.000	0.10	0.30	0.00	0.0	0.000
0.333	0.000	0.10	0.40	0.00	0.0	0.000
0.417	0.000	0.10	0.50	0.00	0.0	0.000
0.500	0.000	0.10	0.60	0.00	0.0	0.000
0.583	0.000	0.18	0.70	0.00	0.0	0.000
0.667	0.000	0.18	0.70	0.00	0.0	0.000
0.750	0.000	0.18	0.70	0.00	0.0	0.000
0.833	0.000	0.18	0.70	0.00	0.0	0.000
0.917	0.000	0.18	0.70	0.00	0.0	0.000
1.000	0.000	0.18	0.70	0.00	0.0	0.000
1.083	0.000	0.18	0.70	0.00	0.0	0.000
1.167	0.000	0.18	0.70	0.00	0.0	0.000
1.250	0.000	0.18	0.70	0.00	0.0	0.000
1.333	0.000	0.18	0.70	0.00	0.0	0.000
1.417	0.000	0.18	0.70	0.00	0.0	0.000
1.500	0.000	0.18	0.70	0.00	0.0	0.000
1.583	0.000	0.19	0.70	0.00	0.0	0.000
1.667	0.000	0.19	0.70	0.00	0.0	0.000
1.750	0.000	0.19	0.70	0.00	0.0	0.000
1.833	0.000	0.19	0.70	0.00	0.0	0.000
1.917	0.000	0.19	0.70	0.00	0.0	0.000
2.000	0.000	0.19	0.70	0.00	0.0	0.000
2.083	0.000	0.22	0.70	0.00	0.0	0.000
2.167	0.000	0.22	0.70	0.00	0.0	0.000
2.250	0.000	0.22	0.70	0.00	0.0	0.000
2.333	0.000	0.22	0.70	0.00	0.0	0.000
2.417	0.000	0.22	0.70	0.00	0.0	0.000
2.500	0.000	0.22	0.70	0.00	0.0	0.000
2.583	0.000	0.27	0.70	0.00	0.0	0.000
2.667	0.000	0.27	0.70	0.00	0.0	0.000
2.750	0.000	0.27	0.70	0.00	0.0	0.000
2.833	0.000	0.27	0.70	0.00	0.0	0.000
2.917	0.000	0.27	0.70	0.00	0.0	0.000
3.000	0.000	0.27	0.70	0.00	0.0	0.000
3.083	0.000	0.28	0.70	0.00	0.0	0.000
3.167	0.000	0.28	0.70	0.00	0.0	0.000
3.250	0.000	0.28	0.70	0.00	0.0	0.000
3.333	0.000	0.28	0.70	0.00	0.0	0.000
3.417	0.000	0.28	0.70	0.00	0.0	0.000
3.500	0.000	0.28	0.70	0.00	0.0	0.000
3.583	0.000	0.30	0.70	0.00	0.0	0.000
3.667	0.000	0.30	0.70	0.00	0.0	0.000
3.750	0.000	0.30	0.70	0.00	0.0	0.000
3.833	0.000	0.30	0.70	0.00	0.0	0.000
3.917	0.000	0.30	0.70	0.00	0.0	0.000
4.000	0.000	0.30	0.70	0.00	0.0	0.000
4.083	0.000	0.35	0.70	0.00	0.0	0.000
4.167	0.000	0.35	0.70	0.00	0.0	0.000
4.250	0.000	0.35	0.70	0.00	0.0	0.000
4.333	0.000	0.35	0.70	0.00	0.0	0.000
4.417	0.000	0.35	0.70	0.00	0.0	0.000
4.500	0.000	0.35	0.70	0.00	0.0	0.000

4.583	0.000	0.63	0.70	0.00	0.0	0.000
4.667	0.000	0.63	0.70	0.00	0.0	0.000
4.750	0.000	0.63	0.70	0.00	0.0	0.000
4.833	0.000	0.63	0.70	0.00	0.0	0.000
4.917	0.000	0.63	0.70	0.00	0.0	0.000
5.000	0.000	0.63	0.70	0.00	0.0	0.000
5.083	0.000	0.52	0.70	0.00	0.0	0.000
5.167	0.000	0.52	0.70	0.00	0.0	0.000
5.250	0.000	0.52	0.70	0.00	0.0	0.000
5.333	0.000	0.52	0.70	0.00	0.0	0.000
5.417	0.000	0.52	0.70	0.00	0.0	0.000
5.500	0.000	0.52	0.70	0.00	0.0	0.000
5.583	0.001	0.90	0.70	0.00	0.0	0.000
5.667	0.003	0.90	0.70	0.00	0.0	0.000
5.750	0.004	0.90	0.70	0.00	0.0	0.000
5.833	0.005	0.90	0.70	0.00	0.0	0.000
5.917	0.007	0.90	0.70	0.00	0.0	0.000
6.000	0.008	0.90	0.70	0.00	0.0	0.000
6.083	0.013	1.39	0.70	0.00	0.0	0.000
6.167	0.018	1.39	0.70	0.00	0.0	0.000
6.250	0.022	1.39	0.70	0.00	0.0	0.000
6.333	0.027	1.39	0.70	0.00	0.0	0.000
6.417	0.032	1.39	0.70	0.00	0.0	0.000
6.500	0.037	1.39	0.70	0.00	0.0	0.000
6.583	0.045	1.85	0.70	0.00	0.0	0.000
6.667	0.053	1.85	0.70	0.00	0.0	0.000
6.750	0.060	1.85	0.70	0.00	0.0	0.000
6.833	0.068	1.85	0.70	0.00	0.0	0.000
6.917	0.076	1.85	0.70	0.00	0.0	0.000
7.000	0.084	1.85	0.70	0.00	0.0	0.000
7.083	0.094	2.16	0.70	0.00	0.0	0.000
7.167	0.104	2.16	0.70	0.00	0.0	0.000
7.250	0.114	2.16	0.70	0.00	0.0	0.000
7.333	0.124	2.16	0.70	0.00	0.0	0.000
7.417	0.135	2.16	0.70	0.00	0.0	0.000
7.500	0.145	2.16	0.70	0.00	0.0	0.000
7.583	0.159	2.83	0.70	0.00	0.0	0.000
7.667	0.174	2.83	0.70	0.00	0.0	0.000
7.750	0.189	2.83	0.70	0.00	0.0	0.000
7.833	0.203	2.83	0.70	0.00	0.0	0.000
7.917	0.218	2.83	0.70	0.00	0.0	0.000
8.000	0.233	2.83	0.70	0.00	0.0	0.000
8.083	0.254	3.78	0.70	0.00	0.0	0.000
8.167	0.275	3.78	0.70	0.00	0.0	0.000
8.250	0.296	3.78	0.70	0.00	0.0	0.000
8.333	0.318	3.78	0.70	0.00	0.0	0.000
8.417	0.339	3.78	0.70	0.00	0.0	0.000
8.500	0.360	3.78	0.70	0.00	0.0	0.000
8.583	0.386	4.53	0.70	0.00	0.0	0.000
8.667	0.413	4.53	0.70	0.00	0.0	0.000
8.750	0.439	4.53	0.70	0.00	0.0	0.000
8.833	0.465	4.53	0.70	0.00	0.0	0.000
8.917	0.492	4.53	0.70	0.00	0.0	0.000
9.000	0.518	4.53	0.70	0.00	0.0	0.000
9.083	0.552	5.57	0.70	0.00	0.0	0.000
9.167	0.585	5.57	0.70	0.00	0.0	0.000
9.250	0.619	5.57	0.70	0.00	0.0	0.000
9.333	0.652	5.57	0.70	0.00	0.0	0.000
9.417	0.686	5.57	0.70	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 4.2 (less LOSS)
REMAINING UNIT FLOW IS 1.3 CFS.

9.500	0.710	5.57	0.70	0.00	0.0	0.009
9.583	0.710	6.49	0.70	0.01	0.3	0.047

9.667	0.710	6.49	0.70	0.01	0.6	0.083
9.750	0.710	6.49	0.70	0.02	0.9	0.116
9.833	0.710	6.49	0.70	0.02	1.2	0.147
9.917	0.710	6.49	0.70	0.03	1.5	0.177
10.000	0.710	6.49	0.70	0.03	1.8	0.204
10.083	0.710	5.04	0.70	0.03	2.0	0.220
10.167	0.710	5.04	0.70	0.04	2.2	0.235
10.250	0.710	5.04	0.70	0.04	2.3	0.250
10.333	0.710	5.04	0.70	0.04	2.4	0.263
10.417	0.710	5.04	0.70	0.04	2.5	0.275
10.500	0.710	5.04	0.70	0.04	2.7	0.287
10.583	0.710	5.78	0.70	0.05	2.8	0.303
10.667	0.710	5.78	0.70	0.05	2.9	0.317
10.750	0.710	5.78	0.70	0.05	3.1	0.331
10.833	0.710	5.78	0.70	0.05	3.2	0.344
10.917	0.710	5.78	0.70	0.06	3.3	0.356
11.000	0.710	5.78	0.70	0.06	3.4	0.368
11.083	0.710	6.08	0.70	0.06	3.5	0.381
11.167	0.710	6.08	0.70	0.06	3.7	0.392
11.250	0.710	6.08	0.70	0.06	3.8	0.404
11.333	0.710	6.08	0.70	0.06	3.9	0.414
11.417	0.710	6.08	0.70	0.07	4.0	0.424
11.500	0.710	6.08	0.70	0.07	4.0	0.433
11.583	0.710	5.65	0.70	0.07	4.1	0.439
11.667	0.710	5.65	0.70	0.07	4.2	0.444
11.750	0.710	5.65	0.70	0.07	4.2	0.449
11.833	0.710	5.65	0.70	0.07	4.3	0.454
11.917	0.710	5.65	0.70	0.07	4.3	0.458
12.000	0.710	5.65	0.70	0.07	4.3	0.462
12.083	0.710	7.69	0.70	0.07	4.5	0.480
12.167	0.710	7.69	0.70	0.08	4.6	0.496
12.250	0.710	7.69	0.70	0.08	4.8	0.511
12.333	0.710	7.69	0.70	0.08	4.9	0.526
12.417	0.710	7.69	0.70	0.08	5.0	0.539
12.500	0.710	7.69	0.70	0.09	5.2	0.552
12.583	0.710	9.39	0.70	0.09	5.3	0.575
12.667	0.710	9.39	0.70	0.09	5.5	0.597
12.750	0.710	9.39	0.70	0.10	5.7	0.617
12.833	0.710	9.39	0.70	0.10	5.9	0.636
12.917	0.710	9.39	0.70	0.10	6.1	0.654
13.000	0.710	9.39	0.70	0.10	6.3	0.671
13.083	0.710	11.26	0.70	0.11	6.5	0.699
13.167	0.710	11.26	0.70	0.11	6.7	0.725
13.250	0.710	11.26	0.70	0.12	7.0	0.750
13.333	0.710	11.26	0.70	0.12	7.2	0.773
13.417	0.710	11.26	0.70	0.12	7.4	0.795
13.500	0.710	11.26	0.70	0.14	7.7	0.814
13.583	0.710	8.97	0.70	0.14	8.0	0.816
13.667	0.710	8.97	0.70	0.14	8.0	0.818
13.750	0.710	8.97	0.70	0.15	8.1	0.819
13.833	0.710	8.97	0.70	0.15	8.1	0.820
13.917	0.710	8.97	0.70	0.15	8.2	0.821
14.000	0.710	8.97	0.70	0.15	8.2	0.822
14.083	0.710	8.83	0.70	0.15	8.2	0.821
14.167	0.710	8.83	0.70	0.15	8.2	0.821
14.250	0.710	8.83	0.70	0.15	8.2	0.821
14.333	0.710	8.83	0.70	0.15	8.2	0.821
14.417	0.710	8.83	0.70	0.15	8.2	0.820
14.500	0.710	8.83	0.70	0.15	8.1	0.820
14.583	0.710	8.95	0.70	0.15	8.2	0.821
14.667	0.710	8.95	0.70	0.15	8.2	0.822
14.750	0.710	8.95	0.70	0.15	8.2	0.822
14.833	0.710	8.95	0.70	0.15	8.2	0.822

14.917	0.710	8.95	0.70	0.15	8.2	0.823
15.000	0.710	8.95	0.70	0.15	8.2	0.823
15.083	0.710	8.37	0.70	0.15	8.2	0.819
15.167	0.710	8.37	0.70	0.14	8.1	0.817
15.250	0.710	8.37	0.70	0.14	8.0	0.814
15.333	0.710	8.37	0.70	0.14	7.9	0.813
15.417	0.710	8.37	0.70	0.13	7.9	0.811
15.500	0.710	8.37	0.70	0.13	7.8	0.810
15.583	0.710	7.01	0.70	0.12	7.7	0.801
15.667	0.710	7.01	0.70	0.12	7.5	0.792
15.750	0.710	7.01	0.70	0.12	7.5	0.784
15.833	0.710	7.01	0.70	0.12	7.4	0.777
15.917	0.710	7.01	0.70	0.12	7.3	0.770
16.000	0.710	7.01	0.70	0.12	7.2	0.764
16.083	0.710	2.57	0.70	0.11	7.1	0.728
16.167	0.710	2.57	0.70	0.11	6.7	0.695
16.250	0.710	2.57	0.70	0.10	6.4	0.663
16.333	0.710	2.57	0.70	0.10	6.1	0.634
16.417	0.710	2.57	0.70	0.09	5.9	0.606
16.500	0.710	2.57	0.70	0.09	5.6	0.581
16.583	0.710	0.76	0.70	0.08	5.3	0.544
16.667	0.710	0.76	0.70	0.08	5.0	0.510
16.750	0.710	0.76	0.70	0.07	4.7	0.479
16.833	0.710	0.76	0.70	0.07	4.4	0.449
16.917	0.710	0.76	0.70	0.07	4.1	0.421
17.000	0.710	0.76	0.70	0.06	3.9	0.395
17.083	0.710	1.17	0.70	0.06	3.6	0.373
17.167	0.710	1.17	0.70	0.05	3.4	0.353
17.250	0.710	1.17	0.70	0.05	3.2	0.334
17.333	0.710	1.17	0.70	0.05	3.1	0.316
17.417	0.710	1.17	0.70	0.05	2.9	0.299
17.500	0.710	1.17	0.70	0.04	2.8	0.283
17.583	0.710	1.27	0.70	0.04	2.6	0.269
17.667	0.710	1.27	0.70	0.04	2.5	0.256
17.750	0.710	1.27	0.70	0.04	2.4	0.244
17.833	0.710	1.27	0.70	0.04	2.2	0.232
17.917	0.710	1.27	0.70	0.03	2.1	0.221
18.000	0.710	1.27	0.70	0.03	2.0	0.211
18.083	0.710	1.13	0.70	0.03	1.9	0.201
18.167	0.710	1.13	0.70	0.03	1.9	0.191
18.250	0.710	1.13	0.70	0.03	1.8	0.182
18.333	0.710	1.13	0.70	0.03	1.7	0.173
18.417	0.710	1.13	0.70	0.03	1.6	0.165
18.500	0.710	1.13	0.70	0.02	1.5	0.158
18.583	0.710	0.71	0.70	0.02	1.4	0.148
18.667	0.710	0.71	0.70	0.02	1.4	0.139
18.750	0.710	0.71	0.70	0.02	1.3	0.130
18.833	0.710	0.71	0.70	0.02	1.2	0.122
18.917	0.710	0.71	0.70	0.02	1.1	0.114
19.000	0.710	0.71	0.70	0.02	1.0	0.107
19.083	0.710	0.86	0.70	0.02	1.0	0.101
19.167	0.710	0.86	0.70	0.01	0.9	0.096
19.250	0.710	0.86	0.70	0.01	0.9	0.091
19.333	0.710	0.86	0.70	0.01	0.8	0.086
19.417	0.710	0.86	0.70	0.01	0.8	0.082
19.500	0.710	0.86	0.70	0.01	0.8	0.078
19.583	0.710	0.73	0.70	0.01	0.7	0.073
19.667	0.710	0.73	0.70	0.01	0.7	0.069
19.750	0.710	0.73	0.70	0.01	0.6	0.065
19.833	0.710	0.73	0.70	0.01	0.6	0.061
19.917	0.710	0.73	0.70	0.01	0.6	0.057
20.000	0.710	0.73	0.70	0.01	0.5	0.054
20.083	0.710	0.79	0.70	0.01	0.5	0.051

20.167	0.710	0.79	0.70	0.01	0.5	0.048
20.250	0.710	0.79	0.70	0.01	0.4	0.046
20.333	0.710	0.79	0.70	0.01	0.4	0.044
20.417	0.710	0.79	0.70	0.01	0.4	0.042
20.500	0.710	0.79	0.70	0.01	0.4	0.040
20.583	0.710	0.74	0.70	0.01	0.4	0.037
20.667	0.710	0.74	0.70	0.01	0.3	0.035
20.750	0.710	0.74	0.70	0.01	0.3	0.033
20.833	0.710	0.74	0.70	0.00	0.3	0.031
20.917	0.710	0.74	0.70	0.00	0.3	0.030
21.000	0.710	0.74	0.70	0.00	0.3	0.028
21.083	0.710	0.72	0.70	0.00	0.3	0.027
21.167	0.710	0.72	0.70	0.00	0.2	0.025
21.250	0.710	0.72	0.70	0.00	0.2	0.024
21.333	0.710	0.72	0.70	0.00	0.2	0.022
21.417	0.710	0.72	0.70	0.00	0.2	0.021
21.500	0.710	0.72	0.70	0.00	0.2	0.020
21.583	0.710	0.74	0.70	0.00	0.2	0.019
21.667	0.710	0.74	0.70	0.00	0.2	0.018
21.750	0.710	0.74	0.70	0.00	0.2	0.017
21.833	0.710	0.74	0.70	0.00	0.2	0.016
21.917	0.710	0.74	0.70	0.00	0.2	0.016
22.000	0.710	0.74	0.70	0.00	0.1	0.015
22.083	0.710	0.77	0.70	0.00	0.1	0.014
22.167	0.710	0.77	0.70	0.00	0.1	0.014
22.250	0.710	0.77	0.70	0.00	0.1	0.013
22.333	0.710	0.77	0.70	0.00	0.1	0.013
22.417	0.710	0.77	0.70	0.00	0.1	0.013
22.500	0.710	0.77	0.70	0.00	0.1	0.012
22.583	0.710	0.65	0.70	0.00	0.1	0.011
22.667	0.710	0.65	0.70	0.00	0.1	0.010
22.750	0.710	0.65	0.70	0.00	0.1	0.009
22.833	0.710	0.65	0.70	0.00	0.1	0.008
22.917	0.710	0.65	0.70	0.00	0.1	0.008
23.000	0.710	0.65	0.70	0.00	0.1	0.007
23.083	0.710	0.62	0.70	0.00	0.1	0.006
23.167	0.710	0.62	0.70	0.00	0.1	0.005
23.250	0.710	0.62	0.70	0.00	0.0	0.004
23.333	0.710	0.62	0.70	0.00	0.0	0.003
23.417	0.710	0.62	0.70	0.00	0.0	0.002
23.500	0.710	0.62	0.70	0.00	0.0	0.002
23.583	0.710	0.63	0.70	0.00	0.0	0.001
23.667	0.710	0.63	0.70	0.00	0.0	0.001
23.750	0.710	0.63	0.70	0.00	0.0	0.000
23.833	0.710	0.63	0.70	0.00	0.0	0.000
23.917	0.709	0.63	0.70	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 5.818 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 3.899 AF
LOSS VOLUME = 1.920 AF

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FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 4

>>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<

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MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW

VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET: UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO (0.938)(DIAMETER):

PIPELENGTH(FT) = 200.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1390.25
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000
3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000

3.833	0.00	0.00	0.00	0.000
3.917	0.00	0.00	0.00	0.000
4.000	0.00	0.00	0.00	0.000
4.083	0.00	0.00	0.00	0.000
4.167	0.00	0.00	0.00	0.000
4.250	0.00	0.00	0.00	0.000
4.333	0.00	0.00	0.00	0.000
4.417	0.00	0.00	0.00	0.000
4.500	0.00	0.00	0.00	0.000
4.583	0.00	0.00	0.00	0.000
4.667	0.00	0.00	0.00	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000
5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000
6.083	0.00	0.00	0.00	0.000
6.167	0.00	0.00	0.00	0.000
6.250	0.00	0.00	0.00	0.000
6.333	0.00	0.00	0.00	0.000
6.417	0.00	0.00	0.00	0.000
6.500	0.00	0.00	0.00	0.000
6.583	0.00	0.00	0.00	0.000
6.667	0.00	0.00	0.00	0.000
6.750	0.00	0.00	0.00	0.000
6.833	0.00	0.00	0.00	0.000
6.917	0.00	0.00	0.00	0.000
7.000	0.00	0.00	0.00	0.000
7.083	0.00	0.00	0.00	0.000
7.167	0.00	0.00	0.00	0.000
7.250	0.00	0.00	0.00	0.000
7.333	0.00	0.00	0.00	0.000
7.417	0.00	0.00	0.00	0.000
7.500	0.00	0.00	0.00	0.000
7.583	0.00	0.00	0.00	0.000
7.667	0.00	0.00	0.00	0.000
7.750	0.00	0.00	0.00	0.000
7.833	0.00	0.00	0.00	0.000
7.917	0.00	0.00	0.00	0.000
8.000	0.00	0.00	0.00	0.000
8.083	0.00	0.00	0.00	0.000
8.167	0.00	0.00	0.00	0.000
8.250	0.00	0.00	0.00	0.000
8.333	0.00	0.00	0.00	0.000
8.417	0.00	0.00	0.00	0.000
8.500	0.00	0.00	0.00	0.000
8.583	0.00	0.00	0.00	0.000
8.667	0.00	0.00	0.00	0.000
8.750	0.00	0.00	0.00	0.000
8.833	0.00	0.00	0.00	0.000
8.917	0.00	0.00	0.00	0.000
9.000	0.00	0.00	0.00	0.000

9.083	0.00	0.00	0.00	0.000
9.167	0.00	0.00	0.00	0.000
9.250	0.00	0.00	0.00	0.000
9.333	0.00	0.00	0.00	0.000
9.417	0.00	0.00	0.00	0.000
9.500	0.04	0.50	0.00	0.000
9.583	0.26	1.56	0.18	0.000
9.667	0.61	2.69	0.59	0.000
9.750	0.94	3.07	0.89	0.000
9.833	1.25	3.36	1.20	0.000
9.917	1.53	3.57	1.49	0.000
10.000	1.80	3.75	1.77	0.000
10.083	2.01	3.87	1.98	0.000
10.167	2.15	3.95	2.14	0.000
10.250	2.29	4.03	2.28	0.000
10.333	2.42	4.10	2.41	0.000
10.417	2.54	4.15	2.53	0.000
10.500	2.66	4.20	2.64	0.000
10.583	2.79	4.24	2.77	0.000
10.667	2.93	4.29	2.91	0.000
10.750	3.07	4.35	3.05	0.000
10.833	3.19	4.39	3.18	0.000
10.917	3.31	4.44	3.30	0.000
11.000	3.42	4.47	3.41	0.000
11.083	3.54	4.50	3.52	0.000
11.167	3.65	4.53	3.64	0.000
11.250	3.76	4.57	3.75	0.000
11.333	3.86	4.60	3.85	0.000
11.417	3.96	4.63	3.95	0.000
11.500	4.05	4.66	4.04	0.000
11.583	4.12	4.69	4.11	0.000
11.667	4.17	4.70	4.17	0.000
11.750	4.22	4.72	4.22	0.000
11.833	4.27	4.73	4.26	0.000
11.917	4.31	4.74	4.30	0.000
12.000	4.35	4.76	4.35	0.000
12.083	4.45	4.78	4.44	0.000
12.167	4.61	4.83	4.60	0.000
12.250	4.76	4.86	4.75	0.000
12.333	4.90	4.89	4.89	0.000
12.417	5.03	4.92	5.02	0.000
12.500	5.16	4.94	5.14	0.000
12.583	5.33	4.97	5.31	0.000
12.667	5.54	5.01	5.52	0.000
12.750	5.74	5.06	5.72	0.000
12.833	5.92	5.09	5.90	0.000
12.917	6.10	5.12	6.08	0.000
13.000	6.26	5.15	6.24	0.000
13.083	6.47	5.19	6.45	0.000
13.167	6.73	5.23	6.70	0.000
13.250	6.97	5.25	6.95	0.000
13.333	7.20	5.28	7.17	0.000
13.417	7.41	5.30	7.39	0.000
13.500	7.73	5.33	7.69	0.000
13.583	7.97	5.34	7.95	0.000
13.667	8.04	5.35	8.03	0.000
13.750	8.08	5.35	8.08	0.000
13.833	8.12	5.35	8.12	0.000
13.917	8.15	5.35	8.15	0.000
14.000	8.18	5.35	8.17	0.000
14.083	8.18	5.35	8.18	0.000
14.167	8.17	5.35	8.17	0.000
14.250	8.16	5.35	8.16	0.000

14.333	8.16	5.35	8.16	0.000
14.417	8.15	5.35	8.15	0.000
14.500	8.15	5.35	8.15	0.000
14.583	8.16	5.35	8.16	0.000
14.667	8.18	5.35	8.18	0.000
14.750	8.19	5.35	8.19	0.000
14.833	8.21	5.35	8.21	0.000
14.917	8.22	5.35	8.22	0.000
15.000	8.22	5.35	8.22	0.000
15.083	8.17	5.35	8.18	0.000
15.167	8.07	5.35	8.08	0.000
15.250	7.99	5.34	8.00	0.000
15.333	7.92	5.34	7.93	0.000
15.417	7.87	5.34	7.88	0.000
15.500	7.83	5.33	7.83	0.000
15.583	7.69	5.33	7.71	0.000
15.667	7.53	5.31	7.55	0.000
15.750	7.45	5.31	7.46	0.000
15.833	7.38	5.30	7.39	0.000
15.917	7.31	5.29	7.32	0.000
16.000	7.25	5.28	7.26	0.000
16.083	7.05	5.26	7.07	0.000
16.167	6.72	5.23	6.76	0.000
16.250	6.42	5.18	6.45	0.000
16.333	6.13	5.13	6.16	0.000
16.417	5.86	5.08	5.89	0.000
16.500	5.61	5.03	5.63	0.000
16.583	5.32	4.97	5.35	0.000
16.667	4.99	4.91	5.02	0.000
16.750	4.67	4.84	4.71	0.000
16.833	4.38	4.76	4.41	0.000
16.917	4.11	4.69	4.14	0.000
17.000	3.86	4.60	3.88	0.000
17.083	3.63	4.53	3.65	0.000
17.167	3.43	4.47	3.45	0.000
17.250	3.24	4.41	3.26	0.000
17.333	3.07	4.35	3.09	0.000
17.417	2.91	4.29	2.92	0.000
17.500	2.75	4.23	2.77	0.000
17.583	2.61	4.18	2.63	0.000
17.667	2.48	4.13	2.50	0.000
17.750	2.36	4.07	2.38	0.000
17.833	2.25	4.00	2.26	0.000
17.917	2.14	3.95	2.16	0.000
18.000	2.05	3.89	2.06	0.000
18.083	1.95	3.83	1.96	0.000
18.167	1.85	3.78	1.86	0.000
18.250	1.76	3.73	1.77	0.000
18.333	1.68	3.68	1.69	0.000
18.417	1.60	3.62	1.61	0.000
18.500	1.53	3.57	1.54	0.000
18.583	1.44	3.51	1.45	0.000
18.667	1.35	3.44	1.37	0.000
18.750	1.27	3.38	1.28	0.000
18.833	1.19	3.31	1.20	0.000
18.917	1.12	3.24	1.13	0.000
19.000	1.05	3.17	1.06	0.000
19.083	0.99	3.11	0.99	0.000
19.167	0.93	3.06	0.94	0.000
19.250	0.89	3.01	0.89	0.000
19.333	0.84	2.97	0.85	0.000
19.417	0.80	2.92	0.80	0.000
19.500	0.76	2.87	0.76	0.000

19.583	0.71	2.82	0.72	0.000
19.667	0.67	2.76	0.68	0.000
19.750	0.63	2.71	0.64	0.000
19.833	0.59	2.67	0.60	0.000
19.917	0.56	2.62	0.56	0.000
20.000	0.52	2.58	0.53	0.000
20.083	0.49	2.54	0.50	0.000
20.167	0.47	2.51	0.47	0.000
20.250	0.45	2.48	0.45	0.000
20.333	0.42	2.45	0.43	0.000
20.417	0.40	2.37	0.40	0.000
20.500	0.38	2.26	0.38	0.000
20.583	0.36	2.14	0.36	0.000
20.667	0.34	2.02	0.34	0.000
20.750	0.32	1.91	0.32	0.000
20.833	0.31	1.80	0.31	0.000
20.917	0.29	1.70	0.29	0.000
21.000	0.27	1.61	0.27	0.000
21.083	0.26	1.52	0.26	0.000
21.167	0.24	1.43	0.24	0.000
21.250	0.23	1.35	0.23	0.000
21.333	0.22	1.27	0.22	0.000
21.417	0.20	1.20	0.20	0.000
21.500	0.19	1.13	0.19	0.000
21.583	0.18	1.07	0.18	0.000
21.667	0.17	1.02	0.17	0.000
21.750	0.16	0.97	0.16	0.000
21.833	0.16	0.93	0.16	0.000
21.917	0.15	0.88	0.15	0.000
22.000	0.14	0.84	0.14	0.000
22.083	0.14	0.81	0.14	0.000
22.167	0.13	0.79	0.13	0.000
22.250	0.13	0.76	0.13	0.000
22.333	0.13	0.74	0.13	0.000
22.417	0.12	0.72	0.12	0.000
22.500	0.12	0.70	0.12	0.000
22.583	0.11	0.66	0.11	0.000
22.667	0.10	0.60	0.11	0.000
22.750	0.09	0.54	0.09	0.000
22.833	0.08	0.50	0.08	0.000
22.917	0.08	0.50	0.08	0.000
23.000	0.07	0.50	0.08	0.000
23.083	0.06	0.50	0.07	0.000
23.167	0.05	0.50	0.06	0.000
23.250	0.04	0.50	0.05	0.000
23.333	0.03	0.50	0.05	0.000
23.417	0.03	0.50	0.04	0.000
23.500	0.02	0.50	0.03	0.000
23.583	0.01	0.50	0.02	0.000
23.667	0.01	0.50	0.02	0.000
23.750	0.00	0.50	0.01	0.000
23.833	0.00	0.00	0.01	0.000
23.917	0.00	0.00	0.00	0.000
24.000	0.00	0.00	0.00	0.000

==========

END OF FLOODSCx ROUTING ANALYSIS

ADVANCED ENGINEERING SOFTWARE (AES) SUMMARY AND OUTPUT

SAND-FILTER BASIN ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO SAND-FILTER BASIN - 25 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: AREA2.DAT
  TIME/DATE OF STUDY: 13:40 05/06/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   25.00   1-HOUR INTENSITY(INCH/HOUR) =   1.165
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.170
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8857
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.90
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   770.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.90
  PIPE TRAVEL TIME(MIN.) =   2.83    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.170
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8857
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.90
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   515.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.90
  PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =    9.26
```

```
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.26
  RAINFALL INTENSITY(INCH/HR) =   2.86
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.90

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   450.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.303*[(  450.00**3)/(     2.50)]**.2 =    9.861
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.772
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8840
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.87
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      3.87

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.87
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   2.70
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.87

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  350.00**3)/(     3.50)]**.2 =    7.929
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.077
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8853
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      1.16   TOTAL RUNOFF(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.16
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    8.86
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.86
  RAINFALL INTENSITY(INCH/HR) =   2.92
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  USER SPECIFIED Tc(MIN.) =    5.000
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.840
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7785
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.75
  TOTAL AREA(ACRES) =      1.59   TOTAL RUNOFF(CFS) =      4.75

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  5
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   3.84
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.75

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        5.90    10.28        2.716          2.10
    2        5.90     9.26        2.856          2.10
    3        3.87    10.38        2.704          1.58
    4        3.16     8.86        2.918          1.16
    5        4.75     5.00        3.840          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  5 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       14.45     5.00       3.840
    2       20.79     8.86       2.918
    3       21.29     9.26       2.856
    4       21.64    10.28       2.716
    5       21.60    10.38       2.704

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      21.64   Tc(MIN.) =   10.28
TOTAL AREA(ACRES) =        8.5
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    999.00 =    1070.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     10.28
PEAK FLOW RATE(CFS)   =      21.64
*** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)
1       14.45       5.00
2       20.79       8.86
3       21.29       9.26
4       21.64      10.28
5       21.60      10.38
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO SAND-FILTER BASIN - 50 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: AREA2.DAT
  TIME/DATE OF STUDY: 13:39 05/06/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   50.00   1-HOUR INTENSITY(INCH/HOUR) =   1.344
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.82
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   770.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   2.77    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   3.14
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.82
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   515.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =    9.22
```

```
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.22
  RAINFALL INTENSITY(INCH/HR) =   3.30
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.82

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   450.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.303*[(  450.00**3)/(     2.50)]**.2 =    9.861
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.198
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.48
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      4.48

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.48
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.35
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.35
  RAINFALL INTENSITY(INCH/HR) =   3.12
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.48

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  350.00**3)/(     3.50)]**.2 =    7.929
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.551
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.65
  TOTAL AREA(ACRES) =      1.16   TOTAL RUNOFF(CFS) =      3.65

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.65
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   3.38
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.65

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  USER SPECIFIED Tc(MIN.) =    5.000
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.430
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7928
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.58
  TOTAL AREA(ACRES) =      1.59   TOTAL RUNOFF(CFS) =      5.58

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  5
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   4.43
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.58

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        6.82    10.23        3.142          2.10
    2        6.82     9.22        3.303          2.10
    3        4.48    10.35        3.124          1.58
    4        3.65     8.80        3.378          1.16
    5        5.58     5.00        4.430          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  5 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       16.85     5.00       4.430
    2       24.08     8.80       3.378
    3       24.68     9.22       3.303
    4       25.08    10.23       3.142
    5       25.01    10.35       3.124

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      25.08   Tc(MIN.) =   10.23
TOTAL AREA(ACRES) =        8.5
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    999.00 =    1070.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     10.23
PEAK FLOW RATE(CFS)   =      25.08
*** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)
1       16.85       5.00
2       24.08       8.80
3       24.68       9.22
4       25.08      10.23
5       25.01      10.35
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

♀

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2008 Advanced Engineering Software (aes)
                      (Rational Tabling Version 15.0)
                  Release Date: 04/01/2008  License ID 1421

                          Analysis prepared by:

                                SCOTT HEBERER
                  DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF INFLOW TO SAND-FILTER BASIN - 100 YEAR STORM EVENT


----------------------------------------------------------------------------
  FILE NAME: AREA2.DAT
  TIME/DATE OF STUDY: 13:37 05/06/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.620
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.500
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.500
  SLOPE OF INTENSITY DURATION CURVE = 0.4800
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.082
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8885
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.62
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   770.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.62
  PIPE TRAVEL TIME(MIN.) =   2.63    Tc(MIN.) =   10.09
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.09
  RAINFALL INTENSITY(INCH/HR) =   3.53
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  UPSTREAM ELEVATION(FEET) =   1450.00
  DOWNSTREAM ELEVATION(FEET) =   1447.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  300.00**3)/(     3.00)]**.2 =    7.455
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.082
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8885
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.62
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.50  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   515.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.62
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =    9.14
```

```
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   3.70
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   450.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  TC = 0.303*[(  450.00**3)/(     2.50)]**.2 =    9.861
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.569
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.00
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1398.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.95
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.00
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.34
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   3.49
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1402.50
  DOWNSTREAM ELEVATION(FEET) =   1399.00
  ELEVATION DIFFERENCE(FEET) =      3.50
  TC = 0.303*[(  350.00**3)/(     3.50)]**.2 =    7.929
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.963
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8882
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.08
  TOTAL AREA(ACRES) =      1.16   TOTAL RUNOFF(CFS) =      4.08

******************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1397.00  DOWNSTREAM(FEET) =  1394.50
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.08
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    8.77
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     615.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    999.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.77
  RAINFALL INTENSITY(INCH/HR) =   3.77
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.08

******************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  22
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.944
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .8027
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.31
  TOTAL AREA(ACRES) =      1.59   TOTAL RUNOFF(CFS) =      6.31

******************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    999.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
```

```
TOTAL NUMBER OF STREAMS =  5
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   4.94
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        7.62    10.09        3.530          2.10
    2        7.62     9.14        3.702          2.10
    3        5.00    10.34        3.488          1.58
    4        4.08     8.77        3.775          1.16
    5        6.31     5.00        4.944          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  5 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       19.00     5.00       4.944
    2       27.08     8.77       3.775
    3       27.66     9.14       3.702
    4       28.08    10.09       3.530
    5       27.93    10.34       3.488

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      28.08   Tc(MIN.) =   10.09
TOTAL AREA(ACRES) =        8.5
LONGEST FLOWPATH FROM NODE    600.00 TO NODE    999.00 =    1070.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     10.09
PEAK FLOW RATE(CFS)   =      28.08
*** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)
1       19.00       5.00
2       27.08       8.77
3       27.66       9.14
4       28.08      10.09
5       27.93      10.34
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

♀

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****************************************************************************

              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                              SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-1HR
----------------------------------------------------------------------------
  FILE NAME: BASIN201.DAT
  TIME/DATE OF STUDY: 15:29 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  1.50 INCHES
         RCFC&WCD 1-Hour Storm (5-Minute period) SELECTED
         (SLOPE OF INTENSITY-DURATION CURVE = 0.48)
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  83.333


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                13.994                14.385
        2                59.664                46.948
        3                78.792                19.663
        4                86.766                 8.197
        5                91.428                 4.792
```

6	94.514	3.173
7	96.650	2.195
8	98.044	1.433
9	98.699	0.673
10	99.289	0.607
11	99.716	0.439
12	99.929	0.219
13	100.000	0.073

♀
****

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0669	0.0083	0.0586
2	0.0707	0.0083	0.0624
3	0.0751	0.0083	0.0668
4	0.0829	0.0083	0.0745
5	0.0874	0.0083	0.0791
6	0.0994	0.0083	0.0911
7	0.1167	0.0083	0.1084
8	0.1282	0.0083	0.1199
9	0.1929	0.0083	0.1846
10	0.3979	0.0083	0.3896
11	0.1079	0.0083	0.0996
12	0.0739	0.0083	0.0656

TOTAL STORM RAINFALL(INCHES) = 1.50
TOTAL SOIL-LOSS(INCHES) = 0.10
TOTAL EFFECTIVE RAINFALL(INCHES) = 1.40

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.0708
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.9912

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1 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 7.5 15.0 22.5 30.0
0.083	0.0058	0.84	VQ . . . .
0.167	0.0309	3.65	.V Q . . . .
0.250	0.0657	5.04	. V Q . . . .
0.333	0.1064	5.91	. V Q . . . .
0.417	0.1528	6.74	. V Q . . . .
0.500	0.2046	7.52	. V Q . . . .
0.583	0.2642	8.65	. VQ . . . .
0.667	0.3333	10.04	. . Q . . . .
0.750	0.4163	12.05	. . Q . . . .
0.833	0.5440	18.54	. . .V Q . . .
0.917	0.7198	25.53	. . . V. Q .
1.000	0.8311	16.15	. . .Q . V .
1.083	0.9000	10.01	. . Q . . . V .
1.167	0.9354	5.14	. Q . . . . V .

```
   1.250      0.9561      3.01  .   Q     .         .         .       V .
   1.333      0.9696      1.96  . Q       .         .         .        V.
   1.417      0.9783      1.26  .Q        .         .         .        V.
   1.500      0.9834      0.74  Q         .         .         .        V.
   1.583      0.9869      0.51  Q         .         .         .        V.
   1.667      0.9892      0.32  Q         .         .         .        V.
   1.750      0.9904      0.18  Q         .         .         .        V.
   1.833      0.9910      0.08  Q         .         .         .        V.
   1.917      0.9911      0.02  Q         .         .         .        V.
   2.000      0.9912      0.00  Q         .         .         .        V.
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   =======================                 =========
             0%                              120.0
            10%                               70.0
            20%                               55.0
            30%                               35.0
            40%                               20.0
            50%                               15.0
            60%                               15.0
            70%                               10.0
            80%                                5.0
            90%                                5.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ==============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                    -----------           |   (and volume)
                   |           |    |     |
                   |           |    |....V........
                   | detention |<-->|           outflow
                   |   basin   |    |.........______
                    -----------     |    ^    |  \
                        |           |  dead   |   basin outlet
                        V           | storage |
                     OUTFLOW         ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.377
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    1.00
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498
5	0.80	17.31	0.542
6	1.00	19.36	0.587

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MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.84	0.84	0.00	0.0	0.000
0.167	0.018	3.65	1.00	0.00	0.0	0.000
0.250	0.046	5.04	1.00	0.00	0.0	0.000
0.333	0.080	5.91	1.00	0.00	0.0	0.000
0.417	0.119	6.74	1.00	0.00	0.0	0.000
0.500	0.164	7.52	1.00	0.00	0.0	0.000
0.583	0.217	8.65	1.00	0.00	0.0	0.000
0.667	0.279	10.04	1.00	0.00	0.0	0.000
0.750	0.355	12.05	1.00	0.00	0.0	0.000
DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) =					4.2 (less LOSS)	
REMAINING UNIT FLOW IS		14.4 CFS.				
0.833	0.377	18.54	1.00	0.04	1.0	0.092
0.917	0.377	25.53	1.00	0.11	3.4	0.238
1.000	0.377	16.15	1.00	0.15	5.6	0.303
1.083	0.377	10.01	1.00	0.15	6.5	0.321
1.167	0.377	5.14	1.00	0.15	6.5	0.304
1.250	0.377	3.01	1.00	0.13	6.0	0.276
1.333	0.377	1.96	1.00	0.12	5.4	0.246
1.417	0.377	1.26	1.00	0.10	4.8	0.214
1.500	0.377	0.74	1.00	0.09	4.1	0.184
1.583	0.377	0.51	1.00	0.08	3.5	0.156
1.667	0.377	0.32	1.00	0.06	3.0	0.131
1.750	0.377	0.18	1.00	0.05	2.5	0.108
1.833	0.377	0.08	1.00	0.04	2.0	0.088
1.917	0.377	0.02	1.00	0.03	1.6	0.070
2.000	0.377	0.00	1.00	0.03	1.3	0.054
2.083	0.377	0.00	1.00	0.02	1.0	0.040
2.167	0.377	0.00	1.00	0.01	0.7	0.029
2.250	0.377	0.00	1.00	0.01	0.5	0.018
2.333	0.377	0.00	1.00	0.00	0.3	0.009
2.417	0.377	0.00	1.00	0.00	0.1	0.002
2.500	0.372	0.00	1.00	0.00	0.0	0.000
2.583	0.365	0.00	1.00	0.00	0.0	0.000
2.667	0.358	0.00	1.00	0.00	0.0	0.000
2.750	0.351	0.00	1.00	0.00	0.0	0.000
2.833	0.345	0.00	1.00	0.00	0.0	0.000
2.917	0.338	0.00	1.00	0.00	0.0	0.000
3.000	0.331	0.00	1.00	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 0.991 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)

```
    OUTFLOW VOLUME =      0.414 AF
    LOSS    VOLUME =      0.578 AF

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  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================
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MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 400.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1391.00
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.96	2.86	0.51	0.000
0.917	3.43	4.11	2.77	0.000
1.000	5.63	4.61	5.12	0.000
1.083	6.49	4.73	6.29	0.000
1.167	6.50	4.73	6.50	0.000
1.250	6.04	4.68	6.15	0.000
1.333	5.43	4.58	5.58	0.000
1.417	4.79	4.45	4.94	0.000
1.500	4.15	4.32	4.30	0.000
1.583	3.54	4.15	3.68	0.000
1.667	2.99	3.98	3.13	0.000
1.750	2.49	3.79	2.62	0.000
1.833	2.04	3.60	2.16	0.000
1.917	1.64	3.37	1.75	0.000
2.000	1.29	3.13	1.39	0.000
2.083	0.98	2.88	1.08	0.000
2.167	0.72	2.62	0.81	0.000
2.250	0.49	2.33	0.58	0.000
2.333	0.29	1.70	0.34	0.000
2.417	0.12	0.69	0.23	0.000
2.500	0.02	0.50	0.01	0.000
2.583	0.00	0.00	0.11	0.000
2.667	0.00	0.00	0.01	0.000

2.750	0.00	0.00	0.01	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-3HR


----------------------------------------------------------------------------
  FILE NAME: BASIN203.DAT
  TIME/DATE OF STUDY: 15:43 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  2.55 INCHES
         RCFC&WCD 3-Hour Storm (10-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  10.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 166.667


============================================================================
                       UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                36.829                18.930
        2                82.779                23.618
        3                92.971                 5.239
        4                97.347                 2.249
```

5	98.994	0.846
6	99.522	0.272
7	99.809	0.147
8	99.952	0.074
9	100.000	0.025

♀
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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0663	0.0167	0.0496
2	0.0663	0.0167	0.0496
3	0.0841	0.0167	0.0675
4	0.0841	0.0167	0.0675
5	0.0841	0.0167	0.0675
6	0.0867	0.0167	0.0700
7	0.1122	0.0167	0.0955
8	0.1071	0.0167	0.0904
9	0.1351	0.0167	0.1185
10	0.1300	0.0167	0.1134
11	0.1632	0.0167	0.1465
12	0.1504	0.0167	0.1338
13	0.1861	0.0167	0.1695
14	0.2167	0.0167	0.2001
15	0.3595	0.0167	0.3429
16	0.3595	0.0167	0.3429
17	0.0969	0.0167	0.0802
18	0.0612	0.0167	0.0445

TOTAL STORM RAINFALL(INCHES) = 2.55
TOTAL SOIL-LOSS(INCHES) = 0.30
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.25

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.2125
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.5929

♀
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3 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

==========

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0065	0.94	VQ . . . .
0.167	0.0129	0.94	VQ . . . .
0.250	0.0275	2.11	V Q . . . .
0.333	0.0420	2.11	V Q . . . .
0.417	0.0607	2.71	.V Q . . . .
0.500	0.0793	2.71	.V Q . . . .
0.583	0.1017	3.24	. V Q . . . .
0.667	0.1240	3.24	. V Q . . . .
0.750	0.1473	3.38	. V Q . . . .
0.833	0.1705	3.38	. V Q . . . .
0.917	0.1945	3.48	. V Q . . . .

```
   1.000      0.2185      3.48  .    VQ   .         .         .         .
   1.083      0.2463      4.05  .     V Q .         .         .         .
   1.167      0.2742      4.05  .     V Q .         .         .         .
   1.250      0.3057      4.57  .      V Q.         .         .         .
   1.333      0.3372      4.57  .       VQ.         .         .         .
   1.417      0.3725      5.13  .        VQ         .         .         .
   1.500      0.4078      5.13  .         Q         .         .         .
   1.583      0.4472      5.73  .         .Q        .         .         .
   1.667      0.4867      5.73  .         .QV       .         .         .
   1.750      0.5307      6.39  .         . QV      .         .         .
   1.833      0.5747      6.39  .         . Q V     .         .         .
   1.917      0.6228      6.97  .         .  Q V    .         .         .
   2.000      0.6708      6.97  .         .  Q  V   .         .         .
   2.083      0.7227      7.54  .         .    Q  V .         .         .
   2.167      0.7746      7.54  .         .    Q   V.         .         .
   2.250      0.8364      8.97  .         .      Q  .V        .         .
   2.333      0.8981      8.97  .         .      Q  . V       .         .
   2.417      0.9848     12.59  .         .         .   VQ    .         .
   2.500      1.0715     12.59  .         .         .    QV   .         .
   2.583      1.1831     16.20  .         .         .        V. Q       .
   2.667      1.2946     16.20  .         .         .         . Q       .
   2.750      1.3778     12.08  .         .         .   Q     .   V     .
   2.833      1.4609     12.08  .         .         .   Q     .     V   .
   2.917      1.4992      5.55  .         .Q        .         .      V  .
   3.000      1.5374      5.55  .         .Q        .         .       V .
   3.083      1.5555      2.63  .    Q    .         .         .        V.
   3.167      1.5736      2.63  .    Q    .         .         .        V.
   3.250      1.5794      0.84  .Q        .         .         .        V.
   3.333      1.5852      0.84  .Q        .         .         .        V.
   3.417      1.5875      0.33  Q         .         .         .        V.
   3.500      1.5898      0.33  Q         .         .         .        V.
   3.583      1.5907      0.14  Q         .         .         .        V.
   3.667      1.5917      0.14  Q         .         .         .        V.
   3.750      1.5921      0.06  Q         .         .         .        V.
   3.833      1.5925      0.06  Q         .         .         .        V.
   3.917      1.5926      0.02  Q         .         .         .        V.
   4.000      1.5928      0.02  Q         .         .         .        V.
   4.083      1.5928      0.01  Q         .         .         .        V.
   4.167      1.5929      0.01  Q         .         .         .        V.
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ========================                =========
             0%                              250.0
            10%                              180.0
            20%                              150.0
            30%                              100.0
            40%                               60.0
            50%                               40.0
            60%                               30.0
            70%                               30.0
            80%                               10.0
            90%                               10.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
```

```
                    INFLOW
                  (STREAM 1)
                       |
                       |
                       V                 __effective depth
                 -----------             |   (and volume)
                |           |    |     |
                |           |    |....V........
                | detention |<-->|           outflow
                |   basin   |    |.........______
                 -----------     |    ^    |  \
                       |         |  dead   |   basin outlet
                       V         | storage |
                    OUTFLOW       ---------
                  (STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.377
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 1.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498
5	0.80	17.31	0.542
6	1.00	19.36	0.587

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.94	0.94	0.00	0.0	0.000
0.167	0.000	0.94	1.00	0.00	0.0	0.000
0.250	0.008	2.11	1.00	0.00	0.0	0.000
0.333	0.015	2.11	1.00	0.00	0.0	0.000
0.417	0.027	2.71	1.00	0.00	0.0	0.000
0.500	0.039	2.71	1.00	0.00	0.0	0.000
0.583	0.054	3.24	1.00	0.00	0.0	0.000
0.667	0.070	3.24	1.00	0.00	0.0	0.000
0.750	0.086	3.38	1.00	0.00	0.0	0.000
0.833	0.103	3.38	1.00	0.00	0.0	0.000
0.917	0.120	3.48	1.00	0.00	0.0	0.000
1.000	0.137	3.48	1.00	0.00	0.0	0.000
1.083	0.158	4.05	1.00	0.00	0.0	0.000

1.167	0.179	4.05	1.00	0.00	0.0	0.000
1.250	0.203	4.57	1.00	0.00	0.0	0.000
1.333	0.228	4.57	1.00	0.00	0.0	0.000
1.417	0.256	5.13	1.00	0.00	0.0	0.000
1.500	0.285	5.13	1.00	0.00	0.0	0.000
1.583	0.317	5.73	1.00	0.00	0.0	0.000
1.667	0.350	5.73	1.00	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 5.0 (less LOSS)
REMAINING UNIT FLOW IS 1.4 CFS.

1.750	0.377	6.39	1.00	0.00	0.1	0.009
1.833	0.377	6.39	1.00	0.02	0.5	0.042
1.917	0.377	6.97	1.00	0.04	1.2	0.075
2.000	0.377	6.97	1.00	0.05	1.9	0.103
2.083	0.377	7.54	1.00	0.06	2.4	0.132
2.167	0.377	7.54	1.00	0.08	3.0	0.156
2.250	0.377	8.97	1.00	0.09	3.6	0.186
2.333	0.377	8.97	1.00	0.10	4.2	0.213
2.417	0.377	12.59	1.00	0.12	4.9	0.259
2.500	0.377	12.59	1.00	0.14	5.8	0.299
2.583	0.377	16.20	1.00	0.17	6.8	0.356
2.667	0.377	16.20	1.00	0.20	7.9	0.406
2.750	0.377	12.08	1.00	0.23	8.8	0.422
2.833	0.377	12.08	1.00	0.28	9.6	0.432
2.917	0.377	5.55	1.00	0.19	9.2	0.400
3.000	0.377	5.55	1.00	0.18	8.1	0.376
3.083	0.377	2.63	1.00	0.16	7.4	0.336
3.167	0.377	2.63	1.00	0.14	6.6	0.301
3.250	0.377	0.84	1.00	0.12	5.8	0.260
3.333	0.377	0.84	1.00	0.11	5.0	0.224
3.417	0.377	0.33	1.00	0.09	4.3	0.190
3.500	0.377	0.33	1.00	0.08	3.6	0.160
3.583	0.377	0.14	1.00	0.06	3.1	0.133
3.667	0.377	0.14	1.00	0.05	2.5	0.110
3.750	0.377	0.06	1.00	0.04	2.1	0.089
3.833	0.377	0.06	1.00	0.03	1.7	0.071
3.917	0.377	0.02	1.00	0.03	1.3	0.055
4.000	0.377	0.02	1.00	0.02	1.0	0.042
4.083	0.377	0.01	1.00	0.01	0.7	0.030
4.167	0.377	0.01	1.00	0.01	0.5	0.019
4.250	0.377	0.00	1.00	0.00	0.3	0.010
4.333	0.377	0.00	1.00	0.00	0.1	0.003
4.417	0.373	0.00	1.00	0.00	0.0	0.000
4.500	0.366	0.00	1.00	0.00	0.0	0.000
4.583	0.359	0.00	1.00	0.00	0.0	0.000
4.667	0.352	0.00	1.00	0.00	0.0	0.000
4.750	0.345	0.00	1.00	0.00	0.0	0.000
4.833	0.338	0.00	1.00	0.00	0.0	0.000
4.917	0.331	0.00	1.00	0.00	0.0	0.000
5.000	0.325	0.00	1.00	0.00	0.0	0.000
5.083	0.318	0.00	1.00	0.00	0.0	0.000
5.167	0.311	0.00	1.00	0.00	0.0	0.000
5.250	0.304	0.00	1.00	0.00	0.0	0.000
5.333	0.297	0.00	1.00	0.00	0.0	0.000
5.417	0.290	0.00	1.00	0.00	0.0	0.000
5.500	0.283	0.00	1.00	0.00	0.0	0.000
5.583	0.276	0.00	1.00	0.00	0.0	0.000
5.667	0.269	0.00	1.00	0.00	0.0	0.000
5.750	0.263	0.00	1.00	0.00	0.0	0.000
5.833	0.256	0.00	1.00	0.00	0.0	0.000
5.917	0.249	0.00	1.00	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 1.593 AF

```
BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME =      0.856 AF
LOSS    VOLUME =      0.737 AF

****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE     95.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================

        MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
        STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
        VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
        EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
        OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
        UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
        (0.938)(DIAMETER):


        PIPELENGTH(FT) =     400.00     MANNINGS FACTOR = 0.013
        UPSTREAM ELEVATION(FT) =    1391.00
        DOWNSTREAM ELEVATION(FT) =    1389.00
        PIPE DIAMETER(FT) =   1.50


        NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:
```

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.09	0.55	0.00	0.000
1.833	0.53	2.39	0.24	0.000
1.917	1.22	3.09	1.05	0.000
2.000	1.86	3.50	1.72	0.000
2.083	2.45	3.78	2.29	0.000
2.167	2.99	3.98	2.85	0.000
2.250	3.56	4.15	3.42	0.000
2.333	4.15	4.32	4.02	0.000
2.417	4.91	4.47	4.72	0.000
2.500	5.80	4.64	5.60	0.000
2.583	6.82	4.76	6.57	0.000

2.667	7.94	4.79	7.27	0.004
2.750	8.82	4.79	7.43	0.013
2.833	9.63	4.79	7.43	0.028
2.917	9.20	4.79	7.43	0.040
3.000	8.07	4.79	7.43	0.045
3.083	7.40	4.79	7.43	0.045
3.167	6.63	4.79	7.43	0.039
3.250	5.84	4.79	7.43	0.028
3.333	5.04	4.79	7.43	0.012
3.417	4.31	4.68	6.38	0.000
3.500	3.64	4.18	4.20	0.000
3.583	3.05	4.00	3.20	0.000
3.667	2.53	3.81	2.66	0.000
3.750	2.07	3.61	2.19	0.000
3.833	1.67	3.39	1.78	0.000
3.917	1.32	3.15	1.42	0.000
4.000	1.01	2.90	1.10	0.000
4.083	0.74	2.65	0.83	0.000
4.167	0.51	2.36	0.60	0.000
4.250	0.31	1.82	0.37	0.000
4.333	0.13	0.79	0.23	0.000
4.417	0.03	0.50	0.04	0.000
4.500	0.00	0.00	0.09	0.000
4.583	0.00	0.00	0.01	0.000
4.667	0.00	0.00	0.02	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000
5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-6HR
----------------------------------------------------------------------------
  FILE NAME: BASIN206.DAT
  TIME/DATE OF STUDY: 15:47 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         USER-ENTERED RAINFALL =  3.40 INCHES
         RCFC&WCD 6-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                      UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                12.140
        2                98.621                 4.756
        3                99.599                 0.167
        4                99.839                 0.041
        5                99.960                 0.021
        6               100.000                 0.007
```

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.1224	0.0500	0.0724
2	0.1462	0.0500	0.0962
3	0.1632	0.0500	0.1132
4	0.1666	0.0500	0.1166
5	0.1802	0.0500	0.1302
6	0.1972	0.0500	0.1472
7	0.2312	0.0500	0.1812
8	0.3060	0.0500	0.2560
9	0.3944	0.0500	0.3444
10	0.4896	0.0500	0.4396
11	0.8534	0.0500	0.8034
12	0.1496	0.0500	0.0996

TOTAL STORM RAINFALL(INCHES) = 3.40
TOTAL SOIL-LOSS(INCHES) = 0.60
TOTAL EFFECTIVE RAINFALL(INCHES) = 2.80

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.4250
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.9823

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6 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0061	0.88	VQ
0.167	0.0121	0.88	VQ
0.250	0.0182	0.88	VQ
0.333	0.0242	0.88	VQ
0.417	0.0303	0.88	VQ
0.500	0.0363	0.88	VQ
0.583	0.0467	1.51	V Q
0.667	0.0571	1.51	V Q
0.750	0.0676	1.51	V Q
0.833	0.0780	1.51	V Q
0.917	0.0884	1.51	V Q
1.000	0.0988	1.51	V Q
1.083	0.1115	1.84	. VQ
1.167	0.1242	1.84	. VQ
1.250	0.1369	1.84	. VQ
1.333	0.1496	1.84	. Q
1.417	0.1623	1.84	. Q
1.500	0.1750	1.84	. Q
1.583	0.1886	1.97	. Q
1.667	0.2022	1.97	. QV
1.750	0.2158	1.97	. QV
1.833	0.2294	1.97	. QV

```
1.917      0.2429      1.97  .  QV     .         .         .         .
2.000      0.2565      1.97  .  Q V    .         .         .         .
2.083      0.2714      2.16  .   QV    .         .         .         .
2.167      0.2863      2.16  .   QV    .         .         .         .
2.250      0.3011      2.16  .   Q V   .         .         .         .
2.333      0.3160      2.16  .   Q V   .         .         .         .
2.417      0.3309      2.16  .   Q V   .         .         .         .
2.500      0.3458      2.16  .   Q V   .         .         .         .
2.583      0.3625      2.43  .   Q  V  .         .         .         .
2.667      0.3793      2.43  .   Q  V  .         .         .         .
2.750      0.3960      2.43  .   Q  V  .         .         .         .
2.833      0.4128      2.43  .   Q   V .         .         .         .
2.917      0.4295      2.43  .   Q   V .         .         .         .
3.000      0.4463      2.43  .   Q    V.         .         .         .
3.083      0.4665      2.93  .    Q   V.         .         .         .
3.167      0.4867      2.93  .    Q   V.         .         .         .
3.250      0.5068      2.93  .    Q    V         .         .         .
3.333      0.5270      2.93  .    Q    V         .         .         .
3.417      0.5472      2.93  .    Q     V        .         .         .
3.500      0.5674      2.93  .    Q     V        .         .         .
3.583      0.5949      4.00  .       Q . V       .         .         .
3.667      0.6225      4.00  .       Q . V       .         .         .
3.750      0.6501      4.00  .       Q .  V      .         .         .
3.833      0.6776      4.00  .       Q .  V      .         .         .
3.917      0.7052      4.00  .       Q .   V     .         .         .
4.000      0.7328      4.00  .       Q .   V     .         .         .
4.083      0.7702      5.44  .         Q    V    .         .         .
4.167      0.8077      5.44  .         Q     V   .         .         .
4.250      0.8451      5.44  .         Q      V  .         .         .
4.333      0.8826      5.44  .         Q      V  .         .         .
4.417      0.9200      5.44  .         Q       V .         .         .
4.500      0.9575      5.44  .         Q        V.         .         .
4.583      1.0059      7.03  .         .   Q     V         .         .
4.667      1.0543      7.03  .         .   Q      V        .         .
4.750      1.1027      7.03  .         .   Q       V       .         .
4.833      1.1511      7.03  .         .   Q        V      .         .
4.917      1.1995      7.03  .         .   Q         V     .         .
5.000      1.2479      7.03  .         .   Q          V    .         .
5.083      1.3300     11.92  .         .         .  Q  V   .         .
5.167      1.4121     11.92  .         .         .  Q    V .         .
5.250      1.4942     11.92  .         .         .  Q      V         .
5.333      1.5762     11.92  .         .         .  Q       V        .
5.417      1.6583     11.92  .         .         .  Q         V      .
5.500      1.7404     11.92  .         .         .  Q           V    .
5.583      1.7757      5.12  .         Q         .         .    V    .
5.667      1.8110      5.12  .         Q         .         .     V   .
5.750      1.8463      5.12  .         Q         .         .      V  .
5.833      1.8816      5.12  .         Q         .         .      V  .
5.917      1.9169      5.12  .         Q         .         .       V .
6.000      1.9521      5.12  .         Q         .         .        V.
6.083      1.9565      0.64  .Q        .         .         .        V.
6.167      1.9609      0.64  .Q        .         .         .        V.
6.250      1.9653      0.64  .Q        .         .         .        V.
6.333      1.9696      0.64  .Q        .         .         .        V.
6.417      1.9740      0.64  .Q        .         .         .        V.
6.500      1.9784      0.64  .Q        .         .         .        V.
6.583      1.9788      0.06  Q         .         .         .        V.
6.667      1.9792      0.06  Q         .         .         .        V.
6.750      1.9797      0.06  Q         .         .         .        V.
6.833      1.9801      0.06  Q         .         .         .        V.
6.917      1.9805      0.06  Q         .         .         .        V.
7.000      1.9809      0.06  Q         .         .         .        V.
7.083      1.9811      0.02  Q         .         .         .        V.
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   7.167      1.9813      0.02  Q         .         .         .        V.
   7.250      1.9814      0.02  Q         .         .         .        V.
   7.333      1.9816      0.02  Q         .         .         .        V.
   7.417      1.9817      0.02  Q         .         .         .        V.
   7.500      1.9819      0.02  Q         .         .         .        V.
   7.583      1.9820      0.01  Q         .         .         .        V.
   7.667      1.9820      0.01  Q         .         .         .        V.
   7.750      1.9821      0.01  Q         .         .         .        V.
   7.833      1.9821      0.01  Q         .         .         .        V.
   7.917      1.9822      0.01  Q         .         .         .        V.
   8.000      1.9822      0.01  Q         .         .         .        V.
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                 Duration
       Peak Flow Rate                      (minutes)
   ======================                  =========
             0%                              480.0
            10%                              330.0
            20%                              210.0
            30%                              150.0
            40%                              120.0
            50%                               60.0
            60%                               30.0
            70%                               30.0
            80%                               30.0
            90%                               30.0


 ******************************************************************************
   FLOW PROCESS FROM NODE    999.00 TO NODE    950.00 IS CODE = 3.1
 ------------------------------------------------------------------------------
   >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
 ==============================================================================

                     INFLOW
                   (STREAM 1)
                        |
                        |
                        V                 __effective depth
                  -----------             |   (and volume)
                 |           |    |       |
                 |           |    |....V........
                 | detention |<-->|           outflow
                 |   basin   |    |.........______
                  -----------     |    ^    |  \
                        |         |  dead   |   basin outlet
                        V         | storage |
                     OUTFLOW       ---------
                   (STREAM 1)


          ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
          THROUGH A FLOW-THROUGH DETENTION BASIN
          SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
            DEAD STORAGE(AF) =      0.377
            SPECIFIED DEAD STORAGE(AF) FILLED =      0.000
            SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET =      0.000
            DETENTION BASIN CONSTANT LOSS RATE(CFS) =    1.00
```

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498
5	0.80	17.31	0.542
6	1.00	19.36	0.587

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.88	0.88	0.00	0.0	0.000
0.167	0.000	0.88	1.00	0.00	0.0	0.000
0.250	0.000	0.88	1.00	0.00	0.0	0.000
0.333	0.000	0.88	1.00	0.00	0.0	0.000
0.417	0.000	0.88	1.00	0.00	0.0	0.000
0.500	0.000	0.88	1.00	0.00	0.0	0.000
0.583	0.004	1.51	1.00	0.00	0.0	0.000
0.667	0.007	1.51	1.00	0.00	0.0	0.000
0.750	0.011	1.51	1.00	0.00	0.0	0.000
0.833	0.014	1.51	1.00	0.00	0.0	0.000
0.917	0.018	1.51	1.00	0.00	0.0	0.000
1.000	0.021	1.51	1.00	0.00	0.0	0.000
1.083	0.027	1.84	1.00	0.00	0.0	0.000
1.167	0.033	1.84	1.00	0.00	0.0	0.000
1.250	0.039	1.84	1.00	0.00	0.0	0.000
1.333	0.044	1.84	1.00	0.00	0.0	0.000
1.417	0.050	1.84	1.00	0.00	0.0	0.000
1.500	0.056	1.84	1.00	0.00	0.0	0.000
1.583	0.063	1.97	1.00	0.00	0.0	0.000
1.667	0.069	1.97	1.00	0.00	0.0	0.000
1.750	0.076	1.97	1.00	0.00	0.0	0.000
1.833	0.083	1.97	1.00	0.00	0.0	0.000
1.917	0.090	1.97	1.00	0.00	0.0	0.000
2.000	0.096	1.97	1.00	0.00	0.0	0.000
2.083	0.104	2.16	1.00	0.00	0.0	0.000
2.167	0.112	2.16	1.00	0.00	0.0	0.000
2.250	0.120	2.16	1.00	0.00	0.0	0.000
2.333	0.128	2.16	1.00	0.00	0.0	0.000
2.417	0.136	2.16	1.00	0.00	0.0	0.000
2.500	0.144	2.16	1.00	0.00	0.0	0.000
2.583	0.154	2.43	1.00	0.00	0.0	0.000
2.667	0.164	2.43	1.00	0.00	0.0	0.000
2.750	0.174	2.43	1.00	0.00	0.0	0.000
2.833	0.184	2.43	1.00	0.00	0.0	0.000
2.917	0.194	2.43	1.00	0.00	0.0	0.000
3.000	0.203	2.43	1.00	0.00	0.0	0.000
3.083	0.217	2.93	1.00	0.00	0.0	0.000
3.167	0.230	2.93	1.00	0.00	0.0	0.000
3.250	0.243	2.93	1.00	0.00	0.0	0.000
3.333	0.257	2.93	1.00	0.00	0.0	0.000
3.417	0.270	2.93	1.00	0.00	0.0	0.000

3.500	0.283	2.93	1.00	0.00	0.0	0.000
3.583	0.304	4.00	1.00	0.00	0.0	0.000
3.667	0.324	4.00	1.00	0.00	0.0	0.000
3.750	0.345	4.00	1.00	0.00	0.0	0.000
3.833	0.366	4.00	1.00	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 2.7 (less LOSS)
REMAINING UNIT FLOW IS 1.3 CFS.

3.917	0.377	4.00	1.00	0.00	0.1	0.009
4.000	0.377	4.00	1.00	0.01	0.4	0.027
4.083	0.377	5.44	1.00	0.02	0.8	0.052
4.167	0.377	5.44	1.00	0.04	1.3	0.073
4.250	0.377	5.44	1.00	0.04	1.7	0.092
4.333	0.377	5.44	1.00	0.05	2.1	0.108
4.417	0.377	5.44	1.00	0.06	2.4	0.122
4.500	0.377	5.44	1.00	0.06	2.7	0.134
4.583	0.377	7.03	1.00	0.07	3.0	0.155
4.667	0.377	7.03	1.00	0.08	3.4	0.173
4.750	0.377	7.03	1.00	0.09	3.8	0.189
4.833	0.377	7.03	1.00	0.10	4.1	0.202
4.917	0.377	7.03	1.00	0.10	4.3	0.214
5.000	0.377	7.03	1.00	0.11	4.6	0.224
5.083	0.377	11.92	1.00	0.13	5.1	0.264
5.167	0.377	11.92	1.00	0.14	5.9	0.299
5.250	0.377	11.92	1.00	0.16	6.5	0.329
5.333	0.377	11.92	1.00	0.17	7.1	0.355
5.417	0.377	11.92	1.00	0.18	7.6	0.378
5.500	0.377	11.92	1.00	0.19	8.1	0.398
5.583	0.377	5.12	1.00	0.18	8.0	0.371
5.667	0.377	5.12	1.00	0.17	7.5	0.348
5.750	0.377	5.12	1.00	0.16	7.0	0.328
5.833	0.377	5.12	1.00	0.15	6.6	0.310
5.917	0.377	5.12	1.00	0.14	6.3	0.295
6.000	0.377	5.12	1.00	0.14	6.0	0.282
6.083	0.377	0.64	1.00	0.12	5.5	0.242
6.167	0.377	0.64	1.00	0.10	4.7	0.207
6.250	0.377	0.64	1.00	0.09	4.0	0.177
6.333	0.377	0.64	1.00	0.07	3.4	0.151
6.417	0.377	0.64	1.00	0.06	2.9	0.129
6.500	0.377	0.64	1.00	0.05	2.5	0.109
6.583	0.377	0.06	1.00	0.04	2.1	0.089
6.667	0.377	0.06	1.00	0.03	1.7	0.071
6.750	0.377	0.06	1.00	0.03	1.3	0.055
6.833	0.377	0.06	1.00	0.02	1.0	0.042
6.917	0.377	0.06	1.00	0.01	0.7	0.030
7.000	0.377	0.06	1.00	0.01	0.5	0.020
7.083	0.377	0.02	1.00	0.01	0.3	0.011
7.167	0.377	0.02	1.00	0.00	0.2	0.003
7.250	0.374	0.02	1.00	0.00	0.0	0.000
7.333	0.367	0.02	1.00	0.00	0.0	0.000
7.417	0.360	0.02	1.00	0.00	0.0	0.000
7.500	0.354	0.02	1.00	0.00	0.0	0.000
7.583	0.347	0.01	1.00	0.00	0.0	0.000
7.667	0.340	0.01	1.00	0.00	0.0	0.000
7.750	0.333	0.01	1.00	0.00	0.0	0.000
7.833	0.326	0.01	1.00	0.00	0.0	0.000
7.917	0.319	0.01	1.00	0.00	0.0	0.000
8.000	0.313	0.01	1.00	0.00	0.0	0.000
8.083	0.306	0.00	1.00	0.00	0.0	0.000
8.167	0.299	0.00	1.00	0.00	0.0	0.000
8.250	0.292	0.00	1.00	0.00	0.0	0.000
8.333	0.285	0.00	1.00	0.00	0.0	0.000
8.417	0.278	0.00	1.00	0.00	0.0	0.000
8.500	0.271	0.00	1.00	0.00	0.0	0.000

8.583	0.264	0.00	1.00	0.00	0.0	0.000
8.667	0.257	0.00	1.00	0.00	0.0	0.000
8.750	0.251	0.00	1.00	0.00	0.0	0.000
8.833	0.244	0.00	1.00	0.00	0.0	0.000
8.917	0.237	0.00	1.00	0.00	0.0	0.000
9.000	0.230	0.00	1.00	0.00	0.0	0.000
9.083	0.223	0.00	1.00	0.00	0.0	0.000
9.167	0.216	0.00	1.00	0.00	0.0	0.000
9.250	0.209	0.00	1.00	0.00	0.0	0.000
9.333	0.202	0.00	1.00	0.00	0.0	0.000
9.417	0.195	0.00	1.00	0.00	0.0	0.000
9.500	0.189	0.00	1.00	0.00	0.0	0.000
9.583	0.182	0.00	1.00	0.00	0.0	0.000
9.667	0.175	0.00	1.00	0.00	0.0	0.000
9.750	0.168	0.00	1.00	0.00	0.0	0.000
9.833	0.161	0.00	1.00	0.00	0.0	0.000
9.917	0.154	0.00	1.00	0.00	0.0	0.000
10.000	0.147	0.00	1.00	0.00	0.0	0.000
10.083	0.140	0.00	1.00	0.00	0.0	0.000
10.167	0.133	0.00	1.00	0.00	0.0	0.000
10.250	0.127	0.00	1.00	0.00	0.0	0.000
10.333	0.120	0.00	1.00	0.00	0.0	0.000
10.417	0.113	0.00	1.00	0.00	0.0	0.000
10.500	0.106	0.00	1.00	0.00	0.0	0.000
10.583	0.099	0.00	1.00	0.00	0.0	0.000
10.667	0.092	0.00	1.00	0.00	0.0	0.000
10.750	0.085	0.00	1.00	0.00	0.0	0.000
10.833	0.078	0.00	1.00	0.00	0.0	0.000
10.917	0.071	0.00	1.00	0.00	0.0	0.000
11.000	0.065	0.00	1.00	0.00	0.0	0.000
11.083	0.058	0.00	1.00	0.00	0.0	0.000
11.167	0.051	0.00	1.00	0.00	0.0	0.000
11.250	0.044	0.00	1.00	0.00	0.0	0.000
11.333	0.037	0.00	1.00	0.00	0.0	0.000
11.417	0.030	0.00	1.00	0.00	0.0	0.000
11.500	0.023	0.00	1.00	0.00	0.0	0.000
11.583	0.016	0.00	1.00	0.00	0.0	0.000
11.667	0.010	0.00	1.00	0.00	0.0	0.000
11.750	0.003	0.00	1.00	0.00	0.0	0.000
11.833	0.000	0.00	0.38	0.00	0.0	0.000
11.917	0.000	0.00	0.00	0.00	0.0	0.000
12.000	0.000	0.00	0.00	0.00	0.0	0.000

```
  PROCESS SUMMARY OF STORAGE:
    INFLOW  VOLUME =      1.982 AF
    BASIN  STORAGE =      0.000 AF (WITH      0.000 AF INITIALLY FILLED)
    OUTFLOW VOLUME =      1.014 AF
    LOSS    VOLUME =      0.969 AF


****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =   4
----------------------------------------------------------------------------
  >>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
============================================================================


         MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
         STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
         VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
         EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
         OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
         UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
```

(0.938)(DIAMETER):

PIPELENGTH(FT) = 400.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1391.00
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000
3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000
3.833	0.00	0.00	0.00	0.000
3.917	0.09	0.53	0.00	0.000
4.000	0.37	2.16	0.14	0.000
4.083	0.82	2.72	0.68	0.000

4.167	1.30	3.14	1.20	0.000
4.250	1.72	3.42	1.60	0.000
4.333	2.08	3.62	1.99	0.000
4.417	2.40	3.76	2.32	0.000
4.500	2.67	3.86	2.60	0.000
4.583	3.01	3.98	2.93	0.000
4.667	3.42	4.10	3.32	0.000
4.750	3.77	4.22	3.69	0.000
4.833	4.07	4.30	4.00	0.000
4.917	4.33	4.36	4.27	0.000
5.000	4.56	4.41	4.50	0.000
5.083	5.08	4.51	4.96	0.000
5.167	5.86	4.65	5.68	0.000
5.250	6.54	4.73	6.38	0.000
5.333	7.12	4.78	6.98	0.000
5.417	7.63	4.79	7.35	0.001
5.500	8.07	4.79	7.43	0.006
5.583	8.00	4.79	7.43	0.010
5.667	7.48	4.79	7.43	0.010
5.750	7.03	4.79	7.43	0.007
5.833	6.64	4.79	7.43	0.002
5.917	6.31	4.74	6.81	0.000
6.000	6.01	4.67	6.15	0.000
6.083	5.46	4.58	5.59	0.000
6.167	4.68	4.43	4.86	0.000
6.250	4.01	4.29	4.17	0.000
6.333	3.42	4.10	3.56	0.000
6.417	2.91	3.95	3.04	0.000
6.500	2.48	3.79	2.59	0.000
6.583	2.06	3.61	2.17	0.000
6.667	1.66	3.38	1.76	0.000
6.750	1.31	3.15	1.41	0.000
6.833	1.01	2.90	1.10	0.000
6.917	0.75	2.65	0.84	0.000
7.000	0.52	2.37	0.61	0.000
7.083	0.32	1.91	0.39	0.000
7.167	0.15	0.89	0.23	0.000
7.250	0.03	0.50	0.07	0.000
7.333	0.00	0.00	0.08	0.000
7.417	0.00	0.00	0.01	0.000
7.500	0.00	0.00	0.02	0.000
7.583	0.00	0.00	0.00	0.000
7.667	0.00	0.00	0.00	0.000
7.750	0.00	0.00	0.00	0.000
7.833	0.00	0.00	0.00	0.000
7.917	0.00	0.00	0.00	0.000
8.000	0.00	0.00	0.00	0.000
8.083	0.00	0.00	0.00	0.000
8.167	0.00	0.00	0.00	0.000
8.250	0.00	0.00	0.00	0.000
8.333	0.00	0.00	0.00	0.000
8.417	0.00	0.00	0.00	0.000
8.500	0.00	0.00	0.00	0.000
8.583	0.00	0.00	0.00	0.000
8.667	0.00	0.00	0.00	0.000
8.750	0.00	0.00	0.00	0.000
8.833	0.00	0.00	0.00	0.000
8.917	0.00	0.00	0.00	0.000
9.000	0.00	0.00	0.00	0.000
9.083	0.00	0.00	0.00	0.000
9.167	0.00	0.00	0.00	0.000
9.250	0.00	0.00	0.00	0.000
9.333	0.00	0.00	0.00	0.000

9.417	0.00	0.00	0.00	0.000
9.500	0.00	0.00	0.00	0.000
9.583	0.00	0.00	0.00	0.000
9.667	0.00	0.00	0.00	0.000
9.750	0.00	0.00	0.00	0.000
9.833	0.00	0.00	0.00	0.000
9.917	0.00	0.00	0.00	0.000
10.000	0.00	0.00	0.00	0.000
10.083	0.00	0.00	0.00	0.000
10.167	0.00	0.00	0.00	0.000
10.250	0.00	0.00	0.00	0.000
10.333	0.00	0.00	0.00	0.000
10.417	0.00	0.00	0.00	0.000
10.500	0.00	0.00	0.00	0.000
10.583	0.00	0.00	0.00	0.000
10.667	0.00	0.00	0.00	0.000
10.750	0.00	0.00	0.00	0.000
10.833	0.00	0.00	0.00	0.000
10.917	0.00	0.00	0.00	0.000
11.000	0.00	0.00	0.00	0.000
11.083	0.00	0.00	0.00	0.000
11.167	0.00	0.00	0.00	0.000
11.250	0.00	0.00	0.00	0.000
11.333	0.00	0.00	0.00	0.000
11.417	0.00	0.00	0.00	0.000
11.500	0.00	0.00	0.00	0.000
11.583	0.00	0.00	0.00	0.000
11.667	0.00	0.00	0.00	0.000
11.750	0.00	0.00	0.00	0.000
11.833	0.00	0.00	0.00	0.000
11.917	0.00	0.00	0.00	0.000
12.000	0.00	0.00	0.00	0.000

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END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D   R O U T I N G   A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                     (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2008 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 15.1)
                 Release Date: 11/06/2008  License ID 1421

                          Analysis prepared by:

                               SCOTT HEBERER
                 DESIGN ENGINEER - NASLAND ENGINEERING

       ANALYSIS OF DISCHARGE TO EXISTING 30" AP - 100 YEAR-24HR


----------------------------------------------------------------------------
  FILE NAME: BASIN224.DAT
  TIME/DATE OF STUDY: 16:03 05/06/2014


****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    999.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       8.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.100
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.850
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.075
         USER-ENTERED RAINFALL =  7.80 INCHES
         RCFC&WCD 24-Hour Storm (30-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  30.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 500.000


============================================================================
                       UNIT HYDROGRAPH DETERMINATION

----------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
----------------------------------------------------------------------------
        1                70.860                12.140
        2                98.621                 4.756
        3                99.599                 0.167
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4	99.839	0.041
5	99.960	0.021
6	100.000	0.007

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UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0390	0.0331	0.0058
2	0.0546	0.0464	0.0082
3	0.0468	0.0398	0.0070
4	0.0546	0.0464	0.0082
5	0.0624	0.0530	0.0094
6	0.0780	0.0639	0.0141
7	0.0780	0.0630	0.0150
8	0.0858	0.0620	0.0238
9	0.1014	0.0611	0.0403
10	0.1170	0.0602	0.0568
11	0.1014	0.0593	0.0421
12	0.1248	0.0584	0.0664
13	0.1404	0.0575	0.0829
14	0.1560	0.0566	0.0994
15	0.1638	0.0558	0.1080
16	0.1950	0.0549	0.1401
17	0.2340	0.0541	0.1799
18	0.2574	0.0533	0.2041
19	0.3042	0.0525	0.2517
20	0.3354	0.0517	0.2837
21	0.2340	0.0510	0.1830
22	0.3120	0.0502	0.2618
23	0.2964	0.0495	0.2469
24	0.2730	0.0487	0.2242
25	0.3978	0.0480	0.3497
26	0.4446	0.0474	0.3972
27	0.5304	0.0467	0.4837
28	0.3588	0.0460	0.3128
29	0.4134	0.0454	0.3680
30	0.3978	0.0448	0.3530
31	0.3666	0.0442	0.3224
32	0.2964	0.0436	0.2528
33	0.0624	0.0430	0.0194
34	0.0468	0.0398	0.0070
35	0.0780	0.0420	0.0360
36	0.0702	0.0415	0.0287
37	0.0624	0.0410	0.0214
38	0.0390	0.0331	0.0058
39	0.0546	0.0401	0.0145
40	0.0390	0.0331	0.0058
41	0.0468	0.0393	0.0075
42	0.0390	0.0331	0.0058
43	0.0390	0.0331	0.0058
44	0.0390	0.0331	0.0058
45	0.0390	0.0331	0.0058
46	0.0312	0.0265	0.0047
47	0.0312	0.0265	0.0047
48	0.0312	0.0265	0.0047

TOTAL STORM RAINFALL(INCHES) = 7.80
TOTAL SOIL-LOSS(INCHES) = 2.21
TOTAL EFFECTIVE RAINFALL(INCHES) = 5.59

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--------------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       1.5679
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =       3.9550
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================================================================================

                        2 4 - H O U R    S T O R M
                    R U N O F F    H Y D R O G R A P H

================================================================================
                HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
        (Note: Time indicated is at END of Each Unit Intervals)
--------------------------------------------------------------------------------
 TIME(HRS) VOLUME(AF)   Q(CFS) 0.        2.5       5.0       7.5      10.0
--------------------------------------------------------------------------------
   0.083      0.0005      0.07  Q         .         .         .         .
   0.167      0.0010      0.07  Q         .         .         .         .
   0.250      0.0015      0.07  Q         .         .         .         .
   0.333      0.0020      0.07  Q         .         .         .         .
   0.417      0.0024      0.07  Q         .         .         .         .
   0.500      0.0029      0.07  Q         .         .         .         .
   0.583      0.0038      0.13  Q         .         .         .         .
   0.667      0.0047      0.13  Q         .         .         .         .
   0.750      0.0056      0.13  Q         .         .         .         .
   0.833      0.0064      0.13  Q         .         .         .         .
   0.917      0.0073      0.13  Q         .         .         .         .
   1.000      0.0082      0.13  Q         .         .         .         .
   1.083      0.0091      0.13  Q         .         .         .         .
   1.167      0.0099      0.13  Q         .         .         .         .
   1.250      0.0108      0.13  Q         .         .         .         .
   1.333      0.0116      0.13  Q         .         .         .         .
   1.417      0.0125      0.13  Q         .         .         .         .
   1.500      0.0134      0.13  Q         .         .         .         .
   1.583      0.0143      0.13  Q         .         .         .         .
   1.667      0.0152      0.13  Q         .         .         .         .
   1.750      0.0161      0.13  Q         .         .         .         .
   1.833      0.0171      0.13  Q         .         .         .         .
   1.917      0.0180      0.13  Q         .         .         .         .
   2.000      0.0189      0.13  Q         .         .         .         .
   2.083      0.0200      0.15  Q         .         .         .         .
   2.167      0.0210      0.15  Q         .         .         .         .
   2.250      0.0221      0.15  Q         .         .         .         .
   2.333      0.0232      0.15  Q         .         .         .         .
   2.417      0.0242      0.15  Q         .         .         .         .
   2.500      0.0253      0.15  Q         .         .         .         .
   2.583      0.0268      0.22  Q         .         .         .         .
   2.667      0.0283      0.22  Q         .         .         .         .
   2.750      0.0298      0.22  Q         .         .         .         .
   2.833      0.0313      0.22  Q         .         .         .         .
   2.917      0.0328      0.22  Q         .         .         .         .
   3.000      0.0343      0.22  Q         .         .         .         .
   3.083      0.0360      0.25  VQ        .         .         .         .
   3.167      0.0377      0.25  VQ        .         .         .         .
   3.250      0.0395      0.25  VQ        .         .         .         .
   3.333      0.0412      0.25  VQ        .         .         .         .
   3.417      0.0429      0.25  VQ        .         .         .         .
   3.500      0.0447      0.25  VQ        .         .         .         .
   3.583      0.0472      0.36  VQ        .         .         .         .
   3.667      0.0497      0.36  VQ        .         .         .         .
   3.750      0.0522      0.36  VQ        .         .         .         .
   3.833      0.0547      0.36  VQ        .         .         .         .
```

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3.917      0.0572      0.36  VQ        .         .         .         .
4.000      0.0597      0.36  VQ        .         .         .         .
4.083      0.0639      0.61  V Q       .         .         .         .
4.167      0.0680      0.61  V Q       .         .         .         .
4.250      0.0722      0.61  V Q       .         .         .         .
4.333      0.0764      0.61  V Q       .         .         .         .
4.417      0.0805      0.61  V Q       .         .         .         .
4.500      0.0847      0.61  V Q       .         .         .         .
4.583      0.0908      0.89  V  Q      .         .         .         .
4.667      0.0969      0.89  V  Q      .         .         .         .
4.750      0.1030      0.89   V Q      .         .         .         .
4.833      0.1091      0.89   V Q      .         .         .         .
4.917      0.1152      0.89   V Q      .         .         .         .
5.000      0.1214      0.89   V Q      .         .         .         .
5.083      0.1268      0.79  .V Q      .         .         .         .
5.167      0.1322      0.79  .V Q      .         .         .         .
5.250      0.1377      0.79  .V Q      .         .         .         .
5.333      0.1431      0.79  .V Q      .         .         .         .
5.417      0.1486      0.79  .V Q      .         .         .         .
5.500      0.1540      0.79  .V Q      .         .         .         .
5.583      0.1610      1.02  .V  Q     .         .         .         .
5.667      0.1680      1.02  .V  Q     .         .         .         .
5.750      0.1750      1.02  .V  Q     .         .         .         .
5.833      0.1821      1.02  .V  Q     .         .         .         .
5.917      0.1891      1.02  .V  Q     .         .         .         .
6.000      0.1961      1.02  .V  Q     .         .         .         .
6.083      0.2053      1.33  . V  Q    .         .         .         .
6.167      0.2145      1.33  . V  Q    .         .         .         .
6.250      0.2236      1.33  . V  Q    .         .         .         .
6.333      0.2328      1.33  . V  Q    .         .         .         .
6.417      0.2420      1.33  . V  Q    .         .         .         .
6.500      0.2512      1.33  . V  Q    .         .         .         .
6.583      0.2623      1.62  . V   Q   .         .         .         .
6.667      0.2734      1.62  . V   Q   .         .         .         .
6.750      0.2845      1.62  . V   Q   .         .         .         .
6.833      0.2957      1.62  . V   Q   .         .         .         .
6.917      0.3068      1.62  .  V  Q   .         .         .         .
7.000      0.3179      1.62  .  V  Q   .         .         .         .
7.083      0.3303      1.80  .  V   Q  .         .         .         .
7.167      0.3427      1.80  .  V   Q  .         .         .         .
7.250      0.3551      1.80  .  V   Q  .         .         .         .
7.333      0.3676      1.80  .  V   Q  .         .         .         .
7.417      0.3800      1.80  .  V   Q  .         .         .         .
7.500      0.3924      1.80  .  V   Q  .         .         .         .
7.583      0.4078      2.24  .   V   Q .         .         .         .
7.667      0.4232      2.24  .   V   Q .         .         .         .
7.750      0.4386      2.24  .   V   Q .         .         .         .
7.833      0.4540      2.24  .   V   Q .         .         .         .
7.917      0.4694      2.24  .   V   Q .         .         .         .
8.000      0.4848      2.24  .   V   Q .         .         .         .
8.083      0.5046      2.87  .    V    .Q        .         .         .
8.167      0.5244      2.87  .    V    .Q        .         .         .
8.250      0.5442      2.87  .    V    .Q        .         .         .
8.333      0.5640      2.87  .    V    .Q        .         .         .
8.417      0.5838      2.87  .    V    .Q        .         .         .
8.500      0.6035      2.87  .     V   .Q        .         .         .
8.583      0.6267      3.36  .     V   .  Q      .         .         .
8.667      0.6499      3.36  .     V   .  Q      .         .         .
8.750      0.6731      3.36  .     V   .  Q      .         .         .
8.833      0.6962      3.36  .      V  .  Q      .         .         .
8.917      0.7194      3.36  .      V  .  Q      .         .         .
9.000      0.7426      3.36  .      V  .  Q      .         .         .
9.083      0.7706      4.07  .      V  .     Q   .         .         .
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```
 9.167      0.7985      4.07  .       V .     Q   .          .          .
 9.250      0.8265      4.07  .       V .     Q   .          .          .
 9.333      0.8545      4.07  .       V .     Q   .          .          .
 9.417      0.8825      4.07  .       V .     Q   .          .          .
 9.500      0.9105      4.07  .        V.     Q   .          .          .
 9.583      0.9428      4.69  .        V.       Q .          .          .
 9.667      0.9751      4.69  .        V.       Q .          .          .
 9.750      1.0074      4.69  .         V       Q .          .          .
 9.833      1.0396      4.69  .         V       Q .          .          .
 9.917      1.0719      4.69  .         V       Q .          .          .
10.000      1.1042      4.69  .          V      Q .          .          .
10.083      1.1292      3.63  .         .V  Q     .          .          .
10.167      1.1541      3.63  .         .V  Q     .          .          .
10.250      1.1791      3.63  .         .V  Q     .          .          .
10.333      1.2041      3.63  .         . V Q     .          .          .
10.417      1.2291      3.63  .         . V Q     .          .          .
10.500      1.2540      3.63  .         . V Q     .          .          .
10.583      1.2824      4.11  .         . V   Q   .          .          .
10.667      1.3107      4.11  .         .  V  Q   .          .          .
10.750      1.3390      4.11  .         .  V  Q   .          .          .
10.833      1.3673      4.11  .         .  V  Q   .          .          .
10.917      1.3956      4.11  .         .   V Q   .          .          .
11.000      1.4240      4.11  .         .   V Q   .          .          .
11.083      1.4535      4.29  .         .   V  Q  .          .          .
11.167      1.4831      4.29  .         .   V  Q  .          .          .
11.250      1.5126      4.29  .         .    V Q  .          .          .
11.333      1.5422      4.29  .         .    V Q  .          .          .
11.417      1.5718      4.29  .         .    V Q  .          .          .
11.500      1.6013      4.29  .         .     VQ  .          .          .
11.583      1.6286      3.96  .         .    QV   .          .          .
11.667      1.6558      3.96  .         .    QV   .          .          .
11.750      1.6831      3.96  .         .    Q V  .          .          .
11.833      1.7103      3.96  .         .    Q V  .          .          .
11.917      1.7375      3.96  .         .    Q V  .          .          .
12.000      1.7648      3.96  .         .    Q V  .          .          .
12.083      1.8018      5.37  .         .       V .Q         .          .
12.167      1.8388      5.37  .         .       V .Q         .          .
12.250      1.8757      5.37  .         .       V .Q         .          .
12.333      1.9127      5.37  .         .        V.Q         .          .
12.417      1.9497      5.37  .         .        V.Q         .          .
12.500      1.9867      5.37  .         .         VQ         .          .
12.583      2.0318      6.54  .         .         V     Q    .          .
12.667      2.0768      6.54  .         .          V    Q    .          .
12.750      2.1218      6.54  .         .          V    Q    .          .
12.833      2.1669      6.54  .         .          V    Q    .          .
12.917      2.2119      6.54  .         .           V   Q    .          .
13.000      2.2570      6.54  .         .           V   Q    .          .
13.083      2.3109      7.84  .         .         .  V       .Q         .
13.167      2.3649      7.84  .         .         .  V       .Q         .
13.250      2.4189      7.84  .         .         .   V      .Q         .
13.333      2.4729      7.84  .         .         .    V     .Q         .
13.417      2.5268      7.84  .         .         .    V     .Q         .
13.500      2.5808      7.84  .         .         .     V    .Q         .
13.583      2.6234      6.18  .         .         .   Q V    .          .
13.667      2.6660      6.18  .         .         .   Q V    .          .
13.750      2.7086      6.18  .         .         .   Q  V   .          .
13.833      2.7512      6.18  .         .         .   Q  V   .          .
13.917      2.7938      6.18  .         .         .   Q   V  .          .
14.000      2.8364      6.18  .         .         .   Q   V  .          .
14.083      2.8781      6.06  .         .         .   Q    V.          .
14.167      2.9199      6.06  .         .         .   Q    V.          .
14.250      2.9616      6.06  .         .         .   Q    V.          .
14.333      3.0033      6.06  .         .         .   Q     V          .
```

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14.417      3.0451      6.06  .         .         .   Q     V         .
14.500      3.0868      6.06  .         .         .   Q      V        .
14.583      3.1290      6.12  .         .         .   Q     .V        .
14.667      3.1711      6.12  .         .         .   Q     . V       .
14.750      3.2133      6.12  .         .         .   Q     . V       .
14.833      3.2554      6.12  .         .         .   Q     . V       .
14.917      3.2975      6.12  .         .         .   Q     .  V      .
15.000      3.3397      6.12  .         .         .   Q     .  V      .
15.083      3.3788      5.68  .         .         . Q       .   V     .
15.167      3.4179      5.68  .         .         . Q       .   V     .
15.250      3.4570      5.68  .         .         . Q       .   V     .
15.333      3.4962      5.68  .         .         . Q       .    V    .
15.417      3.5353      5.68  .         .         . Q       .    V    .
15.500      3.5744      5.68  .         .         . Q       .     V   .
15.583      3.6067      4.69  .         .       Q .         .     V   .
15.667      3.6390      4.69  .         .       Q .         .     V   .
15.750      3.6712      4.69  .         .       Q .         .      V  .
15.833      3.7035      4.69  .         .       Q .         .      V  .
15.917      3.7358      4.69  .         .       Q .         .      V  .
16.000      3.7681      4.69  .         .       Q .         .       V .
16.083      3.7785      1.52  .     Q   .         .         .       V .
16.167      3.7890      1.52  .     Q   .         .         .       V .
16.250      3.7994      1.52  .     Q   .         .         .       V .
16.333      3.8098      1.52  .     Q   .         .         .       V .
16.417      3.8203      1.52  .     Q   .         .         .       V .
16.500      3.8307      1.52  .     Q   .         .         .       V .
16.583      3.8324      0.24  Q         .         .         .       V .
16.667      3.8341      0.24  Q         .         .         .       V .
16.750      3.8357      0.24  Q         .         .         .       V .
16.833      3.8374      0.24  Q         .         .         .       V .
16.917      3.8391      0.24  Q         .         .         .       V .
17.000      3.8407      0.24  Q         .         .         .       V .
17.083      3.8441      0.49  .Q        .         .         .       V .
17.167      3.8475      0.49  .Q        .         .         .       V .
17.250      3.8509      0.49  .Q        .         .         .       V .
17.333      3.8543      0.49  .Q        .         .         .       V .
17.417      3.8577      0.49  .Q        .         .         .        V.
17.500      3.8611      0.49  .Q        .         .         .        V.
17.583      3.8648      0.53  . Q       .         .         .        V.
17.667      3.8684      0.53  . Q       .         .         .        V.
17.750      3.8721      0.53  . Q       .         .         .        V.
17.833      3.8757      0.53  . Q       .         .         .        V.
17.917      3.8794      0.53  . Q       .         .         .        V.
18.000      3.8830      0.53  . Q       .         .         .        V.
18.083      3.8858      0.41  .Q        .         .         .        V.
18.167      3.8886      0.41  .Q        .         .         .        V.
18.250      3.8914      0.41  .Q        .         .         .        V.
18.333      3.8942      0.41  .Q        .         .         .        V.
18.417      3.8970      0.41  .Q        .         .         .        V.
18.500      3.8998      0.41  .Q        .         .         .        V.
18.583      3.9010      0.18  Q         .         .         .        V.
18.667      3.9022      0.18  Q         .         .         .        V.
18.750      3.9035      0.18  Q         .         .         .        V.
18.833      3.9047      0.18  Q         .         .         .        V.
18.917      3.9059      0.18  Q         .         .         .        V.
19.000      3.9072      0.18  Q         .         .         .        V.
19.083      3.9086      0.21  Q         .         .         .        V.
19.167      3.9101      0.21  Q         .         .         .        V.
19.250      3.9115      0.21  Q         .         .         .        V.
19.333      3.9130      0.21  Q         .         .         .        V.
19.417      3.9144      0.21  Q         .         .         .        V.
19.500      3.9158      0.21  Q         .         .         .        V.
19.583      3.9168      0.14  Q         .         .         .        V.
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19.667	3.9178	0.14	Q	.	.	.	V.
19.750	3.9188	0.14	Q	.	.	.	V.
19.833	3.9198	0.14	Q	.	.	.	V.
19.917	3.9208	0.14	Q	.	.	.	V.
20.000	3.9217	0.14	Q	.	.	.	V.
20.083	3.9226	0.12	Q	.	.	.	V.
20.167	3.9234	0.12	Q	.	.	.	V.
20.250	3.9243	0.12	Q	.	.	.	V.
20.333	3.9251	0.12	Q	.	.	.	V.
20.417	3.9260	0.12	Q	.	.	.	V.
20.500	3.9268	0.12	Q	.	.	.	V.
20.583	3.9275	0.11	Q	.	.	.	V.
20.667	3.9283	0.11	Q	.	.	.	V.
20.750	3.9290	0.11	Q	.	.	.	V.
20.833	3.9298	0.11	Q	.	.	.	V.
20.917	3.9305	0.11	Q	.	.	.	V.
21.000	3.9313	0.11	Q	.	.	.	V.
21.083	3.9320	0.10	Q	.	.	.	V.
21.167	3.9327	0.10	Q	.	.	.	V.
21.250	3.9334	0.10	Q	.	.	.	V.
21.333	3.9341	0.10	Q	.	.	.	V.
21.417	3.9347	0.10	Q	.	.	.	V.
21.500	3.9354	0.10	Q	.	.	.	V.
21.583	3.9361	0.10	Q	.	.	.	V.
21.667	3.9368	0.10	Q	.	.	.	V.
21.750	3.9375	0.10	Q	.	.	.	V.
21.833	3.9382	0.10	Q	.	.	.	V.
21.917	3.9389	0.10	Q	.	.	.	V.
22.000	3.9396	0.10	Q	.	.	.	V.
22.083	3.9403	0.10	Q	.	.	.	V.
22.167	3.9410	0.10	Q	.	.	.	V.
22.250	3.9417	0.10	Q	.	.	.	V.
22.333	3.9423	0.10	Q	.	.	.	V.
22.417	3.9430	0.10	Q	.	.	.	V.
22.500	3.9437	0.10	Q	.	.	.	V.
22.583	3.9443	0.09	Q	.	.	.	V.
22.667	3.9449	0.09	Q	.	.	.	V.
22.750	3.9455	0.09	Q	.	.	.	V.
22.833	3.9461	0.09	Q	.	.	.	V.
22.917	3.9467	0.09	Q	.	.	.	V.
23.000	3.9473	0.09	Q	.	.	.	V.
23.083	3.9478	0.08	Q	.	.	.	V.
23.166	3.9484	0.08	Q	.	.	.	V.
23.250	3.9489	0.08	Q	.	.	.	V.
23.333	3.9495	0.08	Q	.	.	.	V.
23.416	3.9501	0.08	Q	.	.	.	V.
23.500	3.9506	0.08	Q	.	.	.	V.
23.583	3.9512	0.08	Q	.	.	.	V.
23.666	3.9517	0.08	Q	.	.	.	V.
23.750	3.9523	0.08	Q	.	.	.	V.
23.833	3.9528	0.08	Q	.	.	.	V.
23.916	3.9534	0.08	Q	.	.	.	V.
24.000	3.9539	0.08	Q	.	.	.	V.
24.083	3.9541	0.02	Q	.	.	.	V.
24.166	3.9542	0.02	Q	.	.	.	V.
24.250	3.9544	0.02	Q	.	.	.	V.
24.333	3.9546	0.02	Q	.	.	.	V.
24.416	3.9547	0.02	Q	.	.	.	V.
24.500	3.9549	0.02	Q	.	.	.	V.
24.583	3.9549	0.00	Q	.	.	.	V.
24.666	3.9549	0.00	Q	.	.	.	V.
24.750	3.9549	0.00	Q	.	.	.	V.
24.833	3.9549	0.00	Q	.	.	.	V.

```
  24.916      3.9549      0.00  Q         .         .         .        V.
  25.000      3.9549      0.00  Q         .         .         .        V.
----------------------------------------------------------------------------
```

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1500.0
10%	720.0
20%	570.0
30%	480.0
40%	450.0
50%	390.0
60%	210.0
70%	180.0
80%	60.0
90%	30.0

```
****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE = 3.1
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================
```

```
                  INFLOW
                (STREAM 1)
                     |
                     |
                     V                __effective depth
                -----------           |   (and volume)
               |           |    |     |
               |           |    |....V........
               | detention |<-->|           outflow
               |   basin   |    |.........______
                -----------     |    ^    |  \
                     |          |  dead   |   basin outlet
                     V          | storage |
                  OUTFLOW        ---------
                (STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.377
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 1.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	0.20	8.66	0.416
3	0.40	12.24	0.456
4	0.60	14.99	0.498

5	0.80	17.31	0.542
6	1.00	19.36	0.587

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.07	0.07	0.00	0.0	0.000
0.167	0.000	0.07	0.14	0.00	0.0	0.000
0.250	0.000	0.07	0.21	0.00	0.0	0.000
0.333	0.000	0.07	0.28	0.00	0.0	0.000
0.417	0.000	0.07	0.36	0.00	0.0	0.000
0.500	0.000	0.07	0.43	0.00	0.0	0.000
0.583	0.000	0.13	0.55	0.00	0.0	0.000
0.667	0.000	0.13	0.68	0.00	0.0	0.000
0.750	0.000	0.13	0.81	0.00	0.0	0.000
0.833	0.000	0.13	0.94	0.00	0.0	0.000
0.917	0.000	0.13	1.00	0.00	0.0	0.000
1.000	0.000	0.13	1.00	0.00	0.0	0.000
1.083	0.000	0.13	1.00	0.00	0.0	0.000
1.167	0.000	0.13	1.00	0.00	0.0	0.000
1.250	0.000	0.13	1.00	0.00	0.0	0.000
1.333	0.000	0.13	1.00	0.00	0.0	0.000
1.417	0.000	0.13	1.00	0.00	0.0	0.000
1.500	0.000	0.13	1.00	0.00	0.0	0.000
1.583	0.000	0.13	1.00	0.00	0.0	0.000
1.667	0.000	0.13	1.00	0.00	0.0	0.000
1.750	0.000	0.13	1.00	0.00	0.0	0.000
1.833	0.000	0.13	1.00	0.00	0.0	0.000
1.917	0.000	0.13	1.00	0.00	0.0	0.000
2.000	0.000	0.13	1.00	0.00	0.0	0.000
2.083	0.000	0.15	1.00	0.00	0.0	0.000
2.167	0.000	0.15	1.00	0.00	0.0	0.000
2.250	0.000	0.15	1.00	0.00	0.0	0.000
2.333	0.000	0.15	1.00	0.00	0.0	0.000
2.417	0.000	0.15	1.00	0.00	0.0	0.000
2.500	0.000	0.15	1.00	0.00	0.0	0.000
2.583	0.000	0.22	1.00	0.00	0.0	0.000
2.667	0.000	0.22	1.00	0.00	0.0	0.000
2.750	0.000	0.22	1.00	0.00	0.0	0.000
2.833	0.000	0.22	1.00	0.00	0.0	0.000
2.917	0.000	0.22	1.00	0.00	0.0	0.000
3.000	0.000	0.22	1.00	0.00	0.0	0.000
3.083	0.000	0.25	1.00	0.00	0.0	0.000
3.167	0.000	0.25	1.00	0.00	0.0	0.000
3.250	0.000	0.25	1.00	0.00	0.0	0.000
3.333	0.000	0.25	1.00	0.00	0.0	0.000
3.417	0.000	0.25	1.00	0.00	0.0	0.000
3.500	0.000	0.25	1.00	0.00	0.0	0.000
3.583	0.000	0.36	1.00	0.00	0.0	0.000
3.667	0.000	0.36	1.00	0.00	0.0	0.000
3.750	0.000	0.36	1.00	0.00	0.0	0.000
3.833	0.000	0.36	1.00	0.00	0.0	0.000
3.917	0.000	0.36	1.00	0.00	0.0	0.000
4.000	0.000	0.36	1.00	0.00	0.0	0.000
4.083	0.000	0.61	1.00	0.00	0.0	0.000
4.167	0.000	0.61	1.00	0.00	0.0	0.000

4.250	0.000	0.61	1.00	0.00	0.0	0.000
4.333	0.000	0.61	1.00	0.00	0.0	0.000
4.417	0.000	0.61	1.00	0.00	0.0	0.000
4.500	0.000	0.61	1.00	0.00	0.0	0.000
4.583	0.000	0.89	1.00	0.00	0.0	0.000
4.667	0.000	0.89	1.00	0.00	0.0	0.000
4.750	0.000	0.89	1.00	0.00	0.0	0.000
4.833	0.000	0.89	1.00	0.00	0.0	0.000
4.917	0.000	0.89	1.00	0.00	0.0	0.000
5.000	0.000	0.89	1.00	0.00	0.0	0.000
5.083	0.000	0.79	1.00	0.00	0.0	0.000
5.167	0.000	0.79	1.00	0.00	0.0	0.000
5.250	0.000	0.79	1.00	0.00	0.0	0.000
5.333	0.000	0.79	1.00	0.00	0.0	0.000
5.417	0.000	0.79	1.00	0.00	0.0	0.000
5.500	0.000	0.79	1.00	0.00	0.0	0.000
5.583	0.000	1.02	1.00	0.00	0.0	0.000
5.667	0.000	1.02	1.00	0.00	0.0	0.000
5.750	0.000	1.02	1.00	0.00	0.0	0.000
5.833	0.001	1.02	1.00	0.00	0.0	0.000
5.917	0.001	1.02	1.00	0.00	0.0	0.000
6.000	0.001	1.02	1.00	0.00	0.0	0.000
6.083	0.003	1.33	1.00	0.00	0.0	0.000
6.167	0.005	1.33	1.00	0.00	0.0	0.000
6.250	0.008	1.33	1.00	0.00	0.0	0.000
6.333	0.010	1.33	1.00	0.00	0.0	0.000
6.417	0.012	1.33	1.00	0.00	0.0	0.000
6.500	0.015	1.33	1.00	0.00	0.0	0.000
6.583	0.019	1.62	1.00	0.00	0.0	0.000
6.667	0.023	1.62	1.00	0.00	0.0	0.000
6.750	0.027	1.62	1.00	0.00	0.0	0.000
6.833	0.031	1.62	1.00	0.00	0.0	0.000
6.917	0.036	1.62	1.00	0.00	0.0	0.000
7.000	0.040	1.62	1.00	0.00	0.0	0.000
7.083	0.045	1.80	1.00	0.00	0.0	0.000
7.167	0.051	1.80	1.00	0.00	0.0	0.000
7.250	0.057	1.80	1.00	0.00	0.0	0.000
7.333	0.062	1.80	1.00	0.00	0.0	0.000
7.417	0.068	1.80	1.00	0.00	0.0	0.000
7.500	0.073	1.80	1.00	0.00	0.0	0.000
7.583	0.082	2.24	1.00	0.00	0.0	0.000
7.667	0.090	2.24	1.00	0.00	0.0	0.000
7.750	0.099	2.24	1.00	0.00	0.0	0.000
7.833	0.107	2.24	1.00	0.00	0.0	0.000
7.917	0.116	2.24	1.00	0.00	0.0	0.000
8.000	0.124	2.24	1.00	0.00	0.0	0.000
8.083	0.137	2.87	1.00	0.00	0.0	0.000
8.167	0.150	2.87	1.00	0.00	0.0	0.000
8.250	0.163	2.87	1.00	0.00	0.0	0.000
8.333	0.176	2.87	1.00	0.00	0.0	0.000
8.417	0.189	2.87	1.00	0.00	0.0	0.000
8.500	0.202	2.87	1.00	0.00	0.0	0.000
8.583	0.218	3.36	1.00	0.00	0.0	0.000
8.667	0.234	3.36	1.00	0.00	0.0	0.000
8.750	0.250	3.36	1.00	0.00	0.0	0.000
8.833	0.267	3.36	1.00	0.00	0.0	0.000
8.917	0.283	3.36	1.00	0.00	0.0	0.000
9.000	0.299	3.36	1.00	0.00	0.0	0.000
9.083	0.320	4.07	1.00	0.00	0.0	0.000
9.167	0.342	4.07	1.00	0.00	0.0	0.000
9.250	0.363	4.07	1.00	0.00	0.0	0.000

DEAD STORAGE FILLED WITH UNIT INFLOW(CFS) = 3.1 (less LOSS)
REMAINING UNIT FLOW IS 0.9 CFS.

9.333	0.377	4.07	1.00	0.00	0.1	0.006
9.417	0.377	4.07	1.00	0.01	0.3	0.025
9.500	0.377	4.07	1.00	0.02	0.7	0.041
9.583	0.377	4.69	1.00	0.03	1.0	0.059
9.667	0.377	4.69	1.00	0.04	1.4	0.075
9.750	0.377	4.69	1.00	0.04	1.7	0.089
9.833	0.377	4.69	1.00	0.05	2.0	0.101
9.917	0.377	4.69	1.00	0.05	2.2	0.111
10.000	0.377	4.69	1.00	0.06	2.4	0.120
10.083	0.377	3.63	1.00	0.06	2.5	0.121
10.167	0.377	3.63	1.00	0.06	2.5	0.121
10.250	0.377	3.63	1.00	0.06	2.5	0.122
10.333	0.377	3.63	1.00	0.06	2.5	0.123
10.417	0.377	3.63	1.00	0.06	2.6	0.123
10.500	0.377	3.63	1.00	0.06	2.6	0.123
10.583	0.377	4.11	1.00	0.06	2.6	0.127
10.667	0.377	4.11	1.00	0.06	2.7	0.130
10.750	0.377	4.11	1.00	0.06	2.7	0.133
10.833	0.377	4.11	1.00	0.06	2.8	0.135
10.917	0.377	4.11	1.00	0.07	2.8	0.137
11.000	0.377	4.11	1.00	0.07	2.9	0.138
11.083	0.377	4.29	1.00	0.07	2.9	0.141
11.167	0.377	4.29	1.00	0.07	3.0	0.143
11.250	0.377	4.29	1.00	0.07	3.0	0.145
11.333	0.377	4.29	1.00	0.07	3.0	0.147
11.417	0.377	4.29	1.00	0.07	3.1	0.149
11.500	0.377	4.29	1.00	0.07	3.1	0.150
11.583	0.377	3.96	1.00	0.07	3.1	0.149
11.667	0.377	3.96	1.00	0.07	3.1	0.148
11.750	0.377	3.96	1.00	0.07	3.1	0.147
11.833	0.377	3.96	1.00	0.07	3.1	0.146
11.917	0.377	3.96	1.00	0.07	3.0	0.146
12.000	0.377	3.96	1.00	0.07	3.0	0.145
12.083	0.377	5.37	1.00	0.07	3.1	0.154
12.167	0.377	5.37	1.00	0.08	3.3	0.161
12.250	0.377	5.37	1.00	0.08	3.4	0.168
12.333	0.377	5.37	1.00	0.08	3.6	0.174
12.417	0.377	5.37	1.00	0.09	3.7	0.178
12.500	0.377	5.37	1.00	0.09	3.8	0.183
12.583	0.377	6.54	1.00	0.09	3.9	0.194
12.667	0.377	6.54	1.00	0.10	4.1	0.203
12.750	0.377	6.54	1.00	0.10	4.3	0.212
12.833	0.377	6.54	1.00	0.11	4.5	0.219
12.917	0.377	6.54	1.00	0.11	4.6	0.225
13.000	0.377	6.54	1.00	0.11	4.7	0.231
13.083	0.377	7.84	1.00	0.12	4.9	0.244
13.167	0.377	7.84	1.00	0.12	5.2	0.255
13.250	0.377	7.84	1.00	0.13	5.4	0.265
13.333	0.377	7.84	1.00	0.13	5.6	0.273
13.417	0.377	7.84	1.00	0.14	5.8	0.281
13.500	0.377	7.84	1.00	0.14	5.9	0.287
13.583	0.377	6.18	1.00	0.14	5.9	0.282
13.667	0.377	6.18	1.00	0.13	5.8	0.278
13.750	0.377	6.18	1.00	0.13	5.7	0.274
13.833	0.377	6.18	1.00	0.13	5.7	0.271
13.917	0.377	6.18	1.00	0.13	5.6	0.268
14.000	0.377	6.18	1.00	0.13	5.5	0.265
14.083	0.377	6.06	1.00	0.13	5.5	0.262
14.167	0.377	6.06	1.00	0.12	5.4	0.260
14.250	0.377	6.06	1.00	0.12	5.4	0.257
14.333	0.377	6.06	1.00	0.12	5.3	0.256
14.417	0.377	6.06	1.00	0.12	5.3	0.254
14.500	0.377	6.06	1.00	0.12	5.3	0.252

14.583	0.377	6.12	1.00	0.12	5.2	0.252
14.667	0.377	6.12	1.00	0.12	5.2	0.251
14.750	0.377	6.12	1.00	0.12	5.2	0.250
14.833	0.377	6.12	1.00	0.12	5.2	0.250
14.917	0.377	6.12	1.00	0.12	5.2	0.249
15.000	0.377	6.12	1.00	0.12	5.2	0.249
15.083	0.377	5.68	1.00	0.12	5.1	0.245
15.167	0.377	5.68	1.00	0.12	5.1	0.243
15.250	0.377	5.68	1.00	0.12	5.0	0.240
15.333	0.377	5.68	1.00	0.11	5.0	0.238
15.417	0.377	5.68	1.00	0.11	4.9	0.236
15.500	0.377	5.68	1.00	0.11	4.9	0.235
15.583	0.377	4.69	1.00	0.11	4.8	0.227
15.667	0.377	4.69	1.00	0.11	4.7	0.220
15.750	0.377	4.69	1.00	0.10	4.5	0.215
15.833	0.377	4.69	1.00	0.10	4.4	0.210
15.917	0.377	4.69	1.00	0.10	4.3	0.205
16.000	0.377	4.69	1.00	0.10	4.2	0.202
16.083	0.377	1.52	1.00	0.09	3.9	0.178
16.167	0.377	1.52	1.00	0.08	3.5	0.157
16.250	0.377	1.52	1.00	0.07	3.1	0.140
16.333	0.377	1.52	1.00	0.06	2.7	0.124
16.417	0.377	1.52	1.00	0.05	2.4	0.111
16.500	0.377	1.52	1.00	0.05	2.2	0.099
16.583	0.377	0.24	1.00	0.04	1.9	0.081
16.667	0.377	0.24	1.00	0.03	1.5	0.066
16.750	0.377	0.24	1.00	0.02	1.2	0.052
16.833	0.377	0.24	1.00	0.02	1.0	0.040
16.917	0.377	0.24	1.00	0.01	0.7	0.030
17.000	0.377	0.24	1.00	0.01	0.5	0.021
17.083	0.377	0.49	1.00	0.01	0.4	0.015
17.167	0.377	0.49	1.00	0.00	0.3	0.010
17.250	0.377	0.49	1.00	0.00	0.2	0.005
17.333	0.377	0.49	1.00	0.00	0.1	0.001
17.417	0.375	0.49	1.00	0.00	0.0	0.000
17.500	0.371	0.49	1.00	0.00	0.0	0.000
17.583	0.368	0.53	1.00	0.00	0.0	0.000
17.667	0.365	0.53	1.00	0.00	0.0	0.000
17.750	0.362	0.53	1.00	0.00	0.0	0.000
17.833	0.358	0.53	1.00	0.00	0.0	0.000
17.917	0.355	0.53	1.00	0.00	0.0	0.000
18.000	0.352	0.53	1.00	0.00	0.0	0.000
18.083	0.348	0.41	1.00	0.00	0.0	0.000
18.167	0.344	0.41	1.00	0.00	0.0	0.000
18.250	0.340	0.41	1.00	0.00	0.0	0.000
18.333	0.336	0.41	1.00	0.00	0.0	0.000
18.417	0.332	0.41	1.00	0.00	0.0	0.000
18.500	0.327	0.41	1.00	0.00	0.0	0.000
18.583	0.322	0.18	1.00	0.00	0.0	0.000
18.667	0.316	0.18	1.00	0.00	0.0	0.000
18.750	0.310	0.18	1.00	0.00	0.0	0.000
18.833	0.305	0.18	1.00	0.00	0.0	0.000
18.917	0.299	0.18	1.00	0.00	0.0	0.000
19.000	0.294	0.18	1.00	0.00	0.0	0.000
19.083	0.288	0.21	1.00	0.00	0.0	0.000
19.167	0.283	0.21	1.00	0.00	0.0	0.000
19.250	0.277	0.21	1.00	0.00	0.0	0.000
19.333	0.272	0.21	1.00	0.00	0.0	0.000
19.417	0.266	0.21	1.00	0.00	0.0	0.000
19.500	0.261	0.21	1.00	0.00	0.0	0.000
19.583	0.255	0.14	1.00	0.00	0.0	0.000
19.667	0.249	0.14	1.00	0.00	0.0	0.000
19.750	0.243	0.14	1.00	0.00	0.0	0.000

19.833	0.237	0.14	1.00	0.00	0.0	0.000
19.917	0.231	0.14	1.00	0.00	0.0	0.000
20.000	0.225	0.14	1.00	0.00	0.0	0.000
20.083	0.219	0.12	1.00	0.00	0.0	0.000
20.167	0.213	0.12	1.00	0.00	0.0	0.000
20.250	0.207	0.12	1.00	0.00	0.0	0.000
20.333	0.201	0.12	1.00	0.00	0.0	0.000
20.417	0.195	0.12	1.00	0.00	0.0	0.000
20.500	0.189	0.12	1.00	0.00	0.0	0.000
20.583	0.183	0.11	1.00	0.00	0.0	0.000
20.667	0.177	0.11	1.00	0.00	0.0	0.000
20.750	0.171	0.11	1.00	0.00	0.0	0.000
20.833	0.165	0.11	1.00	0.00	0.0	0.000
20.917	0.158	0.11	1.00	0.00	0.0	0.000
21.000	0.152	0.11	1.00	0.00	0.0	0.000
21.083	0.146	0.10	1.00	0.00	0.0	0.000
21.167	0.140	0.10	1.00	0.00	0.0	0.000
21.250	0.134	0.10	1.00	0.00	0.0	0.000
21.333	0.128	0.10	1.00	0.00	0.0	0.000
21.417	0.121	0.10	1.00	0.00	0.0	0.000
21.500	0.115	0.10	1.00	0.00	0.0	0.000
21.583	0.109	0.10	1.00	0.00	0.0	0.000
21.667	0.103	0.10	1.00	0.00	0.0	0.000
21.750	0.097	0.10	1.00	0.00	0.0	0.000
21.833	0.090	0.10	1.00	0.00	0.0	0.000
21.917	0.084	0.10	1.00	0.00	0.0	0.000
22.000	0.078	0.10	1.00	0.00	0.0	0.000
22.083	0.072	0.10	1.00	0.00	0.0	0.000
22.167	0.066	0.10	1.00	0.00	0.0	0.000
22.250	0.059	0.10	1.00	0.00	0.0	0.000
22.333	0.053	0.10	1.00	0.00	0.0	0.000
22.417	0.047	0.10	1.00	0.00	0.0	0.000
22.500	0.041	0.10	1.00	0.00	0.0	0.000
22.583	0.034	0.09	1.00	0.00	0.0	0.000
22.667	0.028	0.09	1.00	0.00	0.0	0.000
22.750	0.022	0.09	1.00	0.00	0.0	0.000
22.833	0.016	0.09	1.00	0.00	0.0	0.000
22.917	0.009	0.09	1.00	0.00	0.0	0.000
23.000	0.003	0.09	1.00	0.00	0.0	0.000
23.083	0.000	0.08	0.52	0.00	0.0	0.000
23.167	0.000	0.08	0.08	0.00	0.0	0.000
23.250	0.000	0.08	0.08	0.00	0.0	0.000
23.333	0.000	0.08	0.08	0.00	0.0	0.000
23.417	0.000	0.08	0.08	0.00	0.0	0.000
23.500	0.000	0.08	0.08	0.00	0.0	0.000
23.583	0.000	0.08	0.08	0.00	0.0	0.000
23.667	0.000	0.08	0.08	0.00	0.0	0.000
23.750	0.000	0.08	0.08	0.00	0.0	0.000
23.833	0.000	0.08	0.08	0.00	0.0	0.000
23.917	0.000	0.08	0.08	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 3.955 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 2.344 AF
LOSS VOLUME = 1.611 AF

****
FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 4

>>>>>MODEL PIPEFLOW ROUTING OF STREAM #1<<<<<
==========

MODEL PIPEFLOW ROUTING OF STREAM 1 WHERE
STORAGE EFFECTS ARE NEGLECTED WITHIN THE PIPE, FLOW
VELOCITIES ARE ESTIMATED BY ASSUMING STEADY FLOW FOR
EACH UNIT INTERVAL(NORMAL DEPTH, Dn), AND FLOWS IN EXCESS
OF (.82)(DIAMETER) ARE PONDED AT THE UPSTREAM INLET:
UNIT INTERVAL FLOW VELOCITY COMPUTED USING Dn UP TO
(0.938)(DIAMETER):

PIPELENGTH(FT) = 400.00 MANNINGS FACTOR = 0.013
UPSTREAM ELEVATION(FT) = 1391.00
DOWNSTREAM ELEVATION(FT) = 1389.00
PIPE DIAMETER(FT) = 1.50

NORMAL DEPTH VELOCITY PIPE ROUTING RESULTS:

TIME (HRS)	INFLOW (CFS)	VELOCITY (FPS)	OUTFLOW (CFS)	UPSTREAM PONDING(AF)
0.083	0.00	0.00	0.00	0.000
0.167	0.00	0.00	0.00	0.000
0.250	0.00	0.00	0.00	0.000
0.333	0.00	0.00	0.00	0.000
0.417	0.00	0.00	0.00	0.000
0.500	0.00	0.00	0.00	0.000
0.583	0.00	0.00	0.00	0.000
0.667	0.00	0.00	0.00	0.000
0.750	0.00	0.00	0.00	0.000
0.833	0.00	0.00	0.00	0.000
0.917	0.00	0.00	0.00	0.000
1.000	0.00	0.00	0.00	0.000
1.083	0.00	0.00	0.00	0.000
1.167	0.00	0.00	0.00	0.000
1.250	0.00	0.00	0.00	0.000
1.333	0.00	0.00	0.00	0.000
1.417	0.00	0.00	0.00	0.000
1.500	0.00	0.00	0.00	0.000
1.583	0.00	0.00	0.00	0.000
1.667	0.00	0.00	0.00	0.000
1.750	0.00	0.00	0.00	0.000
1.833	0.00	0.00	0.00	0.000
1.917	0.00	0.00	0.00	0.000
2.000	0.00	0.00	0.00	0.000
2.083	0.00	0.00	0.00	0.000
2.167	0.00	0.00	0.00	0.000
2.250	0.00	0.00	0.00	0.000
2.333	0.00	0.00	0.00	0.000
2.417	0.00	0.00	0.00	0.000
2.500	0.00	0.00	0.00	0.000
2.583	0.00	0.00	0.00	0.000
2.667	0.00	0.00	0.00	0.000
2.750	0.00	0.00	0.00	0.000
2.833	0.00	0.00	0.00	0.000
2.917	0.00	0.00	0.00	0.000
3.000	0.00	0.00	0.00	0.000
3.083	0.00	0.00	0.00	0.000
3.167	0.00	0.00	0.00	0.000
3.250	0.00	0.00	0.00	0.000
3.333	0.00	0.00	0.00	0.000
3.417	0.00	0.00	0.00	0.000

3.500	0.00	0.00	0.00	0.000
3.583	0.00	0.00	0.00	0.000
3.667	0.00	0.00	0.00	0.000
3.750	0.00	0.00	0.00	0.000
3.833	0.00	0.00	0.00	0.000
3.917	0.00	0.00	0.00	0.000
4.000	0.00	0.00	0.00	0.000
4.083	0.00	0.00	0.00	0.000
4.167	0.00	0.00	0.00	0.000
4.250	0.00	0.00	0.00	0.000
4.333	0.00	0.00	0.00	0.000
4.417	0.00	0.00	0.00	0.000
4.500	0.00	0.00	0.00	0.000
4.583	0.00	0.00	0.00	0.000
4.667	0.00	0.00	0.00	0.000
4.750	0.00	0.00	0.00	0.000
4.833	0.00	0.00	0.00	0.000
4.917	0.00	0.00	0.00	0.000
5.000	0.00	0.00	0.00	0.000
5.083	0.00	0.00	0.00	0.000
5.167	0.00	0.00	0.00	0.000
5.250	0.00	0.00	0.00	0.000
5.333	0.00	0.00	0.00	0.000
5.417	0.00	0.00	0.00	0.000
5.500	0.00	0.00	0.00	0.000
5.583	0.00	0.00	0.00	0.000
5.667	0.00	0.00	0.00	0.000
5.750	0.00	0.00	0.00	0.000
5.833	0.00	0.00	0.00	0.000
5.917	0.00	0.00	0.00	0.000
6.000	0.00	0.00	0.00	0.000
6.083	0.00	0.00	0.00	0.000
6.167	0.00	0.00	0.00	0.000
6.250	0.00	0.00	0.00	0.000
6.333	0.00	0.00	0.00	0.000
6.417	0.00	0.00	0.00	0.000
6.500	0.00	0.00	0.00	0.000
6.583	0.00	0.00	0.00	0.000
6.667	0.00	0.00	0.00	0.000
6.750	0.00	0.00	0.00	0.000
6.833	0.00	0.00	0.00	0.000
6.917	0.00	0.00	0.00	0.000
7.000	0.00	0.00	0.00	0.000
7.083	0.00	0.00	0.00	0.000
7.167	0.00	0.00	0.00	0.000
7.250	0.00	0.00	0.00	0.000
7.333	0.00	0.00	0.00	0.000
7.417	0.00	0.00	0.00	0.000
7.500	0.00	0.00	0.00	0.000
7.583	0.00	0.00	0.00	0.000
7.667	0.00	0.00	0.00	0.000
7.750	0.00	0.00	0.00	0.000
7.833	0.00	0.00	0.00	0.000
7.917	0.00	0.00	0.00	0.000
8.000	0.00	0.00	0.00	0.000
8.083	0.00	0.00	0.00	0.000
8.167	0.00	0.00	0.00	0.000
8.250	0.00	0.00	0.00	0.000
8.333	0.00	0.00	0.00	0.000
8.417	0.00	0.00	0.00	0.000
8.500	0.00	0.00	0.00	0.000
8.583	0.00	0.00	0.00	0.000
8.667	0.00	0.00	0.00	0.000

8.750	0.00	0.00	0.00	0.000
8.833	0.00	0.00	0.00	0.000
8.917	0.00	0.00	0.00	0.000
9.000	0.00	0.00	0.00	0.000
9.083	0.00	0.00	0.00	0.000
9.167	0.00	0.00	0.00	0.000
9.250	0.00	0.00	0.00	0.000
9.333	0.06	0.50	0.00	0.000
9.417	0.32	1.89	0.10	0.000
9.500	0.69	2.58	0.58	0.000
9.583	1.05	2.94	0.97	0.000
9.667	1.40	3.22	1.30	0.000
9.750	1.71	3.41	1.62	0.000
9.833	1.97	3.56	1.90	0.000
9.917	2.20	3.68	2.14	0.000
10.000	2.40	3.76	2.35	0.000
10.083	2.50	3.80	2.47	0.000
10.167	2.52	3.80	2.51	0.000
10.250	2.53	3.81	2.53	0.000
10.333	2.54	3.81	2.54	0.000
10.417	2.56	3.82	2.55	0.000
10.500	2.57	3.82	2.56	0.000
10.583	2.61	3.84	2.60	0.000
10.667	2.67	3.86	2.66	0.000
10.750	2.73	3.88	2.72	0.000
10.833	2.78	3.90	2.77	0.000
10.917	2.83	3.92	2.82	0.000
11.000	2.87	3.93	2.86	0.000
11.083	2.91	3.95	2.90	0.000
11.167	2.96	3.97	2.95	0.000
11.250	3.01	3.98	2.99	0.000
11.333	3.04	3.99	3.03	0.000
11.417	3.08	4.00	3.07	0.000
11.500	3.11	4.01	3.10	0.000
11.583	3.11	4.01	3.11	0.000
11.667	3.09	4.01	3.09	0.000
11.750	3.07	4.00	3.07	0.000
11.833	3.05	4.00	3.06	0.000
11.917	3.04	3.99	3.05	0.000
12.000	3.03	3.99	3.03	0.000
12.083	3.11	4.01	3.09	0.000
12.167	3.28	4.06	3.24	0.000
12.250	3.43	4.11	3.39	0.000
12.333	3.55	4.15	3.53	0.000
12.417	3.66	4.19	3.64	0.000
12.500	3.76	4.22	3.74	0.000
12.583	3.92	4.26	3.88	0.000
12.667	4.14	4.32	4.08	0.000
12.750	4.32	4.36	4.28	0.000
12.833	4.49	4.40	4.45	0.000
12.917	4.63	4.42	4.59	0.000
13.000	4.75	4.44	4.72	0.000
13.083	4.94	4.48	4.90	0.000
13.167	5.20	4.54	5.14	0.000
13.250	5.41	4.58	5.36	0.000
13.333	5.61	4.61	5.56	0.000
13.417	5.77	4.64	5.73	0.000
13.500	5.91	4.66	5.88	0.000
13.583	5.93	4.66	5.92	0.000
13.667	5.83	4.65	5.85	0.000
13.750	5.74	4.63	5.76	0.000
13.833	5.67	4.62	5.68	0.000
13.917	5.60	4.61	5.62	0.000

14.000	5.55	4.60	5.56	0.000
14.083	5.49	4.59	5.50	0.000
14.167	5.43	4.58	5.45	0.000
14.250	5.38	4.57	5.39	0.000
14.333	5.34	4.56	5.35	0.000
14.417	5.30	4.56	5.31	0.000
14.500	5.27	4.55	5.28	0.000
14.583	5.25	4.55	5.25	0.000
14.667	5.23	4.54	5.23	0.000
14.750	5.21	4.54	5.22	0.000
14.833	5.20	4.54	5.20	0.000
14.917	5.19	4.54	5.19	0.000
15.000	5.18	4.54	5.18	0.000
15.083	5.14	4.53	5.15	0.000
15.167	5.08	4.51	5.09	0.000
15.250	5.03	4.50	5.04	0.000
15.333	4.98	4.49	4.99	0.000
15.417	4.94	4.48	4.95	0.000
15.500	4.91	4.47	4.91	0.000
15.583	4.81	4.45	4.83	0.000
15.667	4.66	4.43	4.70	0.000
15.750	4.53	4.40	4.56	0.000
15.833	4.42	4.38	4.44	0.000
15.917	4.32	4.36	4.34	0.000
16.000	4.23	4.34	4.25	0.000
16.083	3.95	4.27	4.02	0.000
16.167	3.49	4.13	3.60	0.000
16.250	3.09	4.01	3.19	0.000
16.333	2.75	3.89	2.83	0.000
16.417	2.45	3.78	2.53	0.000
16.500	2.19	3.68	2.26	0.000
16.583	1.88	3.51	1.96	0.000
16.667	1.53	3.30	1.63	0.000
16.750	1.22	3.08	1.31	0.000
16.833	0.96	2.85	1.04	0.000
16.917	0.73	2.63	0.81	0.000
17.000	0.53	2.38	0.60	0.000
17.083	0.37	2.19	0.44	0.000
17.167	0.26	1.51	0.26	0.000
17.250	0.15	0.91	0.23	0.000
17.333	0.07	0.50	0.08	0.000
17.417	0.01	0.50	0.07	0.000
17.500	0.00	0.00	0.02	0.000
17.583	0.00	0.00	0.05	0.000
17.667	0.00	0.00	0.01	0.000
17.750	0.00	0.00	0.00	0.000
17.833	0.00	0.00	0.00	0.000
17.917	0.00	0.00	0.00	0.000
18.000	0.00	0.00	0.00	0.000
18.083	0.00	0.00	0.00	0.000
18.167	0.00	0.00	0.00	0.000
18.250	0.00	0.00	0.00	0.000
18.333	0.00	0.00	0.00	0.000
18.417	0.00	0.00	0.00	0.000
18.500	0.00	0.00	0.00	0.000
18.583	0.00	0.00	0.00	0.000
18.667	0.00	0.00	0.00	0.000
18.750	0.00	0.00	0.00	0.000
18.833	0.00	0.00	0.00	0.000
18.917	0.00	0.00	0.00	0.000
19.000	0.00	0.00	0.00	0.000
19.083	0.00	0.00	0.00	0.000
19.167	0.00	0.00	0.00	0.000

19.250	0.00	0.00	0.00	0.000
19.333	0.00	0.00	0.00	0.000
19.417	0.00	0.00	0.00	0.000
19.500	0.00	0.00	0.00	0.000
19.583	0.00	0.00	0.00	0.000
19.667	0.00	0.00	0.00	0.000
19.750	0.00	0.00	0.00	0.000
19.833	0.00	0.00	0.00	0.000
19.917	0.00	0.00	0.00	0.000
20.000	0.00	0.00	0.00	0.000
20.083	0.00	0.00	0.00	0.000
20.167	0.00	0.00	0.00	0.000
20.250	0.00	0.00	0.00	0.000
20.333	0.00	0.00	0.00	0.000
20.417	0.00	0.00	0.00	0.000
20.500	0.00	0.00	0.00	0.000
20.583	0.00	0.00	0.00	0.000
20.667	0.00	0.00	0.00	0.000
20.750	0.00	0.00	0.00	0.000
20.833	0.00	0.00	0.00	0.000
20.917	0.00	0.00	0.00	0.000
21.000	0.00	0.00	0.00	0.000
21.083	0.00	0.00	0.00	0.000
21.167	0.00	0.00	0.00	0.000
21.250	0.00	0.00	0.00	0.000
21.333	0.00	0.00	0.00	0.000
21.417	0.00	0.00	0.00	0.000
21.500	0.00	0.00	0.00	0.000
21.583	0.00	0.00	0.00	0.000
21.667	0.00	0.00	0.00	0.000
21.750	0.00	0.00	0.00	0.000
21.833	0.00	0.00	0.00	0.000
21.917	0.00	0.00	0.00	0.000
22.000	0.00	0.00	0.00	0.000
22.083	0.00	0.00	0.00	0.000
22.167	0.00	0.00	0.00	0.000
22.250	0.00	0.00	0.00	0.000
22.333	0.00	0.00	0.00	0.000
22.417	0.00	0.00	0.00	0.000
22.500	0.00	0.00	0.00	0.000
22.583	0.00	0.00	0.00	0.000
22.667	0.00	0.00	0.00	0.000
22.750	0.00	0.00	0.00	0.000
22.833	0.00	0.00	0.00	0.000
22.917	0.00	0.00	0.00	0.000
23.000	0.00	0.00	0.00	0.000
23.083	0.00	0.00	0.00	0.000
23.167	0.00	0.00	0.00	0.000
23.250	0.00	0.00	0.00	0.000
23.333	0.00	0.00	0.00	0.000
23.417	0.00	0.00	0.00	0.000
23.500	0.00	0.00	0.00	0.000
23.583	0.00	0.00	0.00	0.000
23.667	0.00	0.00	0.00	0.000
23.750	0.00	0.00	0.00	0.000
23.833	0.00	0.00	0.00	0.000
23.917	0.00	0.00	0.00	0.000
24.000	0.00	0.00	0.00	0.000

==========

END OF FLOODSCx ROUTING ANALYSIS

APPENDIX C

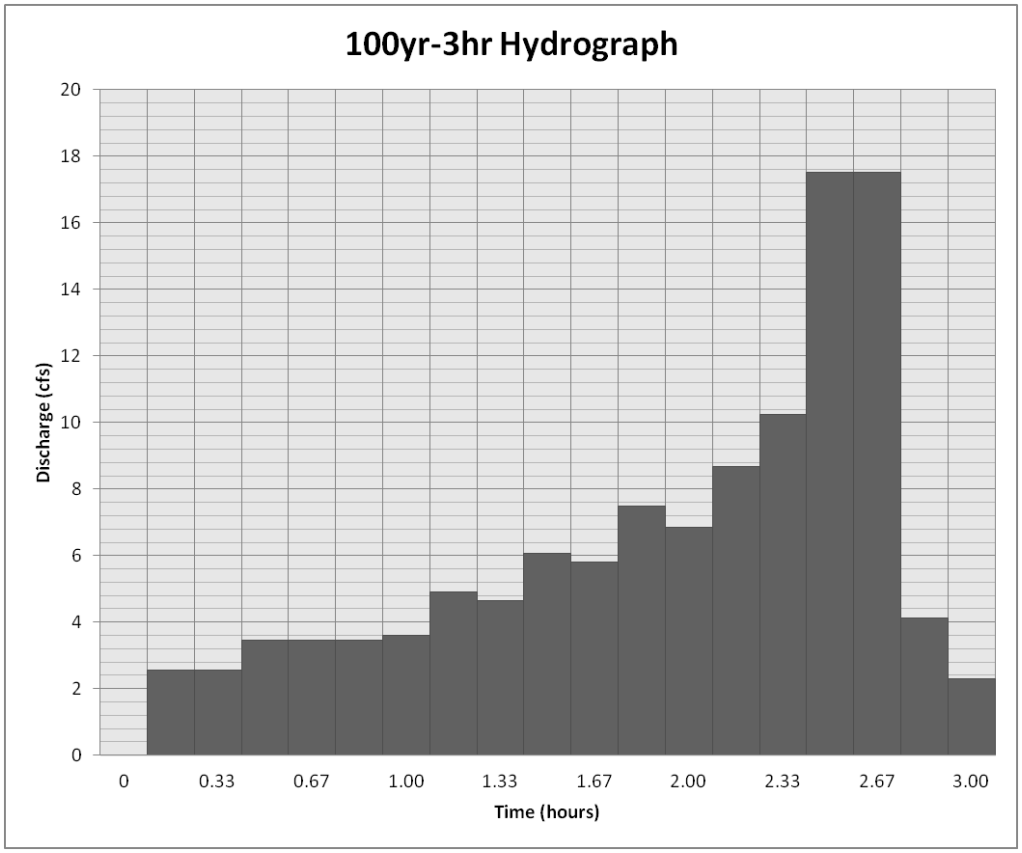
PROPOSED BASIN CONDITIONS
100 YEAR – 1 HOUR, 3 HOUR, 6, HOUR, AND 24 HOUR STORM EVENTS

RESULTS FROM HAND CALCULATED SYNTHETIC UNIT HYDROGRAPH METHOD

SYNTETHIC UNIT HYDROGRAPH METHOD CALCULATIONS

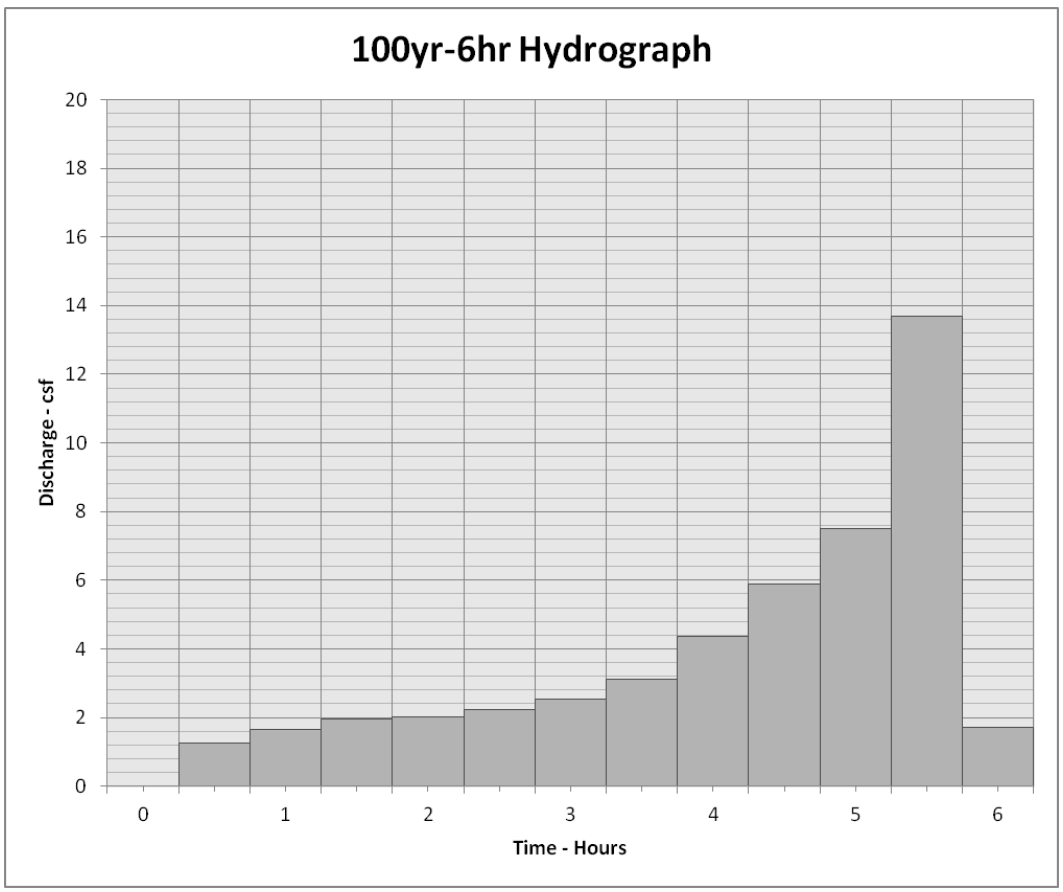
Data and Hydrograph for 100 yr – 3 hr storm event:

Hours 0	[15] Unit Time Period m	[16] Time Percent of Lag =[7]*[15]	[17] Cummulative Average Discharge	[18] Distrib Graph Percent	[19] Unit Hydrograph	Total Adjusted Storm Rain	[20] Pattern Percent Pt E-5.9	Unit Time [min]	[21] Storm Rain [in/hr]	[22] Loss Rate in/hr	[23] Effective Rain [in/hr]	Flood Hydrograph (Short Cut Method:[23]*[3]
0.17	1					2.55	2.6	10	0.398	0.097	0.30	2.557
0.33	2					2.55	2.6	10	0.398	0.097	0.30	2.557
0.50	3					2.55	3.3	10	0.505	0.097	0.41	3.467
0.67	4					2.55	3.3	10	0.505	0.097	0.41	3.467
0.83	5					2.55	3.3	10	0.505	0.097	0.41	3.467
1.00	6					2.55	3.4	10	0.520	0.097	0.42	3.597
1.17	7					2.55	4.4	10	0.673	0.097	0.58	4.898
1.33	8					2.55	4.2	10	0.643	0.097	0.55	4.638
1.50	9	SHORT CUT				2.55	5.3	10	0.811	0.097	0.71	6.068
1.67	10					2.55	5.1	10	0.780	0.097	0.68	5.808
1.83	11					2.55	6.4	10	0.979	0.097	0.88	7.499
2.00	12					2.55	5.9	10	0.903	0.097	0.81	6.848
2.17	13					2.55	7.3	10	1.117	0.097	1.02	8.669
2.33	14					2.55	8.5	10	1.301	0.097	1.20	10.230
2.50	15					2.55	14.1	10	2.157	0.097	2.06	17.513
2.67	16					2.55	14.1	10	2.157	0.097	2.06	17.513
2.83	17					2.55	3.8	10	0.581	0.097	0.48	4.117
3.00	18					2.55	2.4	10	0.367	0.097	0.27	2.297



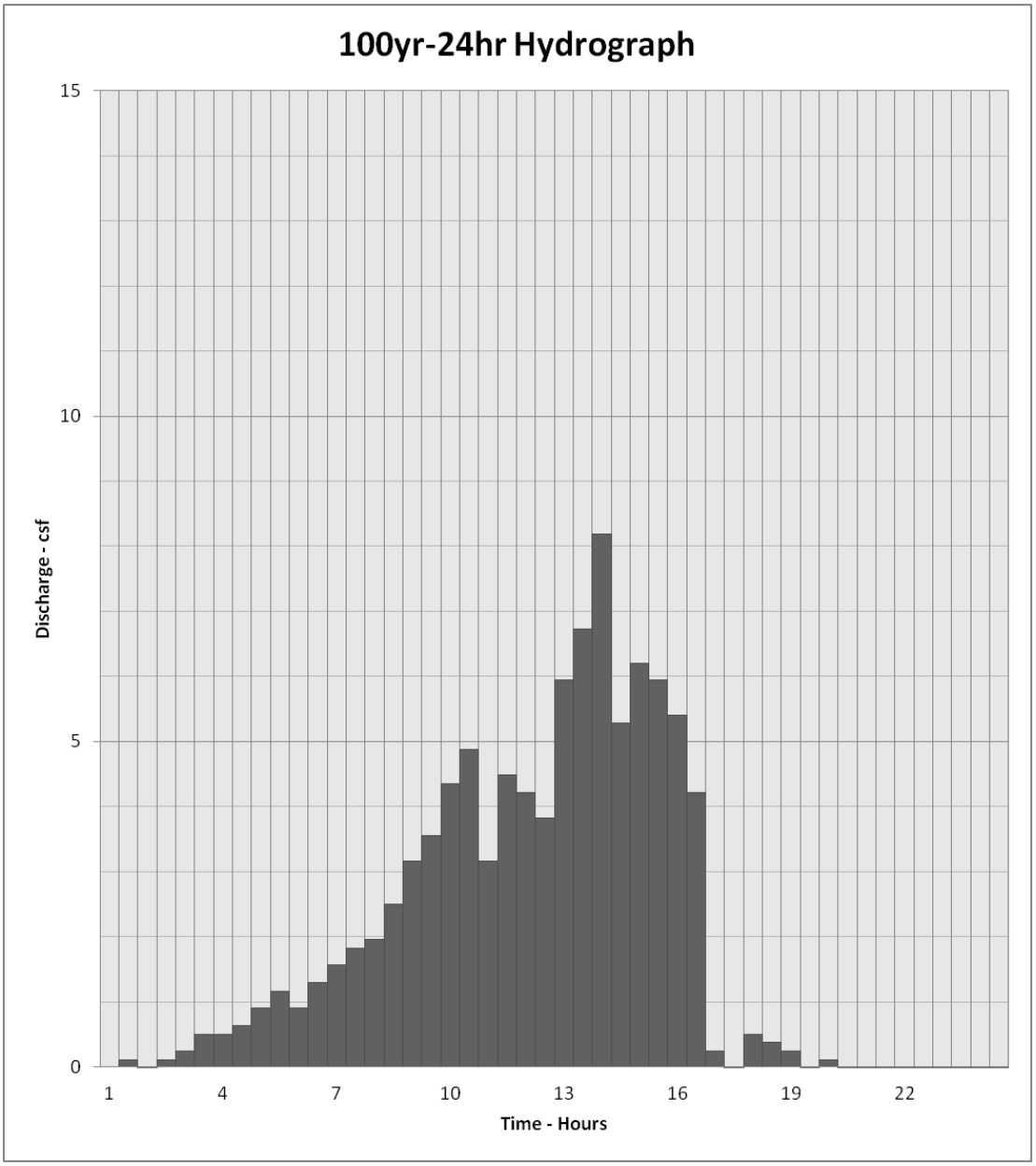
Data and Hydrograph for 100 yr – 6 hr storm event:

Hours	[15] Unit Time Period m	[16] Time Percent of Lag =[7]*[15]	[17] Cummulative Average Discharge	[18] Distrib Graph Percent	[19] Unit Hydrograph	[10] Total Adjusted Storm Rain	[20] Pattern Percent Pt E-5.9	[5] Unit Time [min]	[21] Storm Rain [in/hr]	[22] Loss Rate in/hr	[23] Effective Rain [in/hr]	Flood Hydrograph (Short Cut Method:[23] *[3]
0.00												
0.50	1					3.4	3.6	30	0.245	0.097	0.15	1.256
1.00	2					3.4	4.3	30	0.292	0.097	0.20	1.661
1.50	3					3.4	4.8	30	0.326	0.097	0.23	1.950
2.00	4					3.4	4.9	30	0.333	0.097	0.24	2.008
2.50	5					3.4	5.3	30	0.360	0.097	0.26	2.239
3.00	6					3.4	5.8	30	0.394	0.097	0.30	2.528
3.50	7					3.4	6.8	30	0.462	0.097	0.37	3.106
4.00	8					3.4	9	30	0.612	0.097	0.52	4.378
4.50	9					3.4	11.6	30	0.789	0.097	0.69	5.880
5.00	10					3.4	14.4	30	0.979	0.097	0.88	7.499
5.50	11					3.4	25.1	30	1.707	0.097	1.61	13.683
6.00	12					3.4	4.4	30	0.299	0.097	0.20	1.719



Data and Hydrograph for 100 yr – 24 hr storm event:

Hours	[15] Unit Time Period m	[16] Time Percent of Lag =[7]*[15]	[17] Cummulative Average	[18] Distrib Graph Percent	[19] Unit Hydrograph	[10] Total Adjusted Storm Rain	[20] Pattern Percent Pt E-5.9	[5] Unit Time [min]	[21] Storm Rain [in/hr]	[22] Loss Rate in/hr	[23] Effective Rain [in/hr]	Flood Hydrograph (Short Cut Method:[23] *[3]
0.00												
0.50	1					7.8	0.5	30	0.078	0.097	0.00	0.000
1.00	2					7.8	0.7	30	0.109	0.097	0.01	0.104
1.50	3					7.8	0.6	30	0.094	0.097	0.00	-0.029
2.00	4					7.8	0.7	30	0.109	0.097	0.01	0.104
2.50	5					7.8	0.8	30	0.125	0.097	0.03	0.236
3.00	6					7.8	1	30	0.156	0.097	0.06	0.502
3.50	7					7.8	1	30	0.156	0.097	0.06	0.502
4.00	8					7.8	1.1	30	0.172	0.097	0.07	0.634
4.50	9					7.8	1.3	30	0.203	0.097	0.11	0.899
5.00	10					7.8	1.5	30	0.234	0.097	0.14	1.165
5.50	11					7.8	1.3	30	0.203	0.097	0.11	0.899
6.00	12					7.8	1.6	30	0.250	0.097	0.15	1.297
6.50	13					7.8	1.8	30	0.281	0.097	0.18	1.562
7.00	14					7.8	2	30	0.312	0.097	0.22	1.828
7.50	15					7.8	2.1	30	0.328	0.097	0.23	1.960
8.00	16					7.8	2.5	30	0.390	0.097	0.29	2.491
8.50	17					7.8	3	30	0.468	0.097	0.37	3.154
9.00	18					7.8	3.3	30	0.515	0.097	0.42	3.551
9.50	19					7.8	3.9	30	0.608	0.097	0.51	4.347
10.00	20					7.8	4.3	30	0.671	0.097	0.57	4.877
10.50	21					7.8	3	30	0.468	0.097	0.37	3.154
11.00	22					7.8	4	30	0.624	0.097	0.53	4.480
11.50	23					7.8	3.8	30	0.593	0.097	0.50	4.214
12.00	24					7.8	3.5	30	0.546	0.097	0.45	3.817
12.50	25					7.8	5.1	30	0.796	0.097	0.70	5.938
13.00	26					7.8	5.7	30	0.889	0.097	0.79	6.734
13.50	27					7.8	6.8	30	1.061	0.097	0.96	8.192
14.00	28					7.8	4.6	30	0.718	0.097	0.62	5.275
14.50	29					7.8	5.3	30	0.827	0.097	0.73	6.203
15.00	30					7.8	5.1	30	0.796	0.097	0.70	5.938
15.50	31					7.8	4.7	30	0.733	0.097	0.64	5.408
16.00	32					7.8	3.8	30	0.593	0.097	0.50	4.214
16.50	33					7.8	0.8	30	0.125	0.097	0.03	0.236
17.00	34					7.8	0.6	30	0.094	0.097	0.00	-0.029
17.50	35					7.8	1	30	0.156	0.097	0.06	0.502
18.00	36					7.8	0.9	30	0.140	0.097	0.04	0.369
18.50	37					7.8	0.8	30	0.125	0.097	0.03	0.236
19.00	38					7.8	0.5	30	0.078	0.097	-0.02	-0.162
19.50	39					7.8	0.7	30	0.109	0.097	0.01	0.104
20.00	40					7.8	0.5	30	0.078	0.097	-0.02	-0.162
20.50	41					7.8	0.6	30	0.094	0.097	0.00	-0.029
21.00	42					7.8	0.5	30	0.078	0.097	-0.02	-0.162
21.50	43					7.8	0.5	30	0.078	0.097	-0.02	-0.162
22.00	44					7.8	0.5	30	0.078	0.097	-0.02	-0.162
22.50	45					7.8	0.4	30	0.062	0.097	-0.03	-0.294
23.00	46					7.8	0.4	30	0.062	0.097	-0.03	-0.294
23.50	47					7.8	0.4	30	0.062	0.097	-0.03	-0.294
24.00	48					7.8	0.4	30	0.062	0.097	-0.03	-0.294


100yr-24hr Hydrograph
15
10
5
0
Discharge - csf
1
4
7
10
13
16
19
22
Time - Hours

APPENDIX D

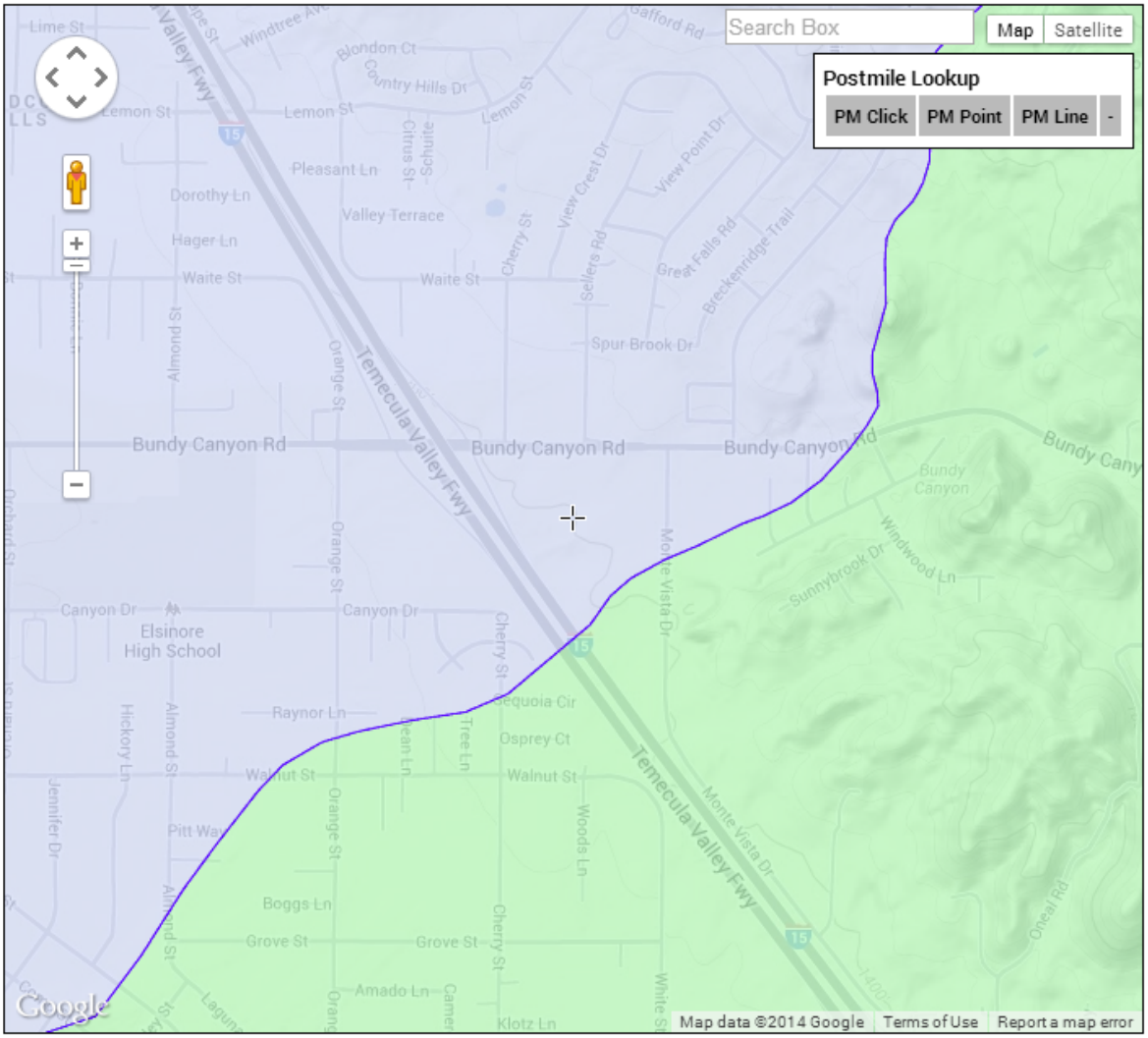
MAPPING OF EXISTING WATERSHEDS AND 100-YEAR FLOODPLAIN

Caltrans > DEA > Stormwater > **Water Quality Planning Tool**

Layers

- 303(d) List and TMDLs (Legend)
- Areas of Special Biological Significance
- Caltrans Districts
- Caltrans Facilities (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

Hydrologic Unit	SAN JACINTO VALLEY	**Hydrologic Area**	Elsinore Valley	**Hydrologic Sub-Area #**	802.31
Hydrologic Sub-Area Name	Elsinore	**Planning Watershed**	4802310000	**HSA Area (acres)**	25729
Latitude, Longitude	33.6253, -117.2692				

WATERSHED BOUNDARY DATASET

Watershed	Lower San Jacinto River	**Subwatershed**	Lake Elsinore	**Hydrologic Unit Code**	180702020308
Average Annual Precipitation (inches)	17.41				

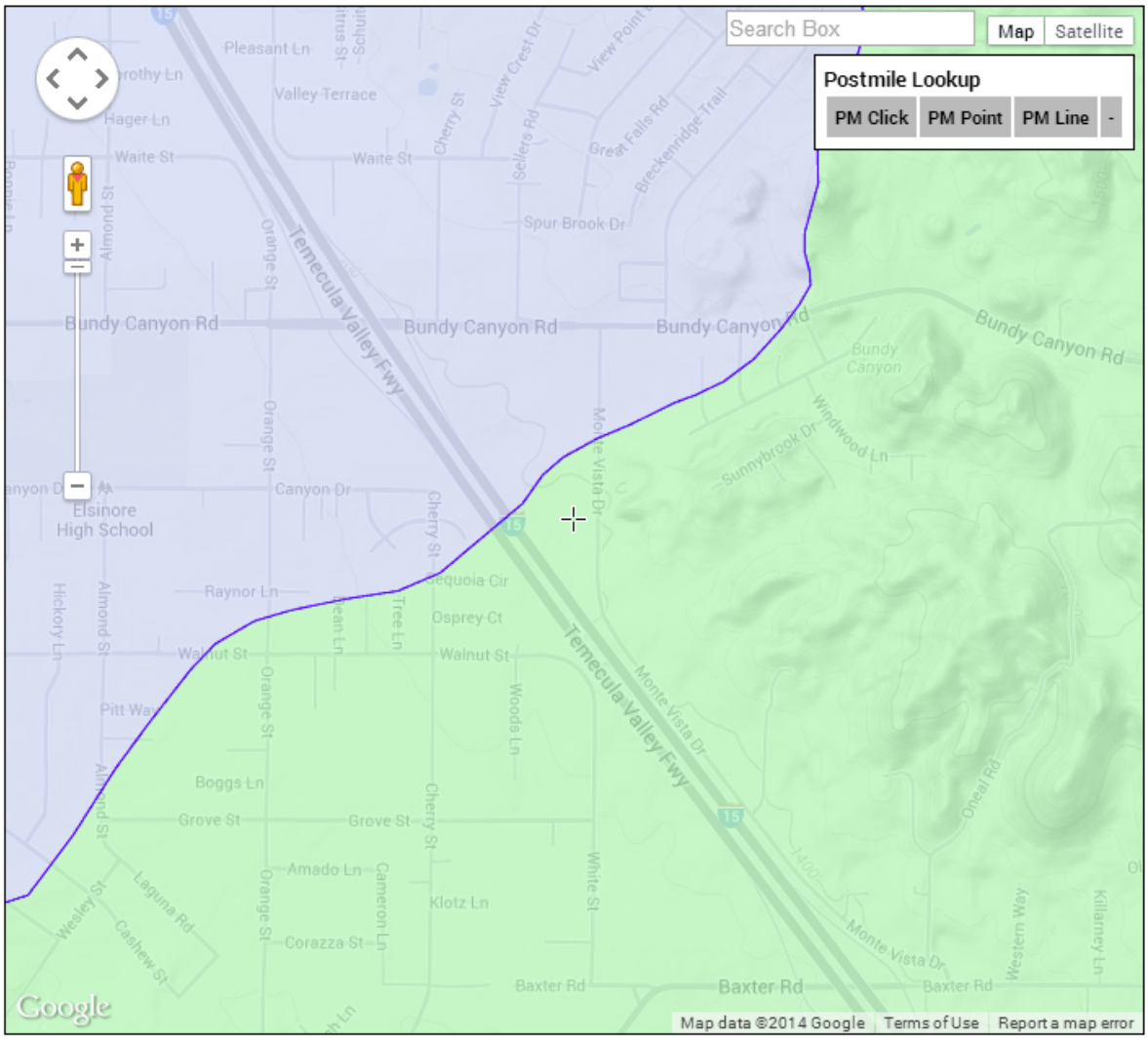
Layers

- 303(d) List and TMDLs (Legend)
- Areas of Special Biological Significance
- Caltrans Districts
- Caltrans Facilities (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation

Information

Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.

Help



Watershed Information

CALWATER WATERSHED

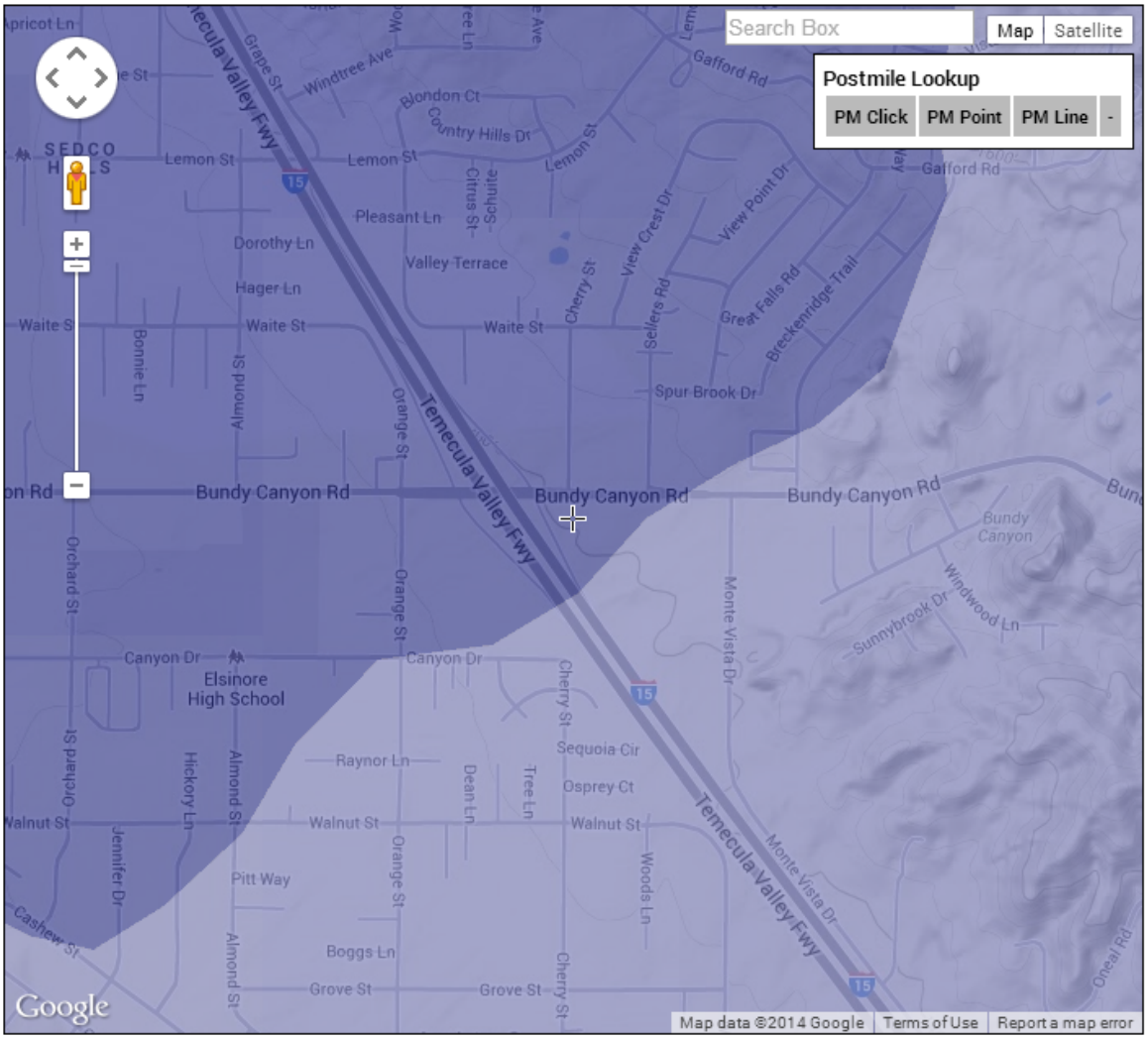
Hydrologic Unit	SANTA MARGARITA	**Hydrologic Area**	Murrieta	**Hydrologic Sub-Area #**	902.31
Hydrologic Sub-Area Name	Wildomar	**Planning Watershed**	4902310000	**HSA Area (acres)**	13114
Latitude, Longitude	33.6226, -117.2674				

WATERSHED BOUNDARY DATASET

Watershed	Murrieta Creek	**Subwatershed**	Cole Canyon-Murrieta Creek	**Hydrologic Unit Code**	180703020402
Average Annual Precipitation (inches)	16.91				

- (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes
- **Soil Loss**

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

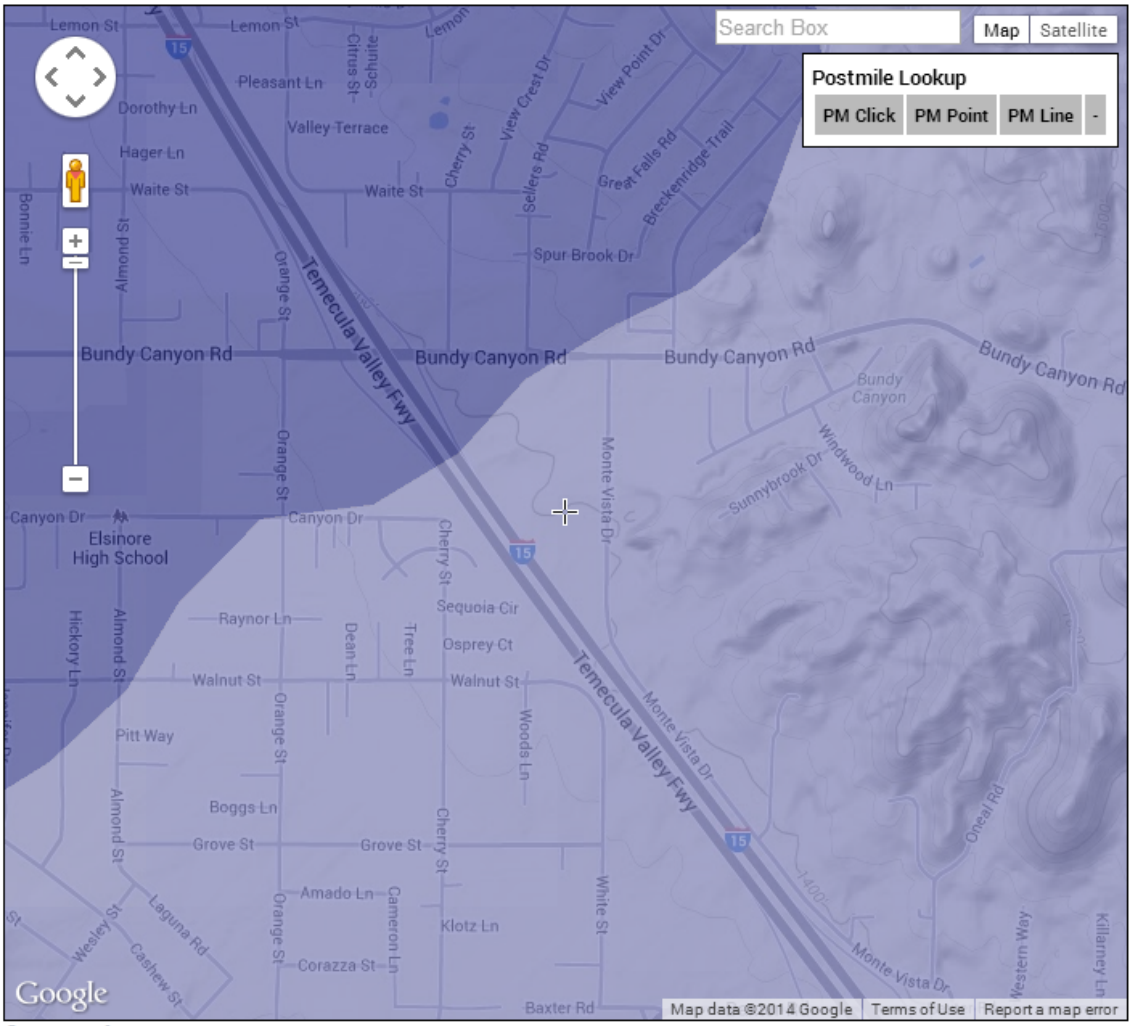
Hydrologic Unit	SAN JACINTO VALLEY	**Hydrologic Area**	Elsinore Valley	**Hydrologic Sub-Area #**	802.31
Hydrologic Sub-Area Name	Elsinore	**Planning Watershed**	4802310000	**HSA Area (acres)**	25729
Latitude, Longitude	33.6263, -117.2708				

WATERSHED BOUNDARY DATASET

Watershed	Lower San Jacinto River	**Subwatershed**	Lake Elsinore	**Hydrologic Unit Code**	180702020308
Average Annual Precipitation (inches)	17.41				

- (Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes
- **Soil Loss**

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

Hydrologic Unit	SANTA MARGARITA	**Hydrologic Area**	Murrieta	**Hydrologic Sub-Area #**	902.31
Hydrologic Sub-Area Name	Wildomar	**Planning Watershed**	4902310000	**HSA Area (acres)**	13114
Latitude, Longitude	33.6234, -117.2678				

WATERSHED BOUNDARY DATASET

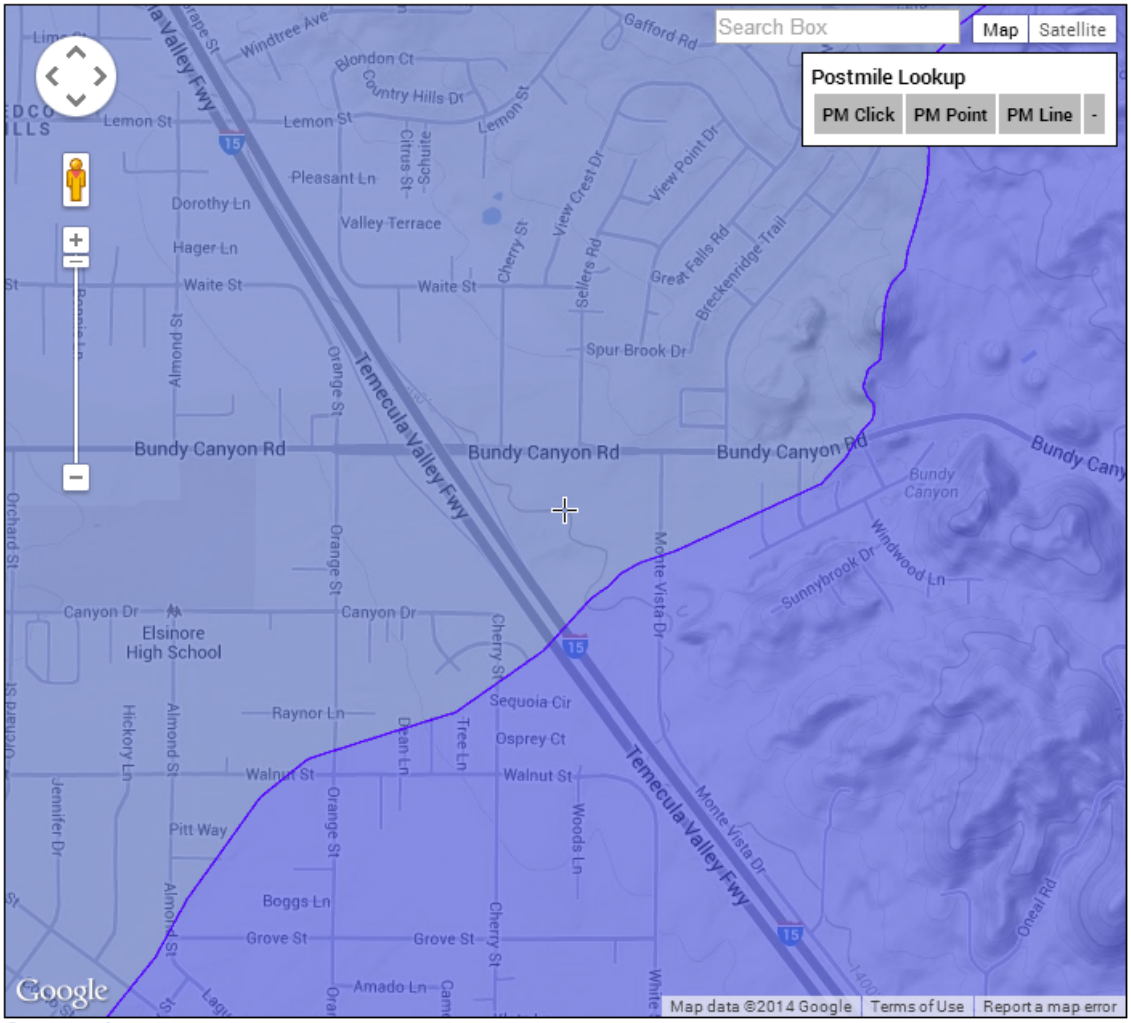
Watershed	Murrieta Creek	**Subwatershed**	Cole Canyon-Murrieta Creek	**Hydrologic Unit Code**	180703020402
Average Annual Precipitation (inches)	16.91				

Caltrans > DEA > Stormwater > **Water Quality Planning Tool**

(Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes

Soil Loss

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

Hydrologic Unit	SAN JACINTO VALLEY	**Hydrologic Area**	Elsinore Valley	**Hydrologic Sub-Area #**	802.31
Hydrologic Sub-Area Name	Elsinore	**Planning Watershed**	4802310000	**HSA Area (acres)**	25729
Latitude, Longitude	33.6255, -117.2692				

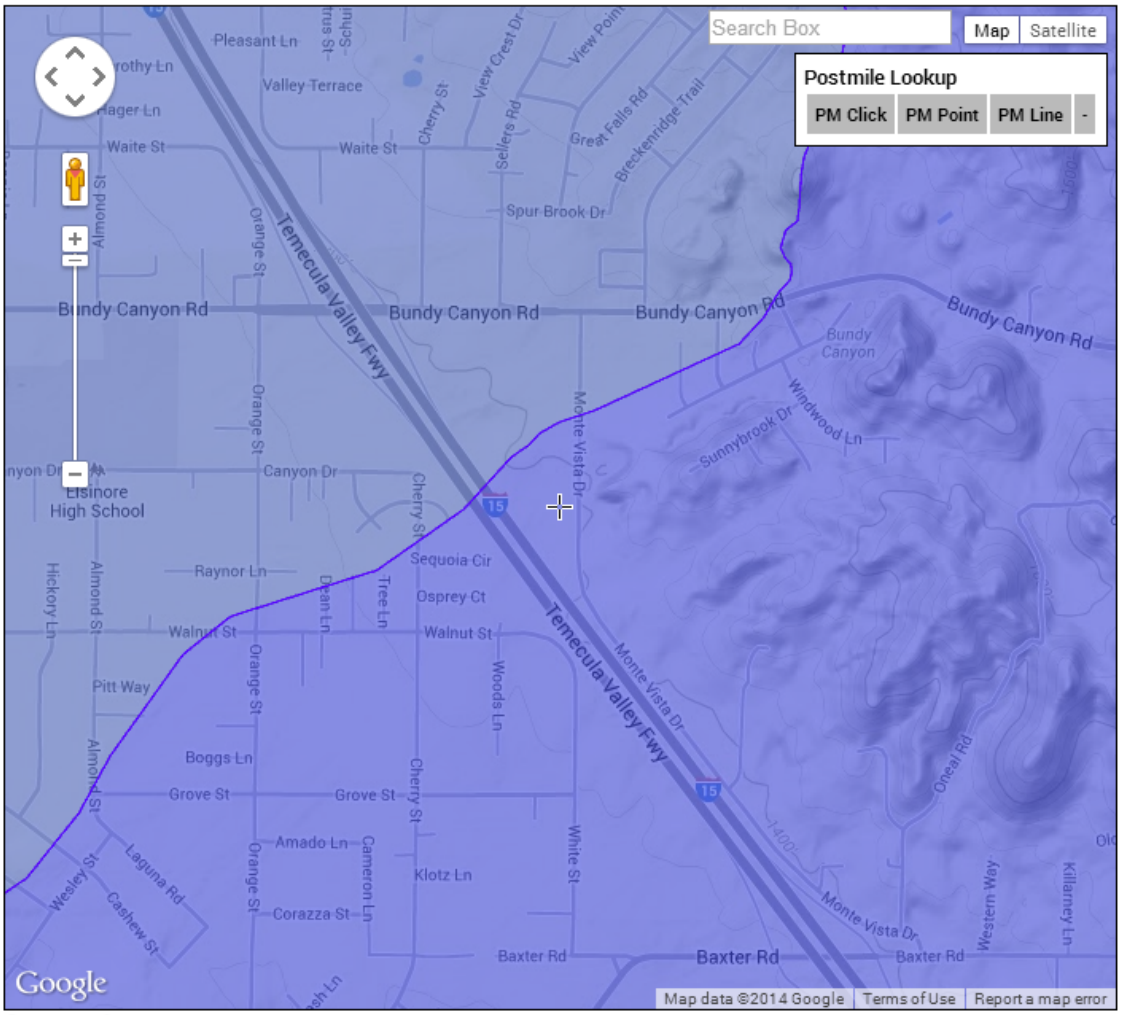
WATERSHED BOUNDARY DATASET

Watershed	Lower San Jacinto River	**Subwatershed**	Lake Elsinore	**Hydrologic Unit Code**	180702020308
Average Annual Precipitation (inches)	17.41				

(Legend)
- Caltrans Tier 1 Monitoring Sites
- Calwater Watersheds
- Coastal Zone
- Counties
- Geologic Map (Legend)
- High Risk Receiving Watersheds
- Monthly Precipitation
- MS4 Areas
- Post Miles
- RWQCB Boundaries
- USGS Topo Maps
- Watershed Boundary Dataset
- Zip Codes

Soil Loss

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help



Watershed Information

CALWATER WATERSHED

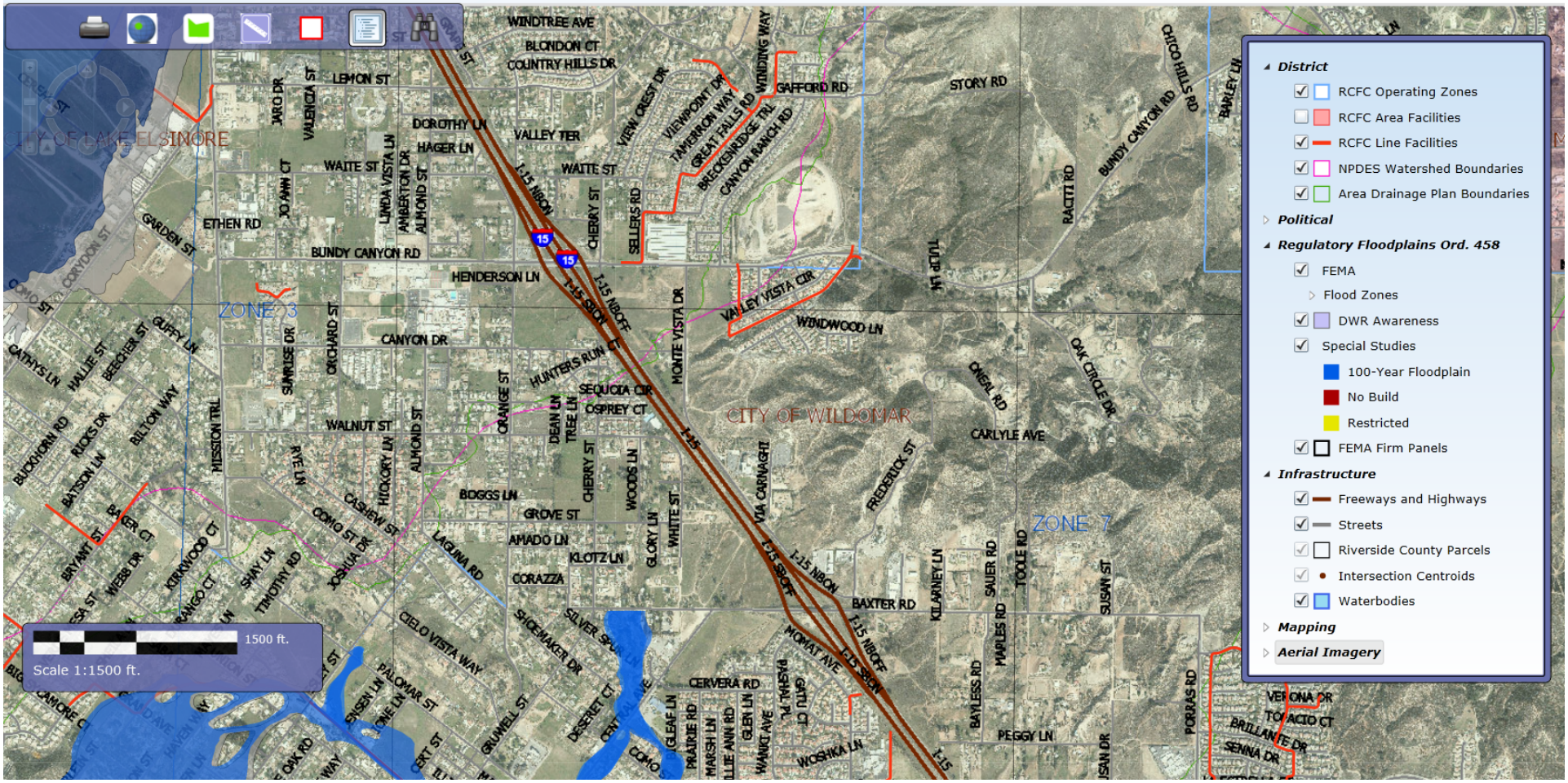
Hydrologic Unit	SANTA MARGARITA	**Hydrologic Area**	Murrieta	**Hydrologic Sub-Area #**	902.31
Hydrologic Sub-Area Name	Wildomar	**Planning Watershed**	4902310000	**HSA Area (acres)**	13114
Latitude, Longitude	33.6225, -117.2672				

WATERSHED BOUNDARY DATASET

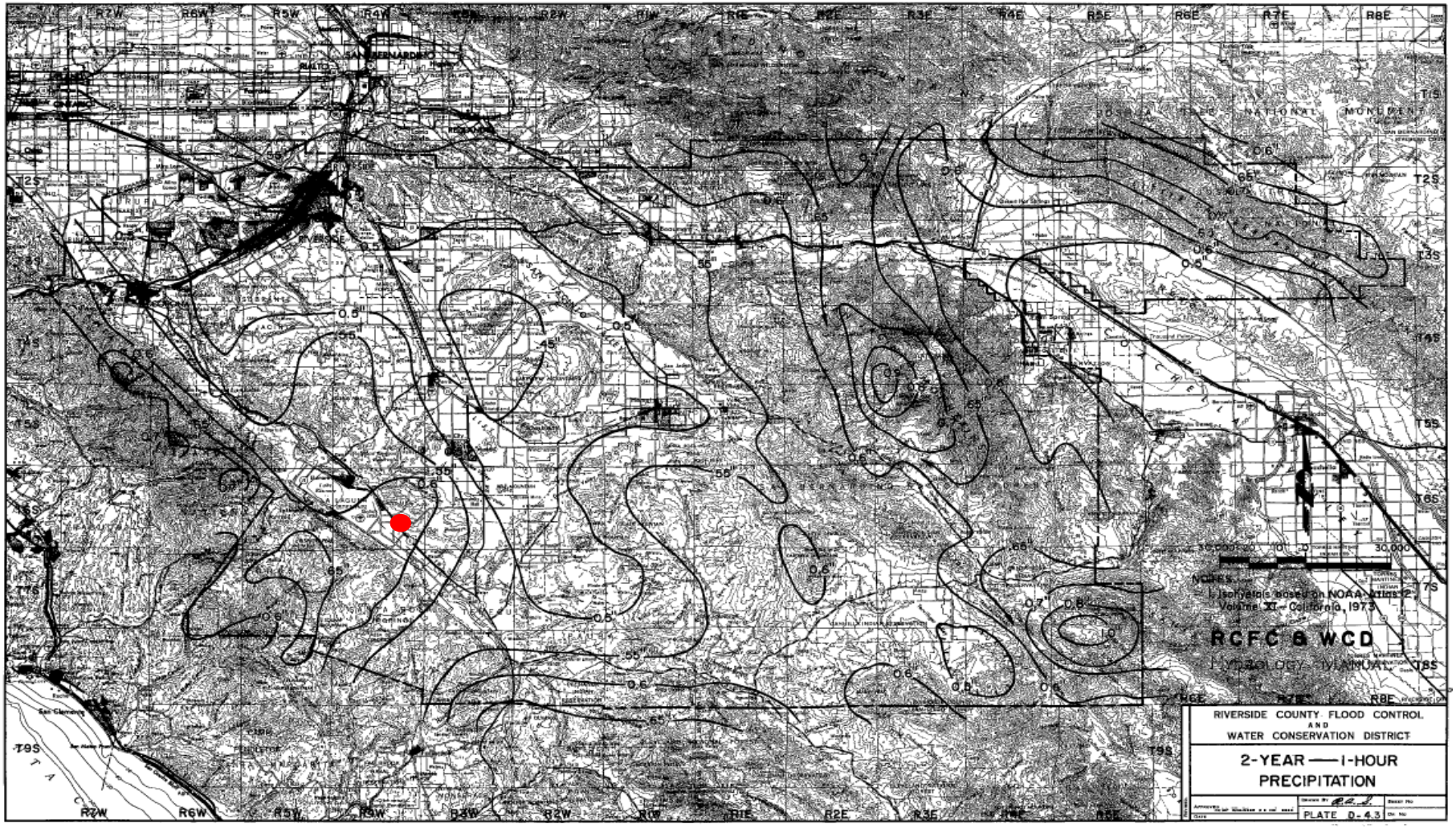
Watershed	Murrieta Creek	**Subwatershed**	Cole Canyon-Murrieta Creek	**Hydrologic Unit Code**	180703020402
Average Annual Precipitation (inches)	16.91				

RCFCWCD - Public Flood Hazard Determination

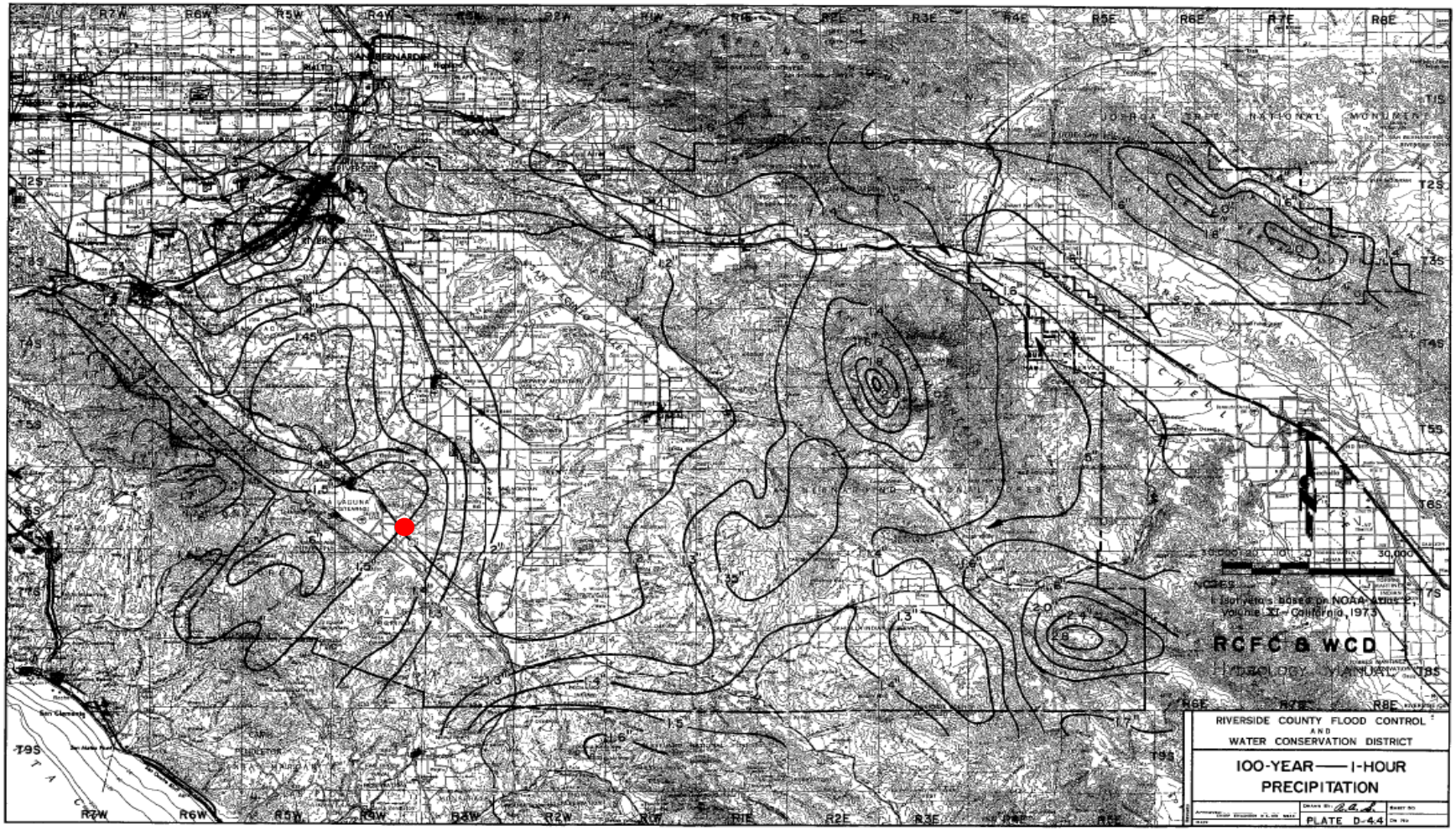
GIS - Information Technology



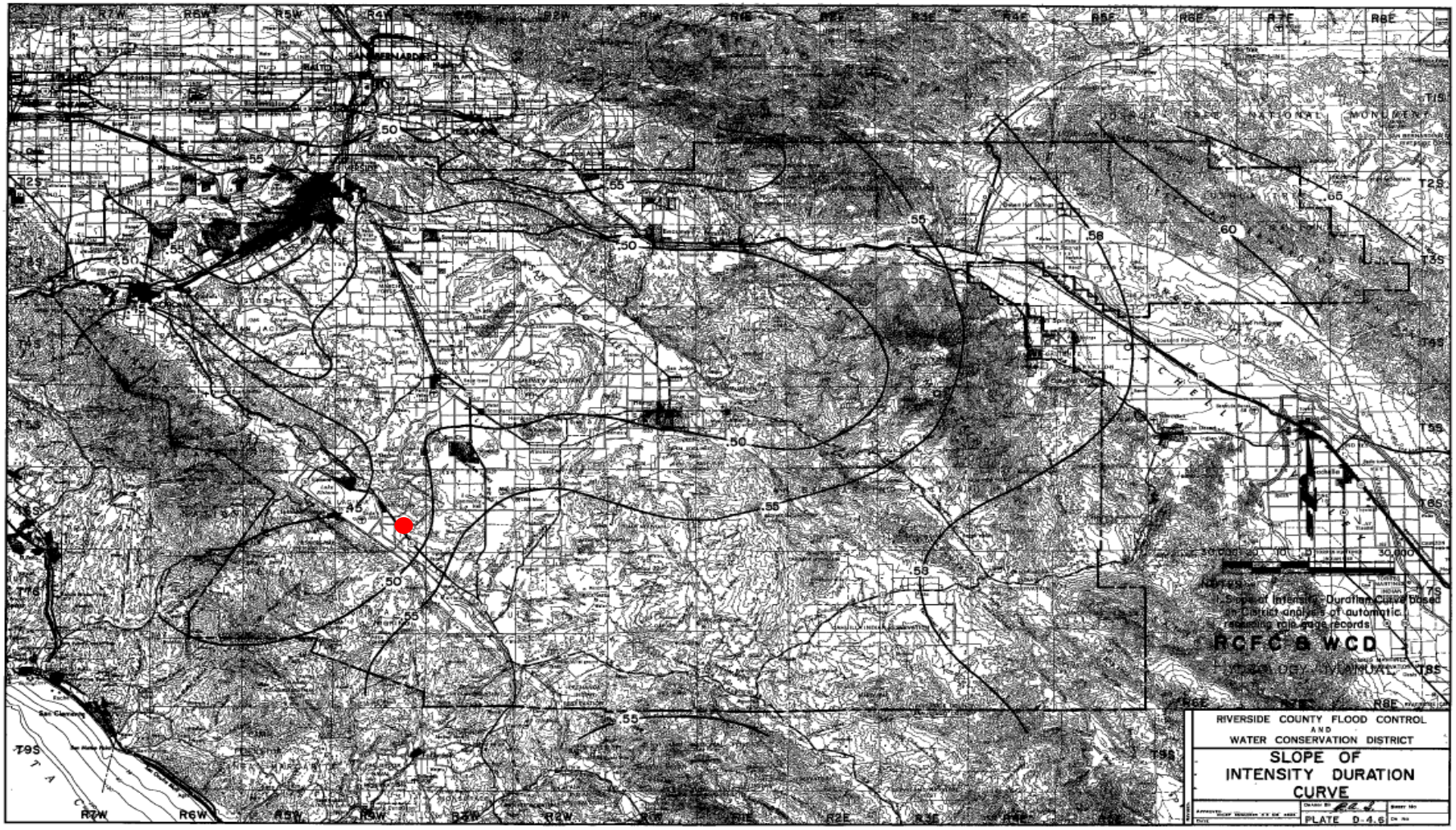
SUPPORTING REFERENCE MATERIAL AND DOCUMENTATION



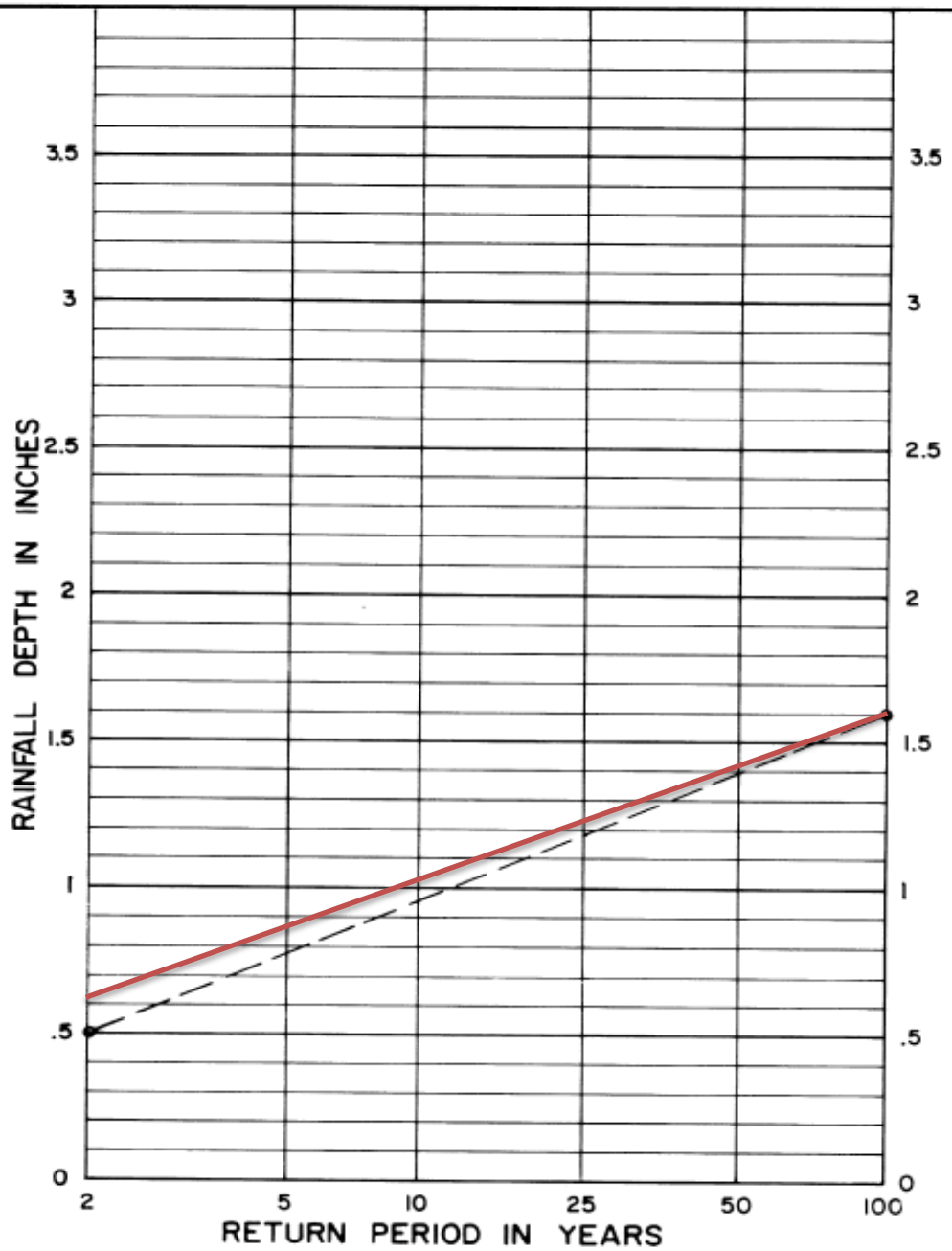
2 Year -- I-Hour Precipitation = 0.62"



100 Year -- I-Hour Precipitation = 1.5"



Slope of Intensity Duration Curve = 0.48



NOTE:
1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

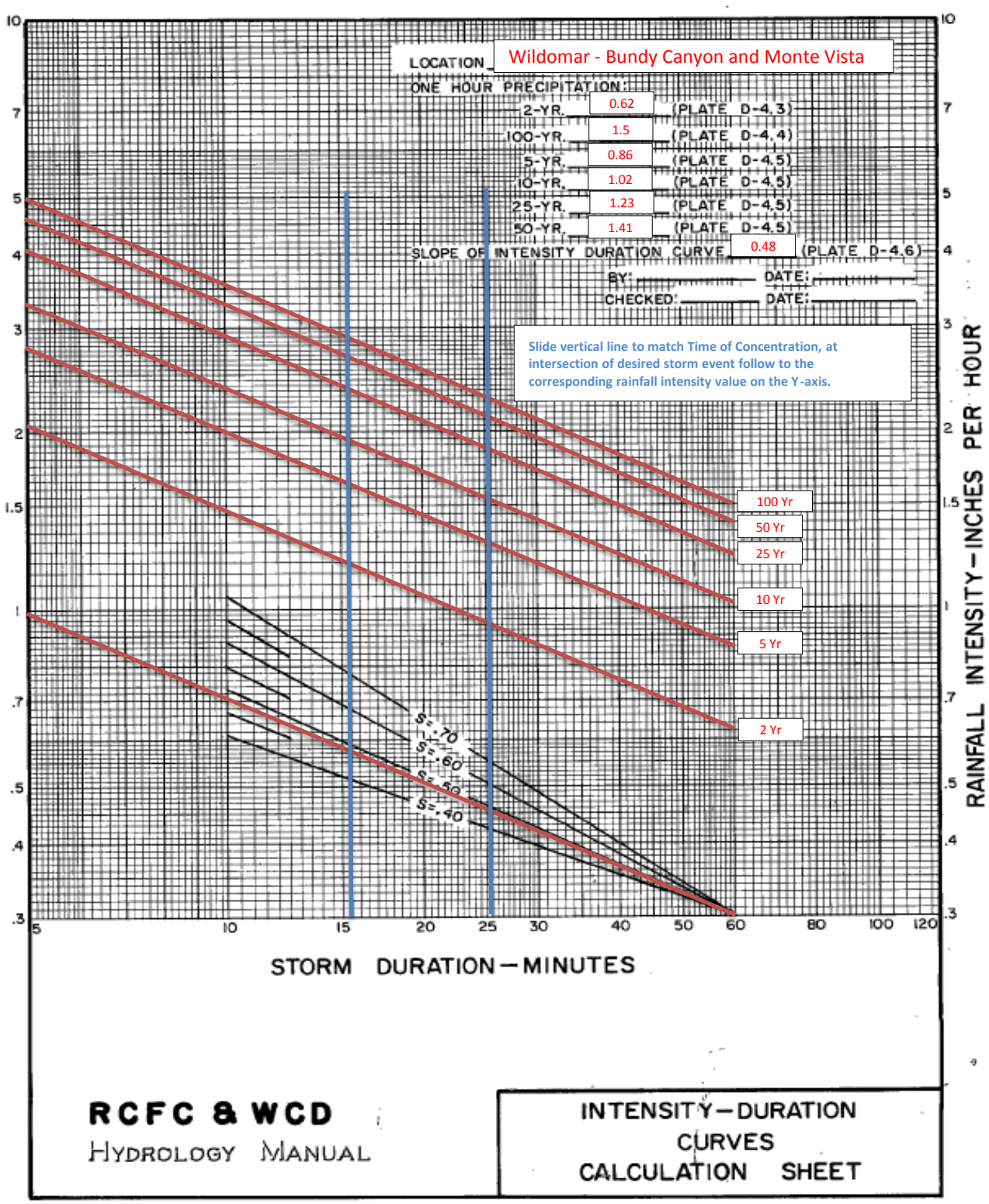
Reference: NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS
RETURN PERIOD FOR
PARTIAL DURATION SERIES

PLATE D-4.5

2 Year Depth taken from Plate D4.3 and 100 Yr Depth taken from Plate 4.4



Slope of 0.48 was taken from Plate D4.6

LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

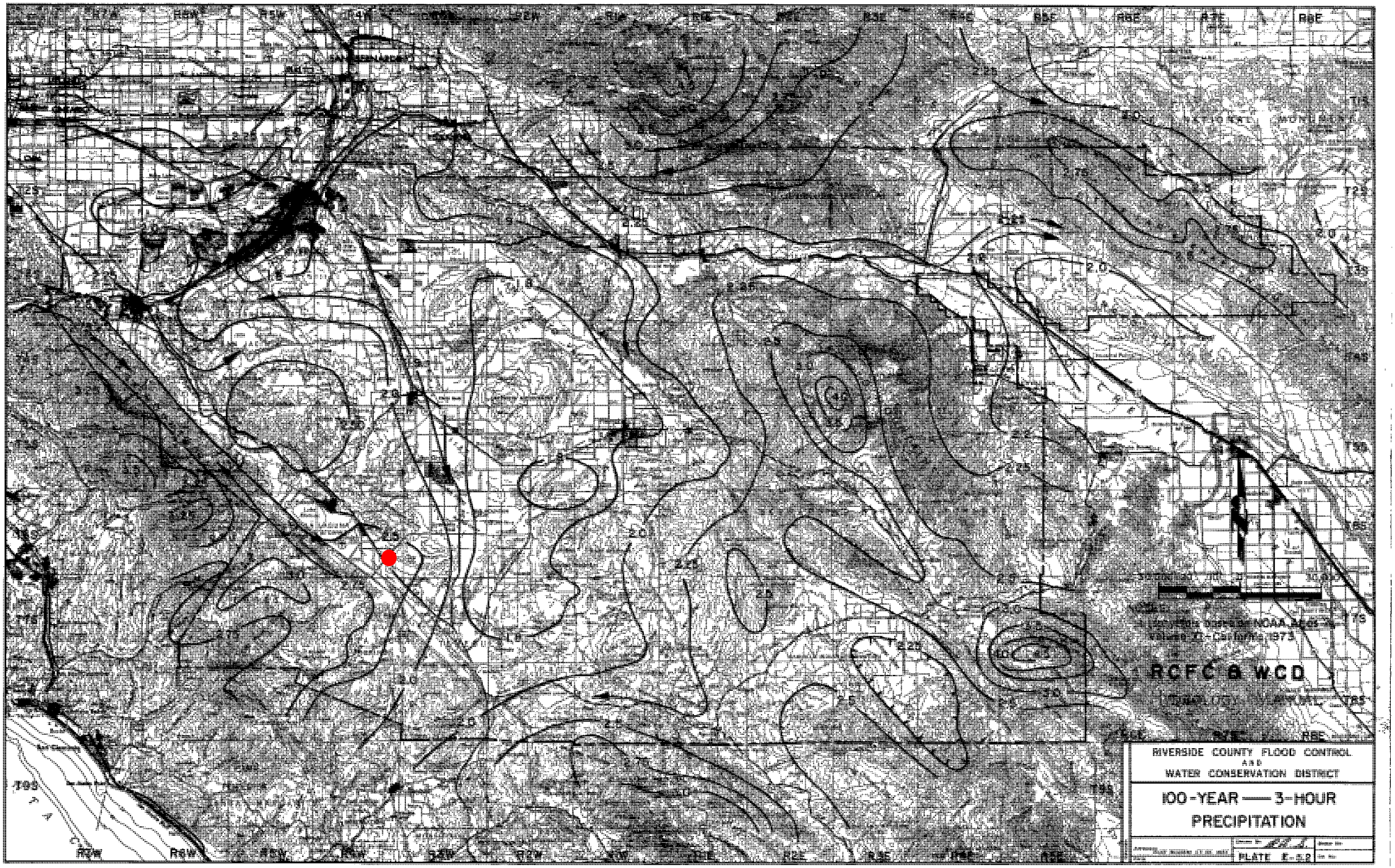
HYDROLOGY MANUAL

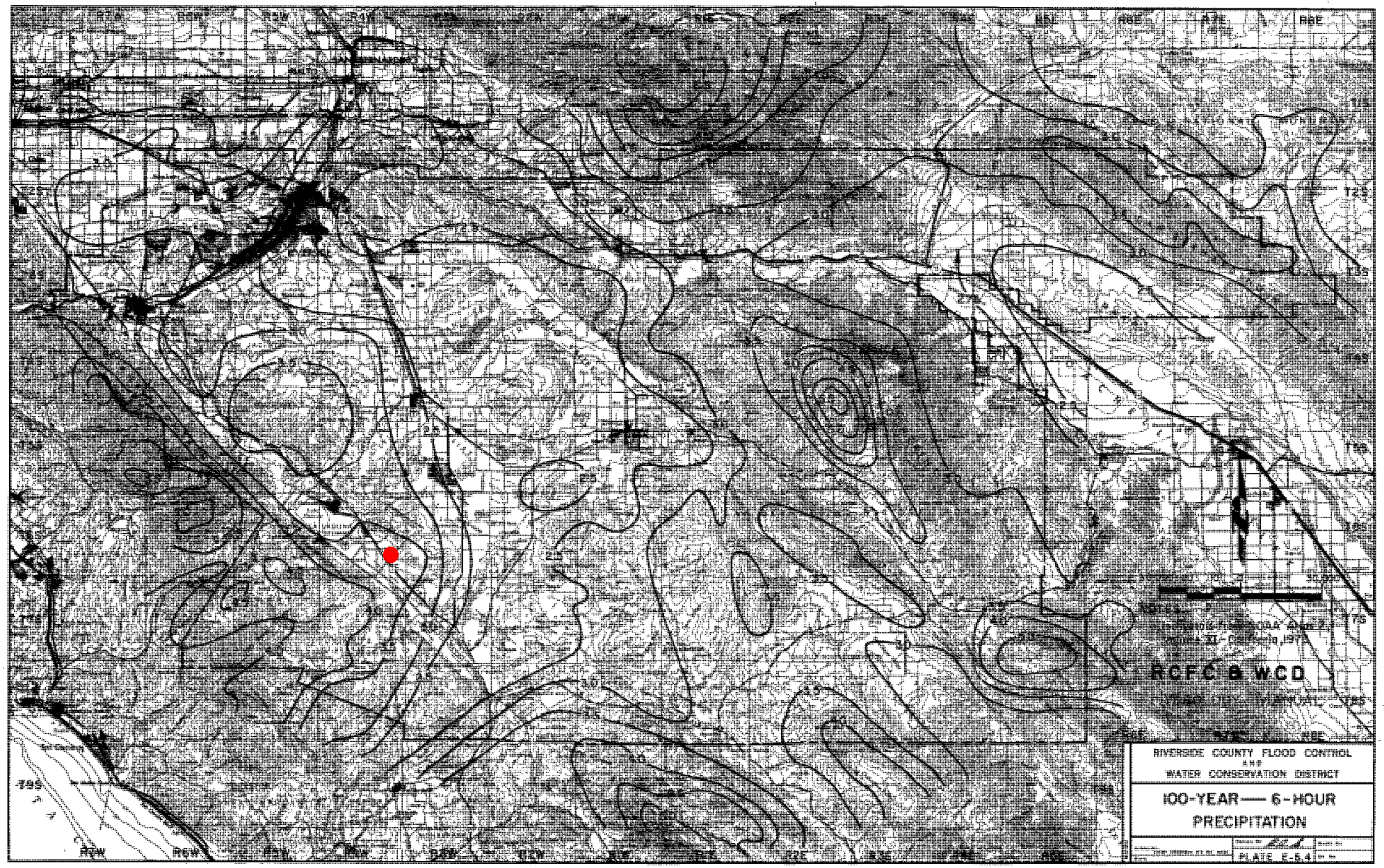
N

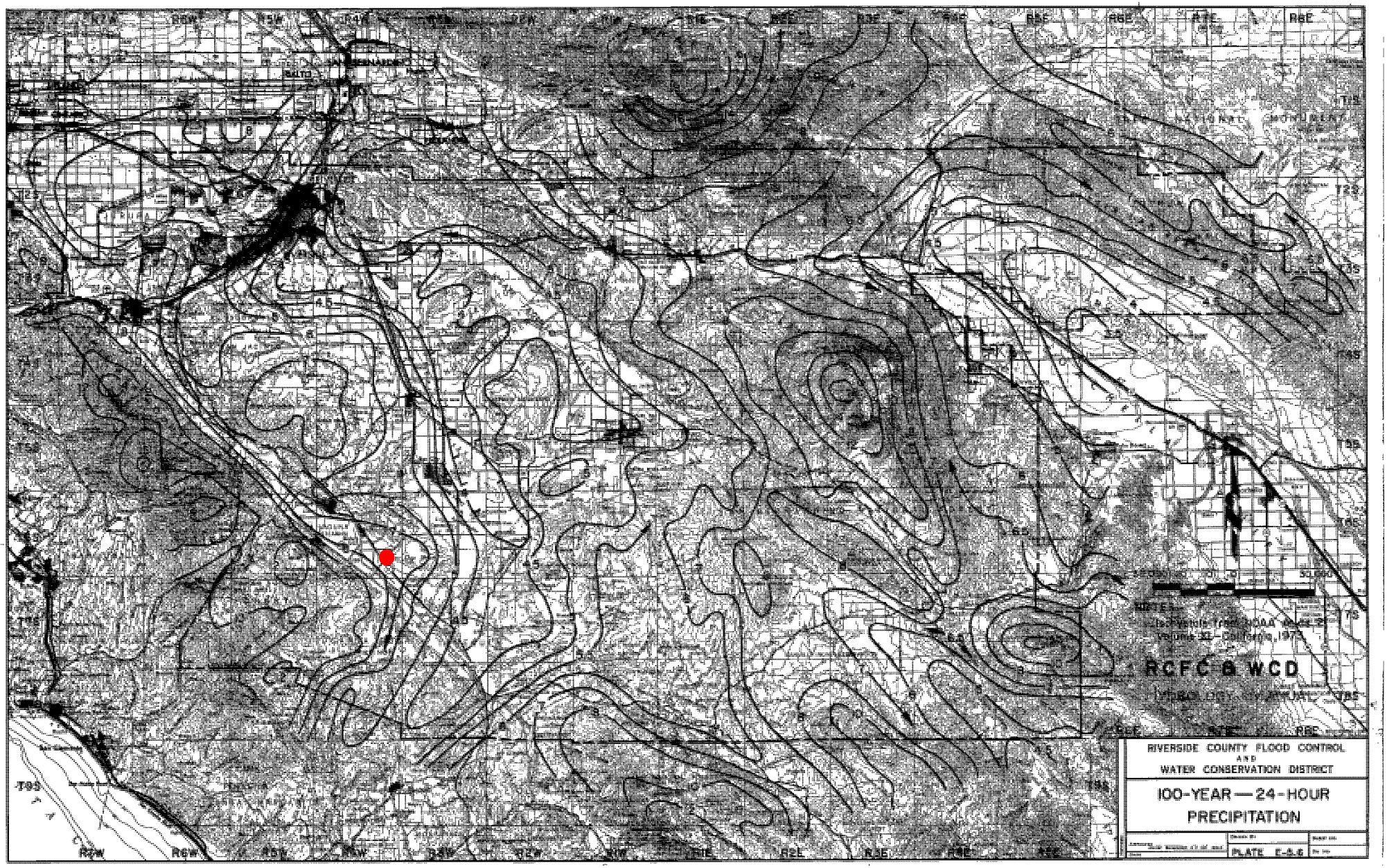
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR ELSINORE

PLATE C-1.41


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR
PRECIPITATION
PLATE E-5.2


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.4


RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.6

INSTRUCTIONS FOR SYNTHETIC UNIT HYDROGRAPH METHOD HYDROLOGY CALCULATIONS

A. Synthetic Unit Hydrograph Development

1. On a USGS topographic quandrangle sheet or other map of suitable scale, outline the proposed drainage system and outline the area or subareas tributary to it.

2. From the map of the drainage system, determine the following basin physical factors and enter them on Sheet 1 of Plate E-2.1.

   A = Drainage area - square miles

   L = Length of longest watercourse - miles

   L_{ca} = Length along the longest watercourse, measured upstream to a point opposite the centroid of the area - miles

   H = Difference in elevation between the concentration point and the most remote point of the basin-feet

   S = Overall slope of longest watercourse between headwaters and concentration point - feet per mile (S = H/L)

3. Determine lag time using Plate E-3 or the following expression (See Sheet 1 of Plate E-2.1):

$$\text{Lag (hours)} = 24\bar{n}\left[\frac{L.Lca}{S^{\frac{1}{2}}}\right]^{(.38)}$$

where:

   $\bar{n}$ = The visually estimated mean of the n (Mannings formula) values of all collection streams and channels within the watershed.

4. Select a unit time period. To adequately define the unit hydrograph the unit time period should be about 25-percent of lag time, and never more than 40-percent of lag time. For ease of calculation, the unit time should match the times for which precipitation patterns are available (Plate E-5.9). Also see Sheet 1 of Plate E-2.1.

5. Utilizing the S-graph applicable to the drainage basin (Plates E-4.1 through E-4.4), determine the average percentage of the ultimate discharge for each unit period. In reading the percentage of discharge from the S-graph, the average ordinate over the time

5. (continued)

increment should be determined rather than the mean of the ordinates at the beginning and end of the time increment. See Columns 16 and 17 of Plate E-2.2.

6. Compute the unit distribution graph by subtracting from the percentage of ultimate discharge for each unit time period, the percentage of ultimate discharge for the previous time period. See Column 18 of Plate E-2.2.

7. Compute the ordinates of the synthetic unit hydrograph (unit graph) by multiplying the distribution graph values by the ultimate discharge K, using:

$$K \text{ (cfs-hours/inch)} = 645A$$

where:

A = Drainage area - square miles

See Column 19 of Plate E-2.2.

B. Flood Hydrograph Development

1. Determine the average point rainfall over the area for the storm duration and frequency desired using Plates E-5.1 through E-5.7. Adjust the average point rainfall for areal effect using Plate E-5.8. See Sheet 1 of Plate E-2.1.

2. Determine the unit period rainfall amounts using the pattern percentages from Plate E-5.9 times the adjusted average point rainfall, and convert them to rainfall rates in inches per hour. See Columns 20 and 21 of Plate E-2.2.

3. Find the pervious area loss rates for subareas within the drainage area using Plates E-6.1 and E-6.2. Adjust these rates to account for impervious area using the relationship below, and then compute a weighted average loss rate for the watershed. See Sheet 2 of Plate E-2.1.

$$F = F_p\,(1.00 - 0.9A_i)$$

where:

F = Adjusted loss rate - inches/hour

F_p = Loss rate for pervious areas - inches/hour (Plate E-6.2)

A_i = Impervious area (actual) - decimal percent (Plate E-6.3)

4. For 3 and 6-hour duration storms assume the weighted average loss rate is a constant defining the maximum loss rate for each unit time period. For 24-hour storms use the variable loss rate function below to compute the maximum loss rate for each unit time period:

$$F_T \text{ (inches/hour)} = C\,(24-(T/60))^{1.55} + F_m$$

where:

$C = (F - F_m)/54$

F = Adjusted loss rate - inches/hour (as previously defined)

T = Time from beginning of storm - minutes

F_m = Minimum value on loss rate curve - inches/hour (typically 50 to 75-percent of F)

The time "T" used should be from the start of the storm to the middle of each unit time period, i.e., for a unit time of 30-minutes the maximum loss rate would be computed for T=15-minutes for period one, T=45-minutes for period two, etc. Enter the maximum loss rates (constant or variable) on Column 22 of Plate E-2.2.

5. Compute the low loss rate for each unit time period where the maximum loss rate exceeds the rainfall rate for that period. The low loss rate should normally be 80 to 90-percent times the rainfall rate. See Column 22 of Plate E-2.2.

6. Compute the effective rainfall rate for each unit time period by subtracting the loss rate from the rainfall rate. See Column 23 of Plate E-2.2. Be sure to use the low loss rate where the maximum loss rate exceeds unit period intensity.

7. Compute the flood hydrograph using one of the following two methods. Do not use the simplified method until the long form method is thoroughly understood:

   (a) Long form method (use Plate E-2.3):

      (1) Multiply the effective rainfall rate for the first unit time period times each synthetic unit hydrograph value to determine the flood hydrograph which would result from that rainfall increment.

      (2) Repeat the above process for each suceeding effective rainfall value, advancing the resultant flood hydrographs one unit time period for each cycle.

7. (continued)

(3) Sum the flow ordinates found in the steps above to determine the average flow ordinate per unit time period for the design storm flood hydrograph.

(b) Simplified Method:

(1) List the unit graph values (Column 19, Plate E-2.2) in reverse order on the right hand side of a separate sheet of paper.

(2) Align the separate sheet with the effective rain column (Column 23 of Plate E-2.2) so that the bottom unit graph value is adjacent to the top effective rain value. The product of these values is the flood hydrograph value in cfs for the first unit period (Column 24 of Plate E-2.2).

(3) Move the separate sheet down one unit time period. The sum of the products of the first two effective rain values, times the adjacent unit graph values, is the flood hydrograph value for the second unit time period.

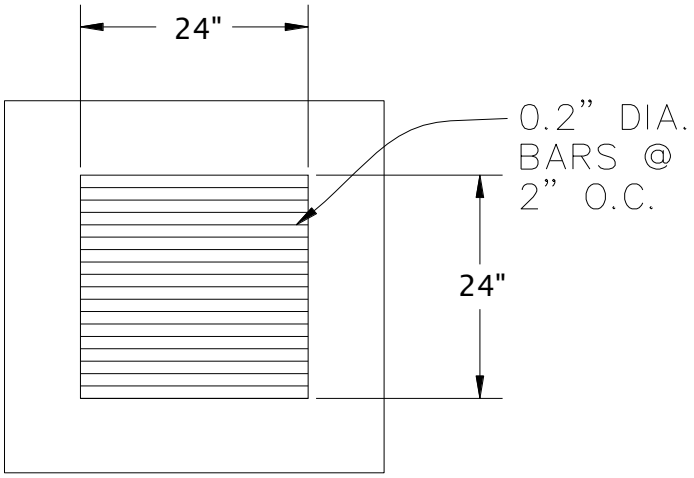
(4) Move the separate sheet down one unit time period to compute each successive flood hydrograph value. The flood hydrograph value in each case is the sum of the products of each effective rain value times the adjacent unit graph value. The procedure is illustrated by the example on the next page. Continue this process until the hydrograph is completely defined (the top unit graph value will be opposite the bottom effective rain value).

The flood hydrograph value computed for any positioning of the separate sheet is always entered opposite the unit graph value at the bottom of the separate sheet.

It is possible to determine the peak discharge without defining the entire hydrograph by aligning the maximum unit graph values just above the maximum effective rain values, and then computing enough flood hydrograph values to identify the peak discharge.

8. If desired add base flow to the flood hydrograph ordinates determined in Step 7.

24" x 24"



CLEAR OPEN AREA

AREA OF BARS: (24/12 x 24/12) - (24/12 x 24/1 x 0.2/12) = 0.4 ft^2

PERMITER:

4 x 24/12 = 8 ft

ORFICE FLOW:

Q = 0.67*Ag*(2gd)^(1/2)

Ag (ft2)	Depth (ft)	Q (cfs)
3.6	0	0
3.6	0.125	6.843452
3.6	0.25	9.678103
3.6	0.375	11.85321
3.6	0.5	13.6869
3.6	0.625	15.30242
3.6	0.75	16.76297
3.6	0.875	18.10607
3.6	1	19.35621

Note: Flow values at various depths were inputted to AES in order to properly size basin outfall structure and limit outfall flows to less than existing conditions.

Appendix D

Educational Materials

3.1 INFILTRATION BASIN

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evapotranspiration (when vegetated), Evaporation, and Sedimentation
Maximum Treatment Area	50 acres
Other Names	Bioinfiltration Basin

Description

An Infiltration Basin is a flat earthen basin designed to capture the design capture volume, V_{BMP}. The stormwater infiltrates through the bottom of the basin into the underlying soil over a 72 hour drawdown period. Flows exceeding V_{BMP} must discharge to a downstream conveyance system. Trash and sediment accumulate within the forebay as stormwater passes into the basin. Infiltration basins are highly effective in removing all targeted pollutants from stormwater runoff.

Figure 1 – Infiltration Basin

See Appendix A, and Appendix C, Section 1 of *Basin Guidelines*, for additional requirements.

Siting Considerations

The use of infiltration basins may be restricted by concerns over ground water contamination, soil permeability, and clogging at the site. See the applicable WQMP for any specific feasibility considerations for using infiltration BMPs. Where this BMP is being used, the soil beneath the basin must be thoroughly evaluated in a geotechnical report since the underlying soils are critical to the basin's long term performance. To protect the basin from erosion, the sides and bottom of the basin must be vegetated, preferably with native or low water use plant species.

In addition, these basins may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur
- Sites with very low soil infiltration rates
- Sites with high groundwater tables or excessively high soil infiltration rates, where pollutants can affect ground water quality
- Sites with unstabilized soil or construction activity upstream
- On steeply sloping terrain
- Infiltration basins located in a fill condition should refer to Appendix A of this Handbook for details on special requirements/restrictions

Setbacks

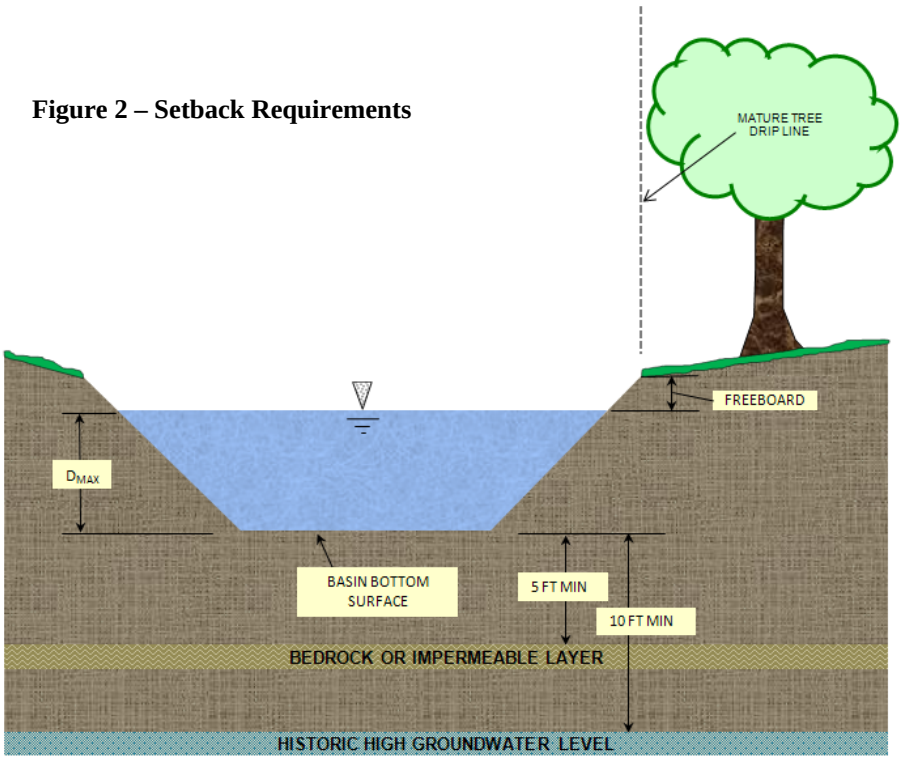
Always consult your geotechnical engineer for site specific recommendations regarding setbacks for infiltration trenches. Recommended setbacks are needed to protect buildings, existing trees, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process since they can affect where infiltration facilities may be placed and how deep they are allowed to be. For instance, depth setbacks can dictate fairly shallow facilities that will have a larger footprint and, in some cases, may make an infiltration basin infeasible. In that instance, another BMP must be selected.

Infiltration basins typically must be set back:

- 10 feet from the historic high groundwater (measured vertically from the bottom of the basin, as shown in Figure 2)
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the basin, as shown in Figure 2)
- From all existing mature tree drip lines as indicated in Figure 2 (to protect their root structure)
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report. All other setbacks shall be in accordance with applicable standards of the District's *Basin Guidelines* (Appendix C).

Figure 2 – Setback Requirements



Forebay

A concrete forebay shall be provided to reduce sediment clogging and to reduce erosion. The forebay shall have a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall / berm. Full height notch-type weir(s), offset from the line of flow from the basin inlet to prevent short circuiting, shall be used to outlet the forebay. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 2).

Overflow

Flows exceeding V_{BMP} must discharge to an acceptable downstream conveyance system. Where an adequate outlet is present, an overflow structure may be used. Where an embankment is present, an emergency spillway may be used instead. Overflows must be placed just above the design water surface for V_{BMP} and be near the outlet of the system. The overflow structure shall be similar to the District's Standard Drawing CB 110. Additional details may be found in the District's *Basin Guidelines* (Appendix C).

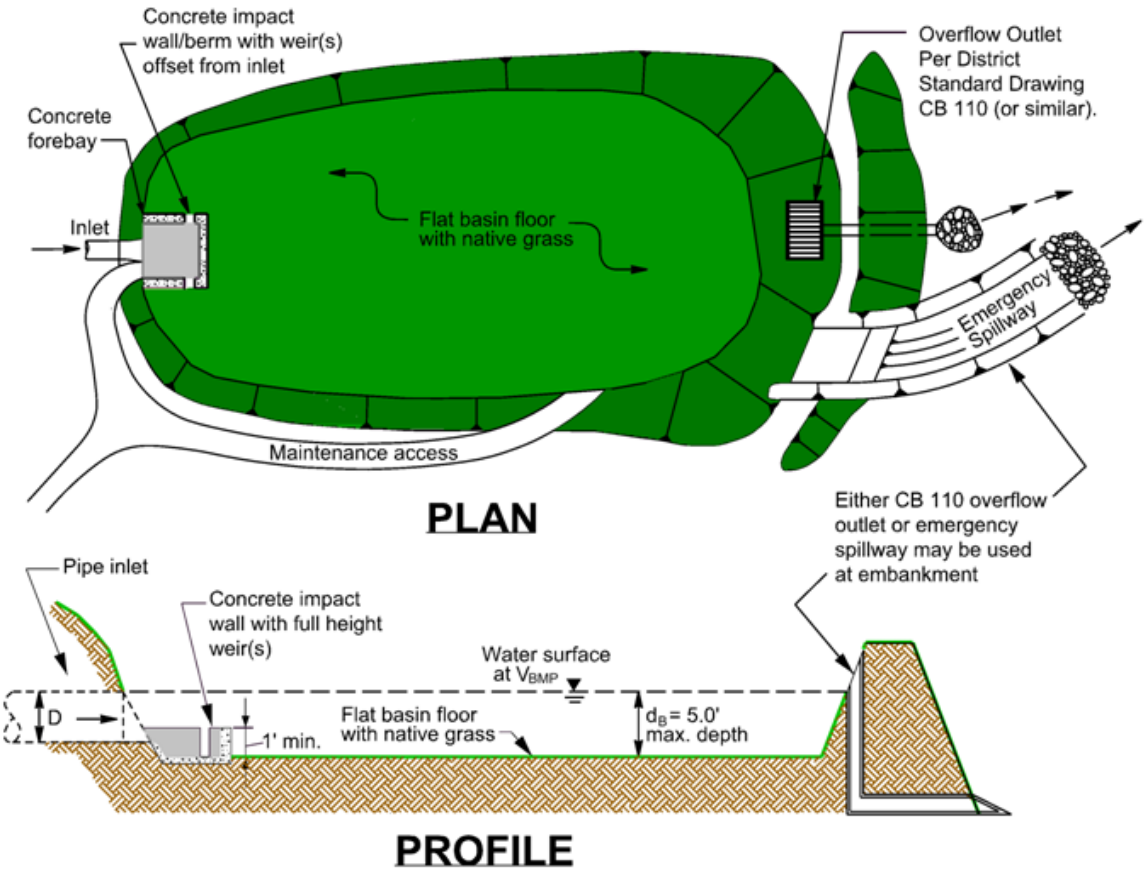


Figure 3 – Infiltration Basin

Landscaping Requirements

Basin vegetation provides erosion protection, improves sediment removal and assists in allowing infiltration to occur. The basin surface and side slopes shall be planted with native grasses. Proper landscape management is also required to ensure that the vegetation does not contribute to water pollution through pesticides, herbicides, or fertilizers. Landscaping shall be in accordance with County of Riverside Ordinance 859 and the District's *Basin Guidelines* (Appendix C), or other guidelines issued by the Engineering Authority.

Maintenance

Normal maintenance of an infiltration basin includes the maintenance of landscaping, debris and trash removal from the surface of the basin, and tending to problems associated with standing water (vectors, odors, etc.). Significant ponding, especially more than 72 hours after an event, may indicate that the basin surface is no longer providing sufficient infiltration and requires aeration. See the District's *Basin Guidelines* (Appendix C) for additional requirements (i.e., fencing, maintenance access, etc.).

Table 1 - Inspection and Maintenance

Schedule	Inspection and Maintenance Activity
Ongoing including just before annual storm seasons and following rainfall events.	• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be strenuously avoided to ensure they don't contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products shouldn't be needed. If such projects are used, o Products shall be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding. o Fertilizers should not be applied within 15 days before, after, or during the rain season. • Remove debris and litter from the entire basin to minimize clogging and improve aesthetics. • Check for obvious problems and repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom. There should be no long-term ponding water. • Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed. • Revegetate side slopes where needed.
Annually. If possible, schedule these inspections within 72 hours after a significant rainfall.	• Inspection of hydraulic and structural facilities. Examine the inlet for blockage, the embankment and spillway integrity, as well as damage to any structural element. • Check for erosion, slumping and overgrowth. Repair as needed. • Check basin depth for sediment build up and reduced total capacity. Scrape bottom as needed and remove sediment. Restore to original cross-section and infiltration rate. Replant basin vegetation. • Verify the basin bottom is allowing acceptable infiltration. Use a disc or other method to aerate basin bottom only if there is actual significant loss of infiltrative capacity, rather than on a routine basis[1]. • No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.

1. CA Stormwater BMP Handbook for New Development and Significant Redevelopment

Table 2 - Design and Sizing Criteria for Infiltration Basins

Design Parameter	Infiltration Basin
Design Volume	V_{BMP}
Forebay Volume	0.5% V_{BMP}
Drawdown time (maximum)	72 hours
Maximum tributary area	50 acres [2]
Minimum infiltration rate	Must be sufficient to drain the basin within the required Drawdown time over the life of the BMP. The WQMP may include specific requirements for minimum tested infiltration rates.
Maximum Depth	5 feet
Spillway erosion control	Energy dissipators to reduce velocities[1]
Basin Slope	0%
Freeboard (minimum)	1 foot [1]
Historic High Groundwater Setback (max)	10 feet
Bedrock/impermeable layer setback (max)	5 feet
Tree setbacks	Mature tree drip line must not overhang the basin
Set back from wells, tanks or springs	100 feet
Set back from foundations	As recommended in Geotechnical Report

1. **Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures**
2. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the District's Basin Guidelines (Appendix C). In addition, information herein may be superseded by other guidelines issued by the co-permittee.

INFILTRATION BASIN SIZING PROCEDURE

1. Find the Design Volume, V_{BMP}.
   a) Enter the Tributary Area, A_T.
   b) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.
2. Determine the Maximum Depth.
   a) Enter the infiltration rate. The infiltration rate shall be established as described in Appendix A: "Infiltration Testing".
   b) Enter the design Factor of Safety from Table 1 in Appendix A: "Infiltration Testing".
   c) The spreadsheet will determine D_1, the maximum allowable depth of the basin based on the infiltration rate along with the maximum drawdown time (72 hours) and the Factor of Safety.

$$D_1 = [(t) \times (I)] / 12s$$

Where I = site infiltration rate (in/hr)
s = safety factor
t = drawdown time (maximum 72 hours)

d) Enter the depth of freeboard.

e) Enter the depth to the historic high groundwater level measured from the top of the basin.

f) Enter the depth to the top of bedrock or other impermeable layer measured from the finished grade.

g) The spreadsheet will determine D_2, the total basin depth (including freeboard, if used) of the basin, based on restrictions to the depth by groundwater and an impermeable layer.

D_2 = Depth to groundwater – (10 + freeboard) (ft);

or

D_2 = Depth to impermeable layer – (5 + freeboard) (ft)

Whichever is least.

h) The spreadsheet will determine the maximum allowable effective depth of basin, D_{MAX}, based on the smallest value between D_1 and D_2. D_{MAX} is the maximum depth of water only and does not include freeboard. D_{MAX} shall not exceed 5 feet.

3. Basin Geometry

a) Enter the basin side slopes, z (no steeper than 4:1).

b) Enter the proposed basin depth, d_B excluding freeboard.

c) The spreadsheet will determine the minimum required surface area of the basin:

$$A_s = V_{BMP} / d_B$$

Where A_s = minimum area required (ft^2)
V_{BMP} = volume of the infiltration basin (ft^3)
d_B= proposed depth not to exceed maximum allowable depth, D_{MAX} (ft)

d) Enter the proposed bottom surface area. This area shall not be less than the minimum required surface area.

4. Forebay

A concrete forebay with a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall shall be provided. Full-height rectangular weir(s) shall be used to outlet the forebay. The weir(s) must be offset from the line of flow from the basin inlet. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 2).

a) The spreadsheet will determine the minimum required forebay volume based on 0.5% V_{BMP}.

b) Enter the proposed depth of the forebay berm/splashwall (1foot minimum).

c) The spreadsheet will determine the minimum required forebay surface area.

d) Enter the width of rectangular weir to be used (minimum 1.5 inches). Weir width should be established based on a 5 minute drawdown time.

3.5 Bioretention Facility

Type of BMP	LID – Bioretention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 10 acres.
Other Names	Rain Garden, Bioretention Cell, Bioretention Basin, Biofiltration Basin, Landscaped Filter Basin, Porous Landscape Detention

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil and maximize plant uptake of pollutants and runoff. This keeps the Best Management Practice (BMP) from becoming clogged and allows more of the soil column to function as both a sponge (retaining water) and a highly effective and self-maintaining biofilter. In most cases, the bottom of a Bioretention Facility is unlined, which also provides an opportunity for infiltration to the extent the underlying onsite soil can accommodate. When the infiltration rate of the underlying soil is exceeded, fully biotreated flows are discharged via underdrains. Bioretention Facilities therefore will inherently achieve the maximum feasible level of infiltration and evapotranspiration and achieve the minimum feasible (but highly biotreated) discharge to the storm drain system.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

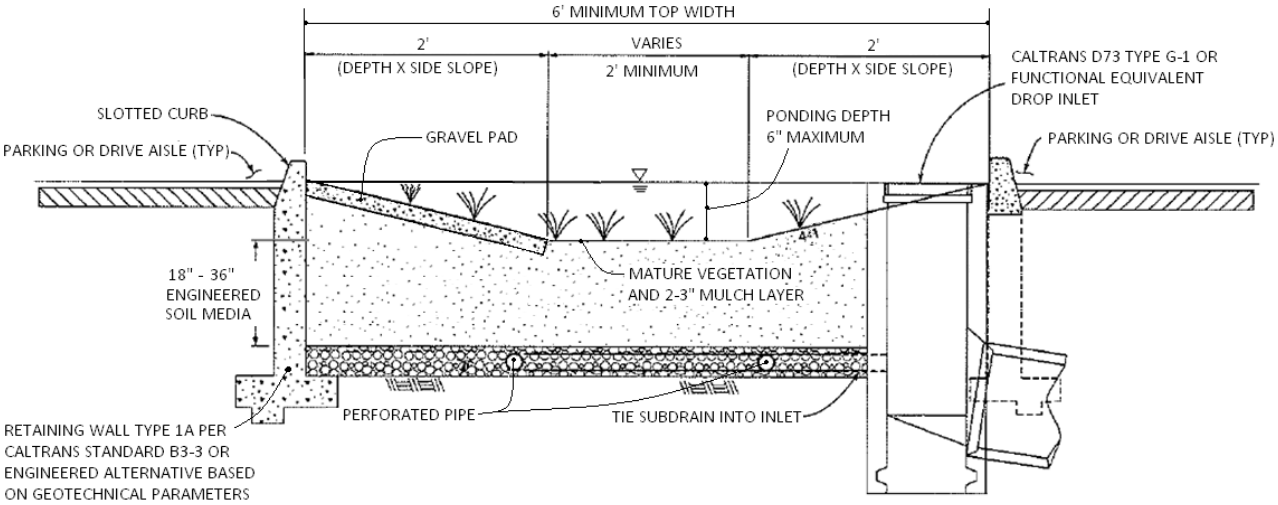
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility as described in this Fact Sheet

Bioretention Facilities should however not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation.

Design and Sizing Criteria

The recommended cross section necessary for a Bioretention Facility includes:

- Vegetated area
- 18' minimum depth of engineered soil media
- 12' minimum gravel layer depth with 6' perforated pipes (added flow control features such as orifice plates may be required to mitigate for HCOC conditions)



While the 18-inch minimum engineered soil media depth can be used in some cases, it is recommended to use 24 inches or a preferred 36 inches to provide an adequate root zone for the chosen plant palate. Such a design also provides for improved removal effectiveness for nutrients. The recommended ponding depth inside of a Bioretention Facility is 6 inches; measured from the flat bottom surface to the top of the water surface as shown in Figure 1.

Because this BMP is filled with an engineered soil media, pore space in the soil and gravel layer is assumed to provide storage volume. However, several considerations must be noted:

- Surcharge storage above the soil surface (6 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be use for the gravel layer.

Figure 1: Standard Layout for a Bioretention Facility

Engineered Soil Media Requirements

The engineered soil media shall be comprised of 85 percent mineral component and 15 percent organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the range specified in Table 1 below. The organic component shall be nitrogen stabilized compost[1], such that nitrogen does not leach from the media.

Table 1: Mineral Component Range Requirements

Percent Range	Component
70-80	Sand
15-20	Silt
5-10	Clay

The trip ticket, or certificate of compliance, shall be made available to the inspector to prove the engineered mix meets this specification.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Therefore, a maximum of 6 inches of ponded water shall be used in the design to ensure that plants within the Bioretention Facility remain healthy.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. The 6-inch ponding depth shown in Figure 1 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts

To allow water to flow into the Bioretention Facility, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 2 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface level.

[1] For more information on compost, visit the US Composting Council website at: http://compostingcouncil.org/

Figure 2: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel pad shall be placed at each inlet point to the Bioretention Facility. The gravel should be 1- to 1.5-inch diameter in size. The gravel should overlap the curb cut opening a minimum of 6 inches. The gravel pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 3.

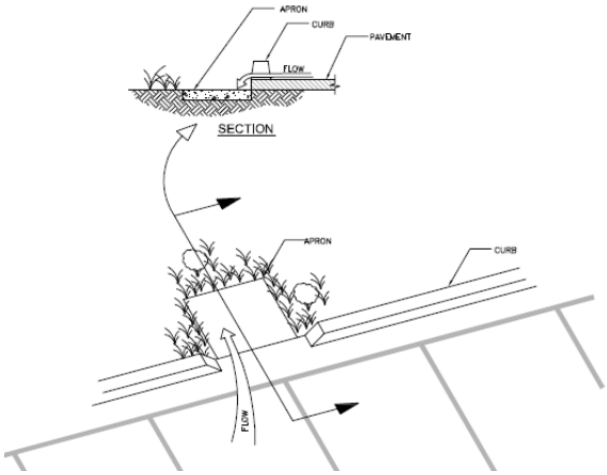


Figure 3: Apron located in a Bioretention Facility

Terracing the Landscaped Filter Basin

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 2 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 2: Check Dam Spacing

6” Check Dam Spacing	
Slope	**Spacing**
1%	*25'*
2%	*15'*
3%	*10'*

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block to protect the Bioretention Facility from erosion.

Retaining Walls

It is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

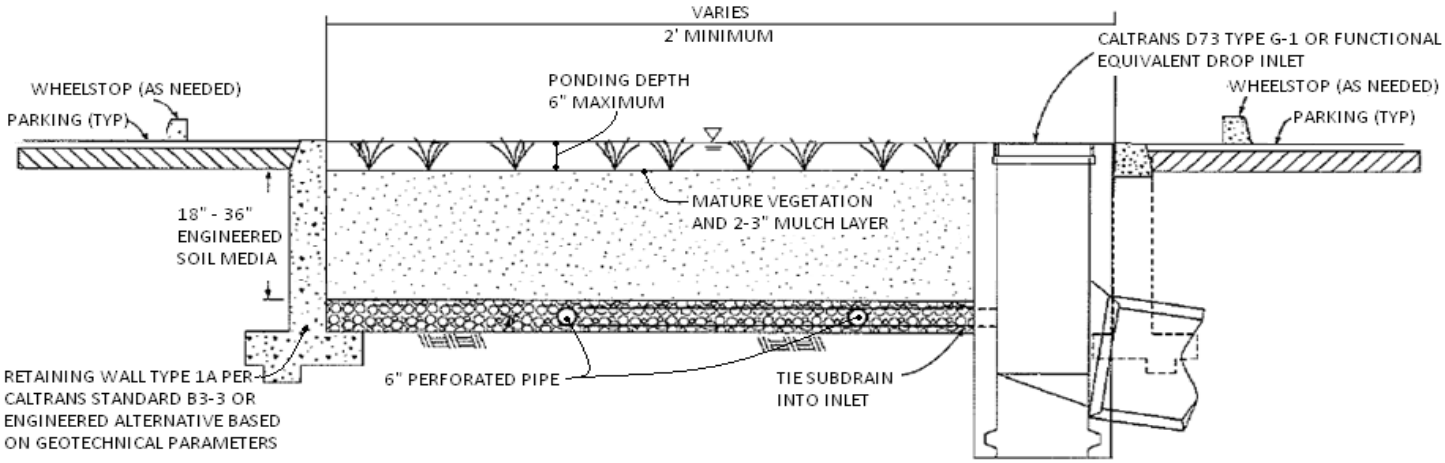
Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, must have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility shall be 4:1. A typical cross section for the Bioretention Facility is shown in Figure 1.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 6-inch maximum drop may be used, and the Bioretention Facility must be planted with trees and shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility,

but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 4.



Planter Boxes

Bioretention Facilities can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 6 inches, and no side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Due to the impermeable liner, the inside bottom of the planter box shall be designed and constructed with a cross fall, directing treated flows within the subdrain layer toward the point where subdrain exits the planter box, and subdrains shall be oriented with drain holes oriented down. These provisions will help avoid excessive stagnant water within the gravel underdrain layer. Similar to the in-ground Bioretention Facility versions, this BMP benefits from healthy plants and biological activity in the root zone. Planter boxes should be planted with appropriately selected vegetation.

Figure 5: Planter Box
Source: LA Team Effort

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 4. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 4. This will allow the design capture volume to be fully treated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Underdrain Gravel and Pipes

An underdrain gravel layer and pipes shall be provided in accordance with Appendix B – Underdrains.

Figure 6: Incorrect Placement of an Overflow Inlet.

Inspection and Maintenance Schedule

The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris • Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding
Annually	• Inspect/clean inlets and outlets

Bioretention Facility Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

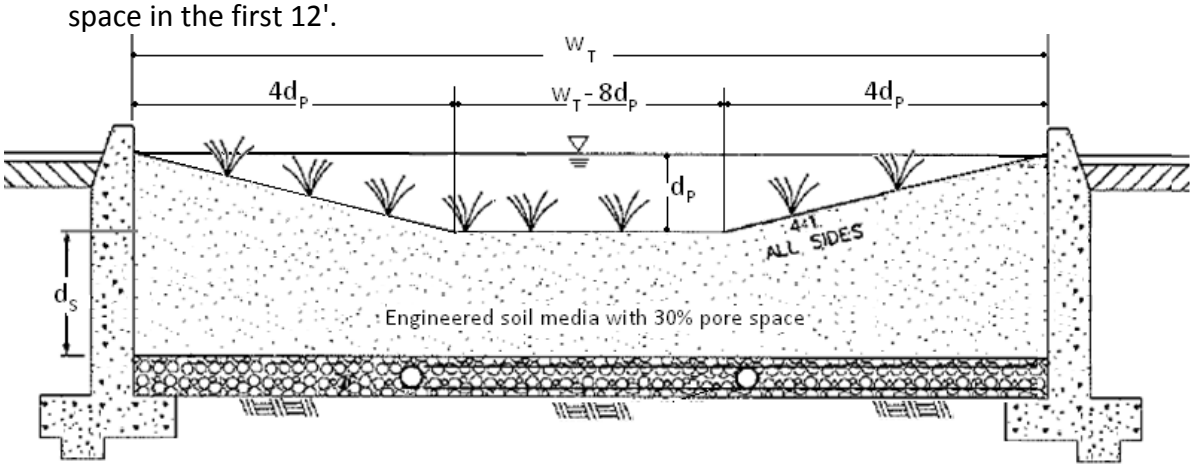
2) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP is located perpendicular to the parking spaces or with planter boxes that do not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The minimum depth for the engineered soil media can be 18' in limited cases, but it is recommended to use 24' or a preferred 36' to provide an adequate root zone for the chosen plant palette. Engineered soil media deeper than 36' will only get credit for the pore space in the first 36'.

5) Enter the top width of the Bioretention Facility.

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%. Gravel layer deeper than 12' will only get credit for the pore space in the first 12'.



a. For the design with side slopes the following equation shall be used to determine the total effective depth. Where, d_P is the depth of ponding within the basin.

$$d_E(\text{ft}) = \frac{0.3 \times \left[\left(w_T(\text{ft}) \times d_S(\text{ft})\right) + 4\left(d_P(\text{ft})\right)^2\right] + 0.4 \times 1(\text{ft}) + d_P(\text{ft})\left[4d_P(\text{ft}) + \left(w_T(\text{ft}) - 8d_P(\text{ft})\right)\right]}{w_T(\text{ft})}$$

This above equation can be simplified if the maximum ponding depth of 0.5' is used. The equation below is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = (0.3 \times d_S(\text{ft}) + 0.4 \text{ x } 1(\text{ft})) - \left(\frac{0.7\ (\text{ft}^2)}{w_T(\text{ft})}\right) + 0.5(\text{ft})$$

b. For the design without side slopes the following equation shall be used to determine the total effective depth:

$$d_E(\text{ft}) = d_P(\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

The equation below, using the maximum ponding depth of 0.5', is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = 0.5\ (\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

7) Calculate the minimum surface area, A_M, required for the Bioretention Facility. This does not include the curb surrounding the Bioretention Facility or side slopes.

$$A_M(\text{ft}^2) = \frac{V_{BMP}(\text{ft}^3)}{d_E\ (\text{ft})}$$

8) Enter the proposed surface area. This area shall not be less than the minimum required surface area.

9) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

10) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Bioretention Facility. See Appendix B for specific information regarding perforated pipes.

11) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

12) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

13) Describe the vegetation used within the Bioretention Facility.

References Used to Develop this Fact Sheet

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Kim, Hunho, Eric A. Seagren and Allen P. Davis. "Engineered Bioretention for Removal of Nitrate from Stormwater Runoff." Water Environment Research 75.4 (2003): 355-366.

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United States Environmental Protection Agency. Storm Water Technology Fact Sheet Bioretention. Washington D.C, 1999.

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Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

3.7 Sand Filter Basin

Type of BMP	Treatment
Treatment Mechanisms	Filtration, Biofiltration
Maximum Tributary Area	25 acres
Other Names	Sand Filter, Media Filter, Pocket Filter

Description

The Sand Filter Basin (SFB) is a basin where the entire invert is constructed as a stormwater filter, using a sand bed above an underdrain system. Stormwater enters the SFB at its forebay where trash and sediment accumulate or through overland sheet flow. Overland sheet flow into the Sand Filter Basin is biofiltered through the vegetated side slopes or other pre-treatment. Flows pass into the sand filter surcharge zone and are gradually filtered through the underlying sand bed. The underdrain gradually dewaters the sand bed and discharges the filtered runoff to a nearby channel, swale, or storm drain.

The primary advantage of the SFB is its effectiveness in removing pollutants where infiltration into the underlying soil is not practical, and where site conditions preclude the use of a Bioretention Facility . The primary disadvantage is a potential for clogging if silts and clays are allowed to flow into the SFB. In addition, this BMP's performance relies heavily on its being regularly and properly maintained.

While this BMP is not currently considered an LID BMP, when designed in accordance with this manual, a Sand Filter Basin is considered to be a highly effective Treatment Control BMP.

Siting Considerations

SFBs should be avoided where onsite configurations include a base flow and/or where this BMP would be put into operation while construction, grading or major landscaping activities are taking place in the tributary catchment. **This BMP has a flat surface area**, so it may be challenging to incorporate into steeply sloping terrain. SFBs should be set away from areas that could discharge fine sediments into the basin such as at the bottom of a slope. **See Section 1 of Riverside County Flood Control and Water Conservation District's "Basin Guidelines" (Appendix C) for additional requirements** (i.e., fencing, maintenance access, etc.) or other guidelines issued by the Engineering Authority (EA)[1].

[1] The Engineering Authority (EA) may choose to alter these guidelines and may have different/additional requirements. These entities, along with the District, will be referred to as the EA.

Setbacks

The bottom of the sand filter should remain above the seasonal high groundwater level. Always consult your geotechnical engineer for additional site specific recommendations.

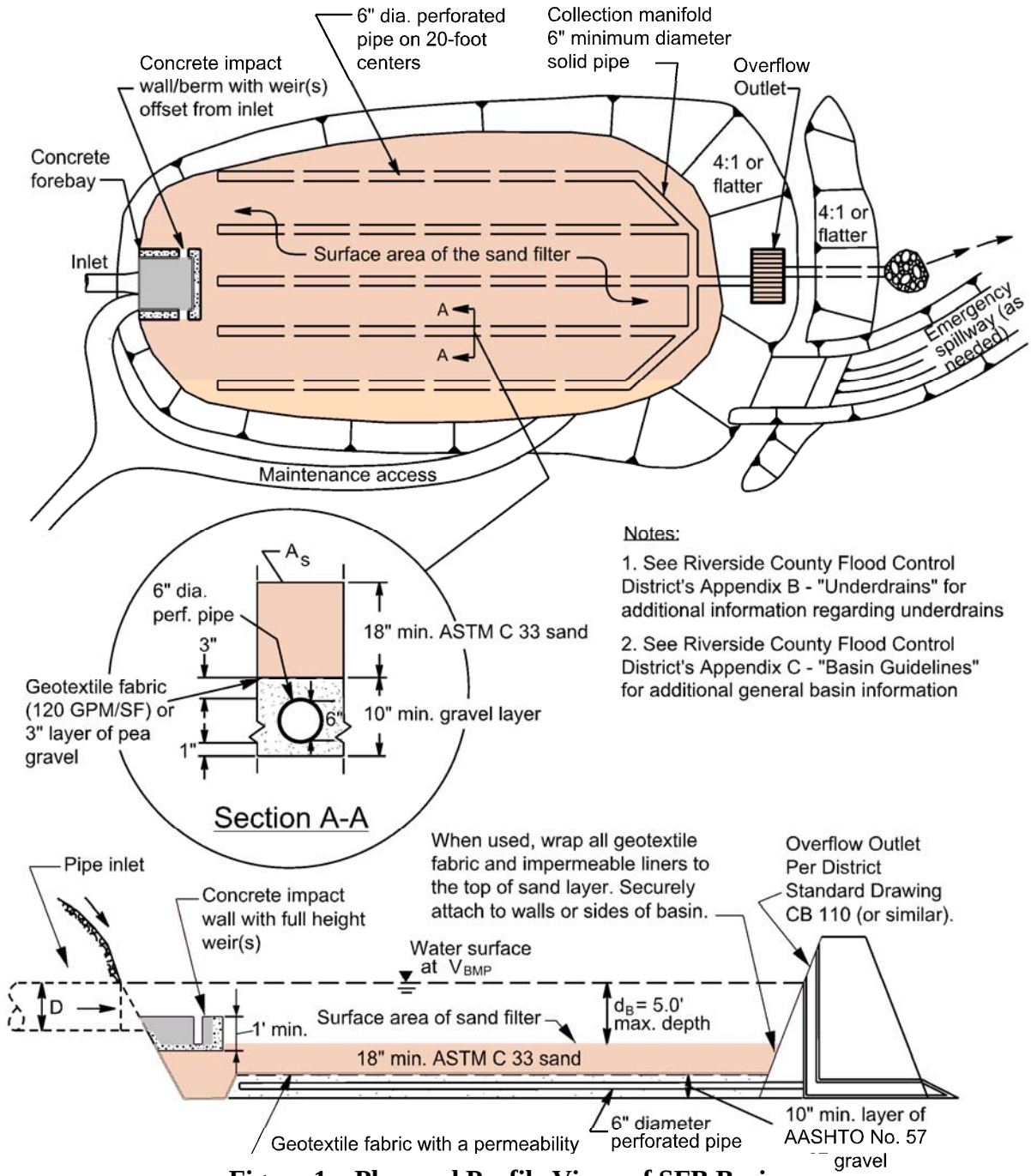


Figure 1 – Plan and Profile Views of SFB Basin

Forebay

A concrete forebay shall be provided to reduce sediment clogging and to reduce erosion. The forebay shall have a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall. Full height notch-type weir(s), offset from the line of flow from the basin inlet to prevent short circuiting shall be used to outlet the forebay. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 1).

Underdrains

Underdrain piping shall consist of a manifold (collector) pipe with perforated lateral branching. The lateral branching conveys the filtered water to the manifold where it is discharged into the outlet structure. See Appendix B for additional information.

Overflow Structure

An overflow must be provided to drain volume in excess of V_{BMP} or to help drain the system if clogging were to occur. Overflows shall flow to an acceptable discharge point such as a downstream conveyance system. Overflows must be placed above the water quality capture volume and near the outlet of the system. The overflow structure shall be similar to the District's Standard Drawing CB 110.

Recommended Maintenance

Table 1 - Recommended Inspection and Maintenance Activities for SFBs

Schedule	Inspection and Maintenance Activity
Semi-monthly including just before the annual storm season and following rainfall events.	• Routine maintenance and inspection. • Remove debris and litter from the entire basin to minimize filter clogging and to improve aesthetics. • Check for obvious problems especially filter clogging and signs of long term ponding. Repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom. There should be no long-term ponding water. • Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed. • Revegetate side slopes where needed.
Annually. If possible, schedule these inspections within 72 hours after a significant rainfall.	• Inspection of hydraulic and structural facilities. Examine the overflow outlet for clogging, the embankment and spillway integrity, and damage to any structural element. • Check side slopes and embankments for erosion, slumping and overgrowth. • Inspect the sand media at the filter drain to verify it is allowing acceptable infiltration. **Scarify the top 3 inches by raking the filter drain's sand surface annually.** • Check the filter drain underdrains for damage or clogging. Repair as needed. • Repair basin inlets, outlets, forebays, and energy dissipaters whenever damage is discovered. • No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.
Every 5 years or sooner depending on the observed drain times (no more than 72 hours to empty the basin).	• Remove the top 3 inches of sand from the filter drain and backfill with 3 inches of new sand to return the sand layer to its original depth. When scarification or removal of the top 3 inches of sand is no longer effective, remove and replace sand filter layer.

Table 2 - Design and Sizing Criteria for SFBs

Design Parameter	Extended Detention Basin
Maximum tributary area	25 acres [2]
Basin design volume	100% of V_{BMP}
Maximum basin depth	5 feet
Forebay volume	0.5 % of V_{BMP}
Longitudinal Slope	0%
Transverse Slope (min.)	0%
Outlet erosion control	Energy dissipaters to reduce velocities[1]

1. **Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures**
2. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the District's "Basin Guidelines" (Appendix C). In addition, information herein may be superseded by other guidelines issued by the EA.

Design Procedure

1. Enter the Tributary Area, A_{TRIB}
2. Enter the Design Capture Volume, V_{BMP}, determined from Section 2.1 of this Handbook
3. SFB Geometry

   Determine the minimum sand filter area required. The filtration bed surface shall be flat with the maximum depth for the reservoir design volume no greater than 5 feet*. The reservoir design volume does not include the volume of the sand filter. No credit is given for voids in the sand layer toward the reservoir volume since the sand is part of the water quality filter and not a reservoir layer. The design storage volume shall equal 100 percent of V_{BMP}. The minimum sand filter area (As) of the basin's bottom shall be determined using the equation:

$$A_s = (V_{BMP} / d_B)$$

   Where:

   V_{BMP} = Design Volume, ft^3
   d_B = proposed basin depth (5 feet maximum), ft

   Once the basin side slopes, proposed basin depth and depth of freeboard are entered, the spreadsheet will calculate the minimum total depth required to use this BMP. This is the depth from the top of the basin (including freeboard) down to the bottom of the underdrain gravel layer. This depth can be used to determine if enough vertical separation is available between the BMP and its outlet destination.

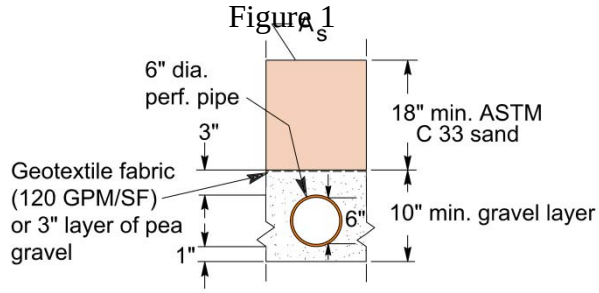
*Note: The 5 foot maximum depth equates to a minimum filter media infiltration rate of 0.83 inches per hour with a 72 hour drawdown time. Studies have shown that while initially most filter media will infiltrate at a much higher rate, it is not uncommon for that rate to decrease significantly over a very short period of time. (Urbonas, 1996)

4. Enter the proposed surface area of the basin.

5. Forebay

Provide a concrete forebay. Its volume shall be at least 0.5% V_{BMP} with a minimum 1 foot high concrete splashwall. Full-height notch-type weir(s) shall be used to outlet the forebay. The weir(s) must be offset from the line of flow from the basin inlet. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 1). Notches shall not be less than 1.5 inches in width.

Figure 1



6. Filter Media

Provide, as a minimum, an 18-inch layer of filter media (ASTM C-33 sand). Other filter media may be considered with sufficient supporting documentation. Where a medium level of removal efficiency is desired for nutrients, the depth of the sand layer must be increased to 36 inches.

5. Underdrains

Underdrains shall be provided per the guidelines outlined in Appendix B.

Appendix E

Soils Report

Appendix F

Treatment Control BMP Sizing Calculations and Design Details

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-1		

Enter the Area Tributary to this Feature A_T = 0.72 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Ornamental Landscaping

Effective Impervious Fraction I_f = 0.10

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.11

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.08 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 209 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-2		

Enter the Area Tributary to this Feature A_T = 2.28 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Concrete or Asphalt

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 5,049 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-3		

Enter the Area Tributary to this Feature A_T = 0.28 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Ornamental Landscaping

Effective Impervious Fraction I_f = 0.10

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.11

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.08 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 81 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-4		

Enter the Area Tributary to this Feature A_T = 3.7 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Concrete or Asphalt

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 8,193 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-5		

Enter the Area Tributary to this Feature A_T = 0.67 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Concrete or Asphalt

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 1,484 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-6		

Enter the Area Tributary to this Feature A_T = 1.56 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.85

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.66

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.45 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 2,548 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-7		

Enter the Area Tributary to this Feature A_T = 2.03 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Natural (B Soil)

Effective Impervious Fraction I_f = 0.15

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.14

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.10 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 737 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	4/8/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-8		

Enter the Area Tributary to this Feature A_T = 2.85 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Concrete or Asphalt

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 6,311 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	5/6/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-9		

Enter the Area Tributary to this Feature A_T = 2.1 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Roofs

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 4,650 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	5/6/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-10		

Enter the Area Tributary to this Feature A_T = 2.1 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Roofs

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 4,650 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	5/6/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-11		

Enter the Area Tributary to this Feature A_T = 1.58 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Concrete or Asphalt

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 3,499 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	5/6/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-12		

Enter the Area Tributary to this Feature A_T = 1.16 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Concrete or Asphalt

Effective Impervious Fraction I_f = 1.00

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.89

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.61 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 2,569 ft^3

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	Nasland Engineering	Date	5/6/2014
Designed by	Scott Heberer	County/City Case No	
Company Project Number/Name	Wal-Mart #3882-02 - Bundy Canyon Road and Monte Vista Drive		
Drainage Area Number/Name	D-13		

Enter the Area Tributary to this Feature A_T = 1.59 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: Wildomar

Range: T06S - R04W

Section: 23

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Natural (B Soil)

Effective Impervious Fraction I_f = 0.15

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.14

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.10 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 577 ft^3

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name:	Nasland Engineering	Date:	5/9/2014
Designed by:	Scott Heberer	County/City Case No.:	BMP-1

Design Volume

Enter the area tributary to this feature	A_T=	3	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	5,258	ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

◯ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	35.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.48	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	3,553	ft^2
Proposed Surface Area	A=	1,794	ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		1	%
6" Check Dam Spacing		25	feet
Describe Vegetation:	Natural Grasses		

Notes: "Proposed Surface Area" only accounts for one of the PLD areas - two are provided.
Therefore, "Minimum Surface Area" = 3,545 sq ft - "Proposed Surface Area" = 3,588 sq ft.

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name:	Nasland Engineering	Date:	5/9/2014
Designed by:	Scott Heberer	County/City Case No.:	BMP-2

Design Volume

Enter the area tributary to this feature	A_T=	3.97	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	8,274	ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	35.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.48	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	5,591	ft^2
Proposed Surface Area	A=	1,461	ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		1	%
6" Check Dam Spacing		25	feet
Describe Vegetation:	Natural Grasses		

Notes: "Proposed Surface Area" only accounts for one of the PLD areas - two are provided.
Therefore, "Minimum Surface Area" = 5,591 sq ft - "Proposed Surface Area" = 2,922 sq ft.
Overflow is designed to discharge into Western Infiltration Basin.

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name:	Nasland Engineering	Date:	5/9/2014
Designed by:	Scott Heberer	County/City Case No.:	BMP-3

Design Volume

Enter the area tributary to this feature	A_T=	0.67	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,484	ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

◯ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	15.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.45	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	1,022	ft^2
Proposed Surface Area	A=	1,073	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		1	%
6" Check Dam Spacing		25	feet
Describe Vegetation:		Natural Grasses	

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name:	Nasland Engineering	Date:	5/9/2014
Designed by:	Scott Heberer	County/City Case No.:	BMP-4

Design Volume

Enter the area tributary to this feature	A_T=	1.56	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	2,548	ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

◯ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	25.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.47	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	1,731	ft^2
Proposed Surface Area	A=	1,750	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		1	%
6" Check Dam Spacing		25	feet
Describe Vegetation:		Natural Grasses	

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID BMP-5	Legend:	Required Entries / Calculated Cells

Company Name:	Nasland Engineering	Date:	5/9/2014
Designed by:	Scott Heberer	County/City Case No.:	

Design Volume

a) Tributary area (BMP subarea)	A_T =	14.1	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	12,700	ft^3

Maximum Depth

a) Infiltration rate	I =	0.7	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	6	
c) Calculate D_1 $\quad D_1 = \dfrac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	0.7	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		50	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		70	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	39.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	0.7	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	0.7	ft
c) Minimum bottom surface area of basin (A_S= V_{BMP}/d_B)	A_S =	18143	ft^2
d) Proposed Design Surface Area	A_D =	29500	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	64	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	64	ft^2
d) Full height notch-type weir	Width (W) =	12.0	in

Notes: Areas directly running off towards this Infiltration Basin required volume of approximately 8000 cubic feet, overflow from northern PLD's account for the additional 5000 cubic feet.

Sand Filter Basin (SFB) - Design Procedure	BMP ID BMP-6	Legend:	Required Entries Calculated Cells

Company Name:	Nasland Engineering	Date:	5/9/2014
Designed by:	Scott Heberer	County/City Case No.:	

Design Volume

Total Tributary area	A_{TRIB} =	8.5	ac
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	15,950	ft^3

Basin Geometry

Basin side slopes (no steeper than 4:1)	z =	4	:1
Proposed basin depth (see Figure 1)	d_B =	4	ft
Depth of freeboard (if used)	d_{fb} =	0	ft
Minimum bottom surface area of basin (As = V_{BMP}/d_B)	A_s =	3987.5	ft^2
Minimum total depth required (includes freeboard, filter media and subdrains)	d_{req} =	6.17	ft
Proposed Surface Area		4,000	ft^2

Forebay

Forebay volume (minimum 0.5% V_{BMP})	Volume =	79.75	ft^3
Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
Forebay surface area (minimum)	Area =	79.75	ft^2
Full height notch-type weir	Width (W) =	12.00	in

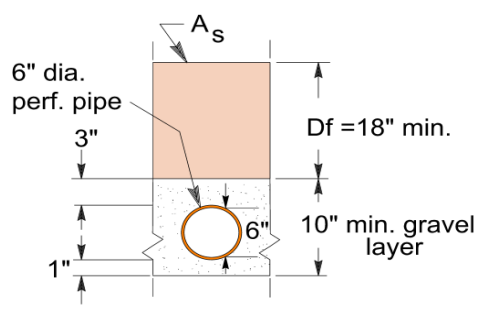
Filter Media

Description of filter media

X Sand (ASTM C-33)

Other (Clarify in "Notes" below)

Media depth, df = 18 inches



Underdrains

Diameter of perforated underdrain		6	in
Spacing of underdrains (maximum 20 feet on center)	OK	8	ft

Notes:

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTION

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Proposed Wal-Mart #3882-02
Southwest Corner—3 Parcels
Bundy Canyon Rd and Monte Vista Dr.
Wildomar, California

PREPARED FOR:
Mr. Pete Ritchey
Nasland Engineering
4740 Ruffner Road
San Diego, California

PREPARED BY:
IWS ENVIRONMENTAL

IWS PROJECT #: 041213-1
Nasland Job #310-014.1

Issuance Date
May 01, 2013
Viability Date
October 17, 2013

IWS Environmental, Inc.
Environmental Management & Engineering

01 May 2013
IWS Project No. 041213-1
Nasland Project No. 310-040.1

Mr. Pete Ritchey
Nasland Engineering
4740 Ruffner Street
San Diego, California 92111

Subject: Phase I Environmental Site Assessment

Site/Project: Proposed Walmart Store Site #3882-02 – Vacant Land (Parcel A, B, & C).
Southwest Corner - Bundy Canyon Road and Monte Vista Drive
Wildomar, California

Dear Mr. Ritchey:

Enclosed is a Phase I Environmental Site Assessment (Phase I) Report for the proposed Walmart Store #3882-02 which will be constructed on the southwest corner of Bundy Canyon Road and Monte Vista Drive. Parcels A, B, and C for which this Phase I is being conducted, comprise 5 acres of the northern portion of a 23 acres site proposed for a Walmart store. The subject parcels will be the future home to the vehicle parking area for the store. The assessment was conducted pursuant to, and in compliance with Wal-Marts "Environmental Due Diligence Policy" dated July 26, 2012, and the American Society for Testing and Materials (ASTM) Standard E 1527-05 and the United States - Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) as guidelines.

The opportunity to provide this service is greatly appreciated. If you have any questions regarding this matter, please contact our office at (714) 893-6140.

Sincerely,

IWS Environmental, Inc.

Jim Bunck R.E.A. #4911
Principal

5211 Hartford Way, Westminster, California 92683
(714) 893-6140 Fax (714) 893-1354

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
Proposed Walmart #3882-02
Southwest Corner - Bundy Canyon Road and Monte Vista Drive Wildomar, California

1.0. INTRODUCTION

IWS Environmental (IWS), was retained by Mr. Pete Ritchey of Nasland Engineering to perform a Phase I Environmental Site Assessment (ESA) for three contiguous parcels located on the southwest corner of Bundy Canyon Road and Monte Vista Drive, Wildomar California. These three parcels, which comprise 5 acres, and will be part of a 24 acre Walmart Store #3882-02 site.

This Phase I was conducted pursuant to, and in compliance with Walmart's "Environmental Due Diligence Policy" dated July 12, 2012. In addition, this Phase I was performed using the American Society for Testing and Materials (ASTM) Standard E 1527-05 and the United States-Environmental Protection Agency (US-EPA) Standards and Practices for All Appropriate Inquiries (AAIs: 40 CFR Part 312).

The property is located in the City of Wildomar at an approximate elevation of 1,430 feet above sea level (Figure 1 - Location Map, Lake Elsinore, California Quadrangle, 1967, photo-revised 1980). The topography of the subject site and surrounding area is flat with a gentle grade to the south.

1.1. SCOPE OF WORK

The purpose of the Phase I was to identify and assess environmental characteristics of the subject property that could lead to liability in the event of ownership, that could have a potential impact on property value, or that could impact the present or future use of the subject property.

The purpose of ASTM Practice E 1527-05 and US-EPA AAI's is to define good commercial and customary practice for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and petroleum products. As such, this practice is intended to permit a user (client) to satisfy one of the requirements to qualify for the innocent landowner defense, contiguous property owner or bona fide prospective purchaser limitations on CERCLA liability: that is, the practices that constitute all appropriate inquiry into the previous ownership and use of the property consistent with good commercial and customary practice as defined in 42 USC 9601(35)(B). An evaluation of business environmental risk associated with a parcel of commercial real estate may necessitate investigation beyond that identified in this practice (based on ASTM Practice E 1527-05, Section 1.1.).

The goal of ASTM Practice E 1527-05 is to identify *recognized environmental conditions (REC"s)*, or the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of hazardous substances or petroleum products into structures on a property or into the ground, ground water, or surface water of the property. Conditions that are determined to be de minimis, that do not present a material risk to public health or the environment and generally would not be the subject of an enforcement action, are not recognized environmental conditions. The USEPA AAI's generally conform to these guidelines in regards to hazardous substances as defined under CERCLA. However, USEPA AAI's performed for EPA Brownfields Grant recipients must also include CERCLA defined hazardous substances, pollutants or contaminants, petroleum/petroleum products and controlled substances.

1.2. ADDITIONS, LIMITATIONS AND EXCEPTIONS

Considerations identified as beyond the scope of a Phase I Environmental Assessment that may affect business environmental risk at a property include the following: asbestos-containing materials (ACMs), radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, cultural and historical resources, industrial hygiene, health and safety issues, ecological resources, endangered species, indoor air quality and high voltage power lines. These environmental issues may warrant assessment based on the type of property or transaction; however, they are considered non-scope issues under ASTM Practice E 1527-05. The addition of these non-scope items must be agreed-upon between the client and IWS prior to initiation of the Phase I.

The following non-scope considerations referred to as Wal-Mart's "Business Environmental Risk Considerations" (BERSs) are included in his Phase I report. They are identified as:

- Radon
- Indoor Air Quality
- Lead in Drinking Water
- Environmental Regulatory Compliance
- High-Voltage Power Lines
- Cultural, Historic, and Archeological Resources
- Wetlands and Surface Waters
- Threatened, Endangered, and Other Protected Species
- Wildlife Sanctuaries and Other Natural Resource Preserves
- Biological Agents
- Mold
- Potential Impacts/Implications of Environmental Issues for the Site Development and Construction.

Some additions to the scope of the Phase I may originate from property research, such as additional addresses, past or present, for the subject property. These additional addresses will be added to the scope of research where feasible.

Additions, limitations or exceptions were made to the scope of this Phase I.

1.3. CLIENT-PROVIDED INFORMATION

According to the ASTM Standard E-1527-05 and the USEPA AAI's, in order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, the client (user) must provide the following information (if available) to the environmental professional. Failure to provide this information could result in a determination that "all appropriate inquiry" is not complete.

- Environmental cleanup liens that are filed or recorded against the site (40 CFR 312.25).

- Activity and land use limitations that are in place on the site or that have been filed or recorded in a registry (40 CFR 312.26).

- Specialized knowledge or experience of the person seeking to qualify for the LLP (40 CFR 312.28). For example, are you involved in the same line of business as the current or former occupants of the property or adjacent properties?

- Relationship of the purchase price to the fair market value of the property if it were not contaminated (20 CFR 312.29).

- Commonly known or reasonably ascertainable information about the property (40 CFR 312.30), including past uses, specific chemicals used on the property, spills or chemical releases or environmental cleanups on the property.

- The degree of obviousness of the presence or likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31). For example, as a user of this assessment, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination on the property?

Additional items should be collected, if available, and provided to the environmental professional. This information is to assist the environmental professional but is not necessarily required to qualify for one of the LLP's. The information includes: 1) the reason the Phase I is required, 2) the type of transaction, 3) the complete and correct address for the property, 4) the scope of services desired for the Phase I, 4) identification of all parties who will rely on the Phase I report, 5) identification of the site contact and how the contact can be reached, 6) any special terms or conditions and, 7) any other knowledge or experience with the property that may be pertinent to the environmental professional (including copies of previous reports).

The following information was provided by Walmart prior to the initiation of the Phase I:

- The purpose of the Phase I is for a proposed new Walmart store which will included the subject parcels. This Phase I is not being conducted for a recipient of an EPA Brownfields Grant.

- Walmart is unaware of any environmental liens or land use limitations on the property.

- Nasland Engineering provided IWS with contact information for access to the subject property.

- Preliminary Title Report dated April 19, 2013

2.0. CRITICAL DATES

Table of Critical Dates	
Report Issuance Date	05/01/13
Date of Interview of Past and Present Owners and Occupants Identified in Section 10 of ASTM 1537-05	04/17/13
Date of Recorded Environmental Cleanup Lien Search	04/19/13
Date of Government Record Review	04/19/13
Date of Visual Inspection of Subject Site and Adjoining Properties	04/23/13
Earliest Date of Interviews, Lien Search, Record Reviews, and Inspections	04/19/13
Report Viability Date	10/17/13

3.0. SITE DESCRIPTION

Figure 1 shows the location of the subject property [7.5 Minute United States Geological Survey (USGS) Topographic Series, Lake Elsinore, California Quadrangle at an elevation of approximately 1,430 feet above sea level. The general topography of the subject site and surrounding area is flat with a gentle grade to the south.

The subject site is vacant undeveloped land, comprised of three contiguous parcels totaling 5 acres in an irregular rectangular configuration. Situated on parcel "A" are several concrete pads where a former farm house and barn were located. The remaining two parcels are vacant and void of any former structures or active agricultural use.

The property is situated in the northeastern portion of the City of Wildomar. The subject parcels and adjacent parcels are designated for retail and commercial development. The site is bound on the north by Bundy Canyon Road and to the east by Monte Vista Drive. Extending north of Bundy Canyon Road is a self storage facility. Extending north of the self storage facility are single family residential tracts. Extending east of Monte Vista Drive is vacant, undeveloped land. East of the vacant land is a single family residential area. The adjacent property to the west is under construction as a retail and commercial area with a gas station nearing completion on the northwest portion of that site. The proposed Walmart will be constructed on a 19 acre vacant parcel directly south of the subject parcels. This vacant parcel, along with the subject parcels were formerly utilized for dry oat farming.

Major arterial roadways in the area include Interstate 15 located 1,000 feet west and Interstate 215 located 5 miles east. The closest major reservoir is Elsinore Lake located 3.3 miles west, northwest. The prominent features on the subject property are depicted in Figure 2. Photographs of the subject property are provided in Appendix A.

3.1. LEGAL DESCRIPTION

On April 19, 2013, First American Steward Title Insurance Company provided a preliminary title report which included the legal description. The subject property is known as assessor parcel numbers 367100033 (Parcel A), 367100034 (Parcel B), and 367100035 (Parcel C), as recorded by the County of Riverside Tax Assessor office. The property information is as follows:

Parcel	
Property Address	No physical address
Property Zoning	Not available
Property Size	4.991 Acres (combined parcels)
Legal Descriptions	See PTR for Legal Description
Improvements (size/year built)	None
Owner/Mailing Address	Bundy Canyon Partners L.P. A California Limited Partnership 12625 High Bluff Drive, San Diego, CA 92130

3.2. GEOLOGIC AND HYDROGEOLOGIC SETTING

3.2.1. Regional and Local Geology

The Site is located at an approximate elevation of 1,430 feet above mean sea level and lies within the Elsinore-Temecula trough, which is a down-dropped structural block, filled with Quaternary alluvium. According to the State of California Department of Water Resources, the property lies within the Temecula Valley Groundwater Basin. Quaternary alluvium in the Temecula Valley Groundwater Basin is estimated to reach more than 2,500 feet thick and is the water-bearing material of this basin. The basin is bounded by non water-bearing crystalline rocks of the Peninsular Range.

Local geologic stratigraphic unit for the Property falls in the Mesozoic period on a geologic time scale. Based upon the U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) data, the soil component in the general area of the Property is considered CAJALCO with a fine sandy loam surface texture. The hydrologic group for the soil is Class C indicating a slow infiltration rate. The soil drainage class for the soil is well drained indicating the soils have intermediate water holding capacity. The soil composition in the general area of the Property does not meet the requirement for a hydric soil. Hydric soils are formed under conditions of saturation, flooding, or ponding and are useful to define wetland boundaries. Soil types for the general area of the Property down to a depth of 26 inches include: fine sandy loam, loam, and weathered bedrock (EDR, 2005).

3.2.2. Regional and Local Hydrogeology

The site lies within the Santa Margarita Hydrologic Unit, Murrieta Hydrologic Area and Murrieta Hydrologic Sub Area. Local groundwater is reported to be approximately 40 feet below ground

surface (bgs) and is expected to trend southwest towards Murrieta Creek, a tributary for the Santa Margarita River. Regional groundwater flow direction is anticipated to parallel Murrieta Creek which trends south past the subject site. According to the RWQCB Basin Plan, the existing beneficial uses of groundwater in this area are municipal, industrial, and agricultural.

No surface water was observed on, or in the vicinity of the subject property. There are no ground water monitoring wells located on or adjacent to the subject site. Data gathered from ground water monitoring wells at a former LUST site ½ mile west indicated an average depth in these wells of 40 feet bsg for an extended period of time. While the data is 10 years old, it is very likely that these depths have not changed significantly, and ground water at the subject site may be of similar depth.

4.0. SITE HISTORY

According to ASTM Standard E1527-05, the objective of consulting historical sources for a Phase I is to develop a history of the previous uses of the property and the surrounding area to help identify the likelihood of past uses having led to recognized environmental conditions with respect to the property. All obvious uses shall be identified from the present, back to the property's first obvious developed use, or back to 1940, whichever is earlier. The US-EPA AAI's requires that the history of the property be documented as far back as the first development of the property or from the time the property was first used for residential, agricultural, commercial, industrial or governmental purposes. At a minimum, this Phase I will comply with the ASTM E1527-05 standard and in most cases will also cover the US-EPA AAI's requirement.

The history of the subject site 1901 to present was researched by reviewing multiple sources, including, but not limited to, chain of title records, historical aerial photographs, topographic maps, Sanborn maps, directory information, building department data, oil and gas maps, and personal interviews.

In summary, it appears that the property was utilized for dry oat farming from 1938 to 1980. After 1980 the property has remained absent of any agricultural use.

4.1. SANBORN FIRE INSURANCE MAPS

EDR-Sanborn Inc. was contacted to perform a search of historical Sanborn Fire Insurance Maps with coverage of the area containing the subject property. Fire insurance maps typically identify structures from a fire hazard perspective. In addition, these maps identify structures and improvements, which may pose environmental concerns. EDR-Sanborn Inc. indicated that there is no map coverage in the area of the subject property.

4.2. AERIAL PHOTOGRAPHS

Aerial photographs of the subject site and surrounding property were reviewed for this report. The following representative photos and stereo pairs (if available) were made available through EDR's private collection. During the review, the photographs were specifically examined for evidence of

hazardous materials, as well as on, and off-site features that may affect the environmental quality of the property. The features include sumps, pits, ponds, lagoons, above ground tanks, landfills,

collection of drums or containers, discoloration of soil, structures, and general land use. Unless stated below, there are no discernable, unusual features on the site or surrounding property, and no visible evidence of hazardous materials stored or dumped on, or adjacent to the site.

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Date	Remarks
1938	The subject property is located in a rural area of Riverside County. The subject site and adjacent properties were vacant undeveloped land. Bundy Canyon Road was present as a 2 lane unimproved road. Citrus groves were present on properties ¼ mile to the north and ½ miles to the south and southwest. Surrounding properties were utilized for agricultural activities in what appeared to be dry oat farming. Foothill Boulevard was present as a two-lane paved road extending along the south border of the site. Two farm house and barns were present 500 feet west of the site.
1953	A house and barn were present on parcel A of the subject site. Dry oat farming was present on parcel B and C of the subject site as well as surrounding properties. Active citrus farming was present on properties directly north and northwest. Scattered farm houses were present within a 1 mile radius of the subject site.
1967 1976	No significant changes were present on the subject parcels and adjacent properties from the previous photograph reviewed. I-15 was present 700 feet west as a 4 lane divided highway.
1980	The house and barn noted on the 1953 photograph was still present in this photograph. Parcels B and C of the subject site appeared to be absent of agricultural activities previously conducted on the site. Citrus groves still dominated land use in the immediate area of the subject site.
1990	No significant changes were present on the subject parcels and adjacent properties from the previous photograph reviewed. Single family residences were present ¼ mile north and continue approximately
1994	The subject parcels remained unchanged from the 1990 photograph reviewed. This photograph showed the surrounding area transiting from agricultural to residential. Residential tracts were present on parcels surrounding the subject site. Only very small patches of active farming was present in the surrounding area in this photograph.
2005 2009 2010	The house and barn that were present on the site (Parcel A) since 1953 were absent in the 2005 photograph. A self storage facility was present directly north of the subject parcels, north of Bundy Canyon Road.

In summary, based on the historical photographs reviewed, the subject parcels (A, B, and C) were vacant undeveloped land from 1938 to 1953. In 1953 a house and barn appeared on parcel A and parcels B and C were active in dry oat farming along with parcels directly south for a period of 28 years. From 1980 to present no agricultural activities have taken place on the site. Aerial photographs of the subject site proceeding 1938 and subsequent to 2010 were not readily available

for review.

4.3. HISTORICAL TOPOGRAPHIC MAPS

Development history of the subject property and surrounding area was researched using historical 7.5 Minute USGS Topographic Maps provided by EDR. Topographic maps supplied by EDR included 1901, 1953, 1978, 1982, 1988, and 1997. The following is a summary of the observations from the maps:

Date	Remarks
1901 - 1903	The subject site and surrounding areas were depicted as vacant undeveloped land. Scattered unformed roads crisscrossed the area. Bundy Canyon Road was depicted extending along the north boundary of the site. The city center of Wildomar was depicted 1 mile southwest. Other population centers of Elsinore and Murrieta were located 4.5 miles northwest and 7 miles south respectively. The Southern California Railroad was depicted ½ west of the site extending in a north south direction. Lake Elsinore Lake was depicted 3.25 miles west, northwest.
1953 - 1973	The subject site was depicted as vacant undeveloped land. Citrus groves were depicted on adjacent properties to the east and west. 1 mile east and 1.5 miles west.
1978 -1982	Two structures were depicted on parcel A of the subject sites. The remaining parcels were depicted as vacant land void of any agricultural activities. Areas to the north and west were depicted as citrus groves. Scattered buildings, likely representing farm houses and barns were depicted within a 1 miles radius of the site. A population center identified as Sedco Hills was depicted 1 mile north, northwest of the subject site. The 1982 map depicts the I-15 Freeway under construction directly west of the site.
1988	The subject site was depicted as vacant, undeveloped land. One of the two structures depicted on the 1978 may is not depicted on this map. A greater abundance of residential structures were depicted in areas ¼ to 1 mile northwest and southwest of the site indicating a transition from agriculture use to residential and commercial use.
1997	No significant changes were noted on the subject site from the pervious map reviewed. Areas directly north and east were depicted as established residential developments.

4.4 BUILDING DEPARTMENT

The City of Wildomar, Building and Safety Department maintains all building permit records for the city. On April 23, 2013, IWS visited the Building and Safety Department to review any permits that may have been present on the subject property. Only two building permit records were found in their file. One for a demolition permit for the former house/barn on parcel A, and the other was for an electrical meter reset for that house. There were several permits found in the Planning Department records for the parcels. All were for temporary events (Wild West Days, outdoor circus, etc.). There were no permits or plans for any underground tanks, sumps, vaults, or other items that may represent an environmental concern for the subject site.

4.5. OWNERSHIP HISTORY, ENVIRONMENTAL LIENS AND USE ACTIVITY RESTRICTIONS

4.5.1. Ownership History – Title Records

A Title Report along with supporting title documents was provided to IWS by Gresham Savage for review. The purpose of the review of these documents was to determine an ownership history for the site and also determine if previous owners may have utilized the site under business entities likely to use, store, or generate hazardous materials. Additionally, the documents may provide title records recorded on the site indicating an environmental lien of land use restriction.

The information provided in these title documents validates the other records obtained and reviewed for this report. No environmental liens, or land use limitations were noted in the review of the Title records for the subject property.

4.6. OCCUPANCY HISTORY – City Directories

EDR was contacted to provide a City Directory Abstract for the subject property. There are no current structures on the site listing a physical address and IWS was not able to associate any of the addresses listed on the City Directory to the subject parcels. A company by the name of VP Racing Fuels is listed at 34281 Monte Vista Drive in 2005. VP Racing Fuel is located 900 feet south of the subject parcels. This business still operates at that address. The business is a retail distributor of racing fuel and does not have any underground or above ground tanks where the fuel is stored. A review of remaining nearby sites did not reveal any current or former businesses that are likely to have a significant negative environmental impact on the subject site.

4.7. OIL AND GAS WELLS

April 17, 2013, the Munger Map Book of California Oil and Gas Fields (1994) was reviewed concerning the subject property and nearby properties. DOG maps contain information regarding oil and gas development. According to the DOG maps, there are no former or present oil wells located on the subject site or within one thousand feet of the subject property.

4.8. PRIOR AGRICULTURAL USE

Agricultural use of land creates the potential for soil and ground water to be impacted by agricultural chemicals such as pesticides, herbicides, and fertilizers. From information gathered from a review of historical Topo maps, aerial photographs and other historical data gathered for this report, it appears

agricultural activities (dry oat farming) were in place on the site and surround properties from 1938 to a date on or before 1980. From 1980 to present the land has remained absent of any agriculture use.

A 2005 Phase II Assessment performed on adjacent parcels directly south of the subject parcels found trace levels of pesticides and herbicide chemicals in the soil. All levels detected were below Residential Soils Preliminary Remediation Goals (PRG's). Since the type of crops grown on the adjacent parcels was identical as the subject site, it is likely these same chemicals are present on the subject site in similar concentrations levels.

IWS did not find any direct indications during the site reconnaissance, such as chemical storage or dumping, spilled powders, discolored or stained soil, or stressed vegetation, that the property has been significantly adversely impacted by agricultural chemicals.

4.9. PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Two previous Environmental Assessments/Investigation reports were provided to IWS for review. The Phase I and Phase II focused on the parcel directly south of the subject parcels; however, their assessments included the southern portions of the subject parcels. The reports are discussed below:

a. On January 2005, (Revised July 2005), a Phase I Environmental Site Assessment was completed for the subject site by C2 Rem, Inc. The report concluded that "*the results of the investigative activities have revealed the potential presence of RECs in connection with the property". Results of a limited soil sampling and analysis activities indicated the presence of low concentrations of pesticides and herbicides on the property. The detected constituents of concern are not anticipated to result in a significant risk for the defined end land use as a commercial facility".*

b. On February 2005, a Phase I Environmental Site Assessment Addendum Phase II Investigation was completed by C2 Rem. This assessment involved the collection and testing of soil samples on the site for the possible presence of pesticides and associated herbicides. The report concluded "*herbicides and pesticides concentrations were below PRGs for Residential Soil scenarios"* and, *"this sampling and analysis activities indicate that the detected constituents of concern are not anticipated to result in a significant risk for potential land users".*

5.0. REGULATORY AGENCY RECORD SEARCH

IWS contacted EDR to conduct a computer search of federal, state, tribal and local regulatory agency databases for sites having recognized environmental conditions or that had permits to manufacture, store, utilize, treat or dispose hazardous materials. EDR's report complies with the

requirement for researching federal, state, tribal and local government records as defined by ASTM E1527-05 and US-EPA AAIs. EDR provided IWS with a report of sites within specified search distances of the subject property that were listed on various environmental databases.

IWS contacted appropriate regulatory agencies to review records regarding the subject property and surrounding sites identified as having recognized environmental conditions that have the potential to impact the subject property based on ground water flow direction, distance from the subject property and nature of the releases causing the environmental condition.

5.1. COMPUTER DATABASE RECORD SEARCH

A computer search of federal, state and regional regulatory agency databases was performed by EDR to identify and locate properties in areas of concern that have been reported as sites known or suspected to contain underground storage tanks, or to have been the scene of hazardous materials spills. Additionally, sites permitted to manufacture, utilize, generate, store, treat or dispose of hazardous materials and/or hazardous wastes are identified and located. In compliance with ASTM E1527-05 and US-EPA AAI's, the most recent versions of the following databases were investigated:

FEDERAL ASTM STANDARD

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
CORRACTS	Corrective Action Report
RCRA-TSDF	Resource Conservation and Recovery Act Information
RCRA-LQG	Resource Conservation and Recovery Act Inform., Large Quantity Generator
RCRA-SQG	Resource Conservation and Recovery Act Inform., Small Quantity Generator
ERNS	Emergency Response Notification System

STATE ASTM STANDARD

AWP	Annual Workplan Sites
CAL-SITES	Calsites Database
CHMIRS	California Hazardous Material Incident Report System
CORTESE	"Cortese" Hazardous Waste & Substances Sites List
NOTIFY 65	Proposition 65 Records
TOXIC PITS	Toxic Pits Cleanup Act Sites
SWF/LF	Solid Waste Information System
WMUDS/SWAT	Waste Management Unit Database
LUST	Leaking Underground Storage Tank Information System

CA-BEP	Bond Expenditure Plan
UST	List of Underground Storage Tank Facilities
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
CA FID UST	Facility Inventory Database

FEDERAL ASTM SUPPLEMENTAL

CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
Delisted NPL	National Priority List Deletions
FINDS	Facility Index System/Facility Identification Initiative Progr. Summary Report
HMIRS	Hazardous Materials Information Reporting System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
NPL LIENS	Federal Superfund Liens
PADS	PCB Activity Database System
ODI	Open Dump Inventory
DOD	Department of Defense Sites
INDIAN RESERV	Indian Reservations
UMTRA	Uranium Mill Tailings Sites
FUDS	Formerly Used Defense Sites
RAATS	RCRA Administrative Action Tracking System
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
SSTS	Section 7 Tracking Systems
FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

AST	Aboveground Petroleum Storage Tank Facilities
CLEANERS	Cleaner Facilities
CA WDS	Waste Discharge System
DEED	List of Deed Restrictions
REF	Unconfirmed Properties Referred to Another Agency
HMS	Local Agency – Hazardous Materials System
EMI	Emissions Inventory Data
NFA	No Further Action Determination
NFE	Properties Needing Further Evaluation
SCH	School Property Evaluation Program
CA SLIC	Statewide SLIC Cases (Spills, Leaks Investigation Cases)
HAZNET	Facility and Manifest Data

EDR PROPRIETARY HISTORICAL DATABASES

COAL GAS	Former Manufactured Gas (Coal Gas) Sites

BROWNSFIELDS DATABASES

US BROWNFIELDS	A Listing of Brownfield Sites
VCP	Voluntary Cleanup Program Properties

The executive summary report from the EDR report is attached as Appendix C. The complete report is attached on CD-R in .pdf format. A location map showing these sites is included in the EDR report.

Of potential concern to the subject property are active sites on the NPL and BEP/AWP lists that are located within a 1-mile radius from the subject property. Any active sites within a 1/2-mile radius on the remaining lists (excluding ASPIS, ERNS and CHMIRS) are also of potential concern. Sites on the CALSITES (formerly ASPIS) list are typically listed following a visual observation made by Cal-EPA from a drive-by survey and do not necessarily pose an environmental concern. Only sites on CALSITES that are adjacent to the subject property are discussed in this report. The ERNS is a list of unauthorized releases of oils and hazardous substances, typically from spills. Most spills are minor in nature. Only significant spills or spills on adjacent properties are noted. The CHMIRS list is also a list of hazardous materials incidents including accidental releases or spills.

Sites with permits to operate underground storage tanks, handle/store/transfer hazardous materials and generate hazardous waste are listed on the database report. However, it does not necessarily imply that these sites have impacted the environment. The total number of sites within a ½ -mile radius of the subject property is noted with emphasis on the immediately adjacent permitted sites. Sites on the HAZNET list are generally a concern if they are listed for the subject property or adjacent sites.

The EDR report plots sites based on a geo-coding technique. If sites are not geo-coded or coded incorrectly, the sites are listed on an orphaned site list. The sites on this list are examined and, if the location is identifiable, they are discussed below.

Also note that several sites may be plotted on the EDR radius maps that are not discussed in this report. These sites fall outside of the search radius discussed above and should not represent an environmental concern to the subject property.

Summary of Database Search

5.1.1 Subject Property

- The subject parcels are not listed on the EDR Database Report.

5.1.2. Site Vicinity Database Search

Sites with recognized environmental conditions surrounding the subject property are typically of concern to the subject property when they are located in an up-gradient direction from the property with respect to the ground water flow direction. Typically, ground water would represent the migration medium for contaminants to travel over significant distances. Sites located in equi-gradient or down-gradient directions from the subject property are less likely to impact the subject property.

Sites with permits to operate USTs, handle/store/transfer hazardous materials and generate hazardous waste are listed on the informational database reports; however, it does not necessarily imply that these sites have impacted the environment. Sites with permits only that are adjacent to subject property are noted.

The pertinent sites listed on the EDR database report, including open LUST cases, are summarized in the following table:

Site	Distance & Direction [1]	Database(s) & Summary	Environmental Concern [2]
Walmart Stores at 22313 Bundy Cyn. Dr.	Borders subject parcels to the south.	HAZNET This listing is for asbestos abatement from a former residence which was razed on a property owned by Walmart directly south of the subject parcels.	None – based upon the asbestos abatement completed.
Sellers Mobile Automotive 35720 Sellers Rod	984 ft. NNW Cross- to up-gradient	EDR US Hist. Auto Station. This business no longer is present at the address indicated.	Unlikely – based upon no documented release of gasoline and distance from subject site.
Arco #5644 (also identified as BP West Coast Products), 33986 Orange St	2485ft. WNW Cross to down-gradient	LUST, FINDS, NPDES. Former LUST site where soil was impacted. Received regulatory closure in 2000	Unlikely – based upon closure status and distance from subject site.

Notes:
1: distance and direction from subject property
2: environmental concern based on the EDR report
N: north
S: south
E: east
NE: northeast
NW: northwest
SE: southeast
SW: southwest
SP: subject property

Remaining sites mapped between ½ and1 mile from the subject site and reviewed do not represent an environmental concern to the subject property.

It should be noted that government agency records pertaining to sites may remain on file for years, and may not be representative of the current environmental status of the site. In addition, listings of the addresses and current occupants of a site provided by the regulatory agencies may not be accurate.

Information provided on the GeoTracker web site (http://geotracker.waterboards.ca.gov/) was utilized to validate information provided in the EDR report reviewed in the above section.

5.1.3. Summary of Database Search – Orphan Sites

Six orphan sites were listed on the EDR database report. Each site was reviewed and evaluated to determine if the site had the potential to negatively impact the subject site. Our review and evaluation of these orphan sites concluded that none of the sites listed have the potential to negatively impact the subject property.

5.2. REGULATORY AGENCY FILE REVIEW

5.2.1. Wildomar Fire Department

On April 18, 2013, IWS sent a written request via email to the Wildomar Fire Department requesting any records they may have for the parcels. On April 26, 2013, Fire Chief Steven Beach responded to our request via email and indicated their agency has no files for the subject parcels. He indicated records may be available at the Riverside County Department of Environmental Health.

5.2.2. County of Riverside - Department of Environmental Health (CR-DEH).

The County of Riverside - Department of Environmental Health (CR-DEH), is the lead agency for enforcing environmental laws involving hazardous materials, hazardous waste and underground storage tanks for the City of Wildomar. On April 18, 2013, a written request was submitted to the CR-DEH for any records for the subject site. On April 25, 2013, Ms Suzanne Cauffiel of the Records Management Department of CR-DEH responded to our request via phone. She indicated two incident reports appeared in their files - not specifically for the subject site, but directly adjacent to the subject parcels.

On April 29, 1993, an abandon container of a solvent like materials was found at the corner of Bundy Canyon Road and Monte Vista Drive. The report did not indicate on what corner of the intersection the container was found, nor the size of the container. The report indicated the substance was removed from the location and there was no release to the soil. Based on this information, it is very unlikely the subject site was significantly impacted by this event.

In November of 1996, a "stash of drugs" (as described in the report), was found along the roadside on Monte Vista Drive approximately 300 feet south of Bundy Canyon Drive. The report did not indicate on what side of the road the drugs were found. The report indicated all drugs were cleaned up and the site was left clean. Based on this information, it is very unlikely the subject site was significantly impacted by this incidence.

5.2.3. Regional Water Quality Control Board

The Santa Ana Region of the Regional Water Quality Control Board (SA-RWQCB) is the enforcing agency for the oversight of assessments and remediation of unauthorized releases of hazardous substances in the soil and ground water. A request for information from the SA-RWQCB was made for the subject parcels. On April 29, 2013, the board responded to our request via email and indicated that no records are available for the subject property at their agency.

5.2.4. Department of Toxic Substances Control

The Department of Toxic Substances Control (DTSC) is the State of California agency responsible for oversight of contaminated sites that are not regulated by the RWQCB. A request for information from the Cypress office of the DTSC was made for the subject property. On April 26, 2013, they responded to our request via mail and indicated that no records are available for the subject property.

5.2.5. Southern California Air Quality Management District (AQMD)

The Southern California Air Quality Management District is the enforcing agency for oversight of air emissions for Riverside County in which the subject site is located. A written request for records was made for the subject property. On April 24, 2013, Maria Rubio of AQMD responded to our request via email and indicated that their agency does not have any files for the subject site.

6.0. SUBJECT PROPERTY RECONNAISSANCE

A site reconnaissance of the subject property was conducted by IWS on April 23, 2013. Photographs of selected features of the subject site are included in Appendix A. The primary features of the subject property are shown in Figure 2

6.1. GENERAL SITE SETTING

The subject property is comprised of three contiguous vacant parcels totaling approximately 4.8-acres in an irregular rectangular shaped configuration. According to preliminary plans reviewed by IWS, these three parcels will be utilized as a vehicle parking area for the proposed 185,000 square

foot Walmart Store which will be constructed on a parcel directly south of the subject parcels. Bundy Canyon Road forms the north border and Monte Vista Drive forms the east border of the subject site. Located directly west is a parcel currently under development as a retail center. Forming the south border is a vacant parcel which will be home to the proposed Walmart building. Residential areas extend north, east and west of the subject site.

6.2. SITE OBSERVATIONS

Conditions noted that are of environmental concern to the subject property are flagged with a YES and the item of concern is noted.

6.2.1. EXTERIOR OBSERVATIONS

YES	NO	CONDITION OBSERVED ON THE EXTERIOR OF SUBJECT PROPERTY
	X	Pits, ponds or lagoons with respect to waste treatment or disposal.
	X	Stained soil or pavement, patched pavement.
	X	Stressed vegetation (from causes other than insufficient water)
	X	Solid waste (mounds or depressions suggesting waste disposal)
	X	Fill dirt from unknown source, or contaminated source.
	X	Waste water / storm water discharged into a drain, ditch or stream.
X		Wells (abandoned, irrigation, domestic, monitoring or oil and gas). ***Located on parcel "C" is a former irrigation well. The well casing has been filled with concrete to the well head. There were no lines observed leading from this well.***
	X	Sumps, clarifiers, oil/water separators, drains, trenches.
	X	Dry wells.
X		Septic systems or cesspools. ***A small concrete sump in what is believed to be a holding area for a septic system is near a concrete foundation where a former house was present. There sump was dry with no indications of hazardous materials, stains, or odors.***
	X	Movement of hazardous materials to adjacent properties
	X	Hazardous substances and/or petroleum products in connection with identified uses.

YES	NO	CONDITION OBSERVED ON THE EXTERIOR OF SUBJECT PROPERTY
	X	Above-ground storage tanks (ASTs) for storage of petroleum products and/or hazardous substances.
	X	Underground storage tanks (USTs) for storage of petroleum products and/or hazardous substances
	X	Vent pipes, fill pipes or access ways that might indicate USTs
	X	Strong, pungent or noxious odors
	X	Pools of liquid (other than water)
	X	55-gallon drum or large sack storage
	X	Hazardous substance and petroleum products containers (not necessarily in connection with identified uses)
	X	Unidentified substance containers
	N/A	Fluorescent lighting, mercury vapor lamps, thermostats or other temperature controls that may contain that may contain mercury.
	X	Electrical or hydraulic equipment known to contain PCBs.
	N/A	Chlorofluorocarbon (CFC) containing equipment (air conditioning units refrigerators coolers etc
	N/A	Obvious signs of possible asbestos-containing material (ACMs)
	X	Other areas of environmental concern

6.3. NON-ASTM SERVICES

The following Non-ASTM services identified by the client as “Business Environmental Risk Considerations” (BERC’s), are included in this report. The BERC’s are factors that could pose a “Business Environmental Risk” that could affect the development and or the intended use of the property. The BERC’s were evaluated for this report and are discussed below.

6.3.1. Radon – The State of California Department of Health Services maintains a current list of radon levels for each city in California. It appears that the average level in the zip code where the subject site is located is 2-4 pCi/L. This level is below the 4.0 pCi/L action levels set by the EPA and adopted by the regulatory agencies in California. Based on this information, it is unlikely any proposed buildings on the site will be adversely impacted by radon.

6.3.2. Indoor Air Quality – The subject site is located in an area of the city comprised primarily of residential with limited retail and commercial types of businesses. There is no history of industrial types of activity on or near the subject property. No hazardous substances or petroleum type materials or contaminated ground water plumes were identified on, adjacent to, or within close proximity to adversely impact the subject site. The subject site was previously utilized for agricultural activities. A previous Phase II conducted by C2Rem detected small quantities of pesticides in the adjoining property to the south at levels below PRG for residential. It is likely the subject parcels have similar values. Based upon this information and a lack of active farming on the subject parcels for over 33 years, residual pesticides, if any, have degraded over time, or were likely diluted during weed abatement conducted on the site and are not considered an environmental concern to the subject property. Therefore, indoor air quality within a proposed building would not be impacted by previous agricultural activities.

6.3.3. Lead in Drinking Water – Potable drinking water is supplied to the site by the Elsinore Valley Municipal Water District (EVMWD). The EVMWD "2011 Water Quality Report (http://www.evmwd.com/civica/filebank/blobdload.asp?BlobID=6672) indicated lead in the drinking water that would be supplied to the site was between non-detect (ND) and 12 ug/L (parts per billion). The Maximum Contaminant Levels (MCLs) allowable for lead in drinking water under California and Federal standards is 0.015 mg/L (parts per billion). Based upon the report, it is likely levels of lead in the drinking water supplied to the site are suitable for consumption.

6.3.4. Environmental Regulatory Compliance – Information gathered for this Phase I indicate no environmental permits have been issued in connection with any previous or current development activities for the subject site.

6.3.5. High-Voltage Power Lines – High-voltage power lines extend along the northern boundary of the subject parcels fronting Bundy Canyon Road and along the eastern boundary fronting Monte Vista Drive. IWS placed a call to Southern California Edison which owns these power transmission lines and was told the voltage carried through these lines does not exceed 16kv, which is not considered "High Voltage". It is likely these lines will be buried as part of the proposed development of the site.

6.3.6. Biological Agents – Information gathered for this Phase I indicate that there is no biological agent at, or near the subject site.

6.3.7. Mold – No buildings or structures were present on the site. Therefore no mold inspection was performed in connection with this site.

6.3.8. Cultural, Historic, and Archeological Resources - The NEPA EDR record check was completed for the subject site. Findings of the report indicated no mapped archaeological or historic properties were encountered within a 1 mile radius of the subject site.

6.3.9. Wetlands and Surface Waters – The NEPA EDR record check indicates one designated National Wetland is located within ½ to 1 mile radius of the subject site. The identified mapped wetland area identified as PUBKH is located south of the subject site and listed as an unconsolidated, temporarily artificially flooded area. There were no areas observed onsite that contained wetlands or evidence of wetland characteristics. Based upon the information above and current development of the site, no further wetlands assessment is warranted.

6.3.10. Threatened, Endangered, and Other Protected Species – The NEPA EDR record check report indicates the subject parcels lie within the boundaries of an a potential range for threatened or endangered species, or critical habitat area under the "California Natural Diversity Database and County Endangered Species". Located within that habitat area are a host of listed "endangered species". They include three amphibians, eight bird species, three insects, three mammals, three reptiles, and fifteen plant species. There were no areas observed onsite that contained areas where protected species are likely to inhabit. Based upon the information above and the current designated zoning for the site, no further assessment for threatened, endangered or protected species is warranted for the subject site.

6.3.11. Wildlife Sanctuaries and Other Natural Resources Preserves – The subject site does not lie in the vicinity of any Designated or Proposed Critical Habitat. Consequently, project activities on the site will not result in any impacts to any wildlife sanctuaries or other natural resource preserves.

6.3.12. Potential Impacts/Implications of Environmental Issues for Site Development and Construction - There are no regulatory issues or any contaminated sites on, adjacent to, or near the subject property that would have a negative impact for development, design, or construction schedule, development and construction costs.

7.0. SITE VICINITY RECONNAISSANCE

North

The property is bound on the north by Bundy Canyon Road. Extending north of Bundy Canyon Road is a self storage facility and residential neighborhoods. An inspection of this area via public access did not reveal any recognized environmental concerns.

South

The property is bound on the south by vacant undeveloped land. An inspection of this area via public access did not reveal any recognized environmental concerns.

East

The property is bound on the east by Monte Vista Drive. Extending east of Monte Vista Drive is a vacant parcel which extends approximately 600 feet east where a residential neighborhood begins. An inspection of this area via public access did not reveal any recognized environmental concerns.

West

The property is bound on the west by a graded parcel that is currently being developed. Located on the western portion of this graded parcel is a newly constructed gas station which appears to be ready for business soon. A visual inspection of this area did not reveal any recognized environmental concerns.

8.0. PERSONAL INTERVIEWS

8.1. WALMART REPRRESENTATIVE

Ms. Rebekah Rodriguez Senior Design Manager for Wal-Mart was provided with a Phase I ESA User Questionnaire for the subject site. Below is a summary of the questionnaire.

YES	NO	TRANSACTION SCREEN ANALYSIS QUESTIONS
	X	1. Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law?
	X	2. Are you aware of any Activity and Use Limitation (AULs) such as engineering controls (e.g. engineering caps, foundations, liners, treatment methods, etc. in use to prevent contamination from migrating to surrounding areas), land use restrictions or institutional controls (e.g. administrative measures restricting groundwater use, construction, or property use) that are in place at the site and or have been filed or recorded in registry under federal, tribal, state or local laws?
	X	3. As the user of the Phase I Environmental Assessment, do you have any specialized knowledge or experience related to property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemical and processes used by this type of business?
X		4. Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? ***Per the Real Estate Director, the purchase price is slightly below market value, but not due to the physical condition of the property.***
		If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property?

YES	NO	TRANSACTION SCREEN ANALYSIS QUESTIONS
		5. Are you aware of commonly known or reasonably ascertainable information about the subject site that would help the environmental professional to identify conditions indicative of releases or threatened releases? For Example:
	X	A. Do you know the past uses of the subject site? ***Property is currently vacant.***
	X	B. Do you know of specific chemicals that are present or once were present on the subject site?
	X	C. Do you know of spills or other chemical releases that have taken place on the subject site?***.***
	X	D. Do you know of any environmental cleanups that have taken place on the subject site?
	X	6. As the user of the Phase I ESA, based on your knowledge and experience related to the subject site, are there any obvious indicators that point to the presence or likely presence of contamination at the subject site?

8.2. CIVIL ENGINEER – NASLAND ENGINEERING

The Civil Engineer for the project, Mr. Peter Ritchey P.E. of Nasland Engineering was provided with a Phase I ESA User Questionnaire for the subject site. Below is a summary of the questionnaire.

YES	NO	TRANSACTION SCREEN ANALYSIS QUESTIONS
	X	1. Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? ***Nasland is not aware of any environmental liens against the property..***
	X	2. Are you aware of any Activity and Use Limitation (AULs) such as engineering controls (e.g. engineering caps, foundations, liners, treatment methods, etc. in use to prevent contamination from migrating to surrounding areas), land use restrictions or institutional controls (e.g. administrative measures restricting groundwater use, construction, or property use) that are in place at the site and or have been filed or recorded in registry under federal, tribal, state or local laws? ***Nasland is not aware of any AULs files or recorded on the property.***
	X	3. As the user of the Phase I Environmental Assessment, do you have any specialized knowledge or experience related to property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemical and processes used by this type of business? ***Nasland has no specialized knowledge or experience relating to the property. The site is currently vacant, undeveloped land.***
	X	4. Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you

YES	NO	TRANSACTION SCREEN ANALYSIS QUESTIONS
		considered whether the lower purchase price is because contamination is known or believed to be present at the property? ***Nasland is not aware of the price being paid for this property.***
		If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? ***Nasland is not aware of the price being paid for this property (lease).***
		5. Are you aware of commonly known or reasonably ascertainable information about the subject site that would help the environmental professional to identify conditions indicative of releases or threatened releases? For Example:
	X	A. Do you know the past uses of the subject site? ***Prior Phase I ESA indicated history is mostly undeveloped , vacant land. Site is currently vacant undeveloped land. One or more single-family homes previously existed on the site.***
	X	B. Do you know of specific chemicals that are present or once were present on the subject site? ***Nasland Engineering is not aware of any specific chemicals present or once used on the property. Prior Phase I ISA did not indicate any chemicals concerns.***
	X	C. Do you know of spills or other chemical releases that have taken place on the subject site? ***Nasland Engineering is not aware of any spills or other chemical releases that may have taken place on the property.***
	X	D. Do you know of any environmental cleanups that have taken place on the subject site? ***Nasland Engineering is not aware of any environmental clean-ups that may have taken place on the property.***
	X	6. As the user of the Phase I ESA, based on your knowledge and experience related to the subject site, are there any obvious indicators that point to the presence or likely presence of contamination at the subject site? ***Nasland Engineering is not aware of any obvious indicators that point to the presence of contamination on the property.***

9.0 SAMPLING AND RESULTS

No sampling of the soil or water was completed on the site as part of this assessment.

10.0. FINDINGS AND CONCLUSIONS

IWS has performed a Phase I Environmental Assessment using ASTM Practice E 1527-05 and US-EPA AAIs as guidelines for the proposed Walmart store to be constructed on the southwest corner of Bundy Canyon Road and Monte Vista Drive. Any exceptions to, or deletions from, this practice are described in Section 1.2 and 12.1 of this report.

Based upon the results of this ESA for the subject property, the following conclusions are presented for review:

10.1. GENERAL CONCLUSIONS

1. The subject site is currently vacant, undeveloped land located in the northern portion of the City of Wildomar. This area of the city has been designated for retail and commercial types of developments in which the subject site is located. The subject property for this ESA is comprised of three contiguous parcels totaling 5 acres. The proposed 185,000 square foot Walmart store will be constructed on a parcel directly adjacent to the south of the subject parcels. The subject parcels for this Phase I will be utilized for the vehicle parking area.

2. Historically the site and surrounding areas have been utilized for agricultural activities. Parcel "A" of the subject parcels was home to a former residential house which occupied the site from 1953 to 2005. Prior to 1953 Parcel A, along with Parcel "B" and "C" where utilized for dry oat farming from 1934 to approximately 1980. Surrounding properties were also active in agricultural use with citrus type crops dominating land use in the area. Between 1980 and the present the site has remained vacant land void of any construction activities or agricultural use. The Riverside County Department of Agriculture office did not have any records for the site to determine the type of pesticides that may have been used on the subject property. A 2005 Phase II Assessment performed on an adjacent parcel directly south of the subject parcels found trace levels of residual pesticides and herbicide chemicals in the soil. All levels detected were below Residential Soils Preliminary Remediation Goals (PRG's). Since the type of crops grown on the adjacent parcels was identical to those on the subject site, it is likely these same chemicals are present on the subject site in similar concentration levels. These levels do not represent an environmental concern to the development of the site. IWS did not find any direct indications during the site reconnaissance of any areas where chemicals utilized in agricultural activities may have been stored, utilized, or spilled. Since the subject site has not been utilized for agricultural purposes for an estimated period of 33 years, residual pesticides, if any, have degraded over time, or were likely diluted during weed abatement activities conducted on the site. Therefore, previous agricultural use is not considered an environmental concern to the subject property.

3. Two previous environmental assessments were conducted on the adjacent parcel directly south of the subject parcels. Those assessment included the southern portion of the subject parcels. Listed below is a summary of the assessments:

    a. On January 2005 (Revised July 2005), a Phase I Environmental Site Assessment was completed for the subject site by C2 Rem, Inc. The report concluded that "*the results of the investigative activities have revealed the potential presence of RECs in connection with the property". Results of a limited soil sampling and analysis activities indicated the presence of low concentrations of pesticides and herbicides*

on the property. The detected constituents of concern are not anticipated to result in a significant risk for the defined end land use as a commercial facility".

b. On February 2005, a Phase I Environmental Site Assessment Addendum Phase II Investigation was completed by C2 Rem. This assessment involved the collection and testing of soil samples on the site for the possible presences of pesticides and herbicides associated. The report concluded "*herbicides and pesticides concentrations were below PRGs for Residential Soil scenarios"* and, *"this sampling and analysis activities indicate that the detected constituents of concern are not anticipated to result in a significant risk for potential land users".*

4. The subject property was not listed on the EDR Database report. Two sites were listed on the EDR report within a ½ radius of the subject site. One, an Arco gas station located ½ mile west impacted the soil with gasoline. That site received regulatory closure in 2000. A historical automotive shop located 984 feet northwest was also listed on the EDR report. It is unlikely either of these two sites have negatively impacted the subject site.

5. Actual groundwater quality conditions beneath the subject site cannot conclusively be determined at this time. Records assessed for this report do not indicate any recorded large contaminated groundwater plume directly beneath the subject site. Depth to groundwater at the subject site is estimated at 40 feet bgs. This depth is based upon former ground water monitoring wells located ½ mile west of the site.

6. Non-ASTM services identified by the client Considerations" (BERC's), were included in this Phase I report. The BERC's were evaluated for this report and are discussed in detail in Section 6.3. of this report.

   a. **Radon** - the subject site is not exposed to radon above 4.0 pCi/l.
   b. **Indoor Air Quality** - No concerns
   c. **Lead in Drinking Water** - No concern based upon Elsinore Valley Municipal Water District (EVMWD) water quality report.
   d. **Environmental Regulatory Compliance -** No concerns.
   e. **High-Voltage Power Line**s – High-voltage power pole lines extend along the north and east side border of the subject site. Edison which owns these power lines indicates the lines do not exceed 16kv which is not considered "High-Voltage".
   c. **Biological Agents** - No concerns.
   d. **Mold** - No concern
   e. **Cultural, Historic, and Archeological Resources** - No concerns.
   f. **Wetlands and Surface Waters** - No assessments warranted.
   g. **Threatened, Endangered, and Other Protected Species** – No assessments warranted.
   h. **Wildlife Sanctuaries and Other Natural Resources Preserves** – None found.
   i. **Potential Impacts/Implications of Environmental Issues for Site Development and Construction** - None found.

7. The subject property was not utilized as a landfill.

8. There are no NPL (national priority list) or Superfund sites located within a one mile radius of the subject property.

9. There were no significant environmental concerns noted in the historical aerial photographs and topo maps reviewed for the site.

10. There are no current environmental liens, structures, or land use limitations attached to the property.

10.2. SPECIFIC CONCLUSIONS

1. None

11.0. *DE MINIMIS* CONDITIONS

This assessment has revealed no evidence of any items that would be considered *de minimis* conditions.

11.1. RECOGNIZED ENVIRONMENTAL CONDITIONS

This assessment has revealed no evidence of REC's in connection with the subject property.

11.2. HISTORICAL RECOGNIZED ENVIRONMENTAL CONDITIONS

This assessment has revealed no evidence of Historical REC's in connection with the subject property.

12.0. RECOMMENDATIONS

Per Wal-Mart's Phase I protocols, recommendations for this Phase I Assessment will be presented under separate cover.

13.0. LIMITATIONS AND DATA GAPS

13.1. LIMITATIONS

Our professional services were performed using that degree of care and skill ordinarily exercised by environmental consultants practicing in this or similar fields. The findings were based mainly upon examination of historical records, maps, aerial photographs and government agency lists, on a site

reconnaissance visit, and on information obtained during personal interviews with persons of long term familiarity with the subject property as specified in ASTM E1527-05 and the US-EPA AAI's. The hazardous waste site lists presented in this report represent only a search of specific government records as listed above. IWS Environmental is aware that additional government records may exist. It should be noted that government agencies often do not list all sites with environmental contamination or that the list could be inaccurate and/or incomplete.

The conclusions and recommendations in this report are based on findings regarding the historical use of the site, and on features noted during the site reconnaissance. The absence of any potential gross contamination sources, historic or present, does not necessarily imply that the site is free of any contamination.

IWS has performed the services in a manner consistent with that level of care and skill ordinarily exercised by other members of our profession currently practicing in the same locality and under similar conditions, within the limitations of ASTM E 1527-05 standard, the All Appropriate Inquires Rule established by the U.S. Environmental Protection Agency (40 C.F.R. Part 312), and Wal-Mart's Environmental Due Diligence Policy dated dated July 1, 2011.

This report only represents a due diligence effort as to the current environmental status of the site. No other warranty, expressed or implied, is made as to the professional recommendations contained in this report.

13.2. DATA GAPS

ASTM E1527-05 and the US-EPA AAI's requires that the report identify and comment on significant data gaps that affect the ability of the environmental professional to identify recognized environmental concerns.

The largest data gap in this research was from a 34 year period between 1903 through1938. From 1938 to present, some form of data was available for each decade. IWS does not believe that any gaps in the data reviewed would affect the ability to identify recognized environmental concerns. It is our opinion such data gaps identified in this Phase I Assessment are not likely significant in our evaluation of the site.

14.0. REFERENCES

California Department of Water Resources (CDWR), 1975, *California's Ground Water,* Bulletin 118.

-----, 2003, *California's Ground Water,* Bulletin 118.

California Division of Mines (CDM), 1952, *Evolution of the California Landscape,* Bulletin 152.

-----, 1954, *Geology of Southern California*, Bulletin 170.

California Division of Mines and Geology (CDMG), 1962, *Geologic Map of California – San Diego-El ;;;

16.0. QUALIFICATIONS STATEMENT, AND SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

Mr. Jim Bunck states that this Phase I Environmental Assessment was performed under his direct supervision, that he has prepared and/or reviewed and approved the report, and that the methods and procedures utilized in the development of this report conforms to minimum industry standards using both the American Society for Testing Methods (ASTM) Standard E1527-05 and the United States – Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) as guidelines. Mr. Bunck certifies that IWS Environmental project personnel and subcontractors are properly licensed and/or certified to conduct these types of investigations.

Mr. Bunck declares that, to the best of his professional knowledge and belief, he meets the definition of Environmental Professional as defined in 40 CFR Part 312. Mr. Bunck possesses the specific qualifications based upon education, training and experience to assess a property of the nature, history, and setting of the subject site. IWS Environmental has developed and performed the "All Appropriate Inquiries" in accordance with the standards and practices as defined in 40 CFR Part 312.

Jim Bunck R.E.A. #4911
Principal

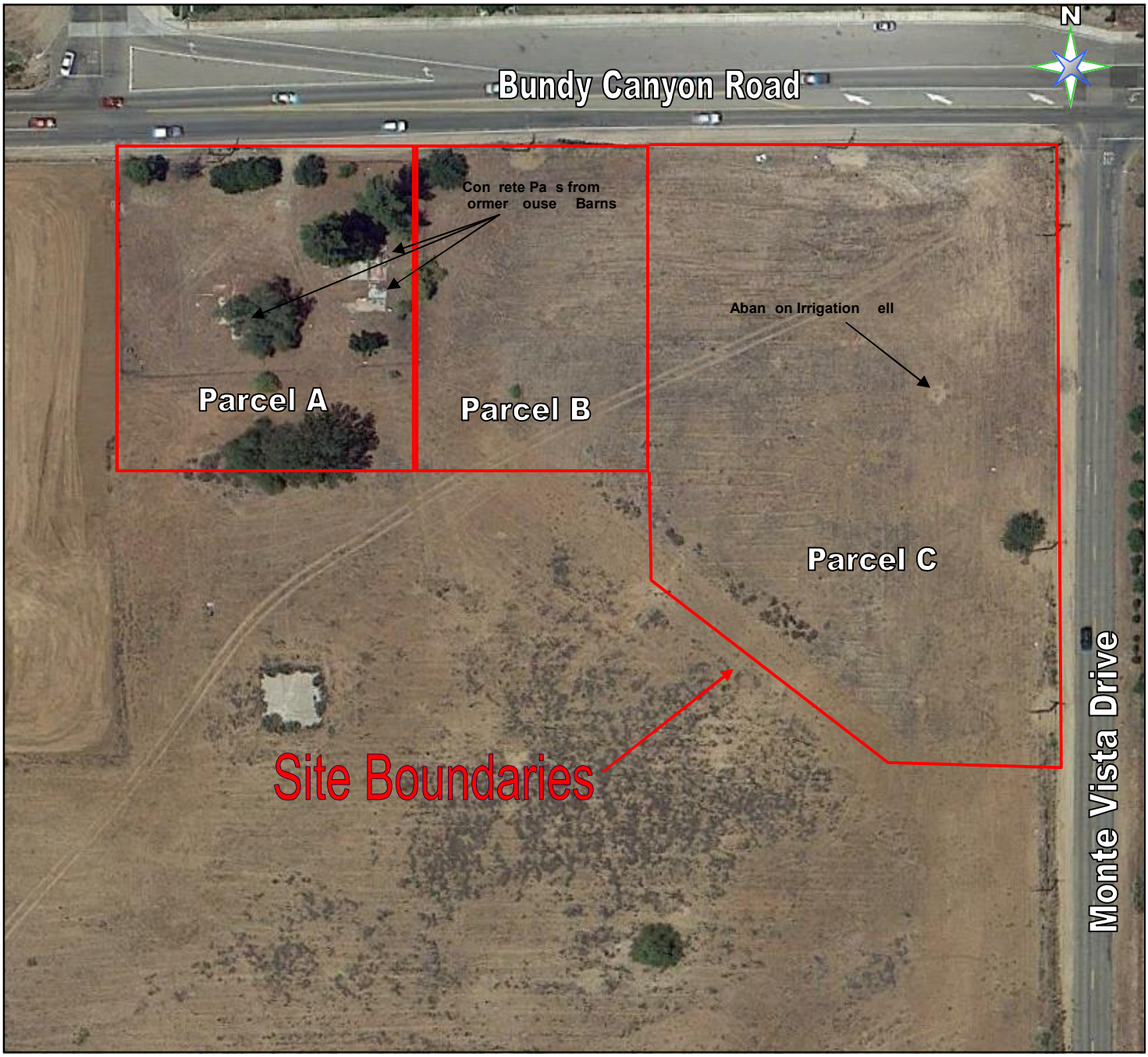
Figures 1, 2, & 3

AREA MAP - SITE PLAN - TAX ASSESSOR MAP

Scale 1" = 4,500 Feet

Site Map Courtesy DeLorme Topo

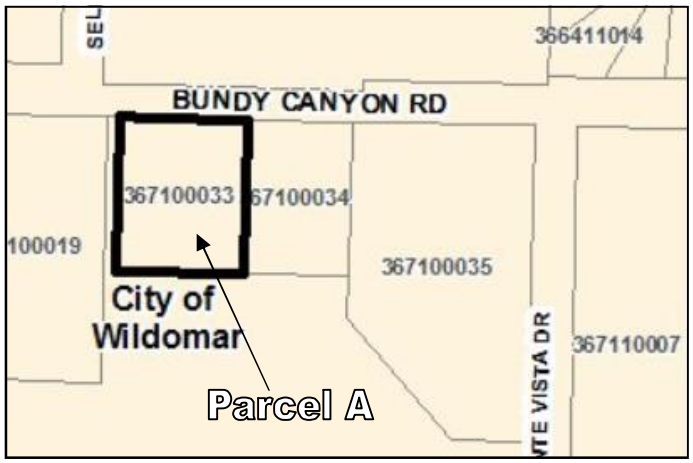
IWS Environmental 5211 Hartford Way Westminster, California 92683	Location Map Walmart #:3882-02 Wildomar, California Date: May 1, 2013	**Figure 1** IWS Project No. 041213-1

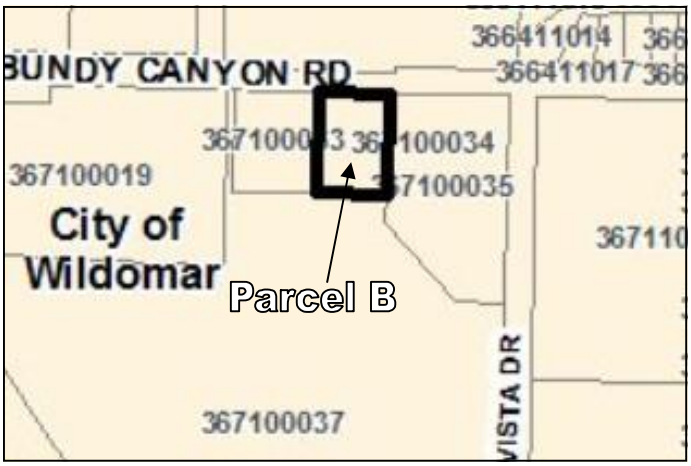


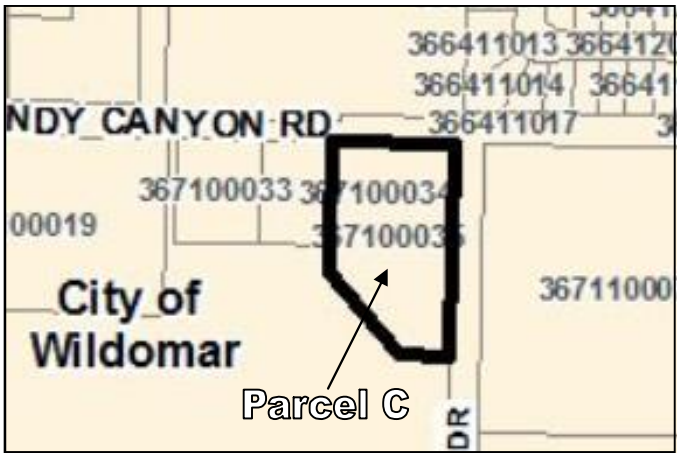
Site Plan Courtesy Google Earth

Scale 1" = 100 Feet

IWS Environmental 5211 Hartford Way Westminster, California 92683	Site Plan Walmart #:3882-02 Wildomar, California Date: May 1, 2013	Figure 2 IWS Project No. 041213-1







Riverside County Tax Assessor Maps

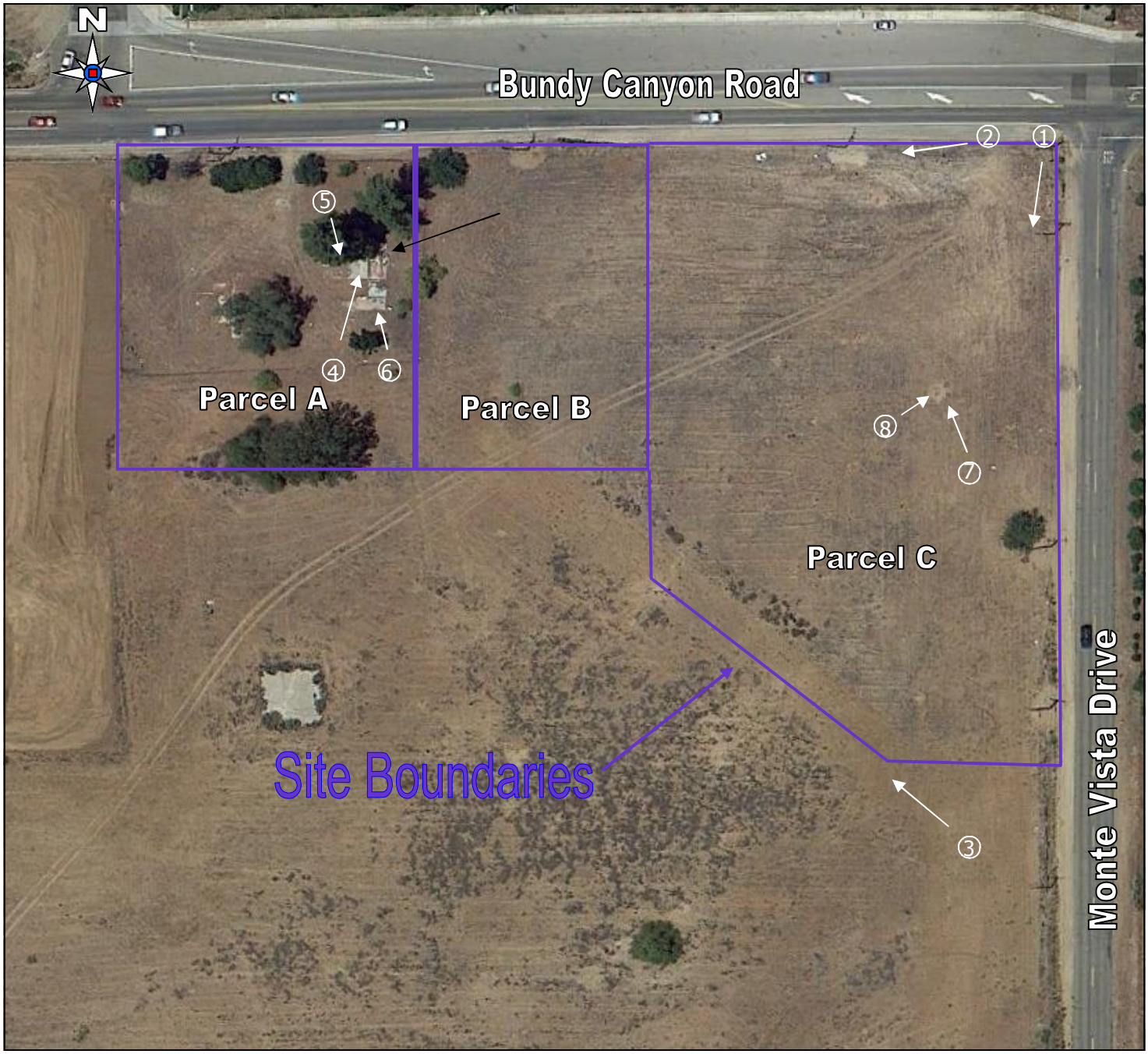
IWS Environmental 5211 Hartford Way Westminster, California 92683	Assessor Parcel Map Walmart #:3882-02 Wildomar, California Date: May 1, 2013	**Figure 3** IWS Project No. 041213-1

Appendix A

Site Photographs

Site Photograph Orientation Guide

Photographs of the site presented on the following pages can be referenced on this page



SITE PHOTOS

Appendix - A

Photograph 1: Viewing south at site from northeast corner of Parcel C. Proposed Walmart store will be located on parcel in background

Photograph 2: Viewing southwest at site from northeast corner of Parcel C.

SITE PHOTOS

Photograph 3: Viewing northwest at Parcel A, B, and C from southern boundary of Parcel C.

Photograph 4: Viewing north at Parcel A from south border of site. Concrete slabs are former foundations for house and barn on site

SITE PHOTOS

Photograph 5: Viewing concrete slab which was the former location of the house on Parcel A.

Photograph 6: Viewing septic tank sump entrance which is located next to the former house pad picture in photograph 5 above. There were no noticeable odors or indications that hazardous materials had been discarded in the sump.

SITE PHOTOS

Photograph 7: Viewing north on Parcel C at abandon irrigation well.

Photograph 8: Viewing top casing of irrigation well. The well casing has been filled in with concrete. No soil stains were observed around this well

SITE PHOTOS

Appendix B

Aerial Photograph of Site

Site
INQUIRY #: 3576272.10
YEAR: 2010
= 500'
N

Appendix C

Wal Mart #3882-02
Bundy Canyon Road/Monte Vista Drive
Wildomar, CA 92595

Inquiry Number: 3576272.7s
April 17, 2013

The EDR Radius Map™ Report with GeoCheck®

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Thank you for your business.
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with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

BUNDY CANYON ROAD/MONTE VISTA DRIVE
WILDOMAR, CA 92595

COORDINATES

Latitude (North):	33.6244000 - 33˚ 37' 27.84''
Longitude (West):	117.2681000 - 117˚ 16' 5.16''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	475132.5
UTM Y (Meters):	3720350.5
Elevation:	1401 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	33117-E3 WILDOMAR, CA
Most Recent Revision:	1988
North Map:	33117-F3 LAKE ELSINORE, CA
Most Recent Revision:	1988

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2010
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
WALMART STORES INC 22313 BUNDY CANYON DR WILDOMAR, CA 92595	HAZNET	N/A

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ..... National Priority List
Proposed NPL ..... Proposed National Priority List Sites
NPL LIENS ..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ..... National Priority List Deletions

Federal CERCLIS list

CERCLIS ..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ..... CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ..... RCRA - Large Quantity Generators
RCRA-SQG ..... RCRA - Small Quantity Generators
RCRA-CESQG ..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ..... Engineering Controls Sites List
US INST CONTROL ..... Sites with Institutional Controls
LUCIS ..... Land Use Control Information System

Federal ERNS list

ERNS ..... Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ..... State Response Sites

EXECUTIVE SUMMARY

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... Solid Waste Information System

State and tribal leaking storage tank lists

SLIC..... Statewide SLIC Cases
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST..... Active UST Facilities
AST..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST..... Underground Storage Tanks on Indian Land
FEMA UST..... Underground Storage Tank Listing

State and tribal voluntary cleanup sites

VCP..... Voluntary Cleanup Program Properties
INDIAN VCP..... Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI..... Open Dump Inventory
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
WMUDS/SWAT..... Waste Management Unit Database
SWRCY..... Recycler Database
HAULERS..... Registered Waste Tire Haulers Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL..... Clandestine Drug Labs
HIST Cal-Sites..... Historical Calsites Database
SCH..... School Property Evaluation Program
Toxic Pits..... Toxic Pits Cleanup Act Sites
CDL..... Clandestine Drug Labs
US HIST CDL..... National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST..... Facility Inventory Database
HIST UST..... Hazardous Substance Storage Container Database
SWEEPS UST..... SWEEPS UST Listing

Local Land Records

LIENS 2..... CERCLA Lien Information

LIENS	Environmental Liens Listing
DEED	Deed Restriction Listing

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
CHMIRS	California Hazardous Material Incident Report System
LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators
DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
CA BOND EXP. PLAN	Bond Expenditure Plan
UIC	UIC Listing
NPDES	NPDES Permits Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE	Hazardous Waste & Substance Site List
CUPA Listings	CUPA Resources List
Notify 65	Proposition 65 Records
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
ENF	Enforcement Action Listing
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
HWT	Registered Hazardous Waste Transporter Database
HWP	EnviroStor Permitted Facilities Listing
Financial Assurance	Financial Assurance Information Listing
2020 COR ACTION	2020 Corrective Action Program List
US AIRS	Aerometric Information Retrieval System Facility Subsystem
PRP	Potentially Responsible Parties
WDS	Waste Discharge System

EXECUTIVE SUMMARY

EPA WATCH LIST..... EPA WATCH LIST
US FIN ASSUR..... Financial Assurance Information
PCB TRANSFORMER..... PCB Transformer Registration Database
PROC..... Certified Processors Database
MWMP..... Medical Waste Management Program Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP..... EDR Proprietary Manufactured Gas Plants
EDR US Hist Cleaners..... EDR Exclusive Historic Dry Cleaners

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 03/13/2013 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
ELSINORE HIGH SCHOOL EXPANSION	***BUNDY CANYON ROAD/ORCHA***	***W 1/2 - 1 (0.934 mi.)***	***5***	***12***
Status: No Further Action				

EXECUTIVE SUMMARY

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 03/18/2013 has revealed that there are 2 LUST sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
ARCO #5644	33986 ORANGE ST	WNW 1/4 - 1/2 (0.471 mi.)	A3	8
BP WEST COAST PRODUCTS LLC 056	***33986 ORANGE ST***	***WNW 1/4 - 1/2 (0.471 mi.)***	***A4***	***9***
Status: Completed - Case Closed				

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there is 1 EDR US Hist Auto Stat site within approximately 0.25 miles of the target property.

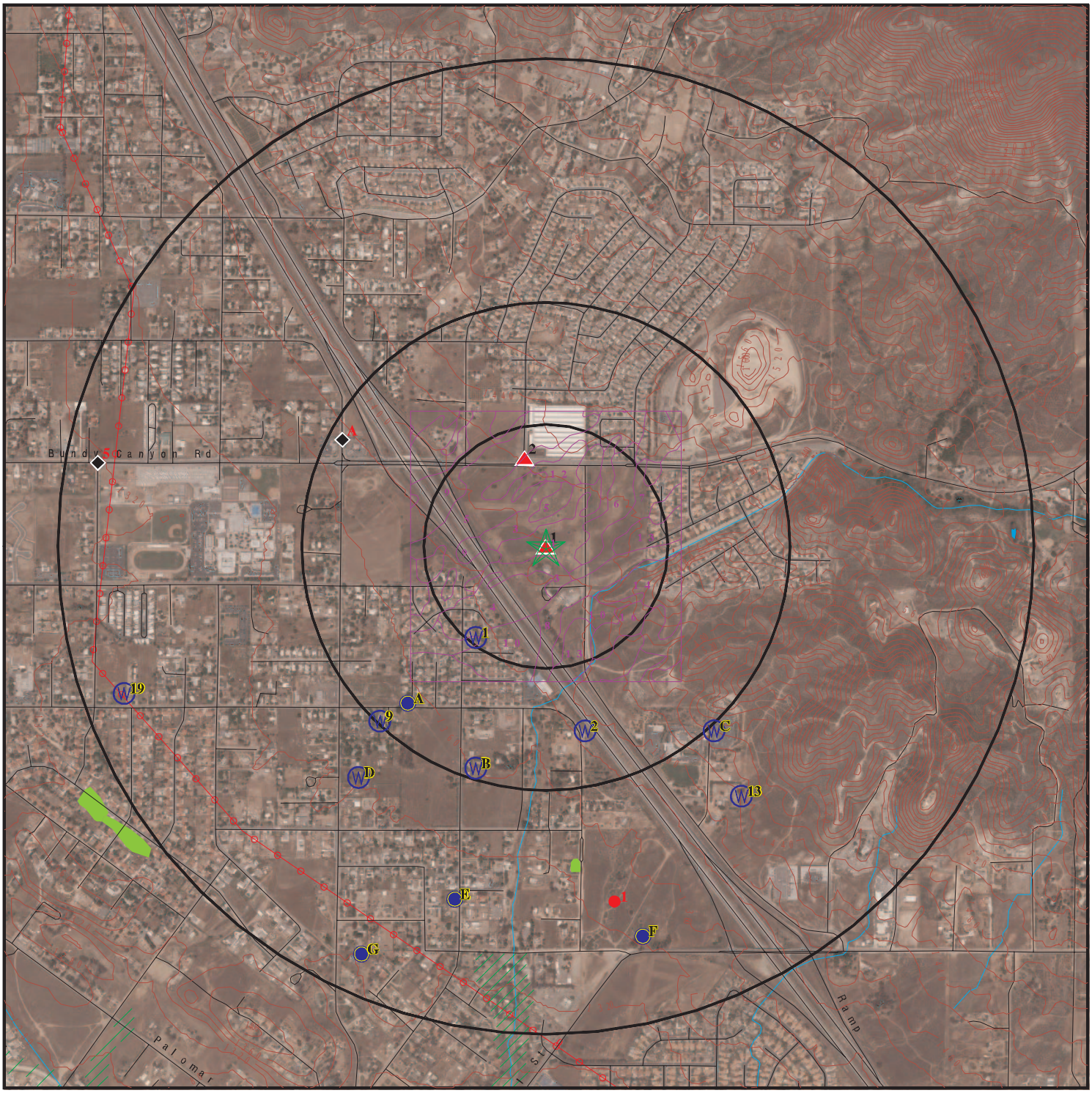
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
Not reported	35720 SELLERS RD	NNW 1/8 - 1/4 (0.186 mi.)	2	8

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 6 records.

Site Name	Database(s)
COACHELLA VALLEY AGGREGATE	US MINES
VULCAN MATERIALS CO.	US MINES
ALL AMERICAN AGGREGATES	US MINES
MINNESOTA MINING & MANUFACTURING C	US MINES
HANSON AGGREGATES WEST, INC.	US MINES
FOSTER SAND & GRAVEL CO.	US MINES

OVERVIEW MAP - 3576272.7s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/4 1/2 1 Miles

- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Wal Mart #3882-02	CLIENT: IWS Environmental
ADDRESS: Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT: Jim Bunck INQUIRY #: 3576272.7s
LAT/LONG: 33.6244 / 117.2681	DATE: April 17, 2013 2:40 pm

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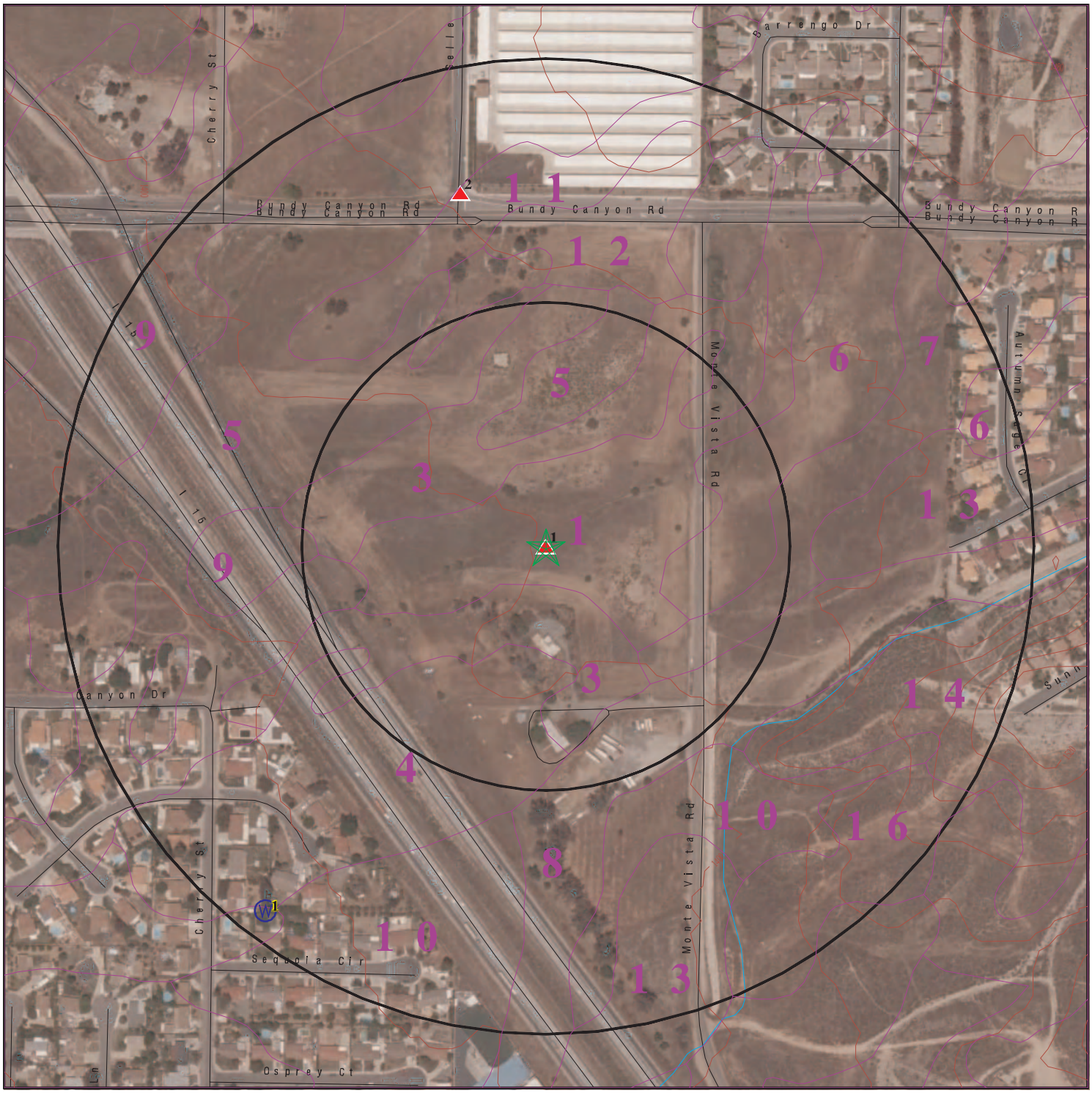
DETAIL MAP - 3576272.7s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Wal Mart #3882-02	CLIENT: IWS Environmental
ADDRESS: Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT: Jim Bunck INQUIRY #: 3576272.7s
LAT/LONG: 33.6244 / 117.2681	DATE: April 17, 2013 2:48 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	1	NR	1
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	2	NR	NR	2

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SLIC	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
SWEEPS UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
HAZNET	TP	1	NR	NR	NR	NR	NR	1
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	1	NR	NR	NR	1
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
Target
Property

WALMART STORES INC
22313 BUNDY CANYON DR
WILDOMAR, CA 92595

HAZNET **S112963163**
N/A

Actual:
1401 ft.

HAZNET:

Year:	2007
Gepaid:	CAC002619389
Contact:	TOM BYLAND
Telephone:	4799034789
Mailing Name:	Not reported
Mailing Address:	2201 SE 10TH ST
Mailing City,St,Zip:	BENTONVILLE, AR 721600000
Gen County:	Not reported
TSD EPA ID:	AZC950823111
TSD County:	Not reported
Waste Category:	Asbestos containing waste
Disposal Method:	Landfill Or Surface Impoundment That Will Be Closed As Landfill(To Include On-Site Treatment And/Or Stabilization)
Tons:	4.8
Facility County:	Riverside

2
NNW
1/8-1/4
0.186 mi.
984 ft.

35720 SELLERS RD
WILDOMAR, CA 92595

EDR US Hist Auto Stat **1015446827**
N/A

Relative:
Higher

Actual:
1422 ft.

EDR Historical Auto Stations:

Name:	SELLERS MOBILE AUTOMOTIVE
Year:	2010
Address:	35720 SELLERS RD

A3
WNW
1/4-1/2
0.471 mi.
2485 ft.

ARCO #5644
33986 ORANGE ST
WILDOMAR, CA 92530

Site 1 of 2 in cluster A

LUST **S104791941**
N/A

Relative:
Lower

Actual:
1374 ft.

LUST REG 8:

Region:	8
County:	Riverside
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083303766T
Local Case Num:	200016624
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	BUNDY CANYON
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	OM
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0606599151
How Stopped Date:	Not reported

ARCO #5644 (Continued) **S104791941**

Enter Date:	8/23/2000
Review Date:	8/16/2000
Prelim Assess:	Not reported
Discover Date:	8/16/2000
Enforcement Date:	Not reported
Close Date:	4/27/2004
Workplan:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Enter Date:	8/23/2000
GW Qualifies:	ND
Soil Qualifies:	ND
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.62387
Longitude:	-117.275134
MTBE Date:	8/26/2003
Max MTBE GW:	0
MTBE Concentration:	0
Max MTBE Soil:	0
MTBE Fuel:	1
MTBE Tested:	MTBE Detected. Site tested for MTBE & MTBE detected
MTBE Class:	*
Staff:	VJJ
Staff Initials:	SAN
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	ELSINORE (8-4)
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	No
Summary:	CONTAMINATION FOUND BY SOIL TESTING 08/16/00

A4 **BP WEST COAST PRODUCTS LLC 05644** **RCRA NonGen / NLR** **1004677836**
WNW **33986 ORANGE ST** **FINDS** **CAR000102061**
1/4-1/2 **WILDOMAR, CA 92595** **NPDES**
0.471 mi. **LUST**
2485 ft. **Site 2 of 2 in cluster A**

Relative:
Lower

Actual:
1374 ft.

RCRA NonGen / NLR:

Date form received by agency:	05/15/2008
Facility name:	BP WEST COAST PRODUCTS LLC 05644
Facility address:	33986 ORANGE ST WILDOMAR, CA 92595
EPA ID:	CAR000102061
Mailing address:	PO BOX 80249 RANCHO SANTA MARGARITA, CA 92688
Contact:	JACKIE DOUGHERTY
Contact address:	PO BOX 80249 RANCHO SANTA MARGARITA, CA 92688
Contact country:	US
Contact telephone:	949-460-5200
Contact email:	Not reported

BP WEST COAST PRODUCTS LLC 05644 (Continued) **1004677836**

EPA Region: 09
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: BP WEST COAST PRODUCTS LLC
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 05/06/2008
Owner/Op end date: Not reported

Owner/operator name: B P W COAST PRODUCTS LLC
Owner/operator address: P O BOX 6038
ARTESIA, CA 90702
Owner/operator country: Not reported
Owner/operator telephone: (714) 690-2425
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 07/10/2002
Facility name: BP WEST COAST PRODUCTS LLC 05644
Site name: ARCO FACILITY NO 05644
Classification: Small Quantity Generator

Violation Status: No violations found

FINDS:

Registry ID: 110012189880

Environmental Interest/Information System
California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART)

BP WEST COAST PRODUCTS LLC 05644 (Continued) **1004677836**

provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

NPDES:

Npdes Number:	CAS000002
Facility Status:	Terminated
Agency Id:	0
Region:	9
Regulatory Measure Id:	337587
Order No:	2009-0009-DWQ
Regulatory Measure Type:	Enrollee
Place Id:	Not reported
WDID:	9 33C349956
Program Type:	Construction
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	12/05/2007
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	09/02/2010
Discharge Name:	Mike Sater
Discharge Address:	1235 Foxford Rd
Discharge City:	La Verne
Discharge State:	California
Discharge Zip:	91750

LUST:

Region:	STATE
Global Id:	T0606599151
Latitude:	33.627307
Longitude:	-117.2748
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	04/27/2004
Lead Agency:	RIVERSIDE COUNTY LOP
Case Worker:	UNK
Local Agency:	RIVERSIDE COUNTY LOP
RB Case Number:	083303766T
LOC Case Number:	200016624
File Location:	Not reported
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

LUST:

Global Id:	T0606599151
Contact Type:	Regional Board Caseworker
Contact Name:	VALERIE JAHN-BULL

BP WEST COAST PRODUCTS LLC 05644 (Continued) **1004677836**

Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	vjahn-bull@waterboards.ca.gov
Phone Number:	9517824903

LUST:

Global Id:	T0606599151
Action Type:	Other
Date:	01/01/1950
Action:	Leak Discovery
Global Id:	T0606599151
Action Type:	Other
Date:	01/01/1950
Action:	Leak Reported

RIVERSIDE CO. LUST:

Region:	RIVERSIDE
Facility ID:	200016624
Employee:	Winters
Site Closed:	Yes
Case Type:	Undefined
Facility Status:	closed/action completed

---

5 West 1/2-1 0.934 mi. 4929 ft. | **ELSINORE HIGH SCHOOL EXPANSION** | **SCH** | **S107736291**
BUNDY CANYON ROAD/ORCHARD STREET | **ENVIROSTOR** | **N/A**
WILDOMAR, CA 92595

Relative: Lower

Actual: 1319 ft.

SCH:

Facility ID:	33010015
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	16.2
National Priorities List:	NO
Cleanup Oversight Agencies:	DTSC
Lead Agency:	DTSC
Lead Agency Description:	* DTSC
Project Manager:	Not reported
Supervisor:	* Rebecca Chou
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404116
Assembly:	67
Senate:	28
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	06/04/2001
Restricted Use:	NO
Funding:	School District
Latitude:	33.62655
Longitude:	-117.2826
APN:	NONE SPECIFIED

ELSINORE HIGH SCHOOL EXPANSION (Continued) **S107736291**

Past Use:	AGRICULTURAL - ROW CROPS
Potential COC:	30001, 30007
Confirmed COC:	30001,30007
Potential Description:	SOIL
Alias Name:	ELSINORE HIGH SCH. EXPANSION (PROPOSED)
Alias Type:	Alternate Name
Alias Name:	ELSINORE HIGH SCHOOL EXPANSION
Alias Type:	Alternate Name
Alias Name:	ELSINORE HIGH SCHOOL EXPANSION (PROP)
Alias Type:	Alternate Name
Alias Name:	LAKE ELSINORE UNIFIED SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	LAKE ELSINORE USD-ELSINORE HS EXP/VCA
Alias Type:	Alternate Name
Alias Name:	404116
Alias Type:	Project Code (Site Code)
Alias Name:	33010015
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	10/10/2000
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	11/15/2000
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	03/22/2001
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	06/04/2001
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	08/15/2000
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	* Workplan
Completed Date:	11/15/2000
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported

ELSINORE HIGH SCHOOL EXPANSION (Continued) **S107736291**

Completed Document Type: Environmental Oversight Agreement
Completed Date: 12/22/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 07/26/2000
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

ENVIROSTOR:
Site Type: School Investigation
Site Type Detailed: School
Acres: 16.2
NPL: NO
Regulatory Agencies: DTSC
Lead Agency: DTSC
Program Manager: Not reported
Supervisor: * Rebecca Chou
Division Branch: Southern California Schools & Brownfields Outreach
Facility ID: 33010015
Site Code: 404116
Assembly: 67
Senate: 28
Special Program: Not reported
Status: No Further Action
Status Date: 06/04/2001
Restricted Use: NO
Site Mgmt. Req.: NONE SPECIFIED
Funding: School District
Latitude: 33.62655
Longitude: -117.2826
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS
Potential COC: 30001, 30007
Confirmed COC: 30001,30007
Potential Description: SOIL
Alias Name: ELSINORE HIGH SCH. EXPANSION (PROPOSED)
Alias Type: Alternate Name
Alias Name: ELSINORE HIGH SCHOOL EXPANSION
Alias Type: Alternate Name
Alias Name: ELSINORE HIGH SCHOOL EXPANSION (PROP)
Alias Type: Alternate Name
Alias Name: LAKE ELSINORE UNIFIED SCHOOL DISTRICT
Alias Type: Alternate Name
Alias Name: LAKE ELSINORE USD-ELSINORE HS EXP/VCA
Alias Type: Alternate Name

ELSINORE HIGH SCHOOL EXPANSION (Continued) **S107736291**

Alias Name: 404116
Alias Type: Project Code (Site Code)
Alias Name: 33010015
Alias Type: Envirostor ID Number

Completed Info:

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 10/10/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 11/15/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 03/22/2001
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 06/04/2001
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 08/15/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 11/15/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 12/22/2000
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 07/26/2000
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported

ELSINORE HIGH SCHOOL EXPANSION (Continued) **S107736291**

Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

Count: 6 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
RIVERSIDE COUNTY	M300003147	COACHELLA VALLEY AGGREGATE	COACHELLA VALLEY AGGREGATE		US MINES
RIVERSIDE COUNTY	M300006399	VULCAN MATERIALS CO.	CORONA ROCK (#171)		US MINES
RIVERSIDE COUNTY	M300003136	ALL AMERICAN AGGREGATES	CORONA PLANT		US MINES
RIVERSIDE COUNTY	M300006397	MINNESOTA MINING & MANUFACTURING C	CORONA PLANT		US MINES
RIVERSIDE COUNTY	M300006400	HANSON AGGREGATES WEST, INC.	EAGLE VALLEY QUARRY		US MINES
RIVERSIDE COUNTY	M300003129	FOSTER SAND & GRAVEL CO.	MAITRI CANYON PLANT		US MINES

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 04/10/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 04/10/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 02/01/2013	Source: EPA
Date Data Arrived at EDR: 03/01/2013	Telephone: N/A
Date Made Active in Reports: 03/13/2013	Last EDR Contact: 04/10/2013
Number of Days to Update: 12	Next Scheduled EDR Contact: 07/22/2013
	Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/04/2013	Source: EPA
Date Data Arrived at EDR: 03/01/2013	Telephone: 703-412-9810
Date Made Active in Reports: 03/13/2013	Last EDR Contact: 04/05/2013
Number of Days to Update: 12	Next Scheduled EDR Contact: 06/10/2013
	Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 07/31/2012	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/09/2012	Telephone: 703-603-8704
Date Made Active in Reports: 12/20/2012	Last EDR Contact: 04/10/2013
Number of Days to Update: 72	Next Scheduled EDR Contact: 07/22/2013
	Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 02/05/2013	Source: EPA
Date Data Arrived at EDR: 03/01/2013	Telephone: 703-412-9810
Date Made Active in Reports: 03/13/2013	Last EDR Contact: 04/05/2013
Number of Days to Update: 12	Next Scheduled EDR Contact: 03/11/2013
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/21/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 6

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 04/03/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/03/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/03/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/03/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/03/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/19/2012
Date Data Arrived at EDR: 12/26/2012
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/19/2012
Date Data Arrived at EDR: 12/26/2012
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 29

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 30

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/30/2012
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/01/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 162

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 03/21/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 03/21/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Semi-Annually

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 01/30/2013
Date Data Arrived at EDR: 01/31/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 55

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 916-327-5092
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/21/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 45

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 03/21/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 08/02/2012
Date Data Arrived at EDR: 08/03/2012
Date Made Active in Reports: 11/05/2012
Number of Days to Update: 94

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/07/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 156

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/14/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 10/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 14

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/05/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/10/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 9

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/26/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 02/05/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 11/14/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 66

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 06/30/2012
Date Data Arrived at EDR: 09/12/2012
Date Made Active in Reports: 10/03/2012
Number of Days to Update: 21

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/16/2012
Date Data Arrived at EDR: 03/26/2012
Date Made Active in Reports: 06/14/2012
Number of Days to Update: 80

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/10/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 03/15/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 12

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/11/2013
Date Data Arrived at EDR: 03/12/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 55

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/06/2012
Date Data Arrived at EDR: 01/29/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 49

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 01/29/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

Other Ascertainable Records

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/03/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/05/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 57

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 03/13/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/13/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/18/2011
Date Data Arrived at EDR: 09/08/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 21

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/06/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 09/01/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 131

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/28/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2010
Date Data Arrived at EDR: 11/10/2010
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 98

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/16/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 06/21/2011
Date Data Arrived at EDR: 07/15/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 60

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/08/2013
Date Data Arrived at EDR: 01/09/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 93

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/11/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/23/2011
Date Data Arrived at EDR: 12/13/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 79

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/08/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/10/2012
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

UIC: UIC Listing

A listing of underground control injection wells.

Date of Government Version: 03/05/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 12/31/2012
Data Release Frequency: Varies

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 01/02/2013
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/25/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/11/2012
Date Data Arrived at EDR: 12/12/2012
Date Made Active in Reports: 01/04/2013
Number of Days to Update: 23

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 12/24/2012
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 01/08/2013
Date Data Arrived at EDR: 01/29/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 49

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/08/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/06/2012
Number of Days to Update: 14

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/14/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 19

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/29/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 11/20/2012
Date Data Arrived at EDR: 11/30/2012
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 89

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 02/19/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 03/06/2013
Date Data Arrived at EDR: 03/12/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 13

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 01/15/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/15/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/15/2013
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 38

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/16/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 02/25/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 27

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/19/2013
Date Data Arrived at EDR: 02/20/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 28

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

2020 COR ACTION: 2020 Corrective Action Program List
The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: N/A

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 12/02/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 04/04/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 11/15/2012
Date Data Arrived at EDR: 11/16/2012
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 91

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 11/15/2012
Date Data Arrived at EDR: 11/16/2012
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 91

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/13/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/16/2013
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 36

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/16/2013
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 01/31/2013
Number of Days to Update: 14

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List
Cupa Facility List

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 04/04/2013
Number of Days to Update: 21

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 10/16/2012
Date Data Arrived at EDR: 10/17/2012
Date Made Active in Reports: 11/13/2012
Number of Days to Update: 27

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 12/21/2012
Date Data Arrived at EDR: 01/04/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 49

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 01/04/2013
Date Data Arrived at EDR: 01/14/2013
Date Made Active in Reports: 03/01/2013
Number of Days to Update: 46

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/27/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 48

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 02/04/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/09/2013
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/25/2013
Number of Days to Update: 46

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 01/08/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/27/2013
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 25

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 02/04/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 03/01/2013
Number of Days to Update: 21

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/15/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 05/01/2012
Date Data Arrived at EDR: 05/02/2012
Date Made Active in Reports: 06/11/2012
Number of Days to Update: 40

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/26/2012
Date Data Arrived at EDR: 06/27/2012
Date Made Active in Reports: 08/17/2012
Number of Days to Update: 51

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county?s Certified Unified Program Agency database. California?s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/13/2013
Date Made Active in Reports: 03/21/2013
Number of Days to Update: 36

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/25/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 33

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/22/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 10/31/2012
Date Data Arrived at EDR: 12/28/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 28

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/21/2013
Date Data Arrived at EDR: 01/22/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 56

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/22/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/30/2013
Date Data Arrived at EDR: 02/21/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 32

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/25/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 61

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/29/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/14/2013
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 01/31/2013
Number of Days to Update: 16

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county?s Certified Unified Program Agency database. California?s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 02/08/2013
Number of Days to Update: 50

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 11/26/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/21/2013
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 02/25/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 27

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List

CUPA Facility List

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/08/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 17

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing

CUPA Program listing from the Environmental Health Division.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 12

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/08/2013
Date Data Arrived at EDR: 03/08/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 17

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 03/08/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 22

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/13/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/19/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 29

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 37

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/12/2013
Date Data Arrived at EDR: 03/13/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 14

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/05/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 43

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/25/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/05/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 50

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/25/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/29/2012
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 43

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/02/2012
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 38

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/05/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 20

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 08/17/2012
Date Data Arrived at EDR: 08/20/2012
Date Made Active in Reports: 10/03/2012
Number of Days to Update: 44

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2012
Date Data Arrived at EDR: 11/06/2012
Date Made Active in Reports: 11/30/2012
Number of Days to Update: 24

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 02/05/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 50

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/25/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 02/26/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 27

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 01/02/2013
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/05/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 20

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/06/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 19

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Annually

Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 34

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List

CUPA facility listing.

Date of Government Version: 02/26/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 22

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List

Cupa Facility List.

Date of Government Version: 03/15/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 12

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 12/12/2012
Date Data Arrived at EDR: 12/17/2012
Date Made Active in Reports: 01/22/2013
Number of Days to Update: 36

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 12/12/2012
Date Data Arrived at EDR: 12/17/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 39

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 01/10/2013
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 42

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/02/2013
Date Data Arrived at EDR: 01/02/2013
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 23

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/14/2013
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 42

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 03/30/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/06/2012
Number of Days to Update: 42

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/21/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 01/28/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 47

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/29/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 12/04/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 36

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 12/19/2012
Date Data Arrived at EDR: 12/28/2012
Date Made Active in Reports: 01/30/2013
Number of Days to Update: 33

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/25/2013
Next Scheduled EDR Contact: 07/08/2013
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 03/05/2013
Date Data Arrived at EDR: 03/06/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 19

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/21/2013
Number of Days to Update: 31

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/15/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 02/07/2013
Date Made Active in Reports: 03/15/2013
Number of Days to Update: 36

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/07/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/23/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 57

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/31/2012
Number of Days to Update: 39

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 09/27/2012
Number of Days to Update: 70

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

WAL MART #3882-02
BUNDY CANYON ROAD/MONTE VISTA DRIVE
WILDOMAR, CA 92595

TARGET PROPERTY COORDINATES

Latitude (North):	33.6244 - 33˚ 37' 27.84''
Longitude (West):	117.2681 - 117˚ 16' 5.16''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	475132.5
UTM Y (Meters):	3720350.5
Elevation:	1401 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	33117-E3 WILDOMAR, CA
Most Recent Revision:	1988
North Map:	33117-F3 LAKE ELSINORE, CA
Most Recent Revision:	1988

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

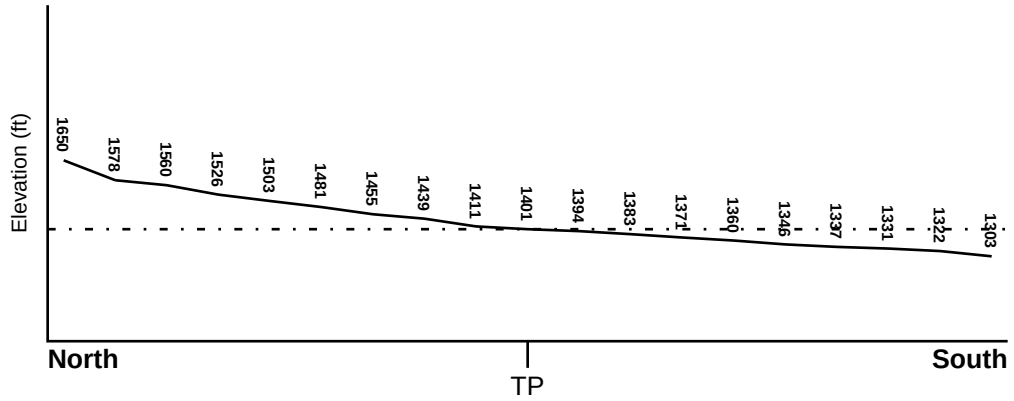
TOPOGRAPHIC INFORMATION

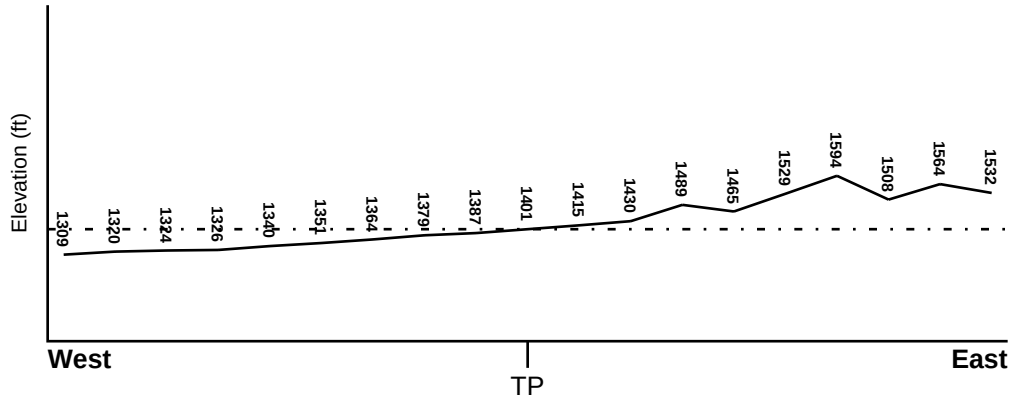
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 1401 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
RIVERSIDE, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06065C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
WILDOMAR	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

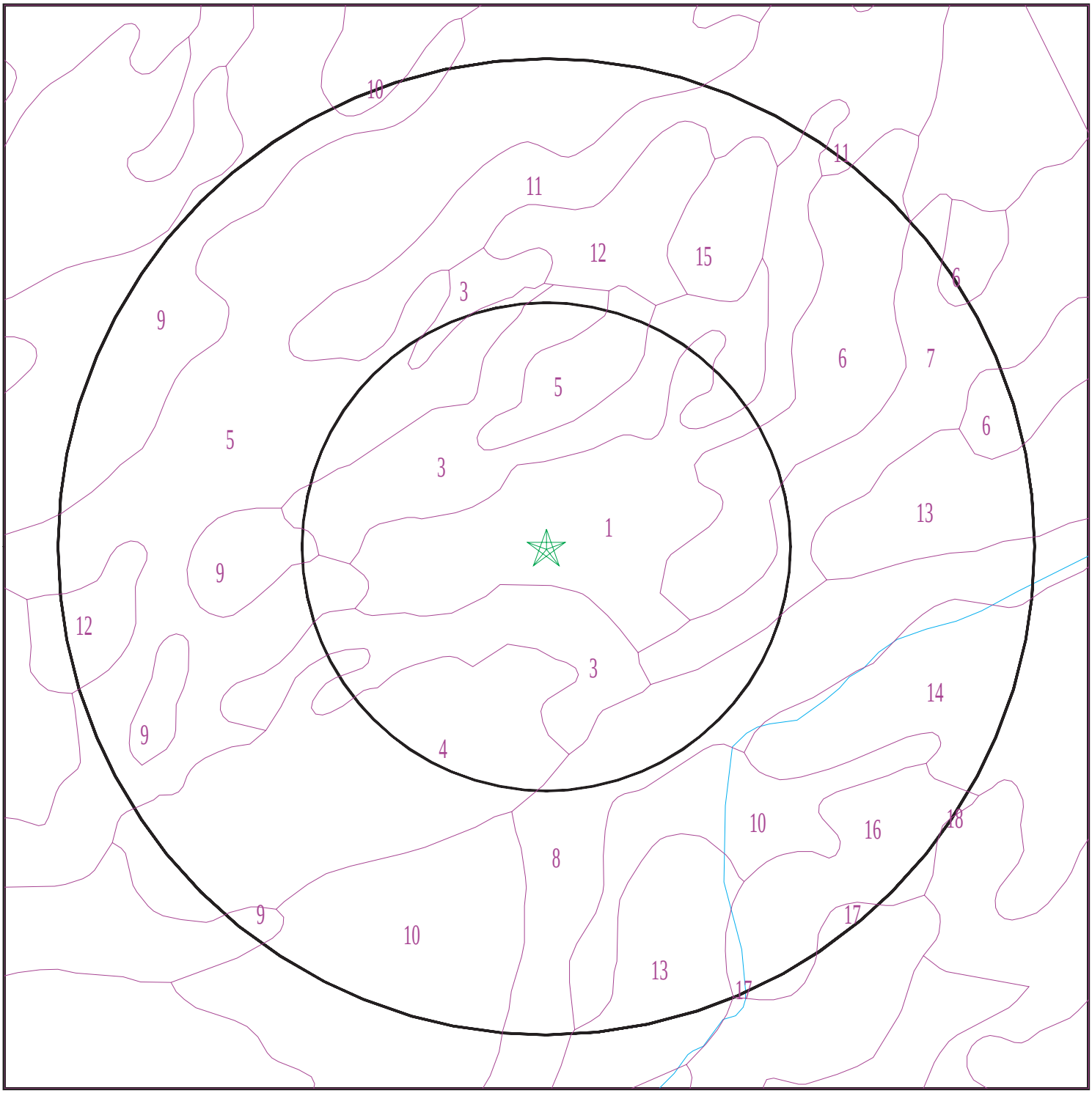
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 3576272.7s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME: Wal Mart #3882-02 ADDRESS: Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595 LAT/LONG: 33.6244 / 117.2681	CLIENT: IWS Environmental CONTACT: Jim Bunck INQUIRY #: 3576272.7s DATE: April 17, 2013 2:49 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: GREENFIELD

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 7.8 Min: 6.1
2	25 inches	42 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 7.8 Min: 6.1
3	42 inches	59 inches	loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 7.8 Min: 6.1

Soil Map ID: 2

Soil Component Name: CAJALCO

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	12 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:
2	12 inches	20 inches	loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:
3	20 inches	61 inches	weathered bedrock	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:

Soil Map ID: 3

Soil Component Name: MONSERATE

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
2	9 inches	18 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
3	18 inches	44 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
4	44 inches	57 inches	cemented	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
5	57 inches	70 inches	loamy coarse sand	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6

Soil Map ID: 4

Soil Component Name: RAMONA

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
2	7 inches	16 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
3	16 inches	68 inches	sandy clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
4	68 inches	74 inches	gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6

Soil Map ID: 5

Soil Component Name: GREENFIELD

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6
2	25 inches	42 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6
3	42 inches	59 inches	loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6
4	59 inches	72 inches	stratified loamy sand to sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6

Soil Map ID: 6

Soil Component Name: YOKOHL

Soil Surface Texture: loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
2	5 inches	20 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
3	20 inches	24 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
4	24 inches	59 inches	stratified sandy loam to gravelly loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6

Soil Map ID: 7

Soil Component Name: HONCUT

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	22 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.1
2	22 inches	59 inches	coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.1

Soil Map ID: 8

Soil Component Name: RIVERWASH

Soil Surface Texture: gravelly coarse sand

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Excessively drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	gravelly coarse sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILIS, Gravels, Clean Gravels, Well-graded gravel.	Max: 141 Min: 42	Max: Min:
2	5 inches	59 inches	stratified extremely gravelly coarse sand to gravelly sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILIS, Gravels, Clean Gravels, Well-graded gravel.	Max: 141 Min: 42	Max: Min:

Soil Map ID: 9

Soil Component Name: RAMONA

Soil Surface Texture: very fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	very fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
2	14 inches	22 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
3	22 inches	68 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
4	68 inches	74 inches	gravelly sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6

Soil Map ID: 10

Soil Component Name: HANFORD

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
2	7 inches	40 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
3	40 inches	59 inches	stratified loamy sand to coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6

Soil Map ID: 11

Soil Component Name: PLACENTIA

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.9
2	18 inches	38 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.9
3	38 inches	57 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.9
4	57 inches	59 inches	gravelly sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.9

Soil Map ID: 12

Soil Component Name: RAMONA

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
2	14 inches	22 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
3	22 inches	68 inches	sandy clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6
4	68 inches	74 inches	gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 6.6

Soil Map ID: 13

Soil Component Name: TUJUNGA

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141 Min: 42	Max: 7.8 Min: 6.1
2	9 inches	59 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141 Min: 42	Max: 7.8 Min: 6.1

Soil Map ID: 14

Soil Component Name: Cieneba

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:
2	14 inches	22 inches	weathered bedrock	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:

Soil Map ID: 15

Soil Component Name: CIENEBA

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	14 inches	22 inches	weathered bedrock	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:

Soil Map ID: 16

Soil Component Name: CIENEBA

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:
2	14 inches	22 inches	weathered bedrock	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	Not reported	Max: 0.42 Min: 0	Max: Min:

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 17

Soil Component Name: MONSERATE

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
2	9 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
3	27 inches	44 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
4	44 inches	57 inches	cemented	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6
5	57 inches	70 inches	loamy coarse sand	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6

Soil Map ID: 18

Soil Component Name: HANFORD

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
2	7 inches	40 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
3	40 inches	59 inches	stratified loamy sand to coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS40000136126	1/8 - 1/4 Mile SW
2	USGS40000136098	1/4 - 1/2 Mile SSE
A3	USGS40000136110	1/4 - 1/2 Mile SW
A5	USGS40000136103	1/4 - 1/2 Mile SW
B6	USGS40000136092	1/4 - 1/2 Mile SSW
C7	USGS40000136102	1/4 - 1/2 Mile SE
B8	USGS40000136084	1/4 - 1/2 Mile SSW
C10	USGS40000136096	1/2 - 1 Mile SE
D11	USGS40000136076	1/2 - 1 Mile SW
D12	USGS40000136088	1/2 - 1 Mile SW
13	USGS40000136066	1/2 - 1 Mile SE
E14	USGS40000136033	1/2 - 1 Mile SSW
F17	USGS40000136022	1/2 - 1 Mile SSE
G18	USGS40000136012	1/2 - 1 Mile SSW
19	USGS40000136111	1/2 - 1 Mile WSW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

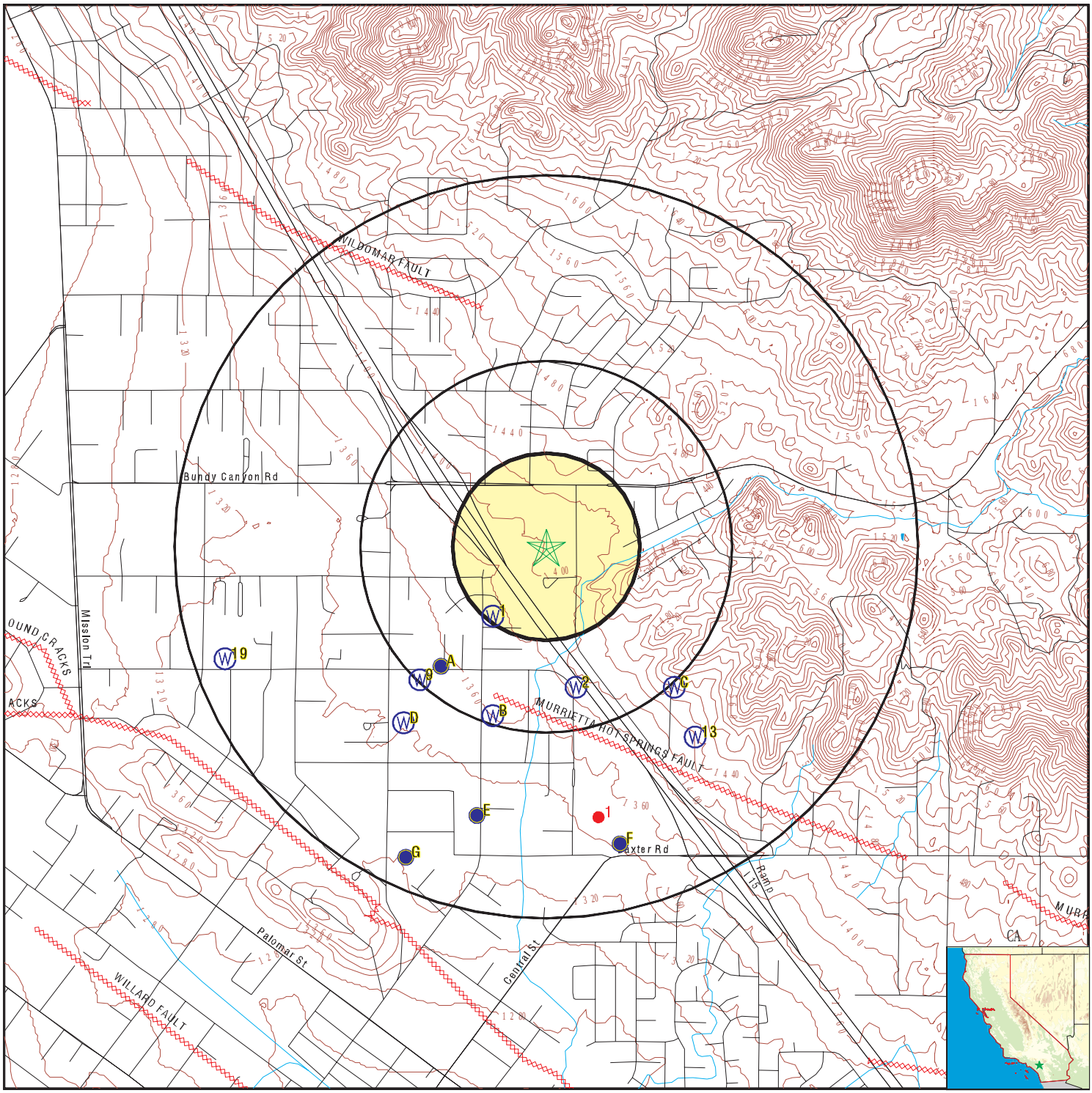
MAP ID	WELL ID	LOCATION FROM TP
A4	CADW50000002378	1/4 - 1/2 Mile SW
9	CADW50000002373	1/4 - 1/2 Mile SW
E15	CADW50000002355	1/2 - 1 Mile SSW
F16	CADW50000002348	1/2 - 1 Mile SSE
G20	CADW50000002347	1/2 - 1 Mile SSW

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CAOG9A000003072	1/2 - 1 Mile South

PHYSICAL SETTING SOURCE MAP - 3576272.7s



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	Wal Mart #3882-02	CLIENT:	IWS Environmental
ADDRESS:	Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT:	Jim Bunck
		INQUIRY #:	3576272.7s
LAT/LONG:	33.6244 / 117.2681	DATE:	April 17, 2013 2:49 pm

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Map ID Direction Distance Elevation	Database	EDR ID Number
1 **SW** **1/8 - 1/4 Mile** **Lower**	**FED USGS**	**USGS40000136126**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333718117161101		
Monloc name:	006S004W26E001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6216898
Longitude:	-117.2705926	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1362.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19470101	Welldepth:	332
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

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2 **SSE** **1/4 - 1/2 Mile** **Lower**	**FED USGS**	**USGS40000136098**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333708117155701		
Monloc name:	006S004W26L001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6189121
Longitude:	-117.2667035	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1391.00
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19470101	Welldepth:	100
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	61.00	

A3
SW
1/4 - 1/2 Mile
Lower

FED USGS **USGS40000136110**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333712117161801		
Monloc name:	006S004W26E002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6200232
Longitude:	-117.272537	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1350.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	44.00	

A4
SW
1/4 - 1/2 Mile
Lower

CA WELLS **CADW50000002378**

Latitude :	33.62		
Longitude :	117.2734		
Site code:	336200N1172734W001	Casgem sta:	06S04W26E002S
Local well:	Not Reported	Casgem s 1:	Unknown
County id:	33		
Basin cd:	9-5	Basin desc:	Temecula Valley
Org unit n:	Southern Region Office	Site id:	CADW50000002378

Map ID Direction Distance Elevation	Database	EDR ID Number
A5 **SW** **1/4 - 1/2 Mile** **Lower**	**FED USGS**	**USGS40000136103**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333709117162001		
Monloc name:	006S004W26M001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6191899
Longitude:	-117.2730926	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1350.00
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	102
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	44.00	

B6 **SSW** **1/4 - 1/2 Mile** **Lower**	**FED USGS**	**USGS40000136092**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333705117161301		
Monloc name:	006S004W26M002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6180788
Longitude:	-117.2711481	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1350.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	91
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

C7
SE **FED USGS** **USGS40000136102**
1/4 - 1/2 Mile
Higher

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333709117154201		
Monloc name:	006S004W26K001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6191899
Longitude:	-117.2625367	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1400.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Other aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	87
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	65.00	

B8
SSW **FED USGS** **USGS40000136084**
1/4 - 1/2 Mile
Lower

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333703117160901		
Monloc name:	006S004W26L002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6175233
Longitude:	-117.270037	Sourcemap scale:	Not Reported

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1353.00
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	130
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	45.00	

9
SW
1/4 - 1/2 Mile
Lower

CA WELLS **CADW50000002373**

Latitude :	33.6192		
Longitude :	117.274		
Site code:	336192N1172740W001	Casgem sta:	06S04W26M001S
Local well:	Not Reported	Casgem s 1:	Unknown
County id:	33		
Basin cd:	9-5	Basin desc:	Temecula Valley
Org unit n:	Southern Region Office	Site id:	CADW50000002373

C10
SE
1/2 - 1 Mile
Higher

FED USGS **USGS40000136096**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333707117153901		
Monloc name:	006S004W26K002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6186344
Longitude:	-117.2617034	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1435.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Other aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19520101	Welldepth:	76
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

D11
SW
1/2 - 1 Mile
Lower

FED USGS **USGS40000136076**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333702117162401		
Monloc name:	006S004W26M003S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6172455
Longitude:	-117.2742038	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1335.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19510101	Welldepth:	171
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

D12
SW
1/2 - 1 Mile
Lower

FED USGS **USGS40000136088**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333704117162801		
Monloc name:	006S004W27J002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.617801
Longitude:	-117.2753149	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1290.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19490101	Welldepth:	250
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

13
SE
1/2 - 1 Mile
Higher

FED USGS **USGS40000136066**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333701117153701		
Monloc name:	006S004W26J001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6169678
Longitude:	-117.2611478	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1410.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Other aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

E14
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000136033**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333650117161201		
Monloc name:	006S004W26N001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6139123
Longitude:	-117.2708703	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1330.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	128
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	54.00	

E15
SSW
1/2 - 1 Mile
Lower

CA WELLS **CADW50000002355**

Latitude :	33.6139		
Longitude :	117.2718		
Site code:	336139N1172718W001	Casgem sta:	06S04W26N001S
Local well:	Not Reported	Casgem s 1:	Unknown
County id:	33		
Basin cd:	9-5	Basin desc:	Temecula Valley
Org unit n:	Southern Region Office	Site id:	CADW50000002355

F16
SSE
1/2 - 1 Mile
Lower

CA WELLS **CADW50000002348**

Latitude :	33.6128		
Longitude :	117.2651		
Site code:	336128N1172651W001	Casgem sta:	06S04W26Q001S
Local well:	Not Reported	Casgem s 1:	Unknown
County id:	33		
Basin cd:	9-5	Basin desc:	Temecula Valley
Org unit n:	Southern Region Office	Site id:	CADW50000002348

F17
SSE
1/2 - 1 Mile
Lower

FED USGS **USGS40000136022**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333646117154801		
Monloc name:	006S004W26Q001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6128012
Longitude:	-117.2642034	Sourcemap scale:	Not Reported

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1331.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19380101	Welldepth:	71
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	5.00	

G18
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000136012**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333644117162401		
Monloc name:	006S004W35D001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070302	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6122456
Longitude:	-117.2742037	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1305.00
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19520101	Welldepth:	198
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	123.00	

19
WSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000136111**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-333712117165601		
Monloc name:	006S004W27G001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.6200231
Longitude:	-117.283093	Sourcemap scale:	Not Reported
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1328.00
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	200
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

G20
SSW **CA WELLS** **CADW50000002347**
1/2 - 1 Mile
Lower

Latitude :	33.6123		
Longitude :	117.2751		
Site code:	336123N1172751W001	Casgem sta:	06S04W35D001S
Local well:	Not Reported	Casgem s 1:	Unknown
County id:	33		
Basin cd:	9-5	Basin desc:	Temecula Valley
Org unit n:	Southern Region Office	Site id:	CADW50000002347

Map ID Direction Distance	Database	EDR ID Number
1 **South** **1/2 - 1 Mile**	**OIL_GAS**	**CAOG9A000003072**

Districtnu:	1	Apinumber:	06500088
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Eddie Fisher		
Countyname:	Riverside	Fieldname:	Any Field
Areaname:	Any Area		
Section:	34		
Township:	06S	Range:	04W
Basemeridi:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	33.613834		
Glong:	-117.265662		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Stuart	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	12/30/1899
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000003072

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92595	5	0

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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Appendix D

Wal Mart #3882-02
Bundy Canyon Road/Monte Vista Drive
Wildomar, CA 92595

Inquiry Number: 3576272.13s
April 15, 2013

EDR NEPACheck®

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EDR NEPACheck® DESCRIPTION

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies include in their decision-making processes appropriate and careful consideration of all environmental effects and actions, analyze potential environmental effects of proposed actions and their alternatives for public understanding and scrutiny, avoid or minimize adverse effects of proposed actions, and restore and enhance environmental quality as much as possible.

The EDR NEPACheck provides information which may be used, in conjunction with additional research, to determine whether a proposed site or action will have significant environmental effect.

The report provides maps and data for the following items (where available). Search results are provided in the Map Findings Summary on page 2 of this report.

Section	Regulation
Natural Areas Map	
• Federal Lands Data:	
- Officially designated wilderness areas	47 CFR 1.1307(1)
- Officially designated wildlife preserves, sanctuaries and refuges	47 CFR 1.1307(2)
- Wild and scenic rivers	40 CFR 6.302(e)
- Fish and Wildlife	40 CFR 6.302
• Threatened or Endangered Species, Fish and Wildlife, Critical Habitat Data (where available)	47 CFR 1.1307(3); 40 CFR 6.302
Historic Sites Map	
• National Register of Historic Places	47 CFR 1.1307(4); 40 CFR 6.302
• State Historic Places (where available)	
• Indian Reservations	
Flood Plain Map	
• National Flood Plain Data (where available)	47 CFR 1.1307(6); 40 CFR 6.302
Wetlands Map	
• National Wetlands Inventory Data (where available)	47 CFR 1.1307(7); 40 CFR 6.302
FCC & FAA Map	
• FCC antenna/tower sites, FAA Markings and Obstructions, Airports, Topographic gradient	47 CFR 1.1307(8)
Key Contacts and Government Records Searched	

MAP FINDINGS SUMMARY

The databases searched in this report are listed below. Database descriptions and other agency contact information is contained in the Key Contacts and Government Records Searched section on page 22 of this report.

TARGET PROPERTY ADDRESS

WAL MART #3882-02
BUNDY CANYON ROAD/MONTE VISTA DRIVE
WILDOMAR, CA 92595

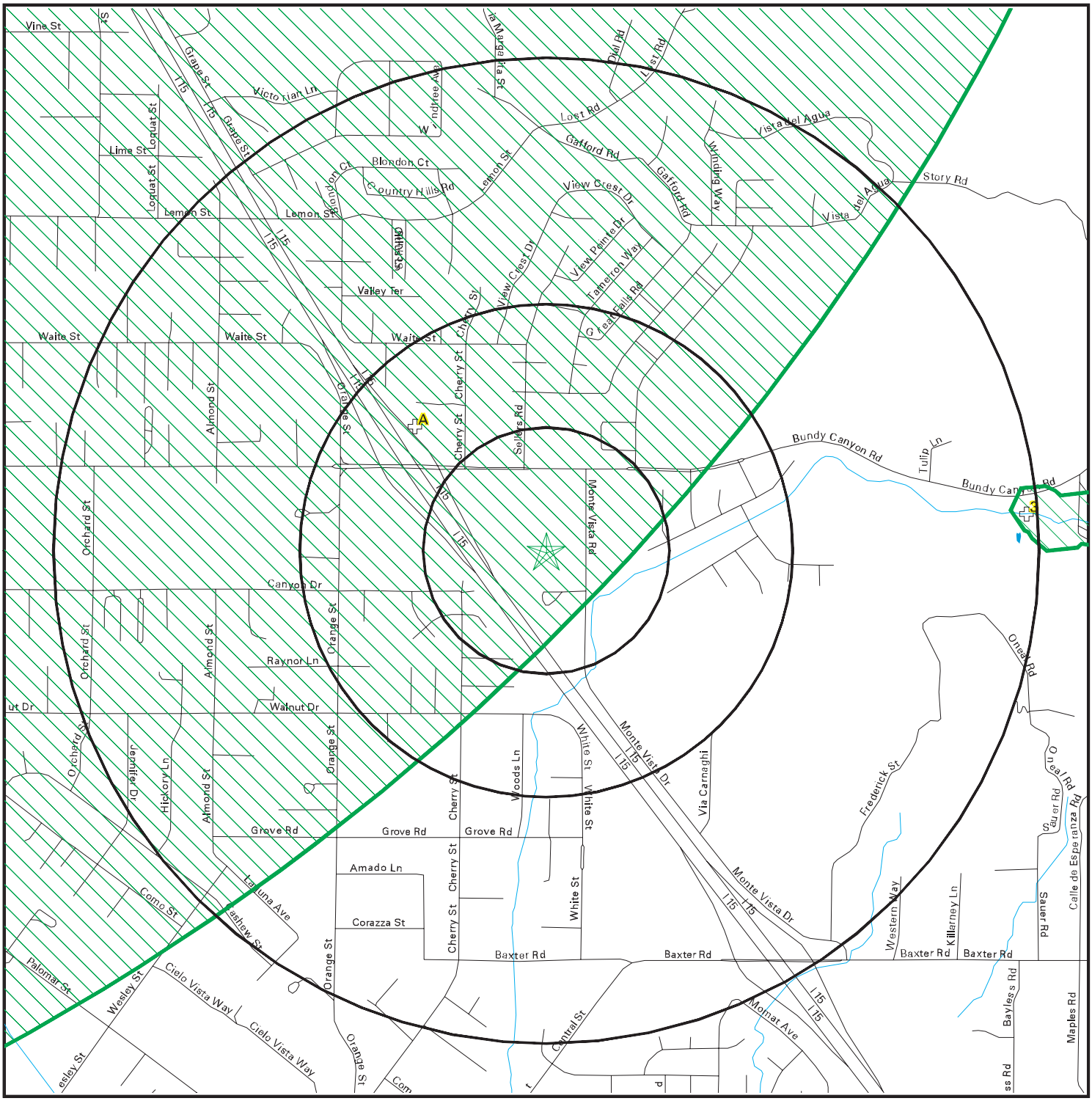
Inquiry #: 3576272.13s
Date: 4/15/13

TARGET PROPERTY COORDINATES

Latitude (North):	33.624401 - 33˚ 37' 27.8''
Longitude (West):	117.268097 - 117˚ 16' 5.1''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	475132.5
UTM Y (Meters):	3720350.5

Applicable Regulation from 47 CFR/FCC Checklist	Database	Search Distance (Miles)	Within Search	Within 1/8 Mile
NATURAL AREAS MAP				
1.1307a (1) Officially Designated Wilderness Area	US Federal Lands	1.00	NO	NO
1.1307a (2) Officially Designated Wildlife Preserve	US Federal Lands	1.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	CA Natural Diversity Database	1.00	YES	YES
1.1307a (3) Threatened or Endangered Species or Critical Habitat	County Endangered Species	County	YES	N/A
HISTORIC SITES MAP				
1.1307a (4) Listed or eligible for National Register	CA Historic Sites	1.00	NO	NO
1.1307a (4) Listed or eligible for National Register	National Register of Hist. Pla	1.00	NO	NO
	Indian Reservation	1.00	NO	NO
FLOODPLAIN MAP				
1.1307 (6) Located in a Flood Plain	FLOODPLAIN	1.00	YES	NO
WETLANDS MAP				
1.1307 (7) Change in surface features (wetland fill)	NWI	1.00	YES	NO
FCC & FAA SITES MAP				
	Cellular	1.00	NO	NO
	4G Cellular	1.00	NO	NO
	Antenna Structure Registration	1.00	NO	NO
	Towers	1.00	NO	NO
	AM Antenna	1.00	NO	NO
	FM Antenna	1.00	NO	NO
	FAA DOF	1.00	NO	NO
	Airports	1.00	NO	---
	Power Lines	1.00	YES	---

Natural Areas Map



- Target Property
- Roads
- County Boundary
- Waterways
- Water
- Locations
- Federal Areas
- Federal Linear Features
- State Areas
- State Linear Features

SITE NAME: Wal Mart #3882-02	CLIENT: IWS Environmental
ADDRESS: Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT: Jim Bunck INQUIRY #: 3576272.13s
LAT/LONG: 33.6244 / 117.2681	DATE: April 15, 2013

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NATURAL AREAS MAP FINDINGS

Endangered Species Listed for: RIVERSIDE County, CA.

Source: EPA Endangered Species Protection Program Database

AMPHIBIAN:	TOAD, ARROYO SOUTHWESTERN
AMPHIBIAN:	SALAMANDER, DESERT SLENDER
AMPHIBIAN:	FROG, MOUNTAIN YELLOW-LEGGED
BIRD:	PELICAN, BROWN
BIRD:	PLOVER, MOUNTAIN
BIRD:	RAIL, YUMA CLAPPER
BIRD:	GNATCATCHER, COASTAL CALIFORNIA
BIRD:	FLYCATCHER, SOUTHWESTERN WILLOW
BIRD:	FLYCATCHER, SOUTHWESTERN WILLOW
BIRD:	EAGLE, BALD
BIRD:	VIREO, LEAST BELL'S
CRUSTACEAN:	SHRIMP, RIVERSIDE FAIRY
CRUSTACEAN:	SHRIMP, VERNAL POOL FAIRY
FISH:	SQUAWFISH, COLORADO
FISH:	PUPFISH, DESERT
FISH:	SUCKER, RAZORBACK
FISH:	SUCKER, SANTA ANA
FISH:	CHUB, BONYTAIL
INSECT:	FLY, DELHI SANDS FLOWER-LOVING
INSECT:	BUTTERFLY, QUINO CHECKERSPOT
MAMMAL:	KANGAROO RAT, SAN BERNARDINO
MAMMAL:	SHEEP, PENINSULAR BIGHORN
MAMMAL:	KANGAROO RAT, STEPHENS'
PLANT:	NAVARRETIA, SPREADING
PLANT:	SPINEFLOWER, SLENDER-HORNED
PLANT:	GRASS, CALIFORNIA ORCUTT
PLANT:	DAISY, PARISH'S
PLANT:	CROWNSCALE, SAN JACINTO VALLEY
PLANT:	CEANOTHUS, VAIL LAKE
PLANT:	WOOLLY-STAR, SANTA ANA RIVER
PLANT:	ONION, MUNZ'S
PLANT:	MINT, OTAY MESA
PLANT:	MILK-VETCH, TRIPLE-RIBBED
PLANT:	MILK-VETCH, COACHELLA VALLEY
PLANT:	AMBROSIA, SAN DIEGO
PLANT:	BRODIAEA, THREAD-LEAVED
PLANT:	BUTTON-CELERY, SAN DIEGO
PLANT:	BARBERRY, NEVIN'S
REPTILE:	LIZARD, COACHELLA VALLEY FRINGE-TOED
REPTILE:	LIZARD, FLAT-TAILED HORNED
REPTILE:	TORTOISE, DESERT

Map ID Direction Distance Distance (ft.)			EDR ID Database
A1 North 0-1/8 mi 0	EO ID:	41054	
	Geo ID:	41054	CAS0030292
	Element code:	PDPGN0V010	CA Natural Diversity Database
	Occurrence ID:	12	
	Last Visited:	1983XXXX	
	Last Observed:	190105XX	
	Presence:	Extirpated	
	Trend:	Unknown	
	Occrank:	None	
	Sensitive?:	N	
	Main Info:	ABRAMS, J. SN DS (HERB)	
	Occtype:	Natural/Native occurrence	
	Directions:	ELSINORE.	

Ownership: UNKNOWN
Threat Comments: URBANIZATION, FLOOD CONTROL HAVE ELIMINATED HABITAT IN THIS VICINITY.
Ecological Comments: Not Reported
Distribution Comments: MAPPED IN VICINITY OF LAKE ELSINORE.
General Comments: MAIN SOURCE OF INFORMATION FOR THIS SITE IS 1901 COLLECTION BY ABRAMS. PROBABLY EXTIRPATED AT THIS SITE (KRANTZ 1979).
Scientific name: DODECAHEMA LEPTOCERAS
Common name: SLENDER-HORNED SPINEFLOWER
Global rank: G1
State rank: S1.1
Federal Status: Endangered
State Status: Endangered
Special Concern?: Not Reported
CNPS Rarity: Plants rare, threatened, or endangered in CA and elsewhere
Redcode: Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported/Endangered throughout its range/Endemic to California
General habitat: CHAPARRAL, COASTAL SCRUB (ALLUVIAL FAN SAGE SCRUB). HIST. FROM LAX, RIV, AND SBD COUNTIES; EXTIRP. FROM MUCH OF RANGE.
Micro habitat: FLOOD DEPOSITED TERRACES AND WASHES; ASSOC INCLUDE ENCELIA, DALEA, LEPIDOSPARTUM, ETC. 200-760M.

A2
North
0-1/8 mi
0

CAS0031828
CA Natural Diversity Database

EO ID: 42065
Geo ID: 41054
Element code: PDPGN040J2
Occurrence ID: 26
Last Visited: 189205XX
Last Observed: 189205XX
Presence: Presumed Extant
Trend: Unknown
Occrank: Unknown
Sensitive?: N
Main Info: MCCLATCHIE, A. #49 UC (HERB)
Occtype: Natural/Native occurrence
Directions: NEAR ELSINORE.
Ownership: UNKNOWN
Threat Comments: Not Reported
Ecological Comments: Not Reported
Distribution Comments: Not Reported
General Comments: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1892 COLLECTION BY A. MCCLATCHIE.
Scientific name: CHORIZANTHE PARRYI VAR PARRYI
Common name: PARRY'S SPINEFLOWER
Global rank: G2T2?
State rank: S2.1
Federal Status: None
State Status: None
Special Concern?: Not Reported
CNPS Rarity: Plants about which we need more information - a review list
Redcode: Unknown/Endangered in a portion of its range/Endemic to California
General habitat: COASTAL SCRUB, CHAPARRAL.
Micro habitat: DRY SLOPES AND FLATS; SOMETIMES AT INTERFACE OF 2 VEG TYPES, SUCH AS CHAP AND OAK WDLAND; DRY, SANDY SOILS. 40-1705M.

NATURAL AREAS MAP FINDINGS

3
East
1/2-1 mi
4996

CAS0007866
CA Natural Diversity Database

EO ID:	12486
Geo ID:	03582
Element code:	CTT61310CA
Occurrence ID:	200
Last Visited:	19800504
Last Observed:	19800504
Presence:	Presumed Extant
Trend:	Unknown
Occrank:	Unknown
Sensitive?:	N
Main Info:	HOLLAND, R. 1988 (MAP)
Occtype:	Natural/Native occurrence
Directions:	UNNAMED TRIBUTARY TO BUNDY CANYON, ABOUT 2.5 MI S OF RAIL- ROAD CANYON RESERVOIR.
Ownership:	UNKNOWN
Threat Comments:	Not Reported
Ecological Comments:	MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY QUERCUS AGRIFOLIA.
Distribution Comments:	EXTANT, 1980, AND BOUNDARY INCREASED PER INTERPRETATION OF AERIAL PHOTOS.
General Comments:	NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. THIS WAS OCC #200 OF CTT61310CA.
Scientific name:	SOUTHERN COAST LIVE OAK RIPARIAN FOREST
Common name:	SOUTHERN COAST LIVE OAK RIPARIAN FOREST
Global rank:	G4
State rank:	S4
Federal Status:	None
State Status:	None
Special Concern?:	Not Reported
CNPS Rarity:	Not Reported
Redcode:	Not Reported
General habitat:	Not Reported
Micro habitat:	Not Reported

Historic Sites Map

- Target Property
- Streets
- County Boundary
- Waterways
- Water
- Historic Sites
- Federal Historic Areas
- State Historic Areas
- US Indian Reservations
- Scenic Trail

SITE NAME:	Wal Mart #3882-02	CLIENT:	IWS Environmental
ADDRESS:	Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT:	Jim Bunck
LAT/LONG:	33.6244 / 117.2681	INQUIRY #:	3576272.13s
		DATE:	April 15, 2013

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HISTORIC SITES MAP FINDINGS

Map ID Direction Distance Distance (ft.)	EDR ID Database

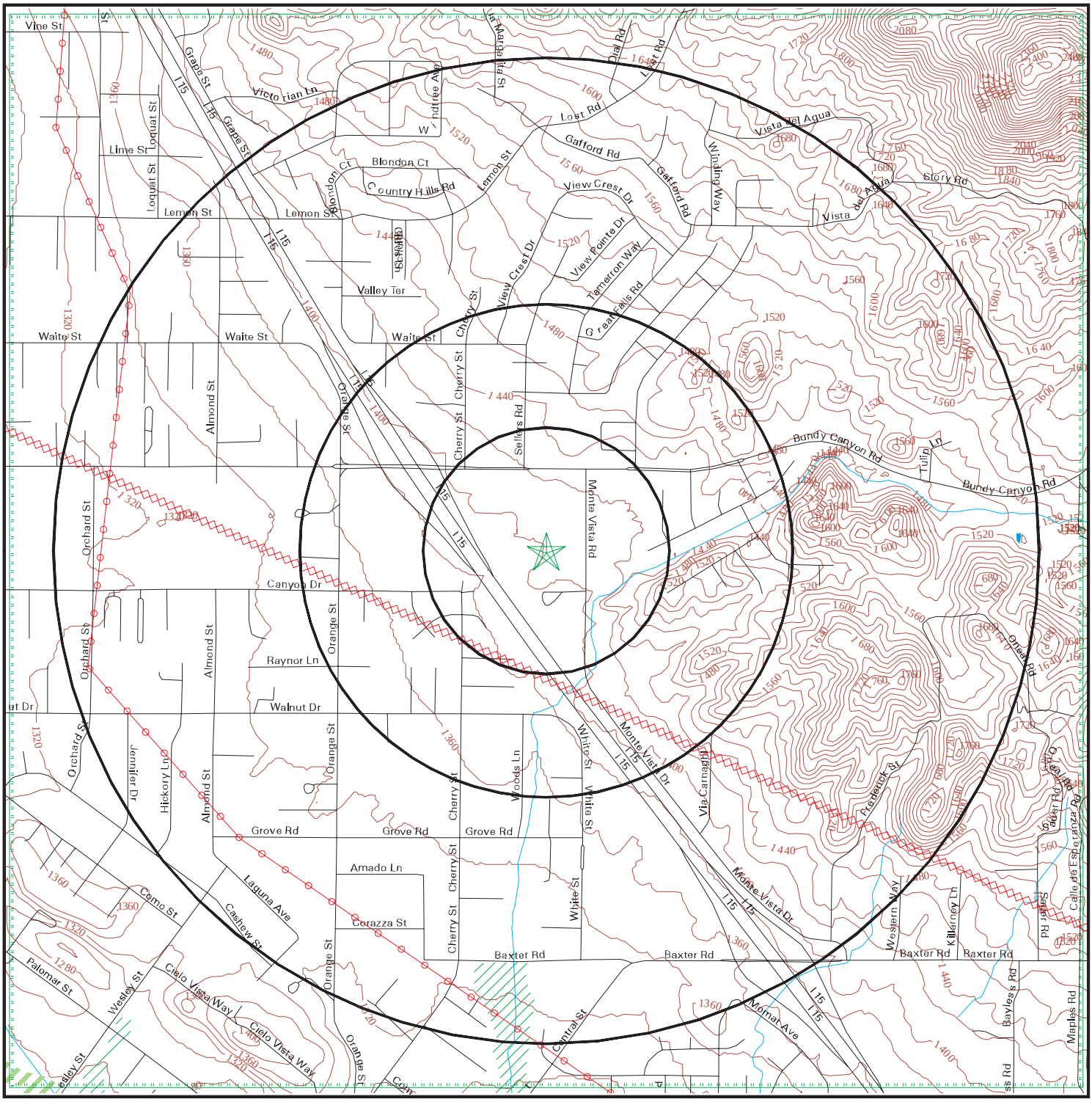
No mapped sites were found in EDR's search of available government records within the search radius around the target property.

UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped:	Status EDR ID Database

No unmapped sites were found in EDR's search of available government records.

Flood Plain Map



Major Roads
Contour Lines
Waterways
County Boundary
Power Lines
Pipe Lines
Fault Lines
Water
100-year flood zone
500-year flood zone
Electronic FEMA data available
Electronic FEMA data not available

SITE NAME:	Wal Mart #3882-02	CLIENT:	IWS Environmental
ADDRESS:	Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT:	Jim Bunck
		INQUIRY #:	3576272.13s
LAT/LONG:	33.6244 / 117.2681	DATE:	April 15, 2013

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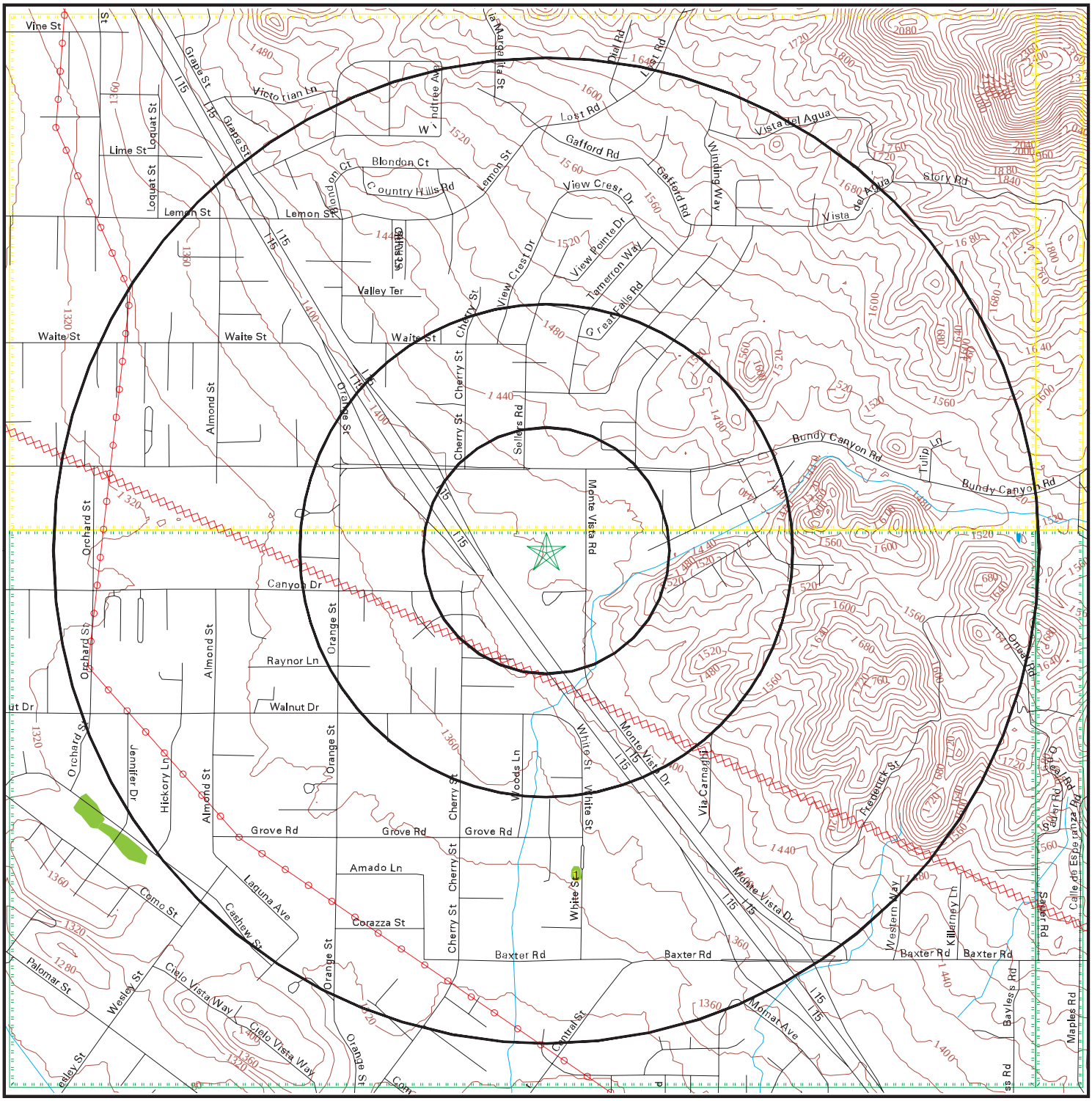
FLOOD PLAIN MAP FINDINGS

Source: FEMA DFIRM Flood Data, FEMA Q3 Flood Data

County	FEMA flood data electronic coverage
RIVERSIDE, CA	YES
Flood Plain panel at target property:	06065C (FEMA DFIRM Flood data)
Additional Flood Plain panel(s) in search area:	None Reported

National Wetlands Inventory Map



- Major Roads
- Contour Lines
- Waterways
- County Boundary
- Power Lines
- Pipe Lines
- Fault Lines
- Water
- National Wetlands Inventory
- Electronic NWI data available
- Electronic NWI data not available

SITE NAME:	Wal Mart #3882-02	CLIENT:	IWS Environmental
ADDRESS:	Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT:	Jim Bunck
LAT/LONG:	33.6244 / 117.2681	INQUIRY #:	3576272.13s
		DATE:	April 15, 2013

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WETLANDS MAP FINDINGS

Source: Fish and Wildlife Service NWI data

NWI hardcopy map at target property: Wildomar
Additional NWI hardcopy map(s) in search area:
Murrieta

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
1 South 1/2-1 mi 3392	PUBKH [P] Palustrine, [UB] Unconsolidated Bottom, [K] Artificially Flooded, [H] Permanently Flooded Lat/Lon: 33.615108 / -117.267128	NWI

*See Wetland Classification System for additional information.

WETLANDS CLASSIFICATION SYSTEM

National Wetland Inventory Maps are produced by the U.S. Fish and Wildlife Service, a sub-department of the U.S. Department of the Interior. In 1974, the U.S. Fish and Wildlife Service developed a criteria for wetland classification with four long range objectives:

- to describe ecological units that have certain homogeneous natural attributes,
- to arrange these units in a system that will aid decisions about resource management,
- to furnish units for inventory and mapping, and
- to provide uniformity in concepts and terminology throughout the U.S.

High altitude infrared photographs, soil maps, topographic maps and site visits are the methods used to gather data for the productions of these maps. In the infrared photos, wetlands appear as different colors and these wetlands are then classified by type. Using a hierarchical classification, the maps identify wetland and deepwater habitats according to:

- system
- subsystem
- class
- subclass
- modifiers

(as defined by Cowardin, et al. U.S. Fish and Wildlife Service FWS/OBS 79/31. 1979.)

The classification system consists of five systems:

1. marine
2. estuarine
3. riverine
4. lacustrine
5. palustrine

The marine system consists of deep water tidal habitats and adjacent tidal wetlands. The riverine system consists of all wetlands contained within a channel. The lacustrine systems includes all nontidal wetlands related to swamps, bogs & marshes. The estuarine system consists of deepwater tidal habitats and where ocean water is diluted by fresh water. The palustrine system includes nontidal wetlands dominated by trees and shrubs and where salinity is below .5% in tidal areas. All of these systems are divided in subsystems and then further divided into class.

National Wetland Inventory Maps are produced by transferring gathered data on a standard 7.5 minute U.S.G.S. topographic map. Approximately 52 square miles are covered on a National Wetland Inventory map at a scale of 1:24,000. Electronic data is compiled by digitizing these National Wetland Inventory Maps.

SYSTEM **MARINE**

SUBSYSTEM **1 - SUBTIDAL** **2 - INTERTIDAL**

	1 - SUBTIDAL					2 - INTERTIDAL			
CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom	AB-AQUATIC BED	RF-REEF	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm		1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

SYSTEM **E - ESTUARINE**

SUBSYSTEM **1 - SUBTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	

SUBSYSTEM **2 - INTERTIDAL**

CLASS	AB-AQUATIC BED	RF-REEF	SB - STREAMBED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	SS-SCRUB SHRUB	FO-FORESTED
Subclass	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

SYSTEM — **R - RIVERINE**

SUBSYSTEM	**1 - TIDAL**	**2 - LOWER PERENNIAL**	**3 - UPPER PERENNIAL**	**4 - INTERMITTENT**	**5 - UNKNOWN PERENNIAL**
CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	*SB-STREAMBED	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	**EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

* STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM.
**EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS.

SYSTEM — **L - LACUSTRINE**

SUBSYSTEM — **1 - LIMNETIC**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	

SUBSYSTEM — **2 - LITTORAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

SUBSYSTEM

P - PALUSTRINE

CLASS	RB--ROCK BOTTOM	UB--UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	US--UNCONSOLIDATED SHORE	ML--MOSS-LICHEN	EM--EMERGENT	SS--SCRUB-SHRUB	FO--FORESTED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble 3 Mud 4 Organic	1 Cobble-Gravel 2 Sand	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6Deciduous 7 Evergreen	

MODIFIERS

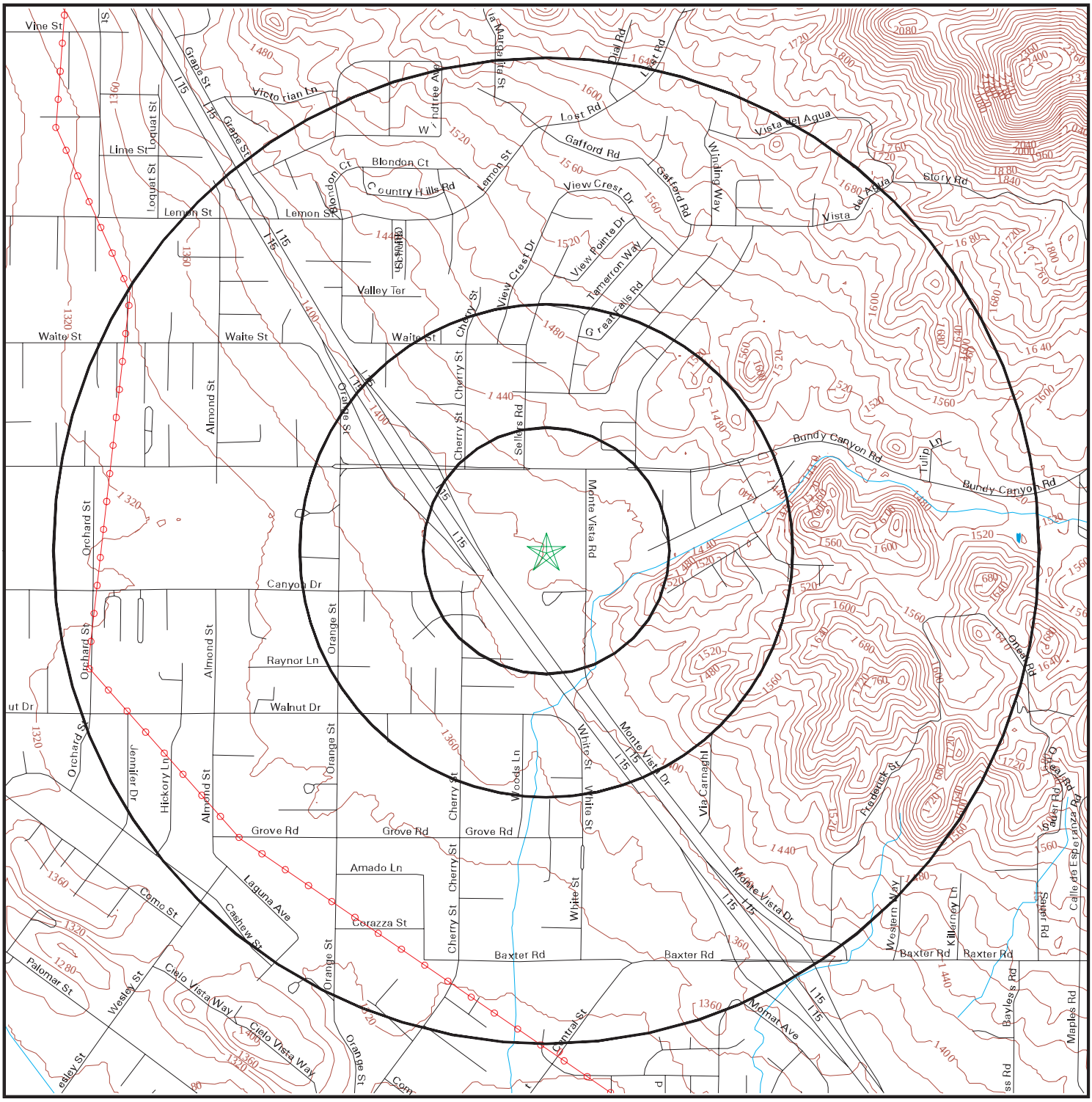
In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME				WATER CHEMISTRY			SOIL	SPECIAL MODIFIERS
Non-Tidal	**Tidal**	**Coastal Modifiers**	**Halinity for all Fresh Water**	**Inland Salinity**		**pH**		
A Temporarily Flooded	H Permanently Flooded	K Artificially Flooded	*S Temporary-Tidal	1 Hyperhaline	7 Hypersaline		g Organic	b Beaver
B Saturated	J Intermittently Flooded	L Subtidal	*R Seasonal-Tidal	2 Euhaline	8 Eusaline	a Acid	n Mineral	d Partially Drained/Ditched
C Seasonally Flooded	K Artificially Flooded	M Irregularly Exposed	*T Semipermanent -Tidal	3 Mixohaline (Brackish)	9 Mixosaline	t Circumneutral		f Farmed
D Seasonally Flooded/ Well Drained	W Intermittently Flooded/Temporary	N Regularly Flooded	V Permanent -Tidal	4 Polyhaline	0 Fresh	i Alkaline		h Diked/Impounded
E Seasonally Flooded/ Saturated	Y Saturated/Semipermanent/ Seasonal	P Irregularly Flooded	U Unknown	5 Mesohaline				r Artificial Substrate
F Semipermanently Flooded	Z Intermittently Exposed/Permanent			6 Oligohaline				s Spoil
G Intermittently Exposed	U Unknown			0 Fresh				x Excavated

*These water regimes are only used in tidally influenced, freshwater systems.

Source: U.S. Department of the Interior
Fish and Wildlife Service
National Wetlands Inventory

FCC & FAA Sites Map



Streets
Contour Lines
County Boundary
Waterways
Power Lines
Water
Sites

SITE NAME:	Wal Mart #3882-02	CLIENT:	IWS Environmental
ADDRESS:	Bundy Canyon Road/Monte Vista Drive Wildomar CA 92595	CONTACT:	Jim Bunck
LAT/LONG:	33.6244 / 117.2681	INQUIRY #:	3576272.13s
		DATE:	April 15, 2013

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FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)	EDR ID Database

No Sites Reported.

FCC & FAA SITES MAP FINDINGS
AIRPORTS

EDR ID
Database

No Sites Reported.

FCC & FAA SITES MAP FINDINGS
POWERLINES

EDR ID
Database

PWR10000166080
POWERLINES

Map label:	SCE Corp.
Operator:	Southern California Edison
Owner:	Edison International
Linetype:	Not Reported
Kv:	0
Linecurrent:	Not Reported
State:	California
Fips:	06
Notes:	110-161
Gis zone:	3 - West Area
Update no:	1010
Length:	4.30724003677
Oper stat:	Operational
Edr id:	PWR10000166080

PWR10000166081
POWERLINES

Map label:	SCE Corp.
Operator:	Southern California Edison
Owner:	Edison International
Linetype:	Not Reported
Kv:	0
Linecurrent:	Not Reported
State:	California
Fips:	06
Notes:	110-161
Gis zone:	3 - West Area
Update no:	1010
Length:	4.41405947822
Oper stat:	Operational
Edr id:	PWR10000166081

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Various Federal laws and executive orders address specific environmental concerns. NEPA requires the responsible offices to integrate to the greatest practical extent the applicable procedures required by these laws and executive orders. EDR provides key contacts at agencies charged with implementing these laws and executive orders to supplement the information contained in this report.

NATURAL AREAS
Officially designated wilderness areas
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.
Date of Government Version: 12/31/2005

Federal Contacts for Additional Information

National Park Service, Pacific West Region
600 Harrison Street, Suite 600
San Francisco, CA 94107
415-427-1300

USDA Forest Service, Pacific Southwest
630 Sansome Street
San Francisco, CA 94111
415-705-2557

BLM - California State Office
2800 Cottage Way, Room W-1834
Sacramento, CA 95825-1886
916-978-4400

Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

Officially designated wildlife preserves, sanctuaries and refuges
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.
Date of Government Version: 12/31/2005

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

State Contacts for Additional Information

Department of Fish & Game 916-653-7667

Wild and scenic rivers

Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

Endangered Species

Government Records Searched in This Report

Endangered Species Protection Program Database
A listing of endangered species by county.
Source: Environmental Protection Agency
Telephone: 703-305-5239

CA Endangered Species: Natural Diversity Database
Source: Dept. of Fish and Game.
Telephone: 916-324-3812

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

State Contacts for Additional Information

Natural Heritage Program, Dept. of Fish & Game 916-322-2493

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

LANDMARKS, HISTORICAL, AND ARCHEOLOGICAL SITES
Historic Places

Government Records Searched in This Report

National Register of Historic Places:

The National Register of Historic Places is the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. These contribute to an understanding of the historical and cultural foundations of the nation.
The National Register includes:

- All prehistoric and historic units of the National Park System;
- National Historic Landmarks, which are properties recognized by the Secretary of the Interior as possessing national significance; and
- Properties significant in American, state, or local prehistory and history that have been nominated by State Historic Preservation Officers, federal agencies, and others, and have been approved for listing by the National Park Service.

Date of Government Version: 03/23/2006

CA Historic Landmarks: CA Historical Landmarks
Source: Office of Historic Preservation.
Telephone: 916-653-6624

Federal Contacts for Additional Information

Park Service; Advisory Council on Historic Preservation
1849 C Street NW
Washington, DC 20240
Phone: (202) 208-6843

State Contacts for Additional Information

Office of Historic Preservation, Ept. Of Parks & Recreation 916-653-6624

Indian Religious Sites

Government Records Searched in This Report

Indian Reservations:

This map layer portrays Indian administrated lands of the United States that have any area equal to or greater than 640 acres.
Source: USGS
Phone: 888-275-8747
Date of Government Version: 12/31/2005

Federal Contacts for Additional Information

Department of the Interior- Bureau of Indian Affairs
Office of Public Affairs
1849 C Street, NW
Washington, DC 20240-0001
Office: 202-208-3711
Fax: 202-501-1516

National Association of Tribal Historic Preservation Officers
1411 K Street NW, Suite 700
Washington, DC 20005
Phone: 202-628-8476
Fax: 202-628-2241

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

State Contacts for Additional Information
A listing of local Tribal Leaders and Bureau of Indian Affairs Representatives can be found at:
http://www.doi.gov/bia/areas/agency.html

Phoenix Area Office, Bureau of Indian Affairs
One North First Street P.O. Box 10
Phoenix, AZ 85001
602-379-6600

Sacramento Area Office, Bureau of Indian Affairs
2800 Cottage Way
Sacramento, CA 95825
916-979-2600

Cultural Division, Yuork Tribe
1034 6th Street
Eureka, CA 95501

Scenic Trails

State Contacts for Additional Information
Pacific Crest Trail Association
5325 Elkhorn Boulevard, #256
Sacramento, California 95842
916-349-2109

FLOOD PLAIN, WETLANDS AND COASTAL ZONE

Flood Plain Management
Government Records Searched in This Report
Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

Federal Contacts for Additional Information
Federal Emergency Management Agency 877-3362-627

State Contacts for Additional Information
Office of Emergency Services 916-262-1843

Wetlands Protection
Government Records Searched in This Report
NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2004 from the U.S. Fish and Wildlife Service.

Federal Contacts for Additional Information
Fish & Wildlife Service 813-570-5412

State Contacts for Additional Information
Department of Fish & Game 916-653-7667

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Coastal Zone Management

Government Records Searched in This Report

CAMA Management Areas
Dept. of Env., Health & Natural Resources
919-733-2293

Federal Contacts for Additional Information

Office of Ocean and Coastal Resource Management
N/ORM, SSMC4
1305 East-West Highway
Silver Spring, Maryland 20910
301-713-3102

State Contacts for Additional Information

California Coastal Commission 415-904-5200

FCC & FAA SITES MAP

For NEPA actions that come under the authority of the FCC, the FCC requires evaluation of Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by the applicable zoning law.

Government Records Searched in This Report

Cellular
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

4G Cellular
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

Antenna Structure Registration
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

Towers
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

AM Antenna
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

FM Antenna
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

FAA Digital Obstacle File
Federal Aviation Administration (FAA)
1305 East-West Highway, Station 5631
Silver Sprinng, MD 20910-3281
Telephone: 301-713-2817
Describes known obstacles of interest to aviation users in the US. Used by the Federal Aviation Administration (FAA) and the National Oceanic and Atmospheric Administration to manage the National Airspace System.

Airport Landing Facilities
Federal Aviation Administration
Telephone (800) 457-6656
Private and public use landing facilities.

Electric Power Transmission Line Data
Rextag Strategies Corp.
14405 Walters Road, Suite 510
Houston, TX 77014
281-769-2247
U.S. Electric Transmission and Power Plants systems Digital GIS Data.

Excessive Radio Frequency Emission
For NEPA actions that come under the authority of the FCC, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the determination of whether the particular facility, operation or transmitter would cause human exposure to levels of radio frequency in excess of certain limits.

Federal Contacts for Additional Information
Office of Engineering and Technology
Federal Communications Commission
445 12th Street SW
Washington, DC 20554
Phone: 202-418-2470

OTHER CONTACT SOURCES

NEPA Single Point of Contact
State Contacts for Additional Information
Grants Coordination
State Clearinghouse
P.O. Box 3044
Room 222
Sacramento, CA 95812-3044
916-445-0613

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Appendix E

Environmental Questionnaires

Wal-Mart Stores, Inc.

Phase I Environmental Site Assessment
User Questionnaire

Site Name: Wildomar - Gatlin Parcel

Site Location: SWC Bundy Canyon & Monte Vista

Project/Store Number: 3882-02

The following questions are taken from the ASTM 1527-05 Standard Practice for Phase I Environmental Site Assessments and must be answered in order to qualify for the Landowner Liability Protections ("LLPs") under the federal Comprehensive Environmental Response Compensation and Liability Act, otherwise known as "CERCLA" or the Superfund law. ***Note that the completion of this form, by itself, does not automatically qualify one for any of the three LLPs, all of which have additional eligibility criteria. Note further that state and local government agencies will often have their own, independent source of environmental liability not covered by any of the LLPs.*** *All questions regarding the source of, defenses to, and transactional, development-related, and operational strategies for managing environmental liability should be directed to Wal-Mart legal counsel.*

Please provide an answer to each question or attach pertinent information and identify a number for each attachment.

1. Are you aware of any environmental cleanup liens against the *property* that are filed or recorded under federal, tribal, state or local law?

   ☑ No ☐ Yes (Describe or attach information) Attachment No.

2. Are you aware of any Activity and Use Limitations (AULs), such as engineering controls (e.g. engineered caps, foundations, liners, treatment methods, etc. in use to prevent contamination from migrating to surrounding areas), land use restrictions or institutional controls (e.g. administrative measures restricting groundwater use, construction, or property use) that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

   ☑ No ☐ Yes (Describe or attach information) Attachment No.

3. As the user of the Phase I Environmental Site Assessment, do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

☑ No ☐ Yes (Describe or attach information) Attachment No.

4. Does the purchase price being paid for this property reasonably reflect the fair market value of the property?

☐ No ☑ Yes (Describe or attach information) Attachment No.

Per the Real Estate Director, the purchase price is slightly below market value, but not due to the physical condition of the property.

(a) If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property*?

☐ No ☐ Yes (Describe or attach information) Attachment No.

5. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as User:

(a) Do you know the past uses of the property? ☑ No ☐ Yes (Describe or attach information) Attachment No.

(b) Do you know of specific chemicals that are present or once were present at the property? ☑ No ☐ Yes (Describe or attach information) Attachment No.

(c) Do you know of spills or other chemical releases that have taken place at the property? ☑ No ☐ Yes (Describe or attach information) Attachment No.

(d) Do you know of any environmental cleanups that have taken place at the property? ☑ No ☐ Yes (Describe or attach information) Attachment No.

6. As the User of the Phase I Environmental Site Assessment, based on your knowledge and experience related to the property are there any obvious indicators that point to the presence or likely presence of contamination at the property?

☑ No ☐ Yes (Describe or attach information) Attachment No.

Signature of Project Manager

Name: Rebekah Rodriguez

Title: Sr. Project Manager

Date: 4/10/13

Wal-Mart Stores, Inc.

Phase I Environmental Site Assessment
User Questionnaire
(Nasland Engineering)

Site Name: **Wildomar, CA Walmart – Outparcels for Purchase**

Site Location: **SW Corner of Bundy Canyon Road & Monte Vista Drive**
Wildomar, CA 92595

Project/Store Number: **N.E. Job # 310-040.1 / Store #3882-02**

The following questions are taken from the ASTM 1527-05 Standard Practice for Phase I Environmental Site Assessments and must be answered in order to qualify for the Landowner Liability Protections ("LLPs") under the federal Comprehensive Environmental Response Compensation and Liability Act, otherwise known as "CERCLA" or the Superfund law. ***Note that the completion of this form, by itself, does not automatically qualify one for any of the three LLPs, all of which have additional eligibility criteria. Note further that state and local government agencies will often have their own, independent source of environmental liability not covered by any of the LLPs.*** *All questions regarding the source of, defenses to, and transactional, development-related, and operational strategies for managing environmental liability should be directed to Wal-Mart legal counsel.*

Please provide an answer to each question or attach pertinent information and identify a number for each attachment.

1. Are you aware of any environmental cleanup liens against the *property* that are filed or recorded under federal, tribal, state or local law?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of any environmental cleanup liens against the property.

2. Are you aware of any Activity and Use Limitations (AULs), such as engineering controls (e.g. engineered caps, foundations, liners, treatment methods, etc. in use to prevent contamination from migrating to surrounding areas), land use restrictions or institutional controls (e.g. administrative measures restricting groundwater use, construction, or property use) that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of any AULs files or recorded on the property.

3. As the user of the Phase I Environmental Site Assessment, do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering does not have any specialized knowledge related to the property. Site is currently vacant, undeveloped land.

4. Does the purchase price being paid for this property reasonably reflect the fair market value of the property?

☐ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of the price being paid for this property.

If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property*?

☐ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of the price being paid for this property.

5. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as User,

(a) Do you know the past uses of the property?

☐ No ■ Yes (Describe or attach information) Attachment No._____

Prior Phase I ESA indicated history is mostly undeveloped, vacant land. Site is currently vacant undeveloped land. One or more single-family homes previously existed on the site.

(b) Do you know of specific chemicals that are present or once were present at the property?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of any specific chemicals present or once used on the property. Prior Phase I ESA did not indicate any chemical concerns.

(c) Do you know of spills or other chemical releases that have taken place at the property?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of any spills or other chemical releases that may have taken place on the property.

(d) Do you know of any environmental cleanups that have taken place at the property?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of any environmental cleanups that may have taken place on the property.

6. As the User of the Phase I Environmental Site Assessment, based on your knowledge and experience related to the property are there any obvious indicators that point to the presence or likely presence of contamination at the property?

■ No ☐ Yes (Describe or attach information) Attachment No._____

Nasland Engineering is not aware of any obvious indicators that point to the presence of contamination on the property.

Signature of Project Manager

Peter B. Ritchey, P.E.

Name

Project Manager

Title

April 17, 2013

Date

Appendix F

Previous Phase I, II Environmental Assessments

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

Wildomar, California

PREPARED FOR:

WAL-MART STORES, INC.

PREPARED BY:

January 2005

Revised
July 2005

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
ESA	Environmental Site Assessment
EDR	Environmental Data Resources
EPA	Environmental Protection Agency
DTCS	Department of Toxic Substances Control
FEMA	Federal Emergency Management Agency
HBMs	Hazardous Building Materials
LUST	Leaking Underground Storage Tank
msl	mean sea level
MCL	Maximum Contaminant Level
MWS	Municipal Water Supply
ppm	parts per minute
PRGs	Preliminary Remediation Goals
pCi/L	picocuries per liter
PWS	Public Water Systems
REA	Registered Environmental Assessor
RECs	Recognized Environmental Conditions
SDWIS	Safe Drinking Water System
SCS	Soil Conservation Service
square feet	ft^2
UST	Underground Storage Tank
USDA	United States Department of Agriculture
USGS	United States Geological Survey

EXECUTIVE SUMMARY

On behalf of Wal-Mart Stores, Inc., a Phase I Environmental Site Assessment (ESA) Report (Report) was prepared by C2 REM for the real property (Property), located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California. The ESA was conducted in accordance with the American Society for Testing and Materials (ASTM) method E 1527-00 entitled, *Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process* and Wal-Mart's Supplemental Phase I requirements and supplemental requirements "*When Buildings are Present"*.

The Phase I activities included: 1) review of current and historical records, plans, reports, and aerial photographs; 2) interviews with representatives familiar with past and present activities at the Property; 3) review of Chain of Title Report; 4) site visit and inspection of the Property; 5) limited soil sampling activities; and 6) identification and assessment of the potential impacts of "orphan sites".

The results of the investigative activities indicate that the potential exists for the presence of Recognized Environmental Conditions (RECs) in connection with the Property. Limited soil sampling and analysis activities conducted on the Property indicate the presence of low concentrations of pesticides and herbicides. Herbicide and pesticide concentrations were below the United States Environmental Protection Agency Preliminary Remediation Goals for Residential Soil scenarios with the exception of one sample (soil-1-surface) for dieldrin; however, the detected concentration at this location was below the PRG for Industrial Soil scenarios. The detected constituents of concern are not anticipated to result in a significant risk for the defined end land use as a commercial facility.

C2 REM did not access the house on the Property; and therefore, is unable to assess any hazardous conditions or RECs associated with the house. This house appears to have been constructed prior to 1967 and may contain asbestos and/or lead containing materials. A proper assessment of the presence of these materials and other potential hazards is recommended.

1.0 INTRODUCTION

This Phase I Environmental Site Assessment (ESA) Report (Report) has been prepared by C2 REM at the request of Wal-Mart Stores, Inc. for the real property (Property) located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California (see Figure 1.0). The purpose of the ESA is to identify the presence or likely presence of recognized environmental conditions (RECs) associated with the Property as a result of current or previous use within the defined area boundary, or at any adjacent properties (as available from a general records search).

Information for this Report was gathered between January 10, 2005 and July 22, 2005. The ESA was conducted in accordance with the American Society for Testing and Materials (ASTM) Method E 1527-00 entitled, *Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process* and Wal-Mart's Phase I ESA guidelines and supplemental requirements.

Pursuant to this defined practice, C2 REM implemented the following procedures:

- Obtained and reviewed current and historical records and reports from Environmental Data Resources, Inc. (EDR) to assess area site usage and environmental impacts (use or presence of hazardous wastes, hazardous releases, underground storage tanks [USTs], dry cleaning chemicals, etc.) at the Property and vicinity. EDR records and reports from January 2005 and July 2005 that were reviewed included: City Directories, Historical Topographic Map Reports, and Radius Map Reports (see Appendix A, Note: Sanborn Map coverage was not available for the Property).

- Reviewed Aerial Photographs (see Appendix B).

- Reviewed Chain of Title Report for the Property going back over sixty years (see Appendix C).

- Conducted site visit and Property inspection on January 20, 2005.

- Conducted limited soil sampling activities on February 2, 2005.

- Conducted interviews with individuals familiar with past and present activities at the Property.

- Identified and assessed the potential impacts of "orphan sites" identified in EDR's Radius Map Reports.

The results of this ESA are presented in the remaining sections of the Report as follows:

2.0 Property Background
3.0 Property Site Visit/Inspection and Limited Soil Sampling Activities
4.0 Interviews
5.0 Regulatory and Historical Records Review
6.0 Business Environmental Risk Considerations
7.0 Wal-Mart Supplemental Phase I Guidelines
8.0 Conclusions
9.0 Assessor's Statement of Qualifications
10.0 Limitations
11.0 References

2.0 PROPERTY BACKGROUND

2.1 PROPERTY LOCATION AND DESCRIPTION

The Property (identified on Riverside, California Assessor Map 367.10 as Parcel No. 367-100-008, 009, 011, and 012) is located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California (see Figure 2.0). The Property is approximately 19 acres and is currently being considered for redevelopment.

The Property is primarily an open field containing grasses and scrubs with one residential home located on the southwest corner of the Property. The elevation of the Property is approximately 1400 feet above mean sea level (msl) and generally decreasing from north to south and from the east to west.

Bundy Canyon Road borders the northern boundary of the Property, Canyon Drive borders the southern boundary, Monte Vista Drive borders the eastern boundary, and the 15 Freeway borders the western boundary of the Property. Surrounding land uses are primarily residential with homes located to the north, east, and south of the Property.

2.2 GEOLOGY IN GENERAL AREA OF PROPERTY

The local geologic stratigraphic unit for the Property falls in the Mesozoic period on a geologic time scale. Based upon the U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) data, the soil component in the general area of the Property is considered CAJALCO with a fine sandy loam surface texture. The hydrologic group for the soil is Class C indicating a slow infiltration rate. The soil drainage class for the soil is well drained indicating the soils have intermediate water holding capacity. The soil composition in the general area of the Property does not meet the requirement for a hydric soil. Hydric soils are formed under conditions of saturation, flooding, or ponding and are useful to define wetland boundaries. Soil types for the general area of the Property down to a depth of 26 inches include: fine sandy loam, loam, and weathered bedrock (EDR, 2005).

2.2 HYDROLOGY AND HYDROGEOLOGY IN GENERAL AREA OF PROPERTY

EDR's Radius Map Reports search results of the Federal Emergency Management Agency (FEMA) flood zone database indicates that the Property does not fall within the 100-year or 500-year flood zone. C2 REM's review of FEMA flood zone maps (panel number 0602452710C and 0602452070D) supports the EDR Radius Map Report search results (see Appendix D). The National Wetlands Inventory provided by the U.S. Fish and Wildlife Service identified a wetland area approximately 0.75 to 1.0 miles southwest and a second wetland area approximately 0.5 to 0.75 miles south of the Property (EDR, 2005).

Select aerial photographs from the years 1938 to 2002 (i.e. 1938, 1953, 1967, 1980, 1990, 1994, 2002) for the Property and its vicinity indicate a naturally occurring regional drainage running through the Property (see Appendix B).

The general topographic gradient of the Property is flat with a gradual decrease in elevation from the north to the south. The surrounding area elevation generally decreases from north to south and from the east to the west. Based upon surface gradients, the anticipated surface water flow is towards the southwest across the Property. The regional groundwater in the area flows generally to the southwest.[1] The Public Water Systems (PWS) database did not identify any public water supply wells within one mile of the Property. Federal U.S. Geological Survey (USGS) groundwater wells located approximately 0.5 miles southwest of the Property measured groundwater at approximately 44.0 feet below ground surface (bgs) (EDR, 2005).

3.0 PROPERTY SITE VISIT/INSPECTION AND LIMITED SOIL SAMPLING ACTIVITIES

3.1 PROPERTY SITE VISIT/SITE INSPECTION

C2 REM conducted a site visit on January 20, 2005 to observe the Property's existing condition and assess the presence of potential hazardous conditions. Photographs and notes were taken to identify specific features, and a site reconnaissance checklist was completed during the course of the site walk. This section provides a summary of the observations made during this visit.

The Property is approximately 19-acres, consisting mainly of open space vegetated with grasses and scrubs. The lone structure on the Property is a residential home along with two small storage sheds located on the southwest corner of the Property. C2 REM could not access the home during this site visit, and as such could not assess the presence of RECs associated with the home. Surrounding land uses in the area are primarily

[1] Source: Representative from Western Municipal Water District.

residential with a single home located south of the Property and communities of homes located north and south of the Property (see Figure 3.0).

A dry drainage channel was observed running from east to west across the Property with vegetation growing along its banks. A corrugated galvanized pipe is installed beneath Monte Vista Drive allowing the drainage channel to continue northeast into the surrounding property. An approximate 20 by 20 foot concrete slab was observed located in the northwest corner of the Property. The concrete slab had been previously used as a basketball court (see Figure 4.0).

During the site walk, no evidence of above ground storage tanks and/or USTs were observed. C2 REM did not observe any areas with stained soils or pools of liquid containing unknown substances.

3.2 LIMITED SOIL SAMPLING ACTIVITIES

On February 2, 2005 C2 REM conducted limited soil sampling and analysis activities to evaluate the potential presence of constituents of interest on the Property. The decision to conduct limited soil sampling activities was based on the potential source of surface and/or shallow subsurface soil contamination (i.e., residual herbicides, pesticides, metals, and volatile fuel hydrocarbons), due to the naturally occurring regional drainage feature running through the Property.

Eight (8) samples were collected from four (4) locations around the Property (see Figure 5.0). The soil sample locations were selected based on the current understanding of the historic naturally occurring regional drainage running through the Property. The samples were sent to a fixed laboratory and analyzed for herbicides, pesticides, metals, and volatile fuel hydrocarbons using United States Environmental Protection Agency (USEPA) Methods 8151A, 8081A, Title 22 Metals, and 8015 Modified respectively.

A summary of the laboratory analytical results is provided in Table 1.0. (see Appendix E for complete laboratory report). Laboratory analysis for volatile fuel hydrocarbons were all non-detectable at a reporting limit of 0.90 – 1.0 mg/kg (ppm).

The laboratory analytical results for metals indicated low levels of the following metals: arsenic, barium, beryllium, cadmium, cobalt, copper, lead, mercury, nickel, thallium, vanadium, and zinc. Arsenic was the only detected metal concentrations above USEPA Preliminary Remediation Goals (PRGs) for Residential Soil scenarios; however, all of the arsenic concentrations were below or within background levels for Southern California soils[2].

The laboratory analytical results for herbicides and pesticides indicate low levels of the following constituents: aldrin, lindane, chlordane, 4-4'-DDD, 4,4'-DDE, 4-4"-DDT, dieldrin, endrin, heptachlor, and MCPP. Herbicide and pesticide concentrations were

[2] California soils contain naturally occurring arsenic ranging from 0.6 to 6.3 mg/kg (Background Concentrations of Trace and Major Elements in California Soils, University of California, March 1996).

below PRGs for Residential Soil scenarios with the exception of one sample (soil-1-surface) for dieldrin; however, the detected concentration at this location was below the PRGs for Industrial Soil scenarios.

In summary, constituents of interest detected at the Property (with the exception of dieldrin at one sample location) were below PRGs or within background levels for Southern California Soils. The results of the above described sampling and analysis activities indicate that the detected constituents of concern are not anticipated to result in a significant risk for the defined end land use as a commercial facility.

4.0 INTERVIEWS

C2 REM contacted a representative from the Santa Ana Regional State Water Resources Control Board's UST Program regarding a site (Arco #5644 located at 33986 Orange Street) listed in the January 2005 EDR Radius Map Report located approximately 0.5-miles west of the Property (see Section 5.1.2 of this Report for greater detail). The representative confirmed that a leak had been reported at 33986 Orange Street in August 2000, and that the current status at this site as of April 2004 was "case closed". This Site and its impact to the subject property are discussed in greater detail in Section 5.1.2 below with supplemental information provided in Appendix A.

In an effort to determine hydrologic conditions at the Property, C2 REM contacted representatives from the Western Municipal Water District. A search of well data in the general area of the Property indicates that the general flow of area groundwater is to the southwest.

5.0 REGULATORY AND HISTORICAL RECORDS REVIEW

5.1 REVIEW OF EDR RADIUS MAP REPORTS

EDR Radius Map Reports were obtained and reviewed for the Property (see Appendix A). The EDR reports meet the government records/databases search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. This report searched for the properties with real or potential environmental impacts within a 1.0-mile radius of the Property. Table 2.0 provides a description of the databases searched by the EDR Radius Map Report. Additionally, EDR's Historical Gas Station & Dry Cleaner Database search did not find any properties within 0.25 miles of the Property (EDR, 2005).

5.1.1 Target Property

The Property was not listed in any of the databases searched by EDR.

5.1.2 Surrounding Properties

The search of government records/databases did identify the following surrounding site with potential environmental impacts located between 0.25 and 0.5 of a mile from the Property:

- As discussed above, a property affiliated with ARCO #5644 is listed on the Leaking Underground Storage Tank (LUST) database. This property is located at 33986 Orange Street approximately 0.25 and 0.5 miles west of the Property.

A leak was identified at this facility and reported on August 2004. The lead regulatory agency has since classified the facility property as "case closed" following an investigative assessment and/or remediation activities. Given the elevation and location (cross gradient) relative to the Property, this surrounding property does not appear to present an imminent environmental impact on the Property.

5.1.3 Orphan Properties

Sites with poor or inadequate address information that could not be mapped by EDR were listed as orphan properties in the EDR Radius Map Reports. C2 REM reviewed the Orphan Summary list of surrounding sites from the EDR Radius Map Reports (see Appendix A), and determined their location in relation to the Property. Based on their location and available information, C2 REM assessed the real and potential environmental impacts to the Property. Table 3.0 provides a summary of the orphan property assessment.

All of the orphan sites, with the exception of the orphan site located at 33669 View Crest and Northbound Riverside 15 at Bundy Canyon Ramp (discussed below), were located more than 3 miles from the Property. Based on the distance and location relative to the Property, these properties are not anticipated to pose any soil contaminant migration risk or a groundwater contaminant migration risk to the Property.

The orphan site located at 33669 View Crest (approximately 1-mile north of Property) is listed in the HAZNET database. The data from this database are extracted from the copies of hazardous waste manifests received each year by the Department of Toxic Substances Control (DTSC). Based on the available information, current use, and the distance from the Property, this orphan site located at 33669 View Crest is not anticipated to pose any soil contaminant migration risk or a groundwater contaminant migration risk to the Property.

The orphan site located at Northbound Riverside 15 at Bundy Canyon Ramp (approximately 0.25 miles northwest of the Property) is listed in the ERNS database. The ERNS database records and stores information on reported releases of oil and hazardous substances. Based on the available information and location of this site (cross gradient from Property), the orphan site located at Northbound Riverside 15 at Bundy

Canyon Ramp is not anticipated to pose any soil contaminant migration risk or a groundwater contaminant migration risk to the Property.

5.2 REVIEW OF THE CITY DIRECTORY

The City Directory Abstract is compiled by searching select national repositories of business directories. The purpose of the City Directory is to determine whether any businesses or other uses requiring licensing or permit were listed in association with the property. The Property was not listed in any of the national repositories (see Appendix A).

5.3 REVIEW OF AERIAL PHOTOGRAPHS

Aerial photographs from the years 1938 to 2002 for the Property and its vicinity were obtained and reviewed (see Appendix B). The aerial photographs from 1938 to 1953 do not show any structures on the Property. The Property and surrounding vicinity during this time appear to be open space or agricultural land. In an aerial photograph taken in 1967, a residential home can be identified in the southwest corner of the Property. A 2002 aerial photograph identifies this same building or a similar home in the same location on the Property. Surrounding land use in the 2002 aerial photograph appears to be primarily residential with some open space to the east of the Property.

5.4 REVIEW OF CHAIN OF TITLE REPORT

C2 REM obtained and reviewed a Chain of Title Report (dating back to 1925) for the Property (see Appendix C). There were no records of records of leases or environmental liens found for the Property. The information contained in the Chain of Title Reports is consistent with the information obtained from C2 REM's review of historical records and aerial photographs.

6.0 BUISNESS ENVIRONMENTAL RISK CONSIDERATIONS

The following are several business environmental risk considerations beyond the scope of ASTM Method E 1527-00 that C2 REM assessed for the Property:

- Radon - According to the California Environmental Protection Agency (EPA), Riverside County is classified as a "Zone 2" county having a predicted indoor radon average level between 2-4 picocuries per liter (pCi/L) of air. The EPA recommended action level for radon is 4 pCi/L of air volume; therefore, the Property is not likely impacted by the presence of radon gas (EDR, 2005).

- Wetlands – The National Wetlands Inventory provided by the U.S. Fish and Wildlife Service identified a wetland area approximately 0.75 to 1.0 miles southwest and a second wetland area approximately 0.5 to 0.75 miles south of the Property (EDR, 2005).

- Regulatory Compliance – Not applicable
- Cultural and Historic Resources - Not applicable.
- Archeological Resources - Not applicable.
- Industrial Hygiene - Not applicable.
- Health and Safety - Not applicable.
- Ecological Resources – May be applicable, based on determination of origin and disposition of the identified drainage channel.
- Endangered Species - Not applicable.
- Wildlife Sanctuaries - Not applicable.
- Indoor Air Quality - Not applicable.
- High Voltage Power Lines - There are no power transmission lines located within 0.5 miles of the Property (EDR, 2005).
- Pesticides and Herbicides – On February 2, 2005 C2 REM conducted limited soil sampling and analysis activities to evaluate the potential presence of pesticides and herbicides on the Property. The laboratory analytical results for herbicides and pesticides indicate low levels of the following constituents: aldrin, lindane, chlordane, 4-4'-DDD, 4,4'-DDE, 4-4"-DDT, dieldrin, endrin, heptachlor, and MCPP. Herbicide and pesticide concentrations were below PRGs for Residential Soil scenarios with the exception of one sample (soil-1-surface) for dieldrin; however, the detected concentration at this location was below the PRG for Industrial Soil scenarios (see Section 3.2.1 for greater detail on soil sampling activities).

7.0 WAL-MART SUPPLEMENTAL PHASE I GUIDELINES

In addition to the requirements of ASTM Method E-1527-00, C2 REM assessed the property according to the additional ESA Phase I requirements provided in Wal-Mart's Supplemental Phase I Guidelines ("When Buildings are Present"). The following RECs and hazardous building materials (HBMs) were assessed for the Property:

- Asbestos Containing Materials - Asbestos for commercial use was banned by the federal government in 1978. The residential home currently on the Property appears to have been constructed in the 1960's;

therefore, the home on the Property may contain some asbestos-containing materials. C2 REM did not access the home on the Property; and therefore, a proper assessment of the presence of these materials is recommended.

- Lead-Based Paint - Lead-based paint in the exterior and interior for commercial use was banned by the federal government in 1978. The residential home currently on the Property appears to have been constructed in the 1960's; therefore, the home on the Property may contain lead-based paint. C2 REM did not access the home on the Property; and therefore, a proper assessment of the presence of lead-based paint is recommended.

- Lead in Drinking Water - Public Water Systems (PWS) database did not identify any public water supply wells within one mile of the Property. A search of EPA's Safe Drinking Water Information System (SDWIS) for the water system (Elsinore Valley MWS) supplying the Property indicated that drinking water supplying the Property meets the EPA drinking water standards maximum contaminant level (MCL) for lead. C2 REM did not test potable water sources to the Property; and therefore, a proper assessment is recommended.

- PCBs- C2 REM didn't observe any electrical transformers and/or equipment with external labels indicating PCB content during the Property inspection event on January 20, 2005. C2 REM did not access the home on the Property; and therefore, a proper assessment of the presence of PCB-containing equipment (i.e., fluorescent light ballasts) is recommended.

- Mercury- C2 REM did not access the home on the Property; and therefore, a proper assessment of the presence of mercury containing equipment (i.e., fluorescent lamps, thermostats) is recommended.

- Chlorofluorocarbons (CFCs)- C2 REM did not access the home on the Property; and therefore, a proper assessment of the presence of CFC-containing equipment (i.e., refrigerators, walk-in coolers, air conditioning units) is recommended.

- Aboveground and Underground Storage Tanks (USTs)- C2 REM did not observe any aboveground tanks or signs of USTs during the Property inspection event on January 20, 2005. A review of the EDR Radius Map Reports supports that no USTs were located, abandoned or removed on the Property.

8.0 CONCLUSIONS

The results of the investigative activities have revealed the potential presence of RECs in connection with the Property located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California. Based on the review of historical records, reports, interviews, and aerial photographs, there is no evidence of historical uses beyond that of an open vegetated field with a residential home located in the southwest corner of the Property.

The results of limited soil sampling and analysis activities indicate the presence of low concentrations of pesticides and herbicides on the Property. Herbicide and pesticide concentrations were below PRGs for Residential Soil scenarios with the exception of one sample (soil-1-surface) for dieldrin; however, the detected concentration at this location was below the PRG for Industrial Soil scenarios. The detected constituents of concern are not anticipated to result in a significant risk for the defined end land use as a commercial facility.

C2 REM did not access the home on the Property; and therefore, is unable to assess any hazardous conditions or RECs associated with the home. This home appears to be have been constructed prior to 1967 and may contain asbestos and/or lead containing materials. A proper assessment of the presence of these materials and other potential hazards is recommended.

C2 REM has performed this ESA in accordance with the ASTM Standard E 1527-00 entitled, *Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process*, and Wal-Mart's Phase I ESA guidelines and Supplemental Requirements *"When Buildings are Present"*.

9.0 ASSESSOR'S STATEMENT OF QUALIFICATIONS

The Phase I activities including the preparation of the Report for the Property were conducted by Jack Keener with the assistance of qualified C2 REM staff. Mr. Keener is a Registered Environmental Assessor I, Certification #07781 who has over ten years of project management in construction, engineering, and environmental projects. Mr. Keener's experience includes a wide range of environmental projects assessing site conditions. Appendix F provides a detailed description of Mr. Keener's qualifications, experience, projects descriptions. Additionally, this Report has been reviewed by Edmond Bourke, Senior Reviewer, a Registered Environmental Assessor II, Certification #20242.

10.0 LIMITATIONS

The reports, records, photographs, and information obtained and utilized in the preparation of this Report have been obtained in part from EDR, Inc. and various

government agencies, and is considered by C2 REM to be correct. It should also be noted that this information is subject to professional interpretation, which leads to conclusions that may differ, based upon the opinions of specific individuals.

This Report has been prepared in accordance with generally accepted environmental assessment practices, based upon the information set forth within the Report narrative for specific application to the Property located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California.

This Report is certified to, can be relied upon by, and has been prepared for the exclusive use of the following identities: Gresham, Savage, Nolan & Tilden, A Professional Corporation; Wal-Mart Stores, Inc., a Delaware corporation; Wal-Mart Real Estate Business Trust, a Delaware statutory trust; and Sam's Real Estate Business Trust, a Delaware statutory trust. Any of the named entities above can convey this Report to an affiliate, related entity, subsidiary, lender, title insurer, regulatory/city agency or current property owner(s) and their agents, but further dissemination requires prior written approval from C2 REM.

No other warranty, expressed or implied, is made.

11.0 REFERENCES

Environmental Data Resources, Inc., *The EDR-Aerial Photography Print Service, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92530,* January 12, 2005.

Environmental Data Resources, Inc., *The EDR-Aerial Photography Print Service, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92595,* July 13, 2005.

Environmental Data Resources, Inc., *The EDR-Chain of Title Report, Assessor Parcel No,'s: 367-100-008, 009, 011, and 102, Lake Elsinore, CA 92595,* July 2005.

Environmental Data Resources, Inc., *The EDR-City Directory Abstract, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92530,* January 11, 2005.

Environmental Data Resources, Inc., *The EDR-City Directory Abstract, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92530,* January 11, 2005.

Environmental Data Resources, Inc., *The EDR-City Directory Abstract, Bundy Canyon Rd/Monte Vista, Wildomar, CA 92530,* July 18, 2005.

Environmental Data Resources, Inc., *The EDR-Historical Topographic Map Report, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92530,* January 11, 2005.

Environmental Data Resources, Inc., *The EDR -Radius Map, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92530,* January 11, 2005.

Environmental Data Resources, Inc., *The EDR -Radius Map, Bundy Canyon Rd/Monte Vista, Lake Elsinore, CA 92595,* July 12, 2005 (EDR, 2005).

Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map, Riverside County, California, Panel 2070 of 3600,* August 18, 2003.

Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map, Riverside County, California, Panel 2710 of 3600,* November 20, 1996.

REGISTERED ENVIRONMENTAL ASSESSOR CLASS I
JACK KEENER
No. 07781
Expires: 6/30/06
STATE OF CALIFORNIA

Jack Keener | REA I #07781

PHASE I ENVIRONMENTAL SITE ASSESSMENT ADDENDUM

Wildomar, California

PREPARED FOR:

WAL-MART STORES, INC.

PREPARED BY:

C2REM
An Environmental Management & Development Company

FEBRUARY 2005

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ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
ESA	Environmental Site Assessment
ppm	parts per million
PRG	Preliminary Remedial Goals
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Addendum to Phase I Environmental Site Assessment (ESA) Report dated January 2005 has been prepared by C2 REM at the request of Wal-Mart Stores, Inc. for the real property (Property), located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California. Specifically, this addendum provides the results from limited soil sampling and analysis activities to evaluate the potential presence of constituents of interest on the Property.

C2 REM collected soil samples on February 2, 2005 and submitted the samples to a fixed laboratory for herbicides/pesticides, metals, and volatile fuel hydrocarbon analysis.

The results of these soil sampling activities indicated that dieldrin was detected above Residential Soil Preliminary Remediation Goals (PRGs); this value was substantially below Industrial Soil land use values. Additionally, arsenic was detected above Residential Soil PRGs; however, all of the arsenic concentrations were below or within background levels for Southern California soils. All other detected chemicals were below Residential Soil PRGs; as such, these chemicals are not likely to impact the proposed development.

2.0 Sampling Methodology
3.0 Laboratory Results
4.0 Conclusions

2.0 SAMPLING METHODOLOGY

Soil samples were collected from four (4) locations including: two (2) taken from within low points of the drainage ditch, one up-gradient (northeastern portion of the Site) and one down-gradient (southwestern portion of the Site) (see Figure 1.0). The soil sample locations were selected based on the current understanding of the historic naturally occurring regional drainage running through the Property.

Soil samples were collected at two depth intervals (surface and 3 feet below ground surface) at each location resulting in eight (8) with an additional duplicate sample for quality control purposes resulting in a total of nine (9) analyses. Samples were collected using a soil core sampler supplied with a driving hammer and core extractor. The samples were collected into a 6-inch brass sleeve and each sleeve, covered with a sheet of paraffin, and capped at both ends. The samples were placed on ice and delivered under chain of custody procedures to a fixed lab and analyzed for herbicides/pesticides, metals, and volatile fuel hydrocarbons using USEPA Methods 8151A, 8081A, Title 22 Metals, and 8015 Modified respectively.

3.0 LABORATORY RESULTS

A summary of the laboratory analytical results is provided in Table 1.0. Laboratory analysis for volatile fuel hydrocarbons were all non-detectable at a reporting limit of 0.90 – 1.0 mg/kg (ppm).

The laboratory analytical results for metals indicate low levels of the following metals: arsenic, barium, beryllium, cadmium, cobalt, copper, lead, mercury, nickel, thallium, vanadium, and zinc. Arsenic was the only detected metal concentrations above United States Environmental Protection Agency (USEPA) PRGs for Residential Soil scenarios; however, all of the arsenic concentrations were below or within background levels for Southern California soils[1].

The laboratory analytical results for herbicides and pesticides indicate low levels of the following constituents: aldrin, lindane, chlordane, 4-4'-DDD, 4,4'-DDE, 4-4"-DDT, dieldrin, endrin, heptachlor, and MCPP. Herbicide and pesticide concentrations were below PRGs for Residential Soil scenarios with the exception of one sample (soil-1-surface) for dieldrin; however, the detected concentration at this location was below the PRG for Industrial Soil scenarios.

4.0 CONCLUSIONS

C2 REM has prepared this addendum to present the findings of limited soil sampling and analysis activities at the Property, located southwest of the intersection at Bundy Canyon Road and Monte Vista Drive in Wildomar, California. These results were used to evaluate the presence of constituents of interest on the Property. Constituents of interest detected at the Property (with the exception of dieldrin at one sample location) were below PRGs or within background levels for Southern California Soils. The results of the above described sampling and analysis activities indicate that the detected constituents of concern are not anticipated to result in a significant risk for potential land users.

_____

Jack Keener REA I #07781

[1] California soils contain naturally occurring arsenic ranging from 0.6 to 6.3 mg/kg (Background Concentrations of Trace and Major Elements in California Soils, University of California, March 1996).

Table 1.0
Summary of Laboratory Analysis
Wildomar, California

Sample	Aldrin (mg/kg)	gamma-BHC (Lindane) (mg/kg)	Chlordane (mg/kg)	4,4'-DDD (mg/kg)	4,4'-DDE (mg/kg)	4,4'-DDT (mg/kg)	Dieldrin (mg/kg)	Endrin (mg/kg)	Heptachlor (mg/kg)	MCPP (mg/kg)	Volatile Fuel Hydrocarbons (mg/kg)
Preliminary Remedial Goals (PRGs) Residential Soil	0.029 mg/kg	0.437 mg/kg	1.6 mg/kg	2.4 mg/kg	1.7 mg/kg	1.7 mg/kg	0.03 mg/kg	18 mg/kg	0.11 mg/kg	61.1 mg/kg	
Soil-1-surface	0.0049	ND	0.038	0.0065	0.0043	0.04	0.04	0.0029	0.00088	1.7	ND
Soil-1-3 feet	ND	ND	ND	0.0022	0.0024	0.0041	ND	ND	ND	2	ND
Soil-2-surface	ND	ND	ND	0.003	0.0025	0.0034	ND	ND	ND	ND	ND
Soil-2-3 feet	ND	ND	ND	0.013	0.014	0.0044	ND	ND	ND	ND	ND
Soil-2-3 feet-dup	ND	0.0029	ND	0.0016	0.0019	0.0055	ND	ND	ND	ND	ND
Soil-3-surface	0.0019	0.0015	ND	ND	ND	ND	ND	ND	ND	ND	ND
Soil-3-3 feet	ND	0.0015	ND	ND	0.00087	0.0029	ND	ND	ND	ND	ND
Soil-4-surface	ND	0.0015	ND	ND	ND	ND	ND	ND	ND	ND	ND
Soil-4-3 feet	ND	0.0022	ND	0.0013	0.0013	0.0043	ND	ND	ND	ND	ND

Sample	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
Preliminary Remedial Goals (PRGs) Residential Soil	0.062 mg/kg (1)	5400 mg/kg	150 mg/kg	37 mg/kg	210 mg/kg (2)	900 mg/kg	3100 mg/kg	150 mg/kg	23 mg/kg	1600 mg/kg (3)	5.2 mg/kg	78 mg/kg	23000 mg/kg
Soil-1-surface	ND	20	0.082	0.085	2.9	1.6	4.3	0.6	0.023	1.5	0.44	18	11
Soil-1-3 feet	1.5	67	0.45	0.29	12	7.3	21	2.4	ND	7.5	ND	55	45
Soil-2-surface	1.2	41	0.27	0.19	8.4	5.2	11	1.8	ND	4.9	ND	37	28
Soil-2-3 feet	1.4	45	0.31	0.25	8.9	6.7	13	1.4	ND	9.5	ND	54	28
Soil-2-3 feet-dup	1.7	67	0.4	0.32	13	7.2	18	2	ND	20	ND	75	36
Soil-3-surface	0.67	75	0.48	0.21	13	4.8	12	1.9	ND	5.6	ND	45	40
Soil-3-3 feet	1.1	58	0.43	0.22	11	4.7	10	3.8	ND	4.9	ND	45	29
Soil-4-surface	1.2	55	0.36	0.23	9.7	6.5	11	2.6	0.0074	4.7	ND	45	29
Soil-4-3 feet	1	37	0.3	0.13	2.3	0.91	8.9	2	ND	3.4	ND	15	18

(1) Cal-Modified Cancer PRG

(2) Total Chromium

(3) Soluable Salts

Bundy Canyon Road

Subject Property

Home

Soil-4

Monte Vista Drive

Soil-1

Dry Drainage Channel

Interstate 15

Soil-2

Soil-3

Home

Canyon Drive

Legend:

▲ **Approximate Sample Location**

Reference: Riverside County Thomas Guide

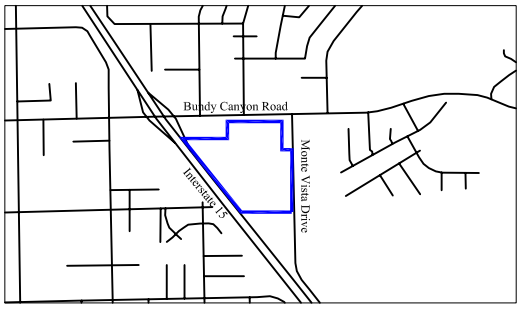

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FIGURE 1.0

SAMPLE LOCATION
WILDOMAR, CALIFORNIA

DATE: 01.25.05	PROJECT NO: 04-114	REV: 01

AN ENVIRONMENTAL MANAGEMENT AND DEVELOPMENT COMPANY

NEWPORT BEACH, CALIFORNIA 949.261.8098