MASTER DRAINAGE PLAN
FOR
THE CATERPILLAR PROPERTY

WOOD/PATEL

Property of
Flood Control District of MC Library
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Phoenix, AZ 85009

MASTER DRAINAGE PLAN
FOR
THE CATERPILLAR PROPERTY

Prepared For:

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
- 1.1 General Background 1
- 1.2 Location & Topography 1
- 1.3 Drainage Background 2
- 1.4 Regional Drainage Structure Characteristics 3
- 1.5 FEMA Regulated Flood Zones 4
- 1.6 Purpose of Report 5

2.0 HYDROLOGIC & HYDRAULIC ANALYSIS 6
- 2.1 Hydrologic Method Description 6
- 2.2 Future Land Use Characteristics 8
- 2.3 Existing Drainage Structures 8

3.0 PROPOSED DRAINAGE SYSTEM 13
- 3.1 Drainage Design Considerations 13
- 3.2 Proposed Drainage Alternative Designs: 15
  - 3.2.1 Design Alternative 'A' 16
  - 3.2.2 Design Alternative 'B' 17
  - 3.2.3 Retention Dewatering Alternatives 19
- 3.3 Other Drainage Areas 22
- 3.4 Drainage Design Criteria 23

4.0 CONCLUSIONS 25

5.0 REFERENCES 26

APPENDICES

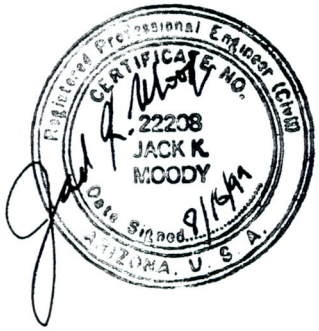
APPENDIX A	HEC-1 Existing Conditions Computer Output Files
APPENDIX B	HEC-1 Design Conditions Computer Output Files
APPENDIX C	Infiltration & Transmission Losses Calculations
APPENDIX D	Geomorphological Evaluation of Landforms

PLATES

PLATE 1	Vicinity Map
PLATE 2	FEMA Flood Insurance Rate Maps
PLATE 3	HEC-1 Schematic Map
PLATE 4	Existing Conditions Drainage Map
PLATE 5	Alternative 'A' Design Drainage Map
PLATE 6	Alternative 'B' Design Drainage Map

TABLES

TABLE 1	Summary of Existing Conditions 100-Year, 6-Hour Storm Peak Flows
TABLE 2	Caterpillar Site Planning Areas I-VII Percent Impervious Calculations
TABLE 3	Existing Onsite Drainage Basins
TABLE 4	Interstate 10 Culvert Summary
TABLE 5	100-Year, 6-Hour Storm Discharge Summary
TABLE 6	Alternative 'A' Detention/Retention Volume Requirements for Post-Development Conditions
TABLE 7	Alternative 'B' Detention/Retention Volume Requirements for Post-Development Conditions
TABLE 8	Retention Basin Requirements with Transmission Losses for Alternative 'A' and Alternative 'B'



1.0 INTRODUCTION

1.1 General Background

DMB White Tank, LLC (DMB) is planning the development of the Caterpillar Property (herein referred to as Property) Master Planned Community. The Caterpillar Foundation, in conjunction with Caterpillar, Inc. (herein referred to as Caterpillar) owned and utilized this Property as a testing facility for heavy equipment. The Property is comprised of approximately 8,800 acres located on the eastern base of the White Tank Mountains.

The project is anticipated to provide a variety of mixed uses, including residential and employment opportunities. The development plan is anticipated to include a mix of custom home sites, single family residential, multifamily residential, commercial sites, resorts, parks, schools, and more.

DMB has retained Wood, Patel & Associates, Inc. to prepare this Master Drainage Plan for the development of the Property.

1.2 Location & Topography

The Property is located immediately east of and within the White Tank Mountains. It is bound on the west by the summit of the White Tank Mountains and on the east by Tuthill Road, with a small section extending to Jackrabbit Road. The Property's northern boundary is comprised of Glendale Avenue and the Northern Avenue alignments. The southern most boundary is south of Interstate 10 (I-10). Adjacent neighbors of the Property include White Tank Mountain Regional Park and the Arizona State Land Department to the north, and the Bureau of Land Management Property to the west. The majority of the land to the east and south is privately owned. More specifically, the Property is located within Sections 7, 18, 19, 20 (south half), 30 and 31, Township 2 North, Range 2 West; and Sections 3, 10, 11, 12, 13, 23, 24 and 25, Township 2 North, Range 3 West; Section 6, Township 1 North, Range 2 West; Section 1, Township 1 North, Range 3 West (see Vicinity Map, Plate 1).

The topography of the Property varies greatly, with elevations ranging from approximately 1100 feet above sea level at the southeast corner of the Property, to 3671 feet at the highest peak near the northwest corner. From the low point of the Property, the topography rises gently in a northwesterly direction to the White Tank Mountains. Small hill forms are also present within the Property and slopes vary from approximately one (1) percent to greater than thirty (30) percent.

Since the mid-1940s until 1988, the Property was used by Caterpillar for heavy equipment testing, product demonstrations, and product development. Most of the disturbance existing onsite occurred as a result of Caterpillar operations, which took place during that period. In addition, Caterpillar constructed many elevated roads that act as levees, as well as large excavated pits that divert and store stormwater. Approximately ninety (90) percent of the Property is in its natural state of vegetation, while the remaining ten (10) percent of the site has experienced various degrees of disturbance as a result of the former Caterpillar Proving Ground operations.

The Property is located within the foothills of the White Tank Mountains. The majority of the Property drains southeasterly through a series of washes (White Granite Wash, Diversion Dike Wash, Tractor Wash, Osborn Road Wash, Bulldozer Wash, and other unnamed washes) to a drainage corridor along the west side of the Tuthill Road alignment (Tuthill Dike Wash). This drainage corridor leads to the southeast corner of the Property where it crosses under I-10, before reaching the White Tanks Flood Retarding Structure (FRS) No. 4. This structure is located along the north side of the Van Buren Street alignment, between Tuthill Road and Jackrabbit Road, and has a total drainage area of approximately 20 square miles.

A portion of the north end of the Property drains easterly to the White Tanks FRS No. 3, generally located east and north of the Jackrabbit Trail and Bethany Home Road alignments.

1.3 Drainage Background

As previously mentioned, the Property slopes from the northwest to the southeast. The drainage is typically conveyed in natural washes; however, the levees and channels often divert the flow from its natural watercourse.

The White Tanks Agua Fria Area Drainage Master Study was prepared by The WLB Group, Inc., dated March 1995, and has been approved by the Flood Control District of Maricopa County (FCDMC), as well as by FEMA. Within this report, the existing hydrology and hydraulics for the Property were determined for both the regional and local drainage conditions.

Major elements of the regional drainage system analyzed which directly impact the development of the Property include White Tanks FRS No. 3, White Tanks FRS No. 4, Tuthill Dike Wash, and Jackrabbit Trail Wash.

The major elements of the local drainage system analyzed which directly impact the development of the Property include existing onsite retention basins, onsite major washes and diversion structures, and onsite and offsite drainage conveyance systems.

1.4 Regional Drainage Structure Characteristics

White Tanks FRS No. 3 has a watershed area of 20.5 square miles, which consists of mountainous and foothill areas within the White Tank Mountains.

Stormwater runoff is collected in natural washes that flow east and southeasterly out of the mountains, either to the White Tanks FRS No. 3 or to the Beardsley Canal Wash which diverts the flow south along the Beardsley Canal to White Tanks FRS No. 3. It has been concluded that the White Tanks FRS No. 3 contains the entire 100-year flood within the reservoir with the 100-year water surface elevation approximately 11 feet below the spillway crest. The Property contains only two small developable areas within this watershed.

White Tanks FRS No. 4 has a watershed area of 19.8 square miles, which consists of mountainous and foothill areas within the White Tank Mountains. Stormwater runoff concentrates in desert washes that flow easterly out of the mountains into two diversion channels, Tuthill Dike Wash and Jackrabbit Trail Wash, which collect and convey the runoff to White Tanks FRS No. 4.

Approximately 12 square miles of the Property is located within the watershed. Caterpillar previously used a large portion of the watershed as a proving grounds to test earth moving equipment. As part of the proving ground operations, Caterpillar

built roads, excavated large basins, and built dikes. Many of these facilities have significantly altered the natural drainage patterns on the Property and some provide a considerable amount of flood control.

It has been concluded that the White Tanks FRS No. 4 contains the entire 100-year runoff volume from the Property of 628 acre-feet with the 100-year water surface elevation approximately 7 feet below the spillway crest.

1.5 FEMA Regulated Flood Zones

The Property is located within the Flood Insurance Rate Maps (FIRMs) for Maricopa County, Arizona and Incorporated Areas, Map Numbers: 04013C1570E, 04013C1590F, 04013C2035F, and 04013C2055E, all dated September 30, 1995, as published by the Federal Emergency Management Agency (FEMA). As shown on these FIRM panels, reproduced and shown on Plates 2.1, 2.2, 2.3, and 2.4, there exists significant major washes which have been recognized by FEMA as Special Flood Hazard Areas. These include portions or all of the following washes: the North Fork White Granite Wash, White Granite Wash, Diversion Dike Wash (formerly Caterpillar Dike Wash), Tractor Wash, Tuthill Dike Wash, Osborn Road Wash (formerly Caterpillar Wash), Bulldozer Wash, and Jackrabbit Trail Wash. Wherever possible, floodplain limits and 100-year discharges within these washes will be maintained as part of the proposed future development of the Property.

Based on the FEMA Flood Insurance Rate Maps, there are no alluvial fan zones indicated within the Property. The flood zones identified are Zone AE, Zone A, Zone X and Zone D, which are defined by FEMA as:

AE - Special Flood Hazard Areas inundated by 100-year flood, base flood elevations determined.

A - Special Flood Hazard Areas inundated by 100-year flood, no base flood elevations determined.

X - Areas determined to be outside 500-year flood plain.

D - Areas in which flood hazards are undetermined.

A review of the major drainage corridors entering the Property was conducted by JE Fuller/Hydrology & Geomorphology, Inc. for the purposes of identifying active alluvial fans. One area of braided or distributary flow was identified at the west Property boundary in Section 25, Township 2 North, Range 3 West. It was concluded that structural solutions would be necessary to protect the downstream areas from this potential break-out flow. Refer to Appendix D for the results of this investigation.

Onsite distributary flow areas will be identified as part of each Planning Unit Drainage Plan. Where structural solutions are necessary, they will be developed as part of the design phase.

1.6 Purpose of Report

The purpose of this report is to study the project site and set drainage requirements for the proposed development of the Property. The scope of this report is to provide a Master Drainage Plan for the Property; and as such, this report presents the results of the conceptual drainage design. Peak future discharges were determined at all basin concentration points and Property boundary locations. The hydrologic study results are presented in Sections 2.0 and 3.0.

The proposed drainage facilities for the Property are based on the future condition hydrologic analysis. The results of the drainage design are presented in Section 3.0.

A detailed analysis of the drainage system for each Planning Unit will occur with each Planning Unit Drainage Plan. Each Planning Unit Drainage Plan will address any increase or decrease in runoff from upstream Planning Units or within the current Planning Unit which may occure as development progresses and densities change.

2.0 HYDROLOGIC & HYDRAULIC ANALYSIS

2.1 Hydrologic Method Description

This section documents the engineering procedures and methodologies used to generate the existing and developed condition hydrologic models for this project. The results of the hydrologic models will be used in the conceptual design of the drainage facilities. Rainfall runoff models were developed for the entire watershed using the U.S. Army Corps of Engineers HEC-1 computer program, version 4.0.1E, dated May 1991.

The WLB Group, Inc. was contracted by the Flood Control District of Maricopa County to study this watershed. *The White Tanks Agua Fria Area Drainage Master Study* (Reference 3) was prepared by The WLB Group, Inc. in March 1995. This study includes topographic mapping, hydrology and hydraulics for the watershed. An existing condition 100-year, 24-hour duration HEC-1 model was also prepared as part of the White Tanks Agua Fria ADMS.

The existing WLB HEC-1 hydrologic model was used in determining the existing peak discharges for both onsite and offsite locations which may be affected by the proposed project development. The existing WLB HEC-1 hydrologic model utilized the Depth-Area Reduction factors used within NOAA Atlas 2. For rainfall losses, the Green & Ampt infiltration equation was used and S-graphs were used for the unit hydrograph generation. The existing conditions WLB HEC-1 hydrologic model was used as the base model for the proposed condition HEC-1 model. To provide an overview of the hydrologic results, applicable 100-year peak flows at all basin concentration points are summarized in Table 1.

TABLE 1

Summary of Existing Conditions 100-Year, 6hr Storm Peak Flows

HEC-1 ID	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs)	HEC-1 ID	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs)
4	0.30	339	38	0.76	715
5	0.72	716	39	0.77	588
6	0.45	591	40	0.52	525
7	0.31	390	41	0.58	567
9	1.40	1096	41A1	0.02	48
14	1.47	1163	41A2	0.03	60
15	1.26	1039	41A3	0.03	69
16	1.13	1255	41A	0.05	91
18	0.81	923	41-1	0.15	208
19	0.79	622	41-2	0.10	143
20	1.07	861	42	1.18	1029
21	0.79	688	43	0.01	23
22	0.57	525	43-1	0.04	76
22A	0.50	764	43-2	0.01	19
23	0.16	289	43-3	0.05	107
24	0.14	207	43-4	0.03	64
25	0.46	500	43-5	0.02	43
26	1.16	943	43-6	0.02	45
27	1.00	999	43-7	0.02	45
28	0.86	747	43-8	0.01	23
29	0.22	228	44	0.22	300
30	0.28	244	45	0.38	401
31	0.71	525	45.1	0.08	143
32	1.29	956	46	0.85	651
33	0.65	643	46.1	0.15	184
34	0.36	361	303A	0.42	531
35	0.39	400	WT#4	0.77	997
36	0.24	193	303	1.21	910
37	0.95	672			

Plate 3 shows the project area drainage map with delineated HEC-1 basins, and concentration points corresponding to the HEC-1 program output and Table 1.

Hard copies of the HEC-1 output files are provided in Appendix A for the existing condition model.

2.2 Future Land Use Characteristics

The proposed condition HEC-1 model was developed by increasing the percent impervious factor for each sub-basin in the existing condition HEC-1 model. The percent impervious factor was increased based on the proposed land use for the Property.

The proposed condition land use information was obtained from DMB. The hydrologic significance of each of the proposed seven (7) planning areas was determined. Each drainage basin was then analyzed with respect to hydrologic significance of the proposed planning area. The results have been detailed on Table 2, located on the following pages.

The increase in the impervious area on the Property resulted in an increase in both the peak flow and runoff volume. Numerous options were evaluated to mitigate the effects of the proposed development. The two most feasible options have been presented in Section 3.0.

These two options have been incorporated into the developed condition hydrologic model, with hard copies of the HEC-1 output files provided in Appendix B.

2.3 Existing Drainage Structures

The existing drainage system of the Property consists of several drainage structures, which will require specific attention in the proposed development design. These structures include the existing onsite storage basins; the existing roadway network, which acts as levees and controls the runoff flow direction south; the existing culvert network, which crosses I-10; and the White Tanks FRS No. 4. The Existing Condition Drainage Map (Plate 4) details the existing storage basins, runoff flow directions, and existing 100-year floodplain limits within the project boundaries.

There are ten separate excavated borrow pits within the Property that act as stormwater storage basins. These storage basins have capacities that range from 11 acre feet to 1,300 acre-feet. Some of the storage basins do not have the capacity to contain the entire 100-year runoff volume produced by the contributing watershed, while other storage basins have capacities far in excess of the contributing 100-year runoff volume. Table 3 summarizes the existing onsite storage basin data.

TABLE 2
PERCENT IMPERVIOUS
CALCULATIONS
FOR
CATERPILLAR PLANNING AREAS I-VII

HEC-I ID	D.A. (sq.mi.)	VII DVLP. AREA (sq.mi.)	% IMP.	VI DVLP. AREA (sq.mi.)	% IMP.	V DVLP. AREA (sq.mi.)	% IMP.	IV DVLP. AREA (sq.mi.)	% IMP.	III DVLP. AREA (sq.mi.)	% IMP.	II DVLP. AREA (sq.mi.)	% IMP.	I DVLP. AREA (sq.mi.)	% IMP.	% IMP. CHANGE	EXISTING % IMP.	TOTAL % IMP.
4	0.30	0.1	23													7.6	1	8.6
7	0.31	0	0													0	10	10
14	1.47	0	0													0	9	9
15	1.26	0	0													0	6.4	6.4
16	1.13			0.64	16.6											9.4	11.1	20.5
18	0.81	0.018	23	0.036	16.6											1.2	9.5	10.7
19	0.79			0.194	16.6											4.1	8.7	12.8
20	1.07			0.062	16.6	0.033	17									1.5	8.4	9.9
21	0.79			0.436	16.6											9.2	4.7	13.9
22	0.57			0.175	16.6											5.1	7.4	12.5
22A	0.50			0.357	16.6											11.9	1	12.9
23	0.16			0.046	16.6											4.7	10.6	15.3
24	0.14			0.007	16.6			0.133	31.7							30.9	0	30.9
25	0.46			0.176	16.6			0.284	31.7							25.9	0	25.9
26	1.16					0.634	17									9.3	3.1	12.4
27	1.00					0.678	17	0.28	31.7							20.4	0.3	20.7
28	0.86															0	0.1	0.1
29	0.22							0.22	31.7							31.7	0	31.7
30	0.28							0.28	31.7							31.7	0.2	31.9
31	0.71															0	0.2	0.2
32	1.29					0.085	17									1.1	10	11.1
33	0.65															0	10	10
34	0.36															0	10	10
35	0.39					0.096	17									4.2	10	14.2
36	0.24					0.185	17									13.1	1.1	14.2
37	0.95					0.071	17									1.3	8.4	9.7
38	0.76					0.534	17									11.9	4.5	16.4

TABLE 2
PERCENT IMPERVIOUS
CALCULATIONS
FOR
CATERPILLAR PLANNING AREAS I-VII

HEC-I ID	D.A. (sq.mi.)	VII DVLP. AREA (sq.mi.)	% IMP.	VI DVLP. AREA (sq.mi.)	% IMP.	V DVLP. AREA (sq.mi.)	% IMP.	IV DVLP. AREA (sq.mi.)	% IMP.	III DVLP. AREA (sq.mi.)	% IMP.	II DVLP. AREA (sq.mi.)	% IMP.	I DVLP. AREA (sq.mi.)	% IMP.	% IMP. CHANGE	EXISTING % IMP.	TOTAL % IMP.
39	0.77					0.109	17	0.533	31.7			0.043	61.7			27.8	0.2	30
40	0.52									0.149	38.3					11	7	18
41	0.58													0.021	80	2.9	0.3	3.2
41A1	0.02															0	0	0
41A2	0.03															0	0	0
41A3	0.03															0	0	0
41A	0.05															0	0	0
41-1	0.15															0	0	0
41-2	0.10															0	0.3	0.3
42	1.18							0.089	31.7	0.674	38.3	0.285	61.7			39.2	0.1	39.3
43	0.01													0.01	80	80	0.6	80.6
43-1	0.04													0.016	80	48.9	0.9	49.8
43-2	0.01													0.01	80	80	1.3	81.3
43-3	0.05													0.05	80	80	0.9	80.9
43-4	0.03													0.03	80	80	0.8	80.8
43-5	0.02													0.02	80	80	0	80
43-6	0.02													0.02	80	80	0	80
43-7	0.02													0.02	80	80	0	80
43-8	0.01													0.01	80	80	0	80
44	0.22															0	0	0
45	0.38															0	0.2	0.2
45.1	0.08															0	0.6	0.6
46	0.85															0	0.4	0.4
46.1	0.15															0	0.6	0.6
303A	0.42													0.044	80	8.3	0.1	8.4
WT#4	0.77															0	0.4	0.4
303	1.21													0.009	80	0.6	0.4	1

Table 3 - Existing Onsite Storage Basins

Basin ID#	Spillway Crest Elevation (ft)	Storage Capacity at Spillway Crest (ac.-ft.)	100-YR Runoff Volume (ac.-ft.)	100-YR Peak Inflow (cfs)	100-YR Peak Outflow (cfs)	100-YR Peak Stage (ft)
16	1250	1,300	86	1,255	0	1210
20	1469	176	54	861	0	1458
21	1347	96	101	1,933	191	1347.8
23	1305	645	34	288	0	1281.6
24	1243	283	9	207	0	1217.8
25	1213	13	22	1,414	1,374	1215.2
27	1213	11	15	1,648	1,642	1214.6
29	1177.5	55	9	228	0	1168.8
38	1297.5	39	51	3,253	3,220	1300.2
42	1095	70	142	7,140	6,601	1102.5

The total 100-year runoff volume contained in these onsite basins equals 421 acre-feet, which is the sum of the underlined numbers in Table 3.

There are numerous roadway embankments, channels, and levees constructed by Caterpillar that have altered the natural condition drainage patterns. It is important to note that, based on field observations, the existing roadway levees along Tuthill Dike Wash are not engineered levees and may experience potential damage during flow events. As a result, it is anticipated that in future design conditions, these levees will be upgraded to engineered levees, thus eliminating any possible damage to these structures during post-development flow events.

As stormwater runoff leaves the Property, it is directed south toward I-10. Numerous culverts, including concrete box culverts and pipe culverts, have been constructed to convey this flow under I-10. Many of these culverts have been designed to convey the 50-year rainfall event, and therefore numerous flow breakouts occur during the 100-year rainfall event. Summary Table 4 is a listing of the I-10 culverts, their

locations according to ADOT highway plans (REF #5) and their existing 100-year discharge values:

TABLE 4 - Interstate 10 Culvert Summary

HEC-1 BASIN ID	CULVERT SIZE	LOCATION	EXISTING Q100 (cfs)
1D303	1-30" CMP	6255+85	23
2D303	1-30" CMP	6261+65	24
3D303	1-30" CMP	6267+60	24
4D303	1-36" CMP	6273+88	23
5D303	2-36" CMPs	6288+25	45
6D303	2-42" CMPs	6305+22	33
7D303	2-36" CMPs	6315+00	47
1D303A	5-48" CMPs	6319+32 - 6324+32	282
2D303A	1-36" CMP	6326+40	10
3D303A	3-36" CMPs	6330+50 - 6340+10	23
DI43-4	2-36" CMPs	6343+25 - 6345+65	21
DI43-5	1-36" CMP	6349+45	19
DI43-6	1-36" CMP	6354+00	6
DI43-7	1-36" CMP	6357+00	20
DI43-8	1-36" CMP	6360+80	12
CP43	4-10'x8' RCBCs	6366+85	4061
DI45-1	1-12'x12' RCBC	6368+00 - 6375+20	325
	2-42" CMPs		--
	3-36" CMPs		--
DI45	9-36" CMPs	6379+84 - 6390+50	330
DI46-1	5-36" CMPs	6395+75 - 6400+60	118
SR46	5-10'x4' RCBCs	6419+30	1705

The majority of the discharge is conveyed to the White Tanks FRS No. 4 after crossing under I-10. As previously discussed, the White Tanks FRS No. 4 contains the entire 100-year flood within the reservoir with a 100-year storage volume of 628 acre-feet, and the 100-year water surface elevation approximately 7 feet below the spillway crest.

3.0 PROPOSED DRAINAGE SYSTEM

3.1 Drainage Design Considerations

The proposed drainage design has been prepared to focus on three primary goals:

1. Where possible, the existing drainage patterns will be maintained in their natural conditions and locations;

2. All post-development 100-year peak discharges leaving the Property will be maintained at or below their pre-development values;

3. The total post-development 100-year runoff volume will be accommodated within the proposed onsite design (Alternative 'A'), or within White Tanks FRS No. 4 (Alternative 'B'). The increase in 100-year runoff volume due to development has been calculated to be approximately 302 acre-feet for the proposed onsite design (Alternative 'A'). This volume is the difference between the proposed total onsite storage of 637 acre-feet, and the existing total onsite storage (excluding basin #16) of 335 acre-feet.

   Within White Tanks No. 4 (Alternative 'B') the additional 100-year runoff volume due to development has been calculated to be approximately 333 acre-feet. This volume is the difference between the proposed total runoff volume within White Tanks No. 4 of 961 acre-feet, and the existing White Tanks FRS No. 4 runoff volume of 628 acre-feet.

A summary of the locations where 100-year discharge values must be maintained in post-development conditions can be found in Table 5 on the following page. It is important to note that one of the primary constraints within the design alternatives is the I-10 culvert system (4 - 10' x 8' RCBCs) located at the intersection of Tuthill Dike Wash and I-10. In the existing condition, the majority of the 100-year discharge is conveyed under I-10 at this location, however, a significant split flow occurs to the east along the north side of I-10. This split flow is conveyed under I-10 as it continues east through a series of culverts. The flows reaching these culverts cannot be increased due to development of the Property.

Stormwater detention/retention will be accomplished by implementing one, or a combination of, the following three alternatives:

1. Utilizing the existing onsite storage basins, increase or decrease the volume of the basins to accommodate the 302 acre-feet increase in 100-year runoff volume due to development;

2. Relocate the existing onsite basins, providing more advantageous locations to accommodate the existing and post-development runoff volumes; and/or

3. Increase the volume of White Tanks FRS No. 4 to accommodate the 333 acre-feet increase in 100-year runoff volume from the proposed development of the Property.

TABLE 5 - 100-YEAR DISCHARGE SUMMARY

HEC-1 BASIN ID	CULVERT SIZE	LOCATION	EXISTING Q100 (cfs)	DESIGN 'A' Q100 (cfs)	DESIGN 'B' Q100 (cfs)
4	--	--	339	339	339
16	--	--	0	0	0
CP30	--	--	879	825	825
1D303	1-30" CMP	6255+85	23	23	23
2D303	1-30" CMP	6261+65	24	24	24
3D303	1-30" CMP	6267+60	24	24	24
4D303	1-36" CMP	6273+88	23	23	23
5D303	2-36" CMPs	6288+25	45	45	45
6D303	2-42" CMPs	6305+22	33	33	33
7D303	2-36" CMPs	6315+00	47	47	47
1D303A	5-48" CMPs	6319+32 - 6324+32	282	282	282
2D303A	1-36" CMP	6326+40	10	10	10
3D303A	3-36" CMPs	6330+50 - 6340+10	23	23	23
DI43-4	2-36" CMPs	6343+25 - 6345+65	21	21	21
DI43-5	1-36" CMP	6349+45	19	19	19
DI43-6	1-36" CMP	6354+00	6	6	6
DI43-7	1-36" CMP	6357+00	20	20	20
DI43-8	1-36" CMP	6360+80	12	12	12
CP43	4-10'x8' RCBCs	6366+85	4061	1355	3724
DI43			1441	0	644
DI45-1	1-12'x12' RCBC	6368+00 - 6375+20	325	105	220
	2-42" CMPs		--		
	3-36" CMPs		--		
DI45	9-36" CMPs	6379+84 - 6390+50	330	206	323
DI46-1	5-36" CMPs	6395+75 - 6400+60	118	105	105
SR46	5-10'x4' RCBCs	6419+30	1705	1702	1702
44	--	--	300	300	300
CP303A	--	--	531	530	516
CP303	--	–	911	911	911

3.2 Proposed Drainage Alternative Designs:

As mentioned before, numerous options were evaluated to mitigate the effects of the proposed development. The two most feasible options have been presented in this report: Design Alternative 'A' and Design Alternative 'B'.

Please note that within both design options, the basins are only tentatively located with the possibility that changes in location may occur as more detailed land planning information becomes available.

3.2.1 Design Alternative 'A'

The primary purpose of Design Alternative 'A' is to provide an alternative that has NO increase in the peak discharge rate or runoff volume to the White Tanks FRS No. 4. As shown on Plate 5, "Design Alternative 'A'", the three primary drainage design considerations were met within this proposed design.

The design consists of seven onsite detention/retention basins. Six of the proposed detention/retention basins were designed as off-line basins and one basin was designed as an on-line basin (which may be changed to an off-line basin). All basins were modeled assuming the increase in discharge due to development would be retained onsite, and **not** drained to the White Tanks FRS No. 4 during the dewatering of the retention basins.

A summary of the requirements for each of the seven onsite detention/retention basins has been provided in Table 6. These requirements satisfy the overall objective of not increasing the existing runoff volume reaching the White Tanks FRS No. 4, and maintaining the existing peak discharge rates.

Table 6 - Alternative 'A'

Detention/Retention Volume Requirements for Post-Development Conditions

Basin ID	Basin Type	100-YR Runoff Volume (ac.-ft.)	100-YR Peak Inflow (cfs)	100-YR Peak Bypass (cfs)
#21	ON-LINE	206	2776	0
#22	OFF-LINE	16	453	100
#25	OFF-LINE	31	603	700
#26	OFF-LINE	38	811	200
#29	OFF-LINE	30	935	825
#38	OFF-LINE	144	2990	400
#40	OFF-LINE	11	370	206
#42	OFF-LINE	161	2978	1355
	TOTAL	637		

The benefits of Alternative 'A' are shown by significantly reducing the 4,061 cfs existing 100-year discharge to White Tanks FRS No. 4 (Table 5, Peak Discharge Summary), to 1,355 cfs for post-development conditions. In addition, Alternative 'A' eliminates the flow split to the east, at the I-10 culvert system (4-10' x 8' RCBCs) intersection location with Tuthill Dike Wash, and thus significantly reduces the flooding potential of the land along the north side of the Interstate, east of the Property.

The primary drawback of Alternative 'A' is the significant amount of land which must be utilized to store the runoff volume onsite.

3.2.2 Design Alternative 'B'

The primary purpose of Design Alternative 'B' was to convey the maximum amount of runoff volume to the White Tanks FRS No. 4, while maintaining the existing peak discharge rates leaving the Property. As shown on Plate 6,

"Design Alternative 'B'", the three primary drainage design considerations outlined in Section 3.1 were met within this proposed design.

The design consists of seven onsite detention/retention basins. All seven proposed basins were designed as off-line basins. All basins were modeled assuming the increase in discharge due to development would be retained onsite, and **not** drained to the White Tanks FRS No. 4 during the dewatering of the retention basins.

A summary of the requirements for each of the seven onsite detention/retention basins has been provided in Table 7. These requirements satisfy the overall objective of increasing the runoff volume while maintaining the existing discharges to White Tanks FRS No. 4. The post-development discharges are shown on Table 5, Peak Discharge Summary.

Table 7 - Alternative 'B'
Onsite Detention/Retention Volume Requirements for Post-Development Conditions

Basin ID	Basin Type	100-YR Runoff Volume (ac.-ft.)	100-YR Peak Inflow (cfs)	100-YR Peak Bypass (cfs)
#21	OFFLINE	71	1976	800
#22	OFFLINE	6	253	300
#25	OFFLINE	31	713	1300
#26	OFFLINE	22	611	400
#29	OFF-LINE	30	935	825
#38	OFFLINE	62	1890	1500
#40	OFFLINE	3	176	400
#42	OFFLINE	71	2037	4275
	TOTAL	296		

The benefits of Alternative 'B' can be seen from the significantly reduced onsite retention volume, which translates into a reduction in onsite land area requirements.

The primary drawback of Alternative 'B' is the significant additional increase in the runoff volume reaching White Tanks FRS No. 4. It may be necessary to excavate additional storage capacity within the White Tanks FRS No. 4 to accommodate this increase in runoff volume. Coordination and cooperation with the FCDMC will be necessary to utilize the White Tanks FRS No. 4 for the additional storage capacity associated with Alternative "B".

3.2.3 Retention Dewatering Alternatives

One important consideration in the design of the retention basins is the ability to dewater the basins within a reasonable period of time.

If the basins are allowed to drain into the existing channels, it may result in additional runoff volume reaching the White Tanks FRS No. 4. Since there is currently no low-flow outfall from White Tanks FRS No. 4, this could create an overburden to the structure.

Percolation tests were performed to determine the infiltration rates that could be expected from the proposed retention basins. Western Technologies, Inc. (WT) performed five shallow pit percolation tests. The results of the tests are presented in Appendix C. Percolation rates were determined to be approximately 0.16 (cubic feet/hour)/square foot. This equates to the ability to drain a basin 5.9 feet deep within a 36 hour time period. We applied a 50% reduction factor to this rate to account for anticipated decrease in effectiveness over time. Therefore, the maximum ponding depth has been set at 2.9 feet in order to drain within a 36 hour time period. To accommodate these percolation rates, the surface areas of the basins have been adjusted to maintain the proposed retention volume at the maximum depth. Where the depth of a basin exceeds 2.9 feet, another method of dewatering/treatment will need to be implemented.

One such means of dewatering the basins is to use the natural wash bed transmission losses. As was revealed during field investigations, the existing washes have relatively wide channel beds with sandy bottoms, which cover long distances before reaching the White Tanks FRS No. 4. These washes exhibit a high potential for infiltration to occur into the channel beds when draining the retention basins.

Wash bed transmission losses were analyzed for each proposed basin and their respective downstream wash characteristics and reach lengths. As shown within Appendix C and on Table 8, the results of the analysis indicate that over a 36 hour period, a percentage of the retention volume can be dewatered by utilizing the wash bed transmission losses. The calculation of transmission losses is done only after the initial losses are satisfied and the seepage has reached a constant rate. Thus, in conjunction with the retention basin infiltration losses, dewatering the basins can occur with a small bleed off pipe at a rate equal to the transmission losses over the length of the downstream drainage reach, with no additional runoff volume expected to enter White Tanks FRS No. 4. As a result, ponding depths can be increased from the maximum ponding depth of 2.9 feet, to depths ranging between 3.6 feet and 12.8 feet, depending on the location of the retention basins.

If percolation rates diminish over time, and basins fail to drain in 36 hours, the implementation of other means of dewatering may be necessary. These options may include: french drains, leach fields, rock filled trenches, and/or drywells. French drains may be utilized in order to obtain an increased infiltration rate within the proposed retention basins. In order to implement such a technique, trenches would need to be excavated within the proposed retention basins, to a depth where a gravel layer exists. The excavated trenches will then be backfilled with rock over a layer of filter fabric. This technique increases the rate of infiltration by directly recharging the water into a more porous material.

In addition, other options can be evaluated to allow standing water for periods in excess of 36 hours. These options may include, among others, the creation of a recreational lake that can be surcharged for stormwater storage, or the use of chemical treatments to control mosquito larvae on an interim basis.

TABLE 8
RETENTION BASIN REQUIREMENTS
W/TRANSMISSION LOSSES
FOR
ALTERNATIVES "A" AND "B"

BASIN ID	Total Volume (ac.-ft.)	ALT. "A" Volume of Transmission Losses (ac.-ft.)	ALT "A" Depth (ft.)	ALT "A" Surface Area w/Transmission Losses (acres)	ALT "A" Discharge Outlet (cfs)	ALT "B" Surface Area w/Transmission Losses (acres)	ALT "B" Volume of Transmission Losses (ac.-ft.)	ALT "B" Depth (ft.)	ALT "B" Discharge Outlet (cfs)
#16	101	0	3.5	40.4	0	40.4	0	3.5	0
#21	71	41.0	4.5	66.0	13.8	12.0	41.0	9.2	13.8
#22	6	2	4.4	5.3	1.0	1.3	2.8	7.0	1.0
#25	31	8.0	5.0	9.2	2.7	9.2	8.0	5.0	2.7
#26	22	16.0	6.5	8.8	5.4	3.0	16.0	12.8	5.4
#29	30	0	3.5	12.0	0	12.0	0	3.5	0
#38	62	41.0	5.2	41.2	13.8	8.5	41.0	12.8	13.8
#40	3	2.8	4.9	3.3	1.0	0.6	2.8	12.8	1.0
#42	71	0	3.5	64.4	0	28.4	0	3.5	0
TOTAL	397	111.6	--	250.6	--	114.6	111.6	--	--

do basins fall within ADWR jurisdiction?

3.3 Other Drainage Areas

As shown on Plate 3, "HEC-1 Schematic", there are areas of the Property that do not drain to the White Tanks FRS No. 4. These areas include drainage basins #4, #7, #14, #15, #16 and approximately the west half of Sections 3 & 10, Township 2 North, Range 3 West.

Four of the five drainage basins (basins #4, #7, #14, & #15) are located in the highlands of the White Tanks FRS No. 3 drainage areas. Drainage basin #4 will require a small detention/retention basin to maintain the existing 100-year discharge of 339 cfs and 100-year runoff volume leaving the Property. Basin #16 will require a retention basin to maintain the existing 100-year condition of no discharge (which was analyzed within the proposed drainage design alternatives).

Finally, approximately the west half of Sections 3 & 10, Township 2 North, Range 3 West, drains to the west. This area consists of steep mountain slopes.

We have assumed that basins #7, #14, #15, and the west half of Sections 3 & 10, Township 2 North, Range 3 West, would maintain the same hydrologic conditions as currently exist. In the event that these assumptions are not correct, development of these areas will require small local detention/retention basins to maintain the existing 100-year discharge and runoff volume leaving the Property.

Thus, no increase in the existing 100-year peak discharge or runoff volume will occur in those areas due to the proposed development of the Property.

3.4 Drainage Design Criteria

The design criteria used in this Master Drainage Plan for the Property development is based on the Town of Buckeye's design standards, as verified during meetings with the Town Engineer. Table 9 summarizes the major design criteria utilized.

Table 9 - Drainage Design Criteria

Drainage Feature	Peak Frequencies		
	10-Year	50-Year	100-Year
Local Streets & Minor Collectors	Runoff contained within street curbs. Dip crossings are allowed if located upstream of basins.	N/A	Runoff to be confined to right-of-way or to drainage easements. Flow to be a maximum of 100 cfs, 10 fps and 12-inch depth above the low point in street. Runoff to be contained 12-inches below the finished floor of adjacent buildings.
Major Collectors and all Arterials	One 12-foot dry lane must be maintained in each direction.	N/A	Same as Local Streets, except no dip crossings allowed.
Storm Drain Systems	Pipes or roadway channels are added if the 10-year runoff exceeds street capacity.	N/A	Catch basins, scuppers and curb openings are to be provided to remove water so as not to exceed the 12-inch maximum depth.
Culvert for Principal Arterials	N/A	N/A	Runoff to be conveyed by culvert under road with no flow over the road.
Culvert for Major Collectors & Minor Arterials	N/A	Runoff to be conveyed by culvert under road with no flow over the road.	Runoff to be conveyed by culvert and by flow over the road with maximum 6-inch flow depth.
Culvert for Local Streets & Minor Collectors	Runoff to be conveyed by culvert with no flow over the road.	25-year storm: runoff to be conveyed by culvert and by flow over the road with a maximum 6-inch flow depth.	Maximum flow depth over road is 12-inches.

Basins will be designed to retain the increase in runoff volume due to development during the 100-year, two-hour storm event where ponding depths are less than or equal to four feet. Where ponding depths are less than or equal to four feet, side slopes within retention/detention basins will be no steeper than four to one (4:1).

Steeper slopes will be allowed when justified by adequate engineering analysis and documentation, subject to approval by the Town Engineer. Where ponding depths are greater than four feet, the basin slopes above the four foot ponding elevation must transition to no steeper than a six to one (6:1) side slope. In multiple use areas, such at retention/detention within golf courses or community parks, the side slopes will vary depending on depth and location, but will never be steeper than the preceding maximum slopes.

4.0 CONCLUSIONS

Based on the results of the study, it can be concluded that:

- The drainage infrastructure will be designed in accordance with the appropriate requirements defined within this report. For situations not addressed within this report, the Town of Buckeye criterion will be used for drainage facility design.

- Detention/retention will be provided to maintain the 100-year stormwater flows leaving the Property at or below existing peak flow rates.

- Additional storage volume will be provided to insure that the post-development peak runoff volumes are less than or equal to the pre-development peak runoff volumes leaving the Property.

- Where possible, the existing 100-year water surface elevations and 100-year floodplain limits will not be increased due to development. Where modifications to these floodplains are necessary, processing will be required through FEMA in the form of Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR) submittals.

The Master Drainage Plan for the Property provides the assurance that the individual Planning Unit Drainage Plans will adhere to all appropriate review agencies' criterion, while insuring the protection and safety of the proposed development and all adjacent land owners from any possible future flooding.

5.0 REFERENCES

1. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona; Volume I-Hydrology*, revised January 1995.

2. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona; Volume II- Hydraulics*, January 1996.

3. The WLB Group, Inc., *The White Tank Agua Fria Area Drainage Master Plan, Part B*, March 1995.

4. Wood, Patel & Associates, Inc., *Summary Report Due Diligence Caterpillar Site*, October 1998.

5. Arizona Department of Transportation, *Ehrenberg - Phoenix Hwy. Cemetery Rd. - Perryville Rd. Maricopa County*, I-10-2 (31), November 1974.

6. U.S. Department of Agriculture, Soil Conservation Service, National Engineering Handbook, *Section 4, Hydrology, Chapter 19, Transmission Losses*, March 1983.

APPENDICES

APPENDIX A

HEC-1 Existing Conditions Computer Output Files

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            MAY   1991                 *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  04/12/99  TIME  17:16:03   *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID
  2           ID
  3           ID        FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
  4           ID        100-YEAR, 24-HOUR STORM                          WTADMS.24
  5           ID
  6           ID        EXISTING CONDITIONS FOR CATERPILLAR PROPERTY EXTRACTED
  7           ID        FROM WHITE TANKS ADMS    3/30/99        FILE: CATADMS2.DAT
  8           ID
  9           ID
              *DIAGRAM
 10           IT       5                    800
 11           IO       5
 12           IN      15
 13           JD    4.03     .001
 14           PC    .000     .002     .005     .008     .011     .014     .017     .020     .023     .026
 15           PC    .029     .032     .035     .038     .041     .044     .048     .052     .056     .060
 16           PC    .064     .068     .072     .076     .080     .085     .090     .095     .100     .105
 17           PC    .110     .115     .120     .126     .133     .140     .147     .155     .163     .172
 18           PC    .181     .191     .203     .218     .236     .257     .283     .387     .663     .707
 19           PC    .735     .758     .776     .791     .804     .815     .825     .834     .842     .849
 20           PC    .856     .863     .869     .875     .881     .887     .893     .898     .903     .908
 21           PC    .913     .918     .922     .926     .930     .934     .938     .942     .946     .950
 22           PC    .953     .956     .959     .962     .965     .968     .971     .974     .977     .980
 23           PC    .983     .986     .989     .992     .995     .998     1.00    1.000    1.000    1.000
 24           JD    3.99       10
 25           JD    3.83       50
 26           JD    3.76      100
 27           JD    3.70      200

 28           KK       4
 29           KM        RUNOFF HYDROGRAPH FORM SUB-BASIN 4.
 30           KO       1
 31           BA     .30
 32           LG     .20      .30     3.87      .77     1.00
 33           UI     48.     192.     287.     444.     512.     346.     236.     115.      67.      35.
 34           UI     14.      14.      0.       0.       0.       0.       0.       0.       0.       0.
 35           UI      0.       0.      0.       0.       0.       0.       0.       0.       0.       0.

 36           KK       5
 37           KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 5.
 38           BA     .72
 39           LG     .20      .34     3.27     1.11     9.20
 40           UI    110.     437.     658.     992.    1242.     849.     591.     315.     174.     101.
 41           UI     34.      34.      34.      0.       0.       0.       0.       0.       0.       0.
 42           UI      0.       0.      0.       0.       0.       0.       0.       0.       0.       0.

 43           KK     CP5
 44           KM        ADD HYDROGRAPHS AT CP5.
 45           HC       2
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1 HEC-1 INPUT PAGE 2

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 46           KK    RCP5
 47           KM        ROUTE COMBINED HYDROGRAPHS AT CP5 TO CP7.
 48           RL                      .5    2800
 49           RS       1              -1       0
 50           RC     .08      .05     .08    4800   .0833
 51           RX     955      970     985    1000    1020    1035    1050    1065
 52           RY    2815     2810    2805    2800    2800    2805    2810    2815

 53           KK       6
 54           KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 6.
 55           BA     .45
 56           LG     .20      .34     3.21     1.14    10.00
 57           UI    204.     622.    1139.     837.     427.     155.      54.      33.       0.       0.
 58           UI      0.       0.      0.       0.       0.       0.       0.       0.       0.       0.

 59           KK   I1CP7
 60           KM        ADD HYDROGRAPHS AT CP7.
 61           HC       2

 62           KK       7
 63           KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 7.
 64           BA     .31
 65           LG     .20      .34     3.21     1.14    10.00
 66           UI    126.     387.     716.     606.     343.     129.      52.      22.       0.       0.
 67           UI      0.       0.      0.       0.       0.       0.       0.       0.       0.       0.
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 68          KK     CP7
 69          KM        ADD HYDROGRAPHS AT CP7.
 70          HC       2

 71          KK    RCP7
 72          KM        ROUTE COMBINED HYDROGRAPHS AT CP7 TO CP9.
 73          RL                     .5    1838
 74          RS       3             -1       0
 75          RC     .08     .05     .08   10200  .07745
 76          RX    1000    1045    1120    1195    1230    1300    1350    1450
 77          RY    1910    1880    1850    1838    1838    1850    1880    1910

 78          KK       9
 79          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 9.
 80          BA    1.40
 81          LG     .20     .34    3.24    1.12    9.70
 82          UI    155.    381.    727.    935.   1216.   1832.   1591.   1224.    938.    705.
 83          UI    386.    261.    177.    115.     47.     47.     47.     47.      0.      0.
 84          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 85          KK   I1CP9
 86          KM        ADD HYDROGRAPHS AT CP9.
 87          HC       2
1                                   HEC-1 INPUT                                          PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 88          KK      14
 89          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 14.
 90          BA    1.47
 91          LG     .20     .34    3.24    1.12    9.00
 92          UI    166.    421.    790.   1019.   1341.   1998.   1636.   1264.    961.    699.
 93          UI    362.    274.    166.     93.     51.     51.     51.      0.      0.      0.
 94          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 95          KK   RCP14
 96          KM        ROUTE FLOW FROM CP14 TO CP15.
 97          RL                    2.0    1194
 98          RS       4             -1       0
 99          RC     .06    .035     .06    8800  .02556
100          RX    1000    1030    1075    1200    1220    1280    1415    1480
101          RY    1296    1295    1294    1288    1288    1294    1296    1300

102          KK      15
103          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 15.
104          BA    1.26
105          LG     .18     .33    3.58     .86    6.40
106          UI    130.    281.    577.    747.    938.   1321.   1552.   1156.    920.    713.
107          UI    519.    277.    217.    138.     93.     40.     40.     40.     40.      0.
108          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
109          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

110          KK  I1CP15
111          KM        ADD HYDROGRAPHS AT CP15
112          HC       2

113          KK      16
114          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 16.
115          KO       1
116          BA    1.13
117          LG     .17     .32    4.08     .41   11.10
118          UI    115.    240.    503.    652.    814.   1126.   1393.   1049.    839.    655.
119          UI    497.    268.    194.    137.    101.     35.     35.     35.     35.      0.
120          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
121          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

122          KK    SR16
123          KM        STORAGE ROUTE THROUGH THE CATERPILLAR DETENTION BASIN IN SUBWATERSHED 16
124          RS       1    STOR       0       0
125          SV       0       1      31     114     270     502     807    1319    1776    1908
126          SQ       0                                                                    4050
127          SE    1198    1200    1210    1220    1230    1240    1250    1260    1266    1267

128          KK    CP15
129          KM        ADD HYDROGRAPHS AT CP15.
130          HC       2
1                                   HEC-1 INPUT                                          PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


131          KK   RCP15
132          KM        ROUTE COMBINED HYDROGRAPHS AT CP15 TO CP17.
133          RL                    2.0    1226
134          RS       3             -1       0
135          RC     .06    .035     .06    6800   .0079
136          RX    1000    1310    1380    1540    1640    1670    1700    1910
137          RY    1234    1232    1228    1226    1226    1228    1232    1235

138          KK      18
139          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 18.
140          BA     .81
141          LG     .20     .34    3.25    1.12    9.50
142          UI    213.    719.   1128.   1731.   1159.    722.    301.    171.     49.     47.
143          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
144          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

145          KK     R18
146          KM        ROUTE FLOW FROM CP18 TO CP19.
147          RS       2             -1       0
148          RC     .08     .05     .08    7800   .0615
149          RX    1000    1030    1080    1097    1120    1140    1205    1218
150          RY    1520    1518    1514    1510    1510    1512    1518    1520

151          KK      19
152          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 19.
153          BA     .79
154          LG     .19     .33    3.31    1.07    8.70
155          UI     84.    195.    385.    496.    632.    936.    940.    708.    553.    427.
156          UI    278.    147.    120.     84.     32.     26.     26.     26.      0.      0.
157          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

158          KK    CP19
159          KM        ADD HYDROGRAPHS AT CP19.
160          HC       2
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 161          KK     R19
 162          KM        ROUTE COMBINED HYDROGRPAH AT CP19 TO CP21.
 163          RS       2              -1       0
 164          RC     .06     .04     .06    5772   .0246
 165          RX    1000    1010    1025    1040    1055    1069    1080    1100
 166          RY    1466    1464    1460    1458    1458    1460    1466    1467

 167          KK      21
 168          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 21.
 169          BA     .79
 170          LG     .19     .31    3.81     .78    4.70
 171          UI     84.    191.    380.    491.    623.    915.    948.    711.    558.    430.
 172          UI    291.    149.    124.     84.     37.     26.     26.     26.      0.      0.
 173          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 174          KK  I1CP21
 175          KM        ADD HYDROGRAPHS AT CP21.
 176          HC       2

 177          KK      20
 178          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 20.
 179          BA    1.07
 180          LG     .19     .33    3.33    1.05    8.40
 181          UI    119.    294.    560.    721.    938.   1414.   1211.    931.    714.    535.
 182          UI    286.    200.    132.     83.     36.     36.     36.     36.      0.      0.
 183          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 184          KK    SR20
 185          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP20.
 186          RS       1    STOR       0       0
 187          SV       0    1.05    9.43   26.91   54.31   92.89  138.67  176.47  190.08  219.05
 188          SV  249.57
 189          SQ       0       0       0       0       0       0       0       0     265    1377
 190          SQ    2963
 191          SE    1443    1446    1450    1454    1458    1462    1466    1469    1470    1472
 192          SE    1474

 193          KK     R20
 194          KM        ROUTE REMAINDER OF FLOW AT CP20  TO CP21
 195          RS       4              -1       0
 196          RC     .06    .045     .06    6240   .0208
 197          RX    1000    1012    1025    1032    1050    1057    1070    1092
 198          RY    1424    1422    1420    1418    1418    1420    1422    1424

 199          KK    CP21
 200          KM        ADD HYDROGRAPHS AT CP21.
 201          HC       2

 202          KK    SR21
 203          KM         STORAGE ROUTE THROUGH RETENTION BASIN AT CP21
 204          RS       1    STOR       0       0
 205          SV       0     .68   20.68   57.58   95.91  102.34  117.65     130
 206          SQ       0       0       0       0       0     265    1377    2000
 207          SE    1319    1320    1330    1340    1347    1348    1350    1351

 208          KK     R21
 209          KM        ROUTE REMAINDER OF FLOW AT CP21 TO CP23
 210          RS       1              -1       0
 211          RC     .03     .03     .05    2340   .0196
 212          RX    1000    1030    1050    1070    1145    1212    1225    1250
 213          RY    1310    1306    1304    1302    1302    1304    1306    1310

 214          KK      23
 215          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 23.
 216          BA     .16
 217          LG     .18     .32    4.04     .65   10.60
 218          UI    111.    327.    471.    228.     68.     20.      0.      0.      0.      0.
 219          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 220          KK    CP23
 221          KM        ADD HYDROGRAPHS AT CP23
 222          HC       2

 223          KK    SR23
 224          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP23.
 225          RS       1    STOR       0       0
 226          SV       0    6.04   20.38   53.82  120.38  216.24  325.98  455.42   606.1  645.49
 227          SV  685.61  767.98
 228          SQ       0       0       0       0       0       0       0       0       0       0
 229          SQ     928    8950
 230          SE    1272    1276    1280    1284    1288    1292    1296    1300    1304    1305
 231          SE    1306    1308

 232          KK     R23
 233          KM        ROUTE REMAINDER OF FLOW AT CP23 TO CP22A
 234          RS       4              -1       0
 235          RC     .05     .03     .05    4992    .005
 236          RX     930     975    1000    1010    1030    1040    1041    1042
 237          RY    1397  1396.5    1396    1394    1394    1396  1396.5    1397

 238          KK      22
 239          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 22
 240          BA     .57
 241          LG     .19     .33    3.38    1.03    7.40
 242          UI     77.    258.    418.    563.    888.    745.    546.    395.    215.    129.
 243          UI     79.     34.     24.     24.      0.      0.      0.      0.      0.      0.
 244          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 245          KK     R22
 246          KM        ROUTE FLOW FROM CP22 TO CP22A
 247          RS       3              -1       0
 248          RC     .05     .03     .05    6230    .025
 249          RX    1000    1030    1060    1070    1100    1115    1125    1150
 250          RY    1294    1292    1290    1288    1288    1290    1292    1294

 251          KK     22A
 252          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 22A
 253          BA     .50
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 254          LG     .15     .29    3.74     .29    1.00
 255          UI     74.    286.    436.    640.    862.    603.    424.    253.    126.     79.
 256          UI     30.     23.     23.      0.      0.      0.      0.      0.      0.      0.
 257          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 258          KK  I1C22A
 259          KM        ADD HYDROGRAPHS AT CP22A
 260          HC       2

 261          KK   CP22A
 262          KM        ADD HYDROGRAPHS AT CP22A
 263          HC       2
1                                        HEC-1 INPUT                                          PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 264          KK    R22A
 265          KM        ROUTE COMBINED HYDROGRAPHS AT CP22A TO CP25
 266          RS       4              -1       0
 267          RC     .03     .03     .05    7022   .0079
 268          RX    1000    1030    1040    1047    1070    1097    1120    1200
 269          RY    1255    1254    1250    1248    1250    1252    1254    1255

 270          KK      25
 271          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 25
 272          BA     .46
 273          LG     .15     .31    4.27     .49     .00
 274          UI     53.    137.    254.    327.    437.    640.    505.    389.    295.    207.
 275          UI    106.     80.     53.     22.     16.     16.     16.      0.      0.      0.
 276          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 277          KK  I1CP25
 278          KM        ADD HYDROGRAPHS AT CP25
 279          HC       2

 280          KK      24
 281          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 24
 282          BA     .14
 283          LG     .35     .31    3.77     .31     .00
 284          UI     21.     85.    128.    193.    241.    165.    115.     61.     34.     20.
 285          UI      7.      7.      7.      0.      0.      0.      0.      0.      0.      0.
 286          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 287          KK    SR24
 288          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP24
 289          RS       1    STOR       0       0
 290          SV       0     .46    2.96    16.6      86  221.55  282.99  306.59  357.02
 291          SQ       0       0       0       0       0       0       0      50    2598
 292          SE    1210    1214    1216    1220    1230    1240    1243    1244    1246

 293          KK     R24
 294          KM        ROUTE REMAINDER OF FLOW AT CP24 TO CP25
 295          RS       1              -1       0
 296          RC     .05     .03     .05    1326    .021
 297          RX    1000    1040    1070    1100    1200    1220    1245    1265
 298          RY    1234    1232    1230    1228    1228    1230    1232    1234

 299          KK    CP25
 300          KM        COMBINE HYDROGRAPHS AT CP25
 301          HC       2

 302          KK    SR25
 303          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP25
 304          RS       1    STOR       0       0
 305          SV       0    5.61   10.27   13.15   16.62   26.62
 306          SQ       0       0       0       0     125    2273
 307          SE    1204    1210    1212    1213    1214    1216
1                                        HEC-1 INPUT                                          PAGE  8

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 308          KK      26
 309          KM        RUNOFF FROM SUB-BASIN 26
 310          BA    1.16
 311          LG     .17     .30    3.97     .68    3.10
 312          UI    103.    163.    401.    532.    639.    787.   1092.   1251.    956.    788.
 313          UI    637.    510.    359.    200.    171.    117.     99.     32.     32.     32.
 314          UI     32.     32.      0.      0.      0.      0.      0.      0.      0.      0.
 315          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 316          KK     R26
 317          KM        ROUTE FLOW FROM CP26 TO CP27
 318          RS       4              -1       0
 319          RC     .05     .03     .05    7020   .0157
 320          RX    1000    1012    1025    1040    1090    1105    1112    1120
 321          RY    1250    1248    1245    1242    1242    1244    1247    1250

 322          KK      27
 323          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 27
 324          BA    1.00
 325          LG     .15     .31    4.27     .48     .30
 326          UI    101.    206.    438.    567.    705.    970.   1225.    936.    750.    587.
 327          UI    450.    256.    172.    129.     99.     31.     31.     31.     31.      0.
 328          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 329          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 330          KK  I1CP27
 331          KM        ADD HYDROGRAPHS AT CP27
 332          HC       2

 333          KK    SR27
 334          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP27
 335          RS       1    STOR       0       0
 336          SV       0     .13    5.77    9.37   11.42   13.71   19.21
 337          SQ       0       0       0       0       0     550    4546
 338          SE    1203    1204    1210    1212    1213    1214    1216

 339          KK    CP27
 340          KM        ADD REMAINING FLOW OF CP25 & CP27 AT CP27
 341          KO       1
 342          HC       2

 343          KK     R27
 344          KM        ROUTE COMBINED REMAINDER FLOW AT CP27 TO CP39
 345          RS       3              -1       0
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346          RC     .03     .03     .05    5928   .0084
347          RX    1000    1010    1020    1025    1055    1085    1175    1250
348          RY    1210    1210    1210    1202    1202    1204    1206    1208

349          KK      34
350          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 34
351          BA     .36
352          LG     .20     .34    3.21    1.14   10.00
353          UI     57.    229.    343.    530.    615.    416.    284.    139.     81.     43.
354          UI     17.     17.      0.      0.      0.      0.      0.      0.      0.      0.
1                                         HEC-1 INPUT                                          PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

355          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

356          KK      33
357          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 33
358          BA     .65
359          LG     .20     .34    3.21    1.14   10.00
360          UI     99.    392.    591.    888.   1120.    769.    535.    290.    159.     93.
361          UI     30.     30.     30.      0.      0.      0.      0.      0.      0.      0.
362          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

363          KK    CP33
364          KM        ADD HYDROGRAPHS AT CP33
365          HC       2

366          KK     R33
367          KM        ROUTE COMBINED HYDROGRAPHS AT CP33 TO CP35
368          RS       2              -1       0
369          RC     .08     .05     .08    4680   .0427
370          RX    1000    1015    1022    1035    1050    1068    1092    1100
371          RY    1800    1760    1720    1680    1680    1720    1760    1800

372          KK      35
373          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 35
374          BA     .39
375          LG     .20     .34    3.21    1.14   10.00
376          UI     72.    272.    410.    672.    631.    428.    270.    119.     74.     28.
377          UI     20.     20.      0.      0.      0.      0.      0.      0.      0.      0.
378          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

379          KK  I1CP35
380          KM        ADD HYDROGRAPHS AT CP35
381          HC       2

382          KK      32
383          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 32
384          BA    1.29
385          LG     .20     .34    3.21    1.14   10.00
386          UI    130.    270.    570.    738.    919.   1268.   1585.   1202.    963.    753.
387          UI    575.    317.    221.    161.    121.     40.     40.     40.     40.      0.
388          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
389          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

390          KK    CP35
391          KM        ADD HYDROGRAPHS AT CP35
392          HC       2

393          KK     R35
394          KM        ROUTE COMBINED HYDROGRAPHS AT CP35 TO CP36
395          RS       2              -1       0
396          RC     .06    .035     .06    5070   .0355
397          RX    1000    1012    1023    1034    1045    1056    1067    1079
398          RY    1429    1428    1426    1424    1424    1426    1428    1429
1                                         HEC-1 INPUT                                          PAGE 10

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

399          KK      36
400          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 36
401          BA     .24
402          LG     .16     .34    2.38    1.41    1.10
403          UI     34.    127.    197.    278.    409.    297.    212.    140.     65.     43.
404          UI     22.     11.     11.      0.      0.      0.      0.      0.      0.      0.
405          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

406          KK  I1CP36
407          KM        ADD HYDROGRAPHS AT CP36
408          HC       2

409          KK      37
410          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 37
411          BA     .95
412          LG     .19     .34    3.24    1.08    8.40
413          UI     90.    167.    373.    488.    598.    764.   1104.    941.    747.    598.
414          UI    475.    344.    190.    151.    103.     81.     28.     28.     28.     28.
415          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
416          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

417          KK    CP36
418          KM        ADD HYDROGRAPHS AT CP 36
419          HC       2

420          KK     R36
421          KM        ROUTE COMBINED HYDROGRAPHS AT CP36 TO CP38
422          RS       2              -1       0
423          RC     .05     .03     .05    4836   .0198
424          RX    1000    1008    1020    1032    1050    1112    1135    1183
425          RY    1344    1342    1340    1338    1338    1340    1342    1344

426          KK      38
427          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 38
428          BA     .76
429          LG     .17     .34    3.21     .97    4.50
430          UI    103.    354.    568.    770.   1209.    983.    720.    513.    270.    168.
431          UI    103.     36.     32.     32.      0.      0.      0.      0.      0.      0.
432          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

433          KK    CP38
434          KM        ADD HYDROGRAPHS AT CP38
435          HC       2

436          KK    SR38
437          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP38
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 438          RS       1    STOR       0       0
 439          SV       0    1.83   15.38   39.25   41.76   47.45   60.58
 440          SQ       0       0       0       0      44    2223    6550
 441          SE    1275    1280    1290  1297.5    1298    1300    1301
1                                        HEC-1 INPUT                                                          PAGE 11

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 442          KK     R38
 443          KM        ROUTE REMAINDER OF FLOW AT CP38 TO CP39
 444          RS       3              -1       0
 445          RC     .05     .03     .05    5438   .0167
 446          RX    1000    1005    1010    1025    1055    1085    1175    1250
 447          RY    1212    1211    1210    1202    1202    1204    1206    1208

 448          KK      39
 449          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 39
 450          BA     .77
 451          LG     .15     .34    3.81     .63     .20
 452          UI     64.     82.    232.    313.    372.    450.    565.    791.    683.    550.
 453          UI    460.    376.    308.    213.    122.    106.     77.     64.     29.     20.
 454          UI     20.     20.     20.     20.      0.      0.      0.      0.      0.      0.
 455          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 456          KK  I1CP39
 457          KM        ADD HYDROGRAPHS AT CP39
 458          HC       2

 459          KK    CP39
 460          KM        ADD HYDROGRAPHS AT CP39
 461          HC       2

 462          KK     R39
 463          KM        ROUTE COMBINED HYDROGRAPH AT CP39 TO CP42
 464          RS       2              -1       0
 465          RC     .03     .03     .05    4836   .0141
 466          RX    1000    1005    1015    1025    1055    1070    1087    1130
 467          RY    1143    1142    1140    1132    1132    1136    1140    1142

 468          KK      40
 469          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 40
 470          BA     .52
 471          LG     .18     .34    3.54     .89    7.00
 472          UI     73.    258.    407.    562.    862.    658.    478.    331.    158.    104.
 473          UI     61.     22.     22.     22.      0.      0.      0.      0.      0.      0.
 474          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 475          KK     R40
 476          KM        ROUTE FLOW FROM CP40 TO CP42
 477          RS       4              -1       0
 478          RC     .05     .03     .05    6396   .0086
 479          RX    1000    1010    1065    1095    1135    1155    1215    1220
 480          RY    1115    1114    1112    1110    1110    1112    1113    1113

 481          KK      42
 482          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 42
 483          BA    1.18
 484          LG     .21     .32    4.21     .45     .10
 485          UI     98.    128.    359.    483.    575.    696.    878.   1223.   1042.    840.
 486          UI    701.    573.    467.    322.    182.    163.    115.     98.     39.     30.
 487          UI     30.     30.     30.     30.      0.      0.      0.      0.      0.      0.
 488          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                        HEC-1 INPUT                                                          PAGE 12

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 489          KK  I1CP42
 490          KM        ADD HYDROGRAPHS AT CP42
 491          HC       2

 492          KK    CP42
 493          KM        ADD HYDROGRAPHS AT CP42
 494          HC       2
 495          KO       1

 496          KK    SR42
 497          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP42
 498          KO       1
 499          RS       1    STOR       0       0
 500          SV       0     .11   10.43   41.63    69.9   77.34    94.2  113.66   134.7  160.78
 501          SQ       0       0       0       0       0     163     844    2096    4630   13500
 502          SE  1071.5    1072    1080    1090    1095    1096    1098    1100    1102    1104

 503          KK     R42
 504          KM        ROUTE REMAINDER OF HYDROGRAPH AT CP42 TO CP43
 505          KO       1
 506          RS       1              -1       0
 507          RC     .03     .03     .05     858   .0151
 508          RX     900     950    1000    1030    1060    1075    1080    1090
 509          RY    1090    1088    1086    1084    1084    1086    1088    1090

 510          KK    41A1
 511          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A1.
 512          BA     .02
 513          LG     .35     .31    3.70     .31     .00
 514          UI     35.     87.     28.      4.      0.      0.      0.      0.      0.      0.
 515          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 516          KK  SR41A1
 517          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6255+85 ON I-10.
 518          RS       1    STOR       0       0
 519          SV       0     .43     .53     .63     .74    1.24    1.65    3.40    6.20
 520          SQ       0      10      14      18      23      29      33     869    6050
 521          SE  1133.4 1134.91 1135.23 1135.58 1135.97 1137.62  1139.0  1140.3 1143.85

 522          KK  CP41A1
 523          KM        DIVERT FLOW FROM CP41A1 TO CP303
 524          DT   1D303
 525          DI       0      14      23      33     869    6050
 526          DQ       0      14      23      33      35      42

 527          KK   R41A1
 528          KM        ROUTE REMAINDER FROM CP41A1 TO CP41A2.
 529          RS       1              -1       0
 530          RC     .06     .03     .04     580   .0093
```

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531          RX     600     800     900     965    1000    1020    1030    1040
532          RY    1147    1143    1142    1141    1141    1143    1145    1145
                                          HEC-1 INPUT                                                    PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

533          KK    41A2
534          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A2.
535          BA     .03
536          LG     .35     .34    3.91     .57     .00
537          UI     46.    124.     51.      9.      0.      0.      0.      0.      0.      0.
538          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

539          KK  CP41A2
540          KM        ADD HYDROGRAPHS AT CP41A2.
541          HC       2     .05

542          KK  SR41A2
543          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6261+65 ON I-10.
544          RS       1    STOR       0       0
545          SV       0     .10     .24     .31     .62    1.72
546          SQ       0       8      19      24     624    2104
547          SE  1132.7 1134.07 1134.98 1135.56 1137.34 1139.65

548          KK  CP41A2
549          KM        DIVERT FLOW FROM CP41A2 TO CP303
550          DT   2D303
551          DI       0       8      19      24     624    2104
552          DQ       0       8      19      24      30      36

553          KK   R41A2
554          KM        ROUTE REMAINDER FROM CP41A2 TO CP41A3.
555          RS       1              -1       0
556          RC     .06     .03     .04     595   .0093
557          RX     600     800     900     965    1000    1020    1030    1040
558          RY    1140    1136    1135    1134    1134    1136    1138    1140

559          KK    41A3
560          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A3.
561          BA     .03
562          LG     .35     .31    3.64     .30     .00
563          UI     38.    112.     64.     14.      4.      0.      0.      0.      0.      0.
564          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

565          KK  CP41A3
566          KM        ADD HYDROGRAPHS AT CP41A3.
567          HC       2     .08

568          KK  SR41A3
569          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6267+60 ON I-10
570          RS       1    STOR       0       0
571          SV       0     .86    1.05    1.25    1.48    2.51    2.84    4.15    5.46    8.08
572          SQ       0      10      14      18      23      29      32     254     654     896
573          SE  1128.6 1130.13 1130.45 1130.80 1131.19 1132.94  1133.5  1134.0  1134.5 1135.57
                                          HEC-1 INPUT                                                    PAGE 14

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

574          KK  CP41A3
575          KM        DIVERT FLOW FROM CP41A3 TO CP303
576          DT   3D303
577          DI       0      10      14      18      23      29      32     254     659    1896
578          DQ       0      10      14      18      23      29      32      33      34      35

579          KK   R41A3
580          KM        ROUTE REMAINDER FROM CP41A3 TO CP41A.
581          RS       1              -1       0
582          RC     .06     .03     .04     628   .0093
583          RX     600     800     900     965    1000    1020    1030    1040
584          RY    1135    1131    1130    1129    1129    1131    1133    1133

585          KK     41A
586          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A.
587          BA     .05
588          LG     .35     .34    4.01     .53     .00
589          UI     44.    136.    137.     51.     14.      5.      0.      0.      0.      0.
590          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

591          KK   CP41A
592          KM        ADD HYDROGRAPHS AT CP41A.
593          HC       2     .13

594          KK   SR41A
595          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6273+88 ON I-10
596          RS       1    STOR       0       0
597          SV       0    1.22    2.65    3.07    3.20    4.78    6.37    7.96    9.57
598          SQ       0      10      36      44      45     312     799    1429    2047
599          SE  1124.4 1125.75 1127.38 1127.86  1128.0  1128.5  1129.0  1129.5 1129.92

600          KK   CP41A
601          KM        DIVERT FLOW FROM CP41A TO CP303
602          DT   4D303
603          DI       0      10      36      44      45     312     799    1429    2047
604          DQ       0      10      36      44      45      47      49      51      52

605          KK    R41A
606          KM        ROUTE REMAINDER FROM CP41A TO CP41-1.
607          RS       1              -1       0
608          RC     .06     .03     .04    1437   .0093
609          RX     600     800     900     965    1000    1020    1030    1040
610          RY    1122    1118    1117    1116    1116    1118    1120    1120

611          KK    41-1
612          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41-1
613          BA     .15
614          LG     .35     .35    3.78     .62     .00
615          UI     45.    148.    244.    325.    203.    111.     46.     21.      9.      9.
616          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
617          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                                          HEC-1 INPUT                                                    PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

618          KK  CP41-1
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619          KM        ADD HYDROGRAPHS AT CP41-1
620          HC       2     .28

621          KK  SR41-1
622          KM        STORAGE ROUTE THROUGH 2-36" CMP AT STA 6288+25 ON I-10.
623          RS       1    STOR       0       0
624          SV       0     .73    3.47    3.94    4.53    5.12    5.71
625          SQ       0      10      36      44     489    1300    2348
626          SE  1112.7 1114.08 1115.71    1116  1116.5    1117  1117.5

627          KK  CP41-1
628          KM        DIVERT FLOW FROM CP41-1 TO CP303
629          DT   5D303
630          DI       0      10      36      44     489    1300    2348
631          DQ       0      10      36      44      47      50      52

632          KK   R41-1
633          KM        ROUTE REMAINDER FROM CP41-1 TO CP41-2.
634          RS       1              -1       0
635          RC     .06     .03     .04    1697   .0075
636          RX     600     800     900     965    1000    1020    1030    1040
637          RY    1104    1102    1101    1100    1100    1102    1104    1105

638          KK    41-2
639          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41-2
640          BA     .10
641          LG     .35     .35    3.87     .58     .30
642          UI     31.    101.    169.    216.    133.     69.     30.     13.      6.      0.
643          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
644          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

645          KK  CP41-2
646          KM        ADD HYDROGRAPHS AT CP41-2
647          HC       2     .38

648          KK  SR41-2
649          KM        STORAGE ROUTE THROUGH 2-42" CMP AT STA 6305+22 ON I-10.
650          RS       1    STOR       0       0
651          SV       0     .84    1.23    1.78    2.46    3.31    4.34    5.61    7.63   11.57
652          SV   13.47   15.30   19.63   23.76
653          SQ       0      10      14      18      23      29      35      42      50      56
654          SQ     201     419     469    1836
655          SE  1099.2 1100.45 1100.70 1100.96 1101.23 1101.52 1101.83 1102.17 1102.83  1103.5
656          SE  1103.8    1104  1104.5 1104.95

657          KK  CP41-2
658          KM        DIVERT FLOW FROM CP41-2 TO CP303
659          DT   6D303
660          DI       0      10      14      18      23      29      35      42      50      56
661          DI     201     419     469    1836
662          DQ       0      10      14      18      23      29      35      42      50      56
663          DQ      59      61      64      68
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

664          KK   R41-2
665          KM        ROUTE REMAINDER FROM CP41-2 TO CP41.
666          RS       1              -1       0
667          RC     .06     .03     .04     978   .0053
668          RX     650     800     850     965    1000    1020    1030    1040
669          RY    1100    1099    1098    1096    1096    1098    1100    1101

670          KK      41
671          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41
672          BA     .58
673          LG     .21     .34    4.24     .44     .30
674          UI     56.    108.    237.    308.    380.    493.    696.    562.    450.    357.
675          UI    282.    193.    103.     90.     56.     38.     17.     17.     17.     17.
676          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
677          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

678          KK    CP41
679          KM        ADD HYDROGRAPHS AT CP41
680          HC       2     .68

681          KK    SR41
682          KM        STORAGE ROUTE THROUGH 2-36" CMP AT STA 6315+00 ON I-10.
683          RS       1    STOR       0       0
684          SV       0     .09     .37     .86    2.15    2.99    4.92    5.83    7.92   11.06
685          SV   15.07
686          SQ       0       8      11      15      24      30      36      42      43     400
687          SQ    1219
688          SE  1094.6 1095.91 1096.15 1096.42 1096.99 1097.30 1097.91 1099.12  1099.5  1100.0
689          SE  1100.6

690          KK    CP41
691          KM        DIVERT FLOW FROM CP41 TO CP303
692          DT   7D303
693          DI       0       8      11      15      24      30      36      42      43     400
694          DI    1219
695          DQ       0       8      11      15      24      30      36      42      43      46
696          DQ      50

697          KK     R41
698          KM        ROUTE REMAINDER FROM CP41 TO CP43-1.
699          RS       1              -1       0
700          RC     .06     .03     .04     700   .0053
701          RX     650     800     850     965    1000    1020    1030    1040
702          RY    1098    1097    1096    1094    1094    1096    1098    1099

703          KK    43-1
704          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-1
705          BA     .04
706          LG     .35     .35    4.29     .40     .90
707          UI     25.     74.    117.     63.     21.      7.      3.      0.      0.      0.
708          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

709          KK  CP43-1
710          KM        ADD HYDROGRAPHS AT CP43-1
711          HC       2     1.0
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712          KK  SR43-1
713          KM        STORAGE ROUTE THROUGH 5-48" CMP FROM STA 6319+32 TO STA 6324+32 ON I-10.
714          RS       1    STOR       0       0
715          SV       0     .37     .80    1.58    2.71    4.54    5.86    7.60   12.33   14.79
716          SV   21.44
717          SQ       0      32      60     102     120     220     260     301     357     501
718          SQ    1057
719          SE  1091.7 1092.82 1093.25 1093.72 1094.21 1094.77 1095.08 1095.43 1096.19  1096.5
720          SE  1097.0

721          KK  CP43-1
722          KM        DIVERT FLOW FROM CP43-1 TO CP303A
723          DT  1D303A
724          DI       0      32      60     102     120     220     260     301     357     501
725          DI    1057
726          DQ       0      32      60     102     120     220     260     301     357     378
727          DQ     417

728          KK   R43-1
729          KM        ROUTE REMAINDER FROM CP43-1 TO CP43-2.
730          RS       1              -1       0
731          RC     .06     .03     .04     500    .005
732          RX     600     725     800     965    1000    1020    1030    1040
733          RY    1095    1094  1093.5    1093    1093    1094    1096    1097

734          KK    43-2
735          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-2
736          BA     .01
737          LG     .35     .35    4.25     .42    1.30
738          UI      9.     28.     27.     10.      2.      1.      0.      0.      0.      0.
739          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

740          KK  CP43-2
741          KM        ADD HYDROGRAPHS AT CP43-2
742          HC       2    1.01

743          KK  SR43-2
744          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6326+40 ON I-10.
745          RS       1    STOR       0       0
746          SV       0     .12     .38     .71    1.11    1.61    3.12    3.95    5.19    6.02
747          SQ       0       8      12      15      20      24      36      38     128     222
748          SE  1092.0 1093.28 1093.52 1093.78 1094.05 1094.35 1095.13  1095.5  1096.0  1096.3

749          KK  CP43-2
750          KM        DIVERT FLOW FROM CP43-2 TO CP303A
751          DT  2D303A
752          DI       0       8      12      15      20      24      36      38     128     222
753          DQ       0       8      12      15      20      24      36      38      40      43
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

754          KK   R43-2
755          KM        ROUTE REMAINDER FROM CP43-2 TO CP43-3.
756          RS       1              -1       0
757          RC     .06     .03     .04    1000    .003
758          RX     750     800     900     965    1000    1020    1030    1040
759          RY  1096.5    1096    1094    1093    1093    1094    1096    1097

760          KK    43-3
761          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-3
762          BA     .05
763          LG     .35     .35    4.30     .40     .90
764          UI     68.    195.     98.     20.      0.      0.      0.      0.      0.      0.
765          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

766          KK  CP43-3
767          KM        ADD HYDROGRAPHS AT CP43-3.
768          HC       2    1.06

769          KK  SR43-3
770          KM        STORAGE ROUTE THROUGH 3-36" CMPS FROM STA 6330+50 TO STA 6340+10 ON I-10
771          RS       1    STOR       0       0
772          SV       0    2.47    3.51    4.85    6.37    8.27   10.69   13.89   18.76   30.99
773          SQ       0      27      36      48      63      78      93     165     364     951
774          SE  1092.8 1094.12 1094.37 1094.65 1094.93 1095.24 1095.59    1096 1096.56 1097.79

775          KK  CP43-3
776          KM        DIVERT FLOW FROM CP43-3 TO CP303A
777          DT  3D303A
778          DI       0      27      36      48      63      78      93     165     364     951
779          DQ       0      27      36      48      63      78      93     102     114     135

780          KK   R43-3
781          KM        ROUTE REMAINDER FROM CP43-3 TO CP43-4.
782          RS       1              -1       0
783          RC     .06     .03     .04     800    .018
784          RX     800     850     930     965    1000    1020    1030    1040
785          RY  1096.5    1096    1094    1093    1093    1096    1097  1097.5

786          KK    43-4
787          KM        RUNOFF HYDROGRAP FROM SUB-BASIN 43-4
788          BA     .03
789          LG     .35     .35    4.28     .41     .80
790          UI     43.    121.     54.     10.      0.      0.      0.      0.      0.      0.
791          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

792          KK  CP43-4
793          KM        ADD HYDROGRAPHS AT CP43-4
794          HC       2    1.09
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

795          KK  SR43-4
796          KM        STORAGE ROUTE THROUGH 2-36" CMPS FROM STA 6343+25 TO STA 6345+65 ON I10
797          RS       1    STOR       0       0
798          SV       0     .89    1.27     1.8    2.43    3.24    3.31    4.75    7.05   12.83
799          SQ       0      18      24      32      42      52      62     131     326     906
800          SE  1092.8 1094.12 1094.37 1094.65 1094.93 1095.24 1095.59    1096 1096.56 1097.79

801          KK  CP43-4
802          KM        DIVERT FLOW AT STA 6345+65
803          DT  DI43-4
804          DI       0      18      24      32      42      52      62     131     326     906
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 805          DQ       0      18      24      32      42      52      62      68      76      90

 806          KK   R43-4
 807          KM        ROUTE REMAINDER FROM CP43-4 TO CP43-5
 808          RS       1              -1       0
 809          RC     .06     .03     .04     500    .018
 810          RX     800     850     930     965    1000    1020    1030    1040
 811          RY  1096.5    1096    1094    1093    1093    1096    1097  1097.5

 812          KK    43-5
 813          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-5
 814          BA     .02
 815          LG     .35     .35    4.25     .39     .00
 816          UI     27.     79.     39.      8.      0.      0.      0.      0.      0.      0.
 817          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 818          KK  CP43-5
 819          KM        ADD HYDROGRAPHS AT CP43-5
 820          HC       2    1.11

 821          KK  SR43-5
 822          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6349+45 ON I-10
 823          RS       1    STOR       0       0
 824          SV       0     .09     .24     .44     .69     1.0    1.42    2.14    2.76    3.73
 825          SV    4.84    5.94
 826          SQ       0       9      13      17      22      27      34      40      42      44
 827          SQ     134     276
 828          SE  1089.8 1091.09 1091.35 1091.64 1091.94 1092.26 1092.62 1093.13  1093.5    1094
 829          SE  1094.5 1094.94

 830          KK  CP43-5
 831          KM        DIVERT FLOW AT STA 6349+45.
 832          DT  DI43-5
 833          DI       0       9      13      17      22      27      34      40      42      44
 834          DI     134     276
 835          DQ       0       9      13      17      22      27      34      40      42      44
 836          DQ      46      48
1                                        HEC-1 INPUT                                          PAGE 20

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 837          KK   R43-5
 838          KM        ROUTE REMAINDER FROM CP43-5 TO CP43-6
 839          RS       1              -1       0
 840          RC     .06     .03     .04     455   .0068
 841          RX     800     850     930     965    1000    1020    1030    1040
 842          RY    1096    1094    1093    1092    1092    1094    1096  1097.5

 843          KK    43-6
 844          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-6
 845          BA     .02
 846          LG     .35     .35    4.17     .38     .00
 847          UI     36.     87.     27.      4.      0.      0.      0.      0.      0.      0.
 848          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 849          KK  CP43-6
 850          KM        ADD HYDROGRAPHS AT CP43-6
 851          HC       2    1.13

 852          KK  SR43-6
 853          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6354+00 ON I-10
 854          RS       1    STOR       0       0
 855          SV       0    1.59    2.29    3.18    4.29    5.62    7.39    9.53   14.20   30.25
 856          SV   32.52    38.0   43.84   49.83   55.96   59.96
 857          SQ       0       9      13      17      22      27      33      39      47      55
 858          SQ      56     141     325     811    1440    2714
 859          SE  1089.3 1090.58 1090.84 1091.12 1091.42 1091.73 1092.09 1092.47 1093.23 1095.27
 860          SE  1095.5  1096.0  1096.5  1097.0  1097.5 1097.82

 861          KK  CP43-6
 862          KM        DIVERT FLOW AT STA 6354+00.
 863          DT  DI43-6
 864          DI       0       9      13      17      22      27      33      39      47      55
 865          DI      56     141     325     811    1440    2714
 866          DQ       0       9      13      17      22      27      33      39      47      55
 867          DQ      56      58      60      61      62      64

 868          KK   R43-6
 869          KM        ROUTE REMAINDER FROM CP43-6 TO CP43-7
 870          RS       1              -1       0
 871          RC     .06     .03     .04     300   .0162
 872          RX     750     800     930     965    1000    1020    1030    1040
 873          RY    1096    1094    1092    1090    1090    1092    1096  1097.5

 874          KK    43-7
 875          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-7
 876          BA     .02
 877          LG     .35     .35    4.25     .39     .00
 878          UI     49.     90.     14.      0.      0.      0.      0.      0.      0.      0.
 879          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                        HEC-1 INPUT                                          PAGE 21

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 880          KK  CP43-7
 881          KM        ADD HYDROGRAPHS AT CP43-7
 882          HC       2    1.15

 883          KK  SR43-7
 884          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6357+00 ON I-10
 885          RS       1    STOR       0       0
 886          SV       0     .27     .39     .55     .74     .98    1.30    1.78    2.23    5.12
 887          SQ       0      10      13      18      23      29      35      38     101     892
 888          SE  1087.6 1088.93 1089.20 1089.49 1089.80 1090.13 1090.51  1091.0 1091.39 1093.26

 889          KK  CP43-7
 890          KM        DIVERT FLOW AT STA 6357+00.
 891          DT  DI43-7
 892          DI       0      10      13      18      23      29      35      38     101     892
 893          DQ       0      10      13      18      23      29      35      38      40      42

 894          KK   R43-7
 895          KM        ROUTE REMAINDER FROM CP43-7 TO CP43-8
 896          RS       1              -1       0
 897          RC     .06     .03     .04     385    .018
```

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898          RX     700     800     850     965    1000    1020    1030    1040
899          RY    1094    1093    1092    1090    1090    1092    1096  1097.5

900          KK    43-8
901          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-8
902          BA     .01
903          LG     .35     .35    4.25     .39     .00
904          UI     36.     37.      4.      0.      0.      0.      0.      0.      0.      0.
905          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

906          KK  CP43-8
907          KM        ADD HYDROGRAPHS AT CP43-8
908          HC       2    1.16

909          KK  SR43-8
910          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6360+85 ON I-10
911          RS       1    STOR       0       0
912          SV       0     .22     .32     .46     .63     .89    1.74    3.41    4.93     6.3
913          SV    6.87
914          SQ       0       8      12      15      20      24      30      36      39     129
915          SQ     186
916          SE  1085.1 1086.38 1086.62 1086.88 1087.15 1087.48 1088.28 1089.33  1090.0  1090.5
917          SE  1090.7

918          KK  CP43-8
919          KM        DIVERT FLOW AT STA 6360+85.
920          DT  DI43-8
921          DI       0       8      12      15      20      24      30      36      39     129
922          DI     186
923          DQ       0       8      12      15      20      24      30      36      39      41
924          DQ      43
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

925          KK   R43-8
926          KM        ROUTE REMAINDER FROM CP43-8 TO CP43.
927          RS       1              -1       0
928          RC     .06     .03     .04     600    .008
929          RX     800     850     930     965    1000    1020    1030    1040
930          RY    1096    1092    1090    1088    1088    1090    1096  1097.5

931          KK      43
932          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43
933          BA     .01
934          LG     .35     .35    4.29     .41     .60
935          UI     25.     45.      7.      0.      0.      0.      0.      0.      0.      0.
936          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

937          KK  I1CP43
938          KM        ADD HYDROGRAPHS AT CP43
939          HC       2    1.17

940          KK    CP43     .03
941          KM        ADD HYDROGRAPHS AT CP43.
942          KO       1
943          HC       2   13.90

944          KK    SR43
945          KM        STORAGE ROUTE THROUGH 4-10X8 BC'S AT STA 6366+85 ON I-10.
946          KO       1
947          RS       1    STOR       0       0
948          SV       0     .52    4.33   16.22   24.89   28.79   33.09   37.88   56.95
949          SQ       0     920    1824    2976    3396    3713    4176    4734    6464
950          SE  1081.2 1085.18 1087.60 1090.19  1091.5  1092.0  1092.5  1093.0 1094.81

951          KK    CP43
952          KM        DIVERT FLOW AT STA 6366+85 ON I-10 (TUTHILL DIKE).
953          KO       1
954          DT    DI43
955          DI       0     920    1824    2976    3396    3713    4176    4734    6464
956          DQ       0       0       0       0       0     177     500     918    2096

957          KK    RD43
958          KM        ROUTE REMAINDER FROM FROM CP43 TO CPWT4.
959          RS       2              -1       0
960          RC     .05     .03     .05    4000   .0083
961          RX     800     900     965    1000    1050    1100    1200    1300
962          RY    1076    1075    1075    1064    1064    1071    1071    1075

963          KK  CP43-4
964          KM        RETURN DIVERT AT CP43-4
965          DR  DI43-4
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

966          KK  RD43-4
967          KM        ROUTE DIVERTED FLOW FROM CP43-4 TO CPWT4
968          RS       2              -1       0
969          RC    .045     .03    .045    4200   .0067
970          RX     910     940     970     990    1000    1020    1060    1100
971          RY    1064    1063    1062    1060    1060    1062    1063    1064

972          KK  CP43-5
973          KM        RETURN DIVERT AT CP43-5
974          DR  DI43-5

975          KK  RD43-5
976          KM        ROUTE DIVERTED FLOW FROM CP43-5 TO CPWT4
977          RS       2              -1       0
978          RC    .045     .03    .045    4100   .0067
979          RX     910     940     970     990    1000    1020    1060    1100
980          RY    1064    1063    1062    1060    1060    1062    1063    1064

981          KK  I1CWT4
982          KM        ADD HYDROGRAPHS AT CPWT4
983          HC       2     .05

984          KK  CP43-6
985          KM        RETURN DIVERT AT CP43-6
986          DR  DI43-6

987          KK  RD43-6
988          KM        ROUTE DIVERTED FLOW FROM CP43-6 TO CPWT4
```

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 989          RS       2              -1       0
 990          RC    .045     .03    .045    4000   .0067
 991          RX     910     940     970     990    1000    1020    1060    1100
 992          RY    1064    1063    1062    1060    1060    1062    1063    1064

 993          KK  I2CWT4
 994          KM        ADD HYDROGRAPHS AT CPWT4
 995          HC       2     .07

 996          KK  CP43-7
 997          KM        RETURN DIVERT AT CP43-7
 998          DR  DI43-7

 999          KK  RD43-7
1000          KM        ROUTE DIVERTED FLOW FROM CP43-7 TO CPWT4
1001          RS       2              -1       0
1002          RC    .045     .03    .045    4000   .0067
1003          RX     910     940     970     990    1000    1020    1060    1100
1004          RY    1064    1063    1062    1060    1060    1062    1063    1064

1005          KK  I3CWT4
1006          KM        ADD HYDROGRAPHS AT CPWT4
1007          HC       2     .09
1                                   HEC-1 INPUT                                          PAGE 24

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1008          KK  CP43-8
1009          KM        RETURN DIVERT AT CP43-8
1010          DR  DI43-8

1011          KK  RD43-8
1012          KM        ROUTE DIVERTED FLOW FROM CP43-8 TO CPWT4
1013          RS       2              -1       0
1014          RC    .045     .03    .045    4000   .0067
1015          RX     910     940     970     990    1000    1020    1060    1100
1016          RY    1064    1063    1062    1060    1060    1062    1063    1064

1017          KK  I4CWT4
1018          KM        ADD HYDROGRAPHS AT CPWT4
1019          HC       2     .10

1020          KK      44
1021          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 44
1022          BA     .22
1023          LG     .35     .35    4.14     .37     .00
1024          UI     33.    133.    200.    301.    379.    260.    181.     98.     54.     31.
1025          UI     10.     10.     10.      0.      0.      0.      0.      0.      0.      0.
1026          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1027          KK  I5CWT4
1028          KM        ADD HYDROGRAPHS AT CPWT4
1029          HC       2     .32

1030          KK  I6CWT4
1031          KM        ADD HYDROGRAPHS AT CPWT4.
1032          HC       2   14.12

1033          KK    45-1
1034          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 45-1
1035          BA     .08
1036          LG     .21     .34    4.19     .38     .60
1037          UI     33.    102.    189.    155.     86.     31.     13.      6.      0.      0.
1038          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1039          KK    CP43
1040          KM        RETURN DIVERT AT CP43
1041          DR    DI43

1042          KK  CP45-1
1043          KM        ADD HYDROGRAPHS AT CP45-1
1044          HC       2   13.98

1045          KK  SR45-1
1046          KM        STORAGE ROUTE THROUGH 1-12X12 BC, 2-42" CMP AND 3-36" CMP FROM STA. 6368
1047          KM        +00 TO STA. 6375+20 ON I-10 (100' TO 800' EAST OF TUTHILL RD.).
1048          RS       1    STOR       0       0
1049          SV       0     .85    2.23    5.73   11.22   14.61   19.71
1050          SQ       0      51     156    1200    3130    4161    5509
1051          SE  1083.1 1084.78  1086.0  1087.4  1089.0  1089.5  1090.0
1                                   HEC-1 INPUT                                          PAGE 25

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1052          KK  CP45-1
1053          KM        DIVERT FLOW AT STA 6375+20
1054          DT  DI45-1
1055          DI       0      51     156    1200    3130    4161    5509
1056          DQ       0      51     156     305     480     543     610

1057          KK   R45-1
1058          KM        ROUTE REMAINDER FROM CP45-1 TO CP45
1059          RS       1              -1       0
1060          RC     .04     .03     .04    1200   .0042
1061          RX     850     900     930     965    1000    1020    1030    1040
1062          RY    1086    1085    1084    1083    1083    1086    1090    1091

1063          KK      45
1064          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 45
1065          BA     .38
1066          LG     .17     .33    3.94     .34     .20
1067          UI     36.     64.    145.    190.    232.    293.    427.    384.    301.    244.
1068          UI    194.    148.     82.     60.     45.     36.     13.     11.     11.     11.
1069          UI     11.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1070          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1071          KK    CP45
1072          KM        ADD HYDROGRAPHS AT CP45
1073          HC       2   14.36

1074          KK    SR45
1075          KM        STORAGE ROUTE THROUGH 9-36" CMP'S FROM STA 6379+84 TO STA 6390+50 ON
1076          KM        I-10.
1077          RS       1    STOR       0       0
1078          SV       0    1.84    5.95   18.55   23.27   29.04
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1079          SQ       0      41     132     317    1462    3517
1080          SE  1081.1 1082.74  1084.0  1086.0  1086.5  1087.0

1081          KK    CP45
1082          KM        DIVERT FLOW AT STA 6390+50.
1083          DT    DI45
1084          DI       0      41     132     317    1462    3517
1085          DQ       0      41     132     317     362     392

1086          KK     R45
1087          KM        ROUTE REMAINDER FROM CP45 TO CP46-1.
1088          RS       1              -1       0
1089          RC     .04     .03     .04    1500   .0031
1090          RX     850     900     930     965    1000    1020    1030    1040
1091          RY    1083    1082    1081    1080    1080    1082    1083    1084

1092          KK    46-1
1093          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 46-1
1094          BA     .15
1095          LG     .19     .35    4.23     .39     .60
1096          UI     19.     60.    101.    133.    203.    208.    151.    111.     75.     37.
1097          UI     26.     16.      6.      6.      6.      0.      0.      0.      0.      0.
1098          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                                    PAGE 26

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1099          KK  CP46-1
1100          KM        ADD HYDROGRAPHS AT CP46-1
1101          HC       2   14.51

1102          KK  SR46-1
1103          KM        STORAGE ROUTE THROUGH 5-36 CMP'S FROM STA 6395+75 TO STA 6400+60 ON
1104          KM        I-10.
1105          RS       1    STOR       0       0
1106          SV       0    1.07    4.71     9.0    11.7   14.88   18.65   23.01
1107          SQ       0      39     128     183     199     610    1351    2310
1108          SE  1078.3  1080.0  1081.5  1082.5  1083.0  1083.5  1084.0  1084.5

1109          KK  CP46-1
1110          KM        DIVERT FLOW AT STA 6400+60.
1111          DT  DI46-1
1112          DI       0      39     128     183     199     610    1351    2310
1113          DQ       0      39     128     183     199     210     225     244

1114          KK   R46-1
1115          KM        ROUTE REMAINDER FROM CP46-1 TO CP46.
1116          RS       1              -1       0
1117          RC     .04     .03     .04    2355   .0057
1118          RX     700     900     930     965    1000    1020    1030    1040
1119          RY    1076  1075.5    1075    1074    1074    1078    1080    1082

1120          KK      46
1121          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 46
1122          BA     .85
1123          LG     .19     .34    4.25     .45     .40
1124          UI     61.     61.    184.    265.    322.    373.    441.    539.    741.    706.
1125          UI    567.    488.    409.    345.    291.    208.    129.    104.     94.     61.
1126          UI     61.     19.     19.     19.     19.     19.     19.     19.      0.      0.
1127          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1128          KK  I1CP46
1129          KM        ADD HYDROGRAPHS AT CP46
1130          HC       2   15.36

1131          KK      28
1132          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 28
1133          BA     .86
1134          LG     .15     .35    4.02     .52     .10
1135          UI     76.    119.    295.    392.    470.    578.    798.    929.    711.    587.
1136          UI    473.    381.    272.    153.    127.     89.     76.     24.     23.     23.
1137          UI     23.     23.      0.      0.      0.      0.      0.      0.      0.      0.
1138          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1139          KK     R28
1140          KM        ROUTE FLOW FROM CP28 TO CP30
1141          RS       2              -1
1142          RC     .03     .03     .05    2400    .027
1143          RX    1000    1001    1035    1050    1065    1075    1085    1095
1144          RY    1165    1165    1164    1162    1162    1164    1166    1168
1                                          HEC-1 INPUT                                                    PAGE 27

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1145          KK      30
1146          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 30
1147          BA     .28
1148          LG     .15     .35    3.27     .97     .20
1149          UI     36.    116.    193.    257.    400.    380.    277.    203.    132.     63.
1150          UI     45.     26.     11.     11.     11.      0.      0.      0.      0.      0.
1151          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1152          KK  I1CP30
1153          KM        ADD HYDROGRAPHS AT CP30
1154          HC       2

1155          KK      29
1156          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 29
1157          BA     .22
1158          LG     .15     .35    3.52     .78     .00
1159          UI     31.    113.    176.    245.    370.    276.    199.    135.     64.     42.
1160          UI     23.     10.     10.     10.      0.      0.      0.      0.      0.      0.
1161          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1162          KK    SR29
1163          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP29
1164          RS       1    STOR       0       0
1165          SV       0    0.99   12.73   23.45   36.25   50.68   54.76   59.33   83.20
1166          SQ       0       0       0       0       0       0       0      88    6226
1167          SE  1164.5    1166    1170    1172    1174    1176  1177.5    1178    1180

1168          KK     R29
1169          KM        ROUTE REMAINDER OF FLOW AT CP29 TO CP30
1170          RS       1              -1       0
1171          RC     .05     .03     .05    1200   .0021
```

```
1172          RX    1000    1042    1052    1060    1082    1090    1140    1170
1173          RY    1171    1170    1168    1166    1166    1168    1170    1172

1174          KK    CP30
1175          KM        ADD HYDROGRAPHS AT CP30
1176          HC       2

1177          KK     R30
1178          KM        ROUTE COMBINED HYDROGRAPHS AT CP30 TO CP31
1179          RS       4              -1       0
1180          RC     .03     .03     .05    6770   .0069
1181          RX    1000    1025    1045    1070    1095    1110    1200    1550
1182          RY    1157    1156    1154    1152    1152    1154    1156    1158

1183          KK      31
1184          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 31
1185          BA     .71
1186          LG     .19     .35    3.76     .68     .20
1187          UI     60.     83.    224.    299.    358.    434.    565.    752.    613.    500.
1188          UI    413.    336.    268.    171.    105.     98.     60.     52.     18.     18.
1189          UI     18.     18.     18.      0.      0.      0.      0.      0.      0.      0.
1190          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                                    PAGE 28

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1191          KK    CP31
1192          KM        ADD HYDROGRAPHS AT CP31
1193          HC       2

1194          KK     R31
1195          KM        ROUTE COMBINED HYDROGRAPH AT CP31 TO CP46
1196          RS       5              -1       0
1197          RC     .03     .03     .05    5800   .0082
1198          RX    1000    1012    1024    1035    1045    1053    1065    1098
1199          RY    1093    1092    1090    1088    1088    1090    1092    1094

1200          KK    CP46
1201          KM        ADD HYDROGRAPHS AT CP46.
1202          HC       2   17.43

1203          KK    SR46
1204          KM        STORAGE ROUTE THROUGH 5-10'X4' BC'S AT STA 6419+30 ON I-10.
1205          RS       1    STOR       0       0
1206          SV       0    1.08    3.13    4.28    5.18    7.54   12.96
1207          SQ       0     730    1460    1680    1834    2090    2420
1208          SE  1065.4 1068.42 1070.53  1071.4  1072.0  1073.0  1074.3

1209          KK     R46
1210          KM        ROUTE REMAINDER OF FLOW AT CP46 TO CPWT4
1211          RS       2              -1       0
1212          RC     .03     .03     .05    6800   .0067
1213          RX     910     930     940     950    1000    1020    1200    1400
1214          RY    1065    1064    1064    1060    1060    1064    1064    1065

1215          KK  CP45-1
1216          KM        RETURN DIVERT AT  CP45-1
1217          DR  DI45-1

1218          KK  RD45-1
1219          KM        ROUTE DIVERTED FLOW FROM CP45-1 TO CPWT4
1220          RS       2              -1       0
1221          RC    .045     .03    .045    4100   .0067
1222          RX     910     940     970     990    1000    1020    1060    1100
1223          RY    1064    1063    1062    1060    1060    1062    1063    1064

1224          KK    CP45
1225          KM        RETURN DIVERT AT CP45
1226          DR    DI45

1227          KK    RD45
1228          KM        ROUTE DIVERTED FLOW FROM  CP45  TO CPWT4.
1229          RS       2              -1       0
1230          RC    .045     .03    .045    4200   .0067
1231          RX     910     940     970     990    1000    1020    1060    1100
1232          RY    1064    1063    1062    1060    1060    1062    1063    1064
1                                          HEC-1 INPUT                                                    PAGE 29

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1233          KK  I7CWT4
1234          KM        ADD HYDROGRAPHS AT CPWT4
1235          HC       2   14.36

1236          KK  CP46-1
1237          KM        RETURN DIVERT AT CP46-1
1238          DR  DI46-1

1239          KK  RD46-1
1240          KM        ROUTE DIVERTED FLOW FROM CP46-1 TO CPWT4
1241          RS       3              -1       0
1242          RC    .045     .03    .045    4900   .0067
1243          RX     910     940     970     990    1000    1020    1060    1100
1244          RY    1064    1063    1062    1060    1060    1062    1063    1064

1245          KK  I8CWT4
1246          KM        ADD HYDROGRAPHS AT CPWT4
1247          HC       2   14.51

1248          KK     WT4
1249          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN WT4
1250          BA     .77
1251          LG     .35     .35    4.17     .38     .40
1252          UI    108.    384.    604.    835.   1279.    973.    707.    488.    232.    153.
1253          UI     90.     33.     33.     33.      0.      0.      0.      0.      0.      0.
1254          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1255          KK  I9CWT4
1256          KM        ADD HYDROGRAPHS AT CPWT4
1257          HC       2   15.28

1258          KK  I10WT4
1259          KM        ADD HYDROGRAPHS AT CPWT4
1260          HC       2    18.2
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1261          KK   CPWT4
1262          KM        ADD ENTIRE FLOW TOGETHER THAT GETS TO WHITE TANKS STRUCTURE NO 4.
1263          KO       1
1264          HC       2   18.57

1265          KK    RS47
1266          KM        STORAGE ROUTE TROUGH WHITE TANKS STRUCTURE NO. 4.
1267          RS       1    STOR       0       0
1268          SV       0    2.81      51     148     277     543    1269    1396    1690    2045
1269          SV    2246
1270          SQ       0       0       0       0       0       0       0     375    2600    6150
1271          SQ   14700
1272          SE     997    1000    1010    1020    1030    1040    1049    1050    1052    1054
1273          SE    1055
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1274          KK  CP43-1
1275          KM        RETURN DIVERT AT CP43-1
1276          DR  1D303A

1277          KK   R43-1
1278          KM        ROUTE REMAINDER FROM CP43-1 TO CP303A
1279          RS       8              -1       0
1280          RC    .035    .035    .035    5300   .0091
1281          RX    1000    1090    1170    1250    1380    1400    1450    1630
1282          RY    1077  1075.8  1076.5    1076    1076  1076.5    1076    1077

1283          KK  CP43-2
1284          KM        RETURN DIVERT AT CP43-2
1285          DR  2D303A

1286          KK   R43-2
1287          KM        ROUTE REMAINDER FROM CP43-2 TO CP303A
1288          RS       8              -1       0
1289          RC    .035    .035    .035    5300   .0091
1290          RX    1000    1090    1170    1250    1380    1400    1450    1630
1291          RY    1077  1075.8  1076.5    1076    1076  1076.5    1076    1077

1292          KK  CP43-3
1293          KM        RETURN DIVERT AT CP43-3
1294          DR  3D303A

1295          KK   R43-3
1296          KM        ROUTE REMAINDER FROM CP43-3 TO CP303A
1297          RS      13              -1       0
1298          RC    .035    .035    .035    4840   .0091
1299          RX    1000    1170    1240    1270    1440    1470    1490    1550
1300          RY    1069    1068  1068.5    1068    1068  1068.5  1067.8  1068.5

1301          KK    303A
1302          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 303A
1303          BA     .42
1304          LG     .35     .35    4.08     .36     .10
1305          UI     56.    182.    299.    400.    629.    559.    409.    297.    178.     95.
1306          UI     63.     32.     17.     17.     17.      0.      0.      0.      0.      0.
1307          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1308          KK  1C303A
1309          KM        ADD HYDROGRAPHS AT CP303A
1310          HC       4    1.48

1311          KK  CP303A
1312          KM        ADD HYDROGRAPHS AT CP303A
1313          HC       2   18.99
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1314          KK   D41A1
1315          KM        RETURN DIVERT AT CP41A1
1316          DR   1D303

1317          KK   R41A1
1318          KM        ROUTE FLOW FROM CP41A1 TO CP303
1319          RS      18              -1       0
1320          RC    .035    .035    .035    7180    .014
1321          RX    1000    1210    1450    1530    1620    1690    1849    1850
1322          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1323          KK   D41A2
1324          KM        RETURN DIVERT AT CP41A2
1325          DR   2D303

1326          KK   R41A2
1327          KM        ROUTE FLOW FROM CP41A2 TO CP303
1328          RS      19              -1       0
1329          RC    .035    .035    .035    7330    .014
1330          RX    1000    1210    1450    1530    1620    1690    1849    1850
1331          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1332          KK   1I303
1333          KM        ADD HYDROGRAPHS AT CP303
1334          HC       2     .05

1335          KK   D41A3
1336          KM        RETURN DIVERT AT CP41A3
1337          DR   3D303

1338          KK   R41A3
1339          KM        ROUTE FLOW FROM CP41A3 TO CP303
1340          RS      25              -1       0
1341          RC    .035    .035    .035    9360    .010
1342          RX    1000    1210    1450    1530    1620    1690    1849    1850
1343          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1344          KK   2I303
1345          KM        ADD HYDROGRAPHS AT CP303
1346          HC       2     .08

1347          KK    D41A
1348          KM        RETURN DIVERT AT CP41A
1349          DR   4D303
```

```
1350          KK    R41A
1351          KM        ROUTE FLOW FROM CP41A TO CP303
1352          RS      26              -1       0
1353          RC    .035     .035     .035    9360    .0095
1354          RX    1000     1210     1450    1530    1620    1690    1849    1850
1355          RY    1106   1105.5     1106    1104    1104    1106    1107    1107
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1356          KK   3I303
1357          KM        ADD HYDROGRAPHS AT CP303
1358          HC       2     .13

1359          KK   D41-1
1360          KM        RETURN DIVERT AT CP41-1
1361          DR   5D303

1362          KK   R41-1
1363          KM        ROUTE FLOW FROM CP41-1 TO CP303
1364          RS      28              -1       0
1365          RC    .035     .035     .035    9200    .0079
1366          RX    1000     1300     1510    1660    1850    1890    1940    2100
1367          RY  1080.5     1079   1080.5    1080    1080    1081  1080.5    1081

1368          KK   4I303
1369          KM        ADD HYDROGRAPHS AT CP303
1370          HC       2     .28

1371          KK   D41-2
1372          KM        RETURN DIVERT AT CP41-2
1373          DR   6D303

1374          KK   R41-2
1375          KM        ROUTE FLOW FROM CP41-2 TO CP303
1376          RS      33              -1       0
1377          RC    .035     .035     .035    9360    .0065
1378          RX    1000     1300     1510    1660    1850    1890    1940    2100
1379          RY  1080.5     1079   1080.5    1080    1080    1081  1080.5    1081

1380          KK   5I303
1381          KM        ADD HYDROGRAPHS AT CP303
1382          HC       2     .38

1383          KK     D41
1384          KM        RETURN DIVERT AT CP41
1385          DR   7D303

1386          KK     R41
1387          KM        ROUTE FLOW FROM CP41 TO CP303
1388          RS      30              -1       0
1389          RC    .035     .035     .035    9830    .0056
1390          RX    1000     1300     1510    1660    1850    1890    1940    2100
1391          RY  1080.5     1079   1080.5    1080    1080    1081  1080.5    1081

1392          KK   6I303
1393          KM        ADD HYDROGRAPHS AT CP303
1394          HC       2     .96
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1395          KK     303
1396          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 303
1397          BA    1.21
1398          LG     .35      .34     4.19      .39      .40
1399          UI     81.      81.     207.     332.     407.     470.     543.     636.     835.    1022.
1400          UI    868.     725.     631.     534.     457.     388.     290.     187.     141.     133.
1401          UI     92.      81.      54.      25.      25.      25.      25.      25.      25.      25.
1402          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
1403          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

1404          KK   CP303
1405          KM        ADD HYDROGRAPHS AT CP303
1406          HC       2    2.17
1407          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   28          4
               .
               .
   36          .           5
               .           .
               .           .
   43        CP5...........
               V
               V
   46       RCP5
               .
               .
   53          .           6
               .           .
               .           .
   59      I1CP7...........
               .
               .
   62          .           7
               .           .
               .           .
   68        CP7...........
               V
               V
   71       RCP7
               .
               .
   78          .           9
               .           .
               .           .
   85      I1CP9...........
               .
               .
   88          .          14
               .           V
               .           V
   95          .       RCP14
               .           .
               .           .
  102          .           .          15
               .           .           .
               .           .           .
  110          .      I1CP15...........
               .           .
               .           .
  113          .           .          16
               .           .           V
               .           .           V
  122          .           .        SR16
               .           .           .
               .           .           .
  128          .        CP15...........
               .           V
               .           V
  131          .       RCP15
               .           .
               .           .
  138          .           .          18
               .           .           V
               .           .           V
  145          .           .         R18
               .           .           .
               .           .           .
  151          .           .           .          19
               .           .           .           .
               .           .           .           .
  158          .           .        CP19...........
               .           .           V
               .           .           V
  161          .           .         R19
               .           .           .
               .           .           .
  167          .           .           .          21
               .           .           .           .
               .           .           .           .
  174          .           .     I1CP21...........
               .           .           .
               .           .           .
  177          .           .           .          20
               .           .           .           V
               .           .           .           V
  184          .           .           .        SR20
               .           .           .           V
               .           .           .           V
  193          .           .           .         R20
               .           .           .           .
               .           .           .           .
  199          .           .        CP21...........
               .           .           V
               .           .           V
  202          .           .        SR21
               .           .           V
               .           .           V
  208          .           .         R21
               .           .           .
               .           .           .
  214          .           .           .          23
               .           .           .           .
               .           .           .           .
  220          .           .        CP23...........
               .           .           V
               .           .           V
  223          .           .        SR23
               .           .           V
               .           .           V
  232          .           .         R23
               .           .           .
               .           .           .
  238          .           .           .          22
               .           .           .           V
               .           .           .           V
```

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245          .          .          .         R22
             .          .          .           .
             .          .          .           .
251          .          .          .           .         22A
             .          .          .           .           .
             .          .          .           .           .
258          .          .          .     I1C22A............
             .          .          .           .
             .          .          .           .
261          .          .      CP22A............
             .          .          V
             .          .          V
264          .          .       R22A
             .          .          .
             .          .          .
270          .          .          .          25
             .          .          .           .
             .          .          .           .
277          .          .    I1CP25............
             .          .          .
             .          .          .
280          .          .          .          24
             .          .          .           V
             .          .          .           V
287          .          .          .        SR24
             .          .          .           V
             .          .          .           V
293          .          .          .         R24
             .          .          .           .
             .          .          .           .
299          .          .       CP25............
             .          .          V
             .          .          V
302          .          .       SR25
             .          .          .
             .          .          .
308          .          .          .          26
             .          .          .           V
             .          .          .           V
316          .          .          .         R26
             .          .          .           .
             .          .          .           .
322          .          .          .           .          27
             .          .          .           .           .
             .          .          .           .           .
330          .          .          .     I1CP27............
             .          .          .           V
             .          .          .           V
333          .          .          .        SR27
             .          .          .           .
             .          .          .           .
339          .          .       CP27............
             .          .          V
             .          .          V
343          .          .       R27
             .          .          .
             .          .          .
349          .          .          .          34
             .          .          .           .
             .          .          .           .
356          .          .          .           .          33
             .          .          .           .           .
             .          .          .           .           .
363          .          .          .       CP33............
             .          .          .           V
             .          .          .           V
366          .          .          .         R33
             .          .          .           .
             .          .          .           .
372          .          .          .           .          35
             .          .          .           .           .
             .          .          .           .           .
379          .          .          .     I1CP35............
             .          .          .           .
             .          .          .           .
382          .          .          .           .          32
             .          .          .           .           .
             .          .          .           .           .
390          .          .          .       CP35............
             .          .          .           V
             .          .          .           V
393          .          .          .         R35
             .          .          .           .
             .          .          .           .
399          .          .          .           .          36
             .          .          .           .           .
             .          .          .           .           .
406          .          .          .     I1CP36............
             .          .          .           .
             .          .          .           .
409          .          .          .           .          37
             .          .          .           .           .
             .          .          .           .           .
417          .          .          .       CP36............
             .          .          .           V
             .          .          .           V
420          .          .          .         R36
             .          .          .           .
             .          .          .           .
426          .          .          .           .          38
             .          .          .           .           .
             .          .          .           .           .
433          .          .          .       CP38............
             .          .          .           V
             .          .          .           V
436          .          .          .        SR38
             .          .          .           V
             .          .          .           V
442          .          .          .         R38
             .          .          .           .
             .          .          .           .
448          .          .          .           .          39
             .          .          .           .           .
             .          .          .           .           .
456          .          .          .     I1CP39............
             .          .          .           .
             .          .          .           .
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459                 .           .       CP39............
                    .           .          V
                    .           .          V
462                 .           .       R39
                    .           .          .
                    .           .          .
468                 .           .          .          40
                    .           .          .           V
                    .           .          .           V
475                 .           .          .         R40
                    .           .          .           .
                    .           .          .           .
481                 .           .          .           .           42
                    .           .          .           .            .
                    .           .          .           .            .
489                 .           .          .      I1CP42............
                    .           .          .           .
                    .           .          .           .
492                 .           .       CP42............
                    .           .          V
                    .           .          V
496                 .           .       SR42
                    .           .          V
                    .           .          V
503                 .           .       R42
                    .           .          .
                    .           .          .
510                 .           .          .        41A1
                    .           .          .           V
                    .           .          .           V
516                 .           .          .      SR41A1
                    .           .          .           .
                    .           .          .           .
524                 .           .          .           .-------->   1D303
522                 .           .          .      CP41A1
                    .           .          .           V
                    .           .          .           V
527                 .           .          .       R41A1
                    .           .          .           .
                    .           .          .           .
533                 .           .          .           .        41A2
                    .           .          .           .            .
                    .           .          .           .            .
539                 .           .          .      CP41A2............
                    .           .          .           V
                    .           .          .           V
542                 .           .          .      SR41A2
                    .           .          .           .
                    .           .          .           .
550                 .           .          .           .-------->   2D303
548                 .           .          .      CP41A2
                    .           .          .           V
                    .           .          .           V
553                 .           .          .       R41A2
                    .           .          .           .
                    .           .          .           .
559                 .           .          .           .        41A3
                    .           .          .           .            .
                    .           .          .           .            .
565                 .           .          .      CP41A3............
                    .           .          .           V
                    .           .          .           V
568                 .           .          .      SR41A3
                    .           .          .           .
                    .           .          .           .
576                 .           .          .           .-------->   3D303
574                 .           .          .      CP41A3
                    .           .          .           V
                    .           .          .           V
579                 .           .          .       R41A3
                    .           .          .           .
                    .           .          .           .
585                 .           .          .           .         41A
                    .           .          .           .            .
                    .           .          .           .            .
591                 .           .          .       CP41A............
                    .           .          .           V
                    .           .          .           V
594                 .           .          .       SR41A
                    .           .          .           .
                    .           .          .           .
602                 .           .          .           .-------->   4D303
600                 .           .          .       CP41A
                    .           .          .           V
                    .           .          .           V
605                 .           .          .        R41A
                    .           .          .           .
                    .           .          .           .
611                 .           .          .           .        41-1
                    .           .          .           .            .
                    .           .          .           .            .
618                 .           .          .      CP41-1............
                    .           .          .           V
                    .           .          .           V
621                 .           .          .      SR41-1
                    .           .          .           .
                    .           .          .           .
629                 .           .          .           .-------->   5D303
627                 .           .          .      CP41-1
                    .           .          .           V
                    .           .          .           V
632                 .           .          .       R41-1
                    .           .          .           .
                    .           .          .           .
638                 .           .          .           .        41-2
                    .           .          .           .            .
                    .           .          .           .            .
645                 .           .          .      CP41-2............
                    .           .          .           V
                    .           .          .           V
648                 .           .          .      SR41-2
                    .           .          .           .
                    .           .          .           .
659                 .           .          .           .-------->   6D303
657                 .           .          .      CP41-2
                    .           .          .           V
                    .           .          .           V
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664                 R41-2
                      .
670                   .          41
                      .           .
                      .           .
678                 CP41............
                      V
                      V
681                 SR41
                      .
                      .
692                   .-------> 7D303
690                 CP41
                      V
                      V
697                  R41
                      .
                      .
703                   .        43-1
                      .           .
                      .           .
709               CP43-1............
                      V
                      V
712               SR43-1
                      .
                      .
723                   .-------> 1D303A
721               CP43-1
                      V
                      V
728                R43-1
                      .
                      .
734                   .        43-2
                      .           .
                      .           .
740               CP43-2............
                      V
                      V
743               SR43-2
                      .
                      .
751                   .-------> 2D303A
749               CP43-2
                      V
                      V
754                R43-2
                      .
                      .
760                   .        43-3
                      .           .
                      .           .
766               CP43-3............
                      V
                      V
769               SR43-3
                      .
                      .
777                   .-------> 3D303A
775               CP43-3
                      V
                      V
780                R43-3
                      .
                      .
786                   .        43-4
                      .           .
                      .           .
792               CP43-4............
                      V
                      V
795               SR43-4
                      .
                      .
803                   .-------> DI43-4
801               CP43-4
                      V
                      V
806                R43-4
                      .
                      .
812                   .        43-5
                      .           .
                      .           .
818               CP43-5............
                      V
                      V
821               SR43-5
                      .
                      .
832                   .-------> DI43-5
830               CP43-5
                      V
                      V
837                R43-5
                      .
                      .
843                   .        43-6
                      .           .
                      .           .
849               CP43-6............
                      V
                      V
852               SR43-6
                      .
                      .
863                   .-------> DI43-6
861               CP43-6
                      V
                      V
868                R43-6
                      .
                      .
874                   .        43-7
                      .           .
```

```
880                 .           .           .           .           .
                    .           .           .      CP43-7...........
                    .           .           .           V
                    .           .           .           V
883                 .           .           .      SR43-7
                    .           .           .           .
                    .           .           .           .
891                 .           .           .           .-------> DI43-7
889                 .           .           .      CP43-7
                    .           .           .           V
                    .           .           .           V
894                 .           .           .       R43-7
                    .           .           .           .
                    .           .           .           .
900                 .           .           .           .        43-8
                    .           .           .           .           .
                    .           .           .           .           .
906                 .           .           .      CP43-8...........
                    .           .           .           V
                    .           .           .           V
909                 .           .           .      SR43-8
                    .           .           .           .
                    .           .           .           .
920                 .           .           .           .-------> DI43-8
918                 .           .           .      CP43-8
                    .           .           .           V
                    .           .           .           V
925                 .           .           .       R43-8
                    .           .           .           .
                    .           .           .           .
931                 .           .           .           .          43
                    .           .           .           .           .
                    .           .           .           .           .
937                 .           .           .      I1CP43...........
                    .           .           .           .
                    .           .           .           .
940                 .           .       CP43...........
                    .           .          V
                    .           .          V
944                 .           .       SR43
                    .           .          .
                    .           .          .
954                 .           .          .------->    DI43
951                 .           .       CP43
                    .           .          V
                    .           .          V
957                 .           .       RD43
                    .           .          .
                    .           .          .
965                 .           .           .           .<-------  DI43-4
963                 .           .           .      CP43-4
                    .           .           .           V
                    .           .           .           V
966                 .           .           .      RD43-4
                    .           .           .           .
                    .           .           .           .
974                 .           .           .           .           .<-------  DI43-5
972                 .           .           .           .      CP43-5
                    .           .           .           .           V
                    .           .           .           .           V
975                 .           .           .           .      RD43-5
                    .           .           .           .           .
                    .           .           .           .           .
981                 .           .           .      I1CWT4...........
                    .           .           .           .
                    .           .           .           .
986                 .           .           .           .           .<-------  DI43-6
984                 .           .           .           .      CP43-6
                    .           .           .           .           V
                    .           .           .           .           V
987                 .           .           .           .      RD43-6
                    .           .           .           .           .
                    .           .           .           .           .
993                 .           .           .      I2CWT4...........
                    .           .           .           .
                    .           .           .           .
998                 .           .           .           .           .<-------  DI43-7
996                 .           .           .           .      CP43-7
                    .           .           .           .           V
                    .           .           .           .           V
999                 .           .           .           .      RD43-7
                    .           .           .           .           .
                    .           .           .           .           .
1005                .           .           .      I3CWT4...........
                    .           .           .           .
                    .           .           .           .
1010                .           .           .           .           .<-------  DI43-8
1008                .           .           .           .      CP43-8
                    .           .           .           .           V
                    .           .           .           .           V
1011                .           .           .           .      RD43-8
                    .           .           .           .           .
                    .           .           .           .           .
1017                .           .           .      I4CWT4...........
                    .           .           .           .
                    .           .           .           .
1020                .           .           .           .          44
                    .           .           .           .           .
                    .           .           .           .           .
1027                .           .           .      I5CWT4...........
                    .           .           .           .
                    .           .           .           .
1030                .           .   I6CWT4...........
                    .           .           .
                    .           .           .
1033                .           .           .        45-1
                    .           .           .           .
                    .           .           .           .
1041                .           .           .           .           .<-------    DI43
1039                .           .           .           .        CP43
                    .           .           .           .           .
                    .           .           .           .           .
1042                .           .           .      CP45-1...........
                    .           .           .           V
                    .           .           .           V
1045                .           .           .      SR45-1
                    .           .           .           .
```

```
1054                .-------> DI45-1
1052            CP45-1
                     V
                     V
1057             R45-1

1063                          45

1071             CP45............
                     V
                     V
1074             SR45

1083                .------->   DI45
1081             CP45
                     V
                     V
1086              R45

1092                        46-1

1099            CP46-1............
                     V
                     V
1102            SR46-1

1111                .-------> DI46-1
1109            CP46-1
                     V
                     V
1114             R46-1

1120                          46

1128            I1CP46............

1131                          28
                               V
                               V
1139                         R28

1145                                        30

1152                      I1CP30............

1155                                        29
                                             V
                                             V
1162                                      SR29
                                             V
                                             V
1168                                       R29

1174                       CP30............
                              V
                              V
1177                        R30

1183                                        31

1191                       CP31............
                              V
                              V
1194                        R31

1200             CP46............
                     V
                     V
1203             SR46
                     V
                     V
1209              R46

1217                          .<-------  DI45-1
1215                      CP45-1
                              V
                              V
1218                      RD45-1

1226                                        .<-------   DI45
1224                                      CP45
                                             V
                                             V
1227                                      RD45

1233                      I7CWT4............

1238                                        .<-------  DI46-1
1236                                    CP46-1
                                             V
                                             V
1239                                    RD46-1

1245                      I8CWT4............
```

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1248                                                  WT4
1255                                        I9CWT4............
1258                                 I10WT4............
1261                          CPWT4............
                                 V
                                 V
1265                           RS47
1276                                   .<-------  1D303A
1274                                 CP43-1
                                        V
                                        V
1277                                  R43-1
1285                                                   .<-------  2D303A
1283                                        CP43-2
                                                 V
                                                 V
1286                                        R43-2
1294                                                                .<-------  3D303A
1292                                                        CP43-3
                                                                 V
                                                                 V
1295                                                        R43-3
1301                                                                          303A
1308                                 1C303A...................................
1311                          CP303A............
1316                                   .<-------   1D303
1314                                  D41A1
                                        V
                                        V
1317                                  R41A1
1325                                                   .<-------   2D303
1323                                        D41A2
                                                 V
                                                 V
1326                                        R41A2
1332                                  1I303............
1337                                                   .<-------   3D303
1335                                        D41A3
                                                 V
                                                 V
1338                                        R41A3
1344                                  2I303............
1349                                                   .<-------   4D303
1347                                         D41A
                                                 V
                                                 V
1350                                         R41A
1356                                  3I303............
1361                                                   .<-------   5D303
1359                                        D41-1
                                                 V
                                                 V
1362                                        R41-1
1368                                  4I303............
1373                                                   .<-------   6D303
1371                                        D41-2
                                                 V
                                                 V
1374                                        R41-2
1380                                  5I303............
1385                                                   .<-------   7D303
1383                                          D41
                                                 V
                                                 V
1386                                          R41
1392                                  6I303............
1395                                          303
1404                                  CP303............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1***************************************           ***************************************
 *                                     *           *                                     *
 *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *           *  U.S. ARMY CORPS OF ENGINEERS       *
 *             MAY  1991               *           *  HYDROLOGIC ENGINEERING CENTER      *
 *          VERSION 4.0.1E             *           *        609 SECOND STREET            *
 *   Lahey F77L-EM/32 version 5.01     *           *     DAVIS, CALIFORNIA 95616         *
 *     Dodson & Associates, Inc.       *           *         (916) 551-1748              *
 * RUN DATE  04/12/99  TIME  17:16:03  *           *                                     *
 ***************************************           ***************************************
```

FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
100-YEAR, 24-HOUR STORM WTADMS.24

EXISTING CONDITIONS FOR CATERPILLAR PROPERTY EXTRACTED
FROM WHITE TANKS ADMS 3/30/99 FILE: CATADMS2.DAT

11 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL	
IPLOT	0	PLOT CONTROL	
QSCAL	0.	HYDROGRAPH PLOT SCALE	

IT HYDROGRAPH TIME DATA

NMIN		5	MINUTES IN COMPUTATION INTERVAL
IDATE	1	0	STARTING DATE
ITIME		0000	STARTING TIME
NQ		800	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	3	0	ENDING DATE
NDTIME		1835	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 66.58 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

13 JD INDEX STORM NO. 1

STRM	4.03	PRECIPITATION DEPTH
TRDA	0.00	TRANSPOSITION DRAINAGE AREA

14 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

24 JD INDEX STORM NO. 2

STRM	3.99	PRECIPITATION DEPTH
TRDA	10.00	TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
25 JD         INDEX STORM NO. 3
                STRM        3.83  PRECIPITATION DEPTH
                TRDA       50.00  TRANSPOSITION DRAINAGE AREA

 0 PI           PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01      0.00      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.03      0.03
                0.03      0.09      0.09      0.09      0.01      0.01      0.01      0.01      0.01      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
26 JD         INDEX STORM NO. 4
                STRM        3.76  PRECIPITATION DEPTH
                TRDA      100.00  TRANSPOSITION DRAINAGE AREA

 0 PI           PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01      0.00      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.03      0.03
                0.03      0.09      0.09      0.09      0.01      0.01      0.01      0.01      0.01      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
27 JD         INDEX STORM NO. 5
                STRM        3.70  PRECIPITATION DEPTH
                TRDA      200.00  TRANSPOSITION DRAINAGE AREA

 0 PI           PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01      0.00      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.03      0.03
                0.03      0.09      0.09      0.09      0.01      0.01      0.01      0.01      0.01      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
```

EXISTING MODEL WITH EXISTING DETENTION/RETENTION BASINS

FILE: CATADMS2.DAT

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	4	339.	12.25	26.	7.	2.	0.30		
+	HYDROGRAPH AT	5	716.	12.25	65.	18.	7.	0.72		
+	2 COMBINED AT	CP5	1053.	12.25	90.	25.	9.	1.02		
+	ROUTED TO	RCP5	973.	12.33	89.	24.	8.	1.02		
+	HYDROGRAPH AT	6	591.	12.08	41.	12.	4.	0.45		
+	2 COMBINED AT	I1CP7	1289.	12.17	130.	35.	13.	1.47		
+	HYDROGRAPH AT	7	390.	12.08	28.	8.	3.	0.31		
+	2 COMBINED AT	CP7	1668.	12.17	158.	43.	15.	1.78		
+	ROUTED TO	RCP7	1435.	12.33	151.	38.	14.	1.78		
+	HYDROGRAPH AT	9	1096.	12.42	127.	36.	13.	1.40		
+	2 COMBINED AT	I1CP9	2527.	12.33	277.	74.	27.	3.18		
+	HYDROGRAPH AT	14	1163.	12.33	130.	37.	13.	1.47		
+	ROUTED TO	RCP14	1041.	12.58	130.	37.	13.	1.47		
+	HYDROGRAPH AT	15	1039.	12.42	117.	32.	11.	1.26		
+	2 COMBINED AT	I1CP15	1920.	12.50	246.	68.	25.	2.73		
+	HYDROGRAPH AT	16	1255.	12.42	155.	43.	15.	1.13		
+	ROUTED TO	SR16	0.	0.08	0.	0.	0.	1.13		
+	2 COMBINED AT	CP15	1920.	12.50	246.	68.	25.	3.86		
+	ROUTED TO	RCP15	1453.	12.83	211.	53.	19.	3.86		
+	HYDROGRAPH AT	18	923.	12.17	73.	21.	7.	0.81		
+	ROUTED TO	R18	750.	12.33	73.	21.	7.	0.81		
+	HYDROGRAPH AT	19	622.	12.42	71.	20.	7.	0.79		
+	2 COMBINED AT	CP19	1353.	12.33	144.	40.	15.	1.60		
+	ROUTED TO	R19	1248.	12.42	144.	40.	15.	1.60		
+	HYDROGRAPH AT	21	688.	12.42	74.	20.	7.	0.79		
+	2 COMBINED AT	I1CP21	1933.	12.42	217.	60.	22.	2.39		
+	HYDROGRAPH AT	20	861.	12.33	97.	27.	10.	1.07		
+	ROUTED TO	SR20	0.	0.08	0.	0.	0.	1.07		
+	ROUTED TO	R20	0.	0.08	0.	0.	0.	1.07		
+	2 COMBINED AT	CP21	1933.	12.42	217.	60.	22.	3.46		
+	ROUTED TO	SR21	191.	13.25	40.	12.	4.	3.46		
+	ROUTED TO	R21	174.	13.42	40.	12.	4.	3.46		
+	HYDROGRAPH AT	23	289.	12.08	18.	5.	2.	0.16		
+	2 COMBINED AT	CP23	288.	12.08	55.	17.	6.	3.62		
	ROUTED TO									

	SR23	0.	0.08	0.	0.	0.	3.62
ROUTED TO							
	R23	0.	0.08	0.	0.	0.	3.62
HYDROGRAPH AT							
	22	525.	12.25	50.	14.	5.	0.57
ROUTED TO							
	R22	493.	12.42	50.	14.	5.	0.57
HYDROGRAPH AT							
	22A	764.	12.25	69.	18.	6.	0.50
2 COMBINED AT							
	I1C22A	1111.	12.33	120.	31.	11.	1.07
2 COMBINED AT							
	CP22A	1108.	12.33	119.	31.	11.	4.69
ROUTED TO							
	R22A	1021.	12.50	119.	31.	11.	4.69
HYDROGRAPH AT							
	25	500.	12.33	50.	12.	5.	0.46
2 COMBINED AT							
	I1CP25	1414.	12.42	169.	44.	16.	5.15
HYDROGRAPH AT							
	24	207.	12.25	18.	5.	2.	0.14
ROUTED TO							
	SR24	0.	0.08	0.	0.	0.	0.14
ROUTED TO							
	R24	0.	0.08	0.	0.	0.	0.14
2 COMBINED AT							
	CP25	1414.	12.42	169.	44.	16.	5.29
ROUTED TO							
	SR25	1374.	12.50	146.	37.	13.	5.29
HYDROGRAPH AT							
	26	943.	12.50	115.	30.	11.	1.16
ROUTED TO							
	R26	886.	12.67	115.	30.	11.	1.16
HYDROGRAPH AT							
	27	999.	12.42	110.	28.	10.	1.00
2 COMBINED AT							
	I1CP27	1648.	12.50	225.	57.	21.	2.16
ROUTED TO							
	SR27	1642.	12.50	205.	52.	19.	2.16
2 COMBINED AT							
	CP27	3011.	12.50	350.	89.	32.	7.45
ROUTED TO							
	R27	2725.	12.75	350.	89.	32.	7.45
HYDROGRAPH AT							
	34	361.	12.25	33.	9.	3.	0.36
HYDROGRAPH AT							
	33	643.	12.25	59.	17.	6.	0.65
2 COMBINED AT							
	CP33	1003.	12.25	91.	26.	9.	1.01
ROUTED TO							
	R33	955.	12.33	91.	26.	9.	1.01
HYDROGRAPH AT							
	35	400.	12.25	35.	10.	4.	0.39
2 COMBINED AT							
	I1CP35	1297.	12.25	127.	36.	13.	1.40
HYDROGRAPH AT							
	32	956.	12.42	117.	33.	12.	1.29
2 COMBINED AT							
	CP35	2155.	12.33	243.	69.	25.	2.69
ROUTED TO							
	R35	2089.	12.42	243.	69.	25.	2.69
HYDROGRAPH AT							
	36	193.	12.25	16.	4.	1.	0.24
2 COMBINED AT							
	I1CP36	2217.	12.42	258.	73.	26.	2.93
HYDROGRAPH AT							
	37	672.	12.42	85.	24.	9.	0.95
2 COMBINED AT							
	CP36	2886.	12.42	343.	97.	35.	3.88
ROUTED TO							
	R36	2810.	12.50	343.	96.	35.	3.88
HYDROGRAPH AT							
	38	715.	12.25	64.	17.	6.	0.76
2 COMBINED AT							
	CP38	3253.	12.42	407.	114.	41.	4.64
ROUTED TO							
	SR38	3220.	12.50	357.	94.	34.	4.64
ROUTED TO							

Old WLB study

+	R38	3133.	12.58	355.	94.	34.	4.64
+ HYDROGRAPH AT	39	588.	12.50	74.	18.	7.	0.77
+ 2 COMBINED AT	I1CP39	3708.	12.58	427.	112.	40.	5.41
+ 2 COMBINED AT	CP39	6110.	12.67	765.	198.	71.	12.86
+ ROUTED TO	R39	6018.	12.67	765.	198.	71.	12.86
+ HYDROGRAPH AT	40	525.	12.25	48.	13.	5.	0.52
+ ROUTED TO	R40	427.	12.50	48.	13.	5.	0.52
+ HYDROGRAPH AT	42	1029.	12.50	131.	33.	12.	1.18
+ 2 COMBINED AT	I1CP42	1454.	12.50	179.	46.	17.	1.70
+ 2 COMBINED AT	CP42	7140.	12.67	934.	242.	87.	14.56
+ ROUTED TO	SR42	6601.	12.75	797.	207.	75.	14.56
+ ROUTED TO	R42	6765.	12.83	797.	207.	75.	14.56
+ HYDROGRAPH AT	41A1	48.	12.00	3.	1.	0.	0.02
+ ROUTED TO	SR41A1	23.	12.17	3.	1.	0.	0.02
+ DIVERSION TO	1D303	23.	12.17	3.	1.	0.	0.02
+ HYDROGRAPH AT	CP41A1	0.	0.08	0.	0.	0.	0.02
+ ROUTED TO	R41A1	0.	0.08	0.	0.	0.	0.02
+ HYDROGRAPH AT	41A2	60.	12.00	3.	1.	0.	0.03
+ 2 COMBINED AT	CP41A2	60.	12.00	3.	1.	0.	0.05
+ ROUTED TO	SR41A2	60.	12.00	3.	1.	0.	0.05
+ DIVERSION TO	2D303	24.	12.00	2.	0.	0.	0.05
+ HYDROGRAPH AT	CP41A2	36.	12.00	1.	0.	0.	0.05
+ ROUTED TO	R41A2	25.	12.08	1.	0.	0.	0.05
+ HYDROGRAPH AT	41A3	69.	12.00	4.	1.	0.	0.03
+ 2 COMBINED AT	CP41A3	86.	12.08	5.	1.	0.	0.08
+ ROUTED TO	SR41A3	24.	12.25	5.	1.	0.	0.08
+ DIVERSION TO	3D303	24.	12.25	5.	1.	0.	0.08
+ HYDROGRAPH AT	CP41A3	0.	0.08	0.	0.	0.	0.08
+ ROUTED TO	R41A3	0.	0.08	0.	0.	0.	0.08
+ HYDROGRAPH AT	41A	91.	12.08	5.	1.	0.	0.05
+ 2 COMBINED AT	CP41A	91.	12.08	5.	1.	0.	0.13
+ ROUTED TO	SR41A	23.	12.25	5.	1.	0.	0.13
+ DIVERSION TO	4D303	23.	12.25	5.	1.	0.	0.13
+ HYDROGRAPH AT	CP41A	0.	0.08	0.	0.	0.	0.13
+ ROUTED TO	R41A	0.	0.08	0.	0.	0.	0.13
+ HYDROGRAPH AT	41-1	208.	12.17	14.	3.	1.	0.15
+ 2 COMBINED AT	CP41-1	208.	12.17	14.	3.	1.	0.28
+ ROUTED TO	SR41-1	148.	12.33	14.	3.	1.	0.28
+ DIVERSION TO	5D303	45.	12.33	11.	3.	1.	0.28
HYDROGRAPH AT							

CP41-1	103.	12.33	2.	1.	0.	0.28
ROUTED TO						
R41-1	38.	12.42	2.	1.	0.	0.28
HYDROGRAPH AT						
41-2	143.	12.17	9.	2.	1.	0.10
2 COMBINED AT						
CP41-2	143.	12.17	12.	3.	1.	0.38
ROUTED TO						
SR41-2	33.	12.50	12.	3.	1.	0.38
DIVERSION TO						
6D303	33.	12.50	12.	3.	1.	0.38
HYDROGRAPH AT						
CP41-2	0.	0.08	0.	0.	0.	0.38
ROUTED TO						
R41-2	0.	0.08	0.	0.	0.	0.38
HYDROGRAPH AT						
41	567.	12.42	64.	16.	6.	0.58
2 COMBINED AT						
CP41	567.	12.42	64.	16.	6.	0.68
ROUTED TO						
SR41	531.	12.50	64.	16.	6.	0.68
DIVERSION TO						
7D303	47.	12.50	26.	7.	2.	0.68
HYDROGRAPH AT						
CP41	484.	12.50	38.	9.	3.	0.68
ROUTED TO						
R41	465.	12.58	38.	9.	3.	0.68
HYDROGRAPH AT						
43-1	76.	12.08	5.	1.	0.	0.04
2 COMBINED AT						
CP43-1	465.	12.58	42.	11.	4.	1.00
ROUTED TO						
SR43-1	282.	12.83	42.	11.	4.	1.00
DIVERSION TO						
1D303A	282.	12.83	42.	11.	4.	1.00
HYDROGRAPH AT						
CP43-1	0.	0.08	0.	0.	0.	1.00
ROUTED TO						
R43-1	0.	0.08	0.	0.	0.	1.00
HYDROGRAPH AT						
43-2	19.	12.00	1.	0.	0.	0.01
2 COMBINED AT						
CP43-2	19.	12.00	1.	0.	0.	1.01
ROUTED TO						
SR43-2	10.	12.17	1.	0.	0.	1.01
DIVERSION TO						
2D303A	10.	12.17	1.	0.	0.	1.01
HYDROGRAPH AT						
CP43-2	0.	0.08	0.	0.	0.	1.01
ROUTED TO						
R43-2	0.	0.08	0.	0.	0.	1.01
HYDROGRAPH AT						
43-3	107.	12.00	6.	1.	1.	0.05
2 COMBINED AT						
CP43-3	107.	12.00	6.	1.	1.	1.06
ROUTED TO						
SR43-3	23.	12.17	5.	1.	1.	1.06
DIVERSION TO						
3D303A	23.	12.17	5.	1.	1.	1.06
HYDROGRAPH AT						
CP43-3	0.	0.08	0.	0.	0.	1.06
ROUTED TO						
R43-3	0.	0.08	0.	0.	0.	1.06
HYDROGRAPH AT						
43-4	64.	12.00	3.	1.	0.	0.03
2 COMBINED AT						
CP43-4	64.	12.00	3.	1.	0.	1.09
ROUTED TO						
SR43-4	21.	12.17	3.	1.	0.	1.09
DIVERSION TO						
DI43-4	21.	12.17	3.	1.	0.	1.09
HYDROGRAPH AT						
CP43-4	0.	0.08	0.	0.	0.	1.09
ROUTED TO						
R43-4	0.	0.08	0.	0.	0.	1.09
HYDROGRAPH AT						
43-5	43.	12.00	2.	1.	0.	0.02
2 COMBINED AT						

+	CP43-5	43.	12.00	2.	1.	0.	1.11
ROUTED TO +	SR43-5	19.	12.17	2.	1.	0.	1.11
DIVERSION TO +	DI43-5	19.	12.17	2.	1.	0.	1.11
HYDROGRAPH AT +	CP43-5	0.	0.08	0.	0.	0.	1.11
ROUTED TO +	R43-5	0.	0.08	0.	0.	0.	1.11
HYDROGRAPH AT +	43-6	45.	12.00	2.	1.	0.	0.02
2 COMBINED AT +	CP43-6	45.	12.00	2.	1.	0.	1.13
ROUTED TO +	SR43-6	6.	12.17	2.	1.	0.	1.13
DIVERSION TO +	DI43-6	6.	12.17	2.	1.	0.	1.13
HYDROGRAPH AT +	CP43-6	0.	0.08	0.	0.	0.	1.13
ROUTED TO +	R43-6	0.	0.08	0.	0.	0.	1.13
HYDROGRAPH AT +	43-7	45.	12.00	2.	1.	0.	0.02
2 COMBINED AT +	CP43-7	45.	12.00	2.	1.	0.	1.15
ROUTED TO +	SR43-7	20.	12.08	2.	1.	0.	1.15
DIVERSION TO +	DI43-7	20.	12.08	2.	1.	0.	1.15
HYDROGRAPH AT +	CP43-7	0.	0.08	0.	0.	0.	1.15
ROUTED TO +	R43-7	0.	0.08	0.	0.	0.	1.15
HYDROGRAPH AT +	43-8	23.	12.00	1.	0.	0.	0.01
2 COMBINED AT +	CP43-8	23.	12.00	1.	0.	0.	1.16
ROUTED TO +	SR43-8	12.	12.08	1.	0.	0.	1.16
DIVERSION TO +	DI43-8	12.	12.08	1.	0.	0.	1.16
HYDROGRAPH AT +	CP43-8	0.	0.08	0.	0.	0.	1.16
ROUTED TO +	R43-8	0.	0.08	0.	0.	0.	1.16
HYDROGRAPH AT +	43	23.	12.00	1.	0.	0.	0.01
2 COMBINED AT +	I1CP43	22.	12.00	1.	0.	0.	1.17
2 COMBINED AT +	CP43	6786.	12.83	799.	208.	75.	13.90
ROUTED TO +	SR43	5503.	12.92	799.	208.	75.	13.90
DIVERSION TO +	DI43	1441.	12.92	80.	20.	7.	13.90
HYDROGRAPH AT +	CP43	4061.	12.92	719.	187.	68.	13.90
ROUTED TO +	RD43	4023.	13.00	717.	187.	68.	13.90
HYDROGRAPH AT +	CP43-4	21.	12.17	3.	1.	0.	1.09
ROUTED TO +	RD43-4	14.	12.67	3.	1.	0.	1.09
HYDROGRAPH AT +	CP43-5	19.	12.17	2.	1.	0.	1.11
ROUTED TO +	RD43-5	13.	12.58	2.	1.	0.	1.11
2 COMBINED AT +	I1CWT4	27.	12.67	5.	1.	0.	0.05
HYDROGRAPH AT +	CP43-6	6.	12.17	2.	1.	0.	1.13
ROUTED TO +	RD43-6	4.	13.17	2.	1.	0.	1.13
2 COMBINED AT +	I2CWT4	29.	12.67	8.	2.	1.	0.07
HYDROGRAPH AT +	CP43-7	20.	12.08	2.	1.	0.	1.15
ROUTED TO							

	RD43-7	12.	12.58	2.	1.	0.	1.15
2 COMBINED AT	I3CWT4	41.	12.58	10.	3.	1.	0.09
HYDROGRAPH AT	CP43-8	12.	12.08	1.	0.	0.	1.16
ROUTED TO	RD43-8	5.	12.58	1.	0.	0.	1.16
2 COMBINED AT	I4CWT4	46.	12.58	11.	3.	1.	0.10
HYDROGRAPH AT	44	300.	12.25	25.	6.	2.	0.22
2 COMBINED AT	I5CWT4	323.	12.25	36.	9.	3.	0.32
2 COMBINED AT	I6CWT4	4057.	13.00	747.	196.	71.	14.12
HYDROGRAPH AT	45-1	143.	12.08	9.	2.	1.	0.08
HYDROGRAPH AT	CP43	1441.	12.92	80.	20.	7.	13.90
2 COMBINED AT	CP45-1	1440.	12.92	90.	22.	8.	13.98
ROUTED TO	SR45-1	1428.	13.00	90.	22.	8.	13.98
DIVERSION TO	DI45-1	325.	13.00	35.	9.	3.	13.98
HYDROGRAPH AT	CP45-1	1104.	13.00	54.	14.	5.	13.98
ROUTED TO	R45-1	989.	13.08	54.	14.	5.	13.98
HYDROGRAPH AT	45	401.	12.42	48.	12.	4.	0.38
2 COMBINED AT	CP45	1030.	13.08	101.	25.	9.	14.36
ROUTED TO	SR45	815.	13.17	101.	25.	9.	14.36
DIVERSION TO	DI45	330.	13.17	85.	21.	8.	14.36
HYDROGRAPH AT	CP45	485.	13.17	16.	4.	1.	14.36
ROUTED TO	R45	318.	13.25	16.	4.	1.	14.36
HYDROGRAPH AT	46-1	184.	12.25	18.	4.	2.	0.15
2 COMBINED AT	CP46-1	316.	13.25	33.	8.	3.	14.51
ROUTED TO	SR46-1	118.	13.42	33.	8.	3.	14.51
DIVERSION TO	DI46-1	118.	13.42	33.	8.	3.	14.51
HYDROGRAPH AT	CP46-1	0.	0.08	0.	0.	0.	14.51
ROUTED TO	R46-1	0.	0.08	0.	0.	0.	14.51
HYDROGRAPH AT	46	651.	12.58	94.	24.	9.	0.85
2 COMBINED AT	I1CP46	637.	12.58	92.	23.	8.	15.36
HYDROGRAPH AT	28	747.	12.50	89.	22.	8.	0.86
ROUTED TO	R28	738.	12.50	89.	22.	8.	0.86
HYDROGRAPH AT	30	244.	12.33	21.	5.	2.	0.28
2 COMBINED AT	I1CP30	879.	12.50	110.	28.	10.	1.14
HYDROGRAPH AT	29	228.	12.25	18.	5.	2.	0.22
ROUTED TO	SR29	0.	0.08	0.	0.	0.	0.22
ROUTED TO	R29	0.	0.08	0.	0.	0.	0.22
2 COMBINED AT	CP30	879.	12.50	110.	28.	10.	1.36
ROUTED TO	R30	809.	12.67	110.	28.	10.	1.36
HYDROGRAPH AT	31	525.	12.50	63.	16.	6.	0.71
2 COMBINED AT							

+		CP31	1258.	12.58	173.	43.	16.	2.07
	ROUTED TO							
+		R31	1220.	12.75	173.	43.	16.	2.07
	2 COMBINED AT							
+		CP46	1737.	12.67	259.	65.	23.	17.43
	ROUTED TO							
+		SR46	1705.	12.75	259.	65.	23.	17.43
	ROUTED TO							
+		R46	1591.	12.92	259.	65.	23.	17.43
	HYDROGRAPH AT							
+		CP45-1	325.	13.00	35.	9.	3.	13.98
	ROUTED TO							
+		RD45-1	263.	13.25	35.	9.	3.	13.98
	HYDROGRAPH AT							
+		CP45	330.	13.17	85.	21.	8.	14.36
	ROUTED TO							
+		RD45	314.	13.42	85.	21.	8.	14.36
	2 COMBINED AT							
+		I7CWT4	552.	13.25	120.	30.	11.	14.36
	HYDROGRAPH AT							
+		CP46-1	118.	13.42	33.	8.	3.	14.51
	ROUTED TO							
+		RD46-1	108.	13.75	33.	8.	3.	14.51
	2 COMBINED AT							
+		I8CWT4	618.	13.25	153.	38.	14.	14.51
	HYDROGRAPH AT							
+		WT4	997.	12.25	88.	22.	8.	0.77
	2 COMBINED AT							
+		I9CWT4	1048.	12.25	237.	60.	21.	15.28
	2 COMBINED AT							
+		I10WT4	2009.	13.00	491.	123.	44.	18.20
	2 COMBINED AT							
+		CPWT4	6026.	13.00	1228.	317.	114.	18.57
	ROUTED TO							
+		RS47	0.	0.08	0.	0.	0.	18.57
	HYDROGRAPH AT							
+		CP43-1	282.	12.83	42.	11.	4.	1.00
	ROUTED TO							
+		R43-1	236.	13.50	42.	11.	4.	1.00
	HYDROGRAPH AT							
+		CP43-2	10.	12.17	1.	0.	0.	1.01
	ROUTED TO							
+		R43-2	4.	13.92	1.	0.	0.	1.01
	HYDROGRAPH AT							
+		CP43-3	23.	12.17	5.	1.	1.	1.06
	ROUTED TO							
+		R43-3	15.	13.75	5.	1.	1.	1.06
	HYDROGRAPH AT							
+		303A	531.	12.25	49.	12.	4.	0.42
	4 COMBINED AT							
+		1C303A	530.	12.25	97.	24.	9.	1.48
	2 COMBINED AT							
+		CP303A	516.	12.25	94.	24.	8.	18.99
	HYDROGRAPH AT							
+		D41A1	23.	12.17	3.	1.	0.	0.02
	ROUTED TO							
+		R41A1	13.	13.58	3.	1.	0.	0.02
	HYDROGRAPH AT							
+		D41A2	24.	12.00	2.	0.	0.	0.05
	ROUTED TO							
+		R41A2	12.	13.50	2.	0.	0.	0.05
	2 COMBINED AT							
+		1I303	25.	13.58	5.	1.	0.	0.05
	HYDROGRAPH AT							
+		D41A3	24.	12.25	5.	1.	0.	0.08
	ROUTED TO							
+		R41A3	15.	14.50	5.	1.	0.	0.08
	2 COMBINED AT							
+		2I303	27.	13.67	9.	2.	1.	0.08
	HYDROGRAPH AT							
+		D41A	23.	12.25	5.	1.	0.	0.13
	ROUTED TO							
+		R41A	13.	14.67	5.	1.	0.	0.13
	2 COMBINED AT							
+		3I303	32.	14.42	14.	4.	1.	0.13
	HYDROGRAPH AT							
+		D41-1	45.	12.33	11.	3.	1.	0.28
	ROUTED TO							

R41-1	33.	14.25	11.	3.	1.	0.28
2 COMBINED AT						
4I303	65.	14.25	25.	6.	2.	0.28
HYDROGRAPH AT						
D41-2	33.	12.50	12.	3.	1.	0.38
ROUTED TO						
R41-2	29.	14.58	11.	3.	1.	0.38
2 COMBINED AT						
5I303	90.	14.50	35.	9.	3.	0.38
HYDROGRAPH AT						
D41	47.	12.50	26.	7.	2.	0.68
ROUTED TO						
R41	44.	14.67	25.	7.	2.	0.68
2 COMBINED AT						
6I303	132.	14.50	60.	16.	6.	0.96
HYDROGRAPH AT						
303	910.	12.67	138.	35.	12.	1.21
2 COMBINED AT						
CP303	911.	12.67	192.	50.	18.	2.17

*** NORMAL END OF HEC-1 ***

NOTES:

- WT#4 Q100 = 6026 cfs, with a volume of 629 acre-ft.

- CONCENTRATION POINTS WHERE DISCHARGES MUST BE MET WHEN LEAVING THE PROPERTY: #41, #43, #43-1, #43-2, #43-3, #43-4, #43-5, #43-6, #43-7, #43-8, #45, #45-1, #46, #46-1.

- SPLIT FLOW AT C.P.43 = 1440 cfs TO THE EAST @ 40 acre-ft & Tp of 12.92, and C.P.#43= 4061 cfs under I-10.

APPENDIX B

HEC-1 Design Conditions Computer Output Files

ALTERNATIVE 'A'

HEC-1 OUTPUT

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               MAY   1991              *
 *            VERSION 4.0.1E             *
 *     Lahey F77L-EM/32 version 5.01     *
 *       Dodson & Associates, Inc.       *
 *  RUN DATE  05/12/99  TIME  07:10:54   *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X    X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X    X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                          HEC-1 INPUT                                                          PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID        FUTURE CONDITIONS MODEL AT SPECIFIC LOCATIONS
    2           ID        MINIMUM FEMA DISTURBANCE MODEL
    3           ID
    4           ID        FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
    5           ID        100-YEAR, 24-HOUR STORM                            WTADMS.24
    6           ID
    7           ID        EXISTING CONDITIONS FOR CATERPILLAR PROPERTY EXTRACTED
    8           ID        FROM WHITE TANKS ADMS    3/30/99        FILE: CATADMS2.DAT
    9           ID
   10           ID        FUTURE CONDITIONS FOR CATERPILLAR PROPERTY
   11           ID        PLANNING AREAS I THRU VII IMPERVIOUS CALCS.
   12           ID        REVISED 4/26/99 FILE: FUTDIV7.DAT
   13           ID
   14           ID        REVISED FUTURE CONDITIONS MODEL FOR CATERPILLAR
   15           ID        NO BASINS ONSITE DRAIN TO WT#4
   16           ID        REVISED 5/11/99                ALTERNATIVE 'A'
   17           ID         4/26/99 FILE: FUTDIV10.DAT
   18           ID
                *DIAGRAM
   19           IT       5                    1200
   20           IO       5
   21           IN      15
   22           JD    4.03    .001
   23           PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
   24           PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
   25           PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
   26           PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
   27           PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
   28           PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
   29           PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
   30           PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
   31           PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
   32           PC    .983    .986    .989    .992    .995    .998    1.00   1.000   1.000   1.000
   33           JD    3.99      10
   34           JD    3.83      50
   35           JD    3.76     100
   36           JD    3.70     200

   37           KK      18
   38           KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 18.
   39           BA     .81
   40           LG     .20     .34    3.25    1.12    10.7
   41           UI    213.    719.   1128.   1731.   1159.    722.    301.    171.     49.     47.
   42           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
   43           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

   44           KK     R18
   45           KM        ROUTE FLOW FROM CP18 TO CP19.
   46           RS       2              -1       0
   47           RC     .08     .05     .08    7800   .0615
   48           RX    1000    1030    1080    1097    1120    1140    1205    1218
   49           RY    1520    1518    1514    1510    1510    1512    1518    1520
1                                          HEC-1 INPUT                                                          PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   50           KK      19
   51           KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 19.
   52           BA     .79
   53           LG     .19     .33    3.31    1.07    12.8
   54           UI     84.    195.    385.    496.    632.    936.    940.    708.    553.    427.
   55           UI    278.    147.    120.     84.     32.     26.     26.     26.      0.      0.
   56           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

   57           KK    CP19
   58           KM        ADD HYDROGRAPHS AT CP19.
   59           HC       2

   60           KK     R19
   61           KM        ROUTE COMBINED HYDROGRPAH AT CP19 TO CP21.
   62           RS       2              -1       0
   63           RC     .06     .04     .06    5772   .0246
   64           RX    1000    1010    1025    1040    1055    1069    1080    1100
   65           RY    1466    1464    1460    1458    1458    1460    1466    1467

   66           KK      21
   67           KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 21.
   68           BA     .79
```

```
 69          LG     .19     .31    3.81     .78    13.9
 70          UI     84.    191.    380.    491.    623.    915.    948.    711.    558.    430.
 71          UI    291.    149.    124.     84.     37.     26.     26.     26.      0.      0.
 72          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 73          KK  I1CP21
 74          KM        ADD HYDROGRAPHS AT CP21.
 75          HC       2

 76          KK      20
 77          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 20.
 78          BA    1.07
 79          LG     .19     .33    3.33    1.05     9.9
 80          UI    119.    294.    560.    721.    938.   1414.   1211.    931.    714.    535.
 81          UI    286.    200.    132.     83.     36.     36.     36.     36.      0.      0.
 82          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *   SR20
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP20.
             *      1    STOR       0       0
             *      0    1.05    9.43   26.91   54.31   92.89  138.67  176.47  190.08  219.05
             * 249.57
             *      0       0       0       0       0       0       0       0     265    1377
             *   2963
             *   1443    1446    1450    1454    1458    1462    1466    1469    1470    1472
             *   1474

 83          KK     R20
 84          KM        ROUTE REMAINDER OF FLOW AT CP20  TO CP21
 85          RS       4              -1       0
 86          RC     .06    .045     .06    6240   .0208
 87          RX    1000    1012    1025    1032    1050    1057    1070    1092
 88          RY    1424    1422    1420    1418    1418    1420    1422    1424
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 89          KK    CP21
 90          KM        ADD HYDROGRAPHS AT CP21.
 91          HC       2

 92          KK     D21
 93          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 94          KO       1
 95          DT     D21
 96          DI       0    5000
 97          DQ       0    5000
             *   SR21
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP21
             *      1    STOR       0       0
             *      0     .68   20.68   57.58   95.91  102.34  117.65     130
             *      0       0       0       0       0     265    1377    2000
             *   1319    1320    1330    1340    1347    1348    1350    1351

 98          KK     R21
 99          KM        ROUTE REMAINDER OF FLOW AT CP21 TO CP23
100          RS       1              -1       0
101          RC     .03     .03     .05    2340   .0196
102          RX    1000    1030    1050    1070    1145    1212    1225    1250
103          RY    1310    1306    1304    1302    1302    1304    1306    1310

104          KK      23
105          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 23.
106          BA     .16
107          LG     .18     .32    4.04     .65    15.3
108          UI    111.    327.    471.    228.     68.     20.      0.      0.      0.      0.
109          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

110          KK    CP23
111          KM        ADD HYDROGRAPHS AT CP23
112          HC       2

113          KK     D23
114          KM        DIVERT FLOW TO A RETENTION BASIN IN 21
115          KO       1
116          DT    DF23
117          DI       0    1000
118          DQ       0    1000
             *   SR23
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP23.
             *      1    STOR       0       0
             *      0    6.04   20.38   53.82  120.38  216.24  325.98  455.42   606.1  645.49
             * 685.61  767.98
             *      0       0       0       0       0       0       0       0       0       0
             *    928    8950
             *   1272    1276    1280    1284    1288    1292    1296    1300    1304    1305
             *   1306    1308
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

119          KK     R23
120          KM        ROUTE REMAINDER OF FLOW AT CP23 TO CP22A
121          RS       4              -1       0
122          RC     .05     .03     .05    4992    .005    1400
123          RX     930     975    1000    1010    1030    1040    1041    1042
124          RY    1397  1396.5    1396    1394    1394    1396  1396.5    1397

125          KK      22
126          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 22
127          BA     .57
128          LG     .19     .33    3.38    1.03    12.5
129          UI     77.    258.    418.    563.    888.    745.    546.    395.    215.    129.
130          UI     79.     34.     24.     24.      0.      0.      0.      0.      0.      0.
131          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

132          KK     D22
133          KM        DIVERT FLOW TO OFFLINE RETENION BASIN IN #22
134          KO       1
135          DT    DF22
136          DI       0     100    2000
137          DQ       0       0    1900

138          KK     R22
139          KM        ROUTE FLOW FROM CP22 TO CP22A
140          RS       3              -1       0
```

```
141          RC     .05     .03     .05    6230    .025
142          RX    1000    1030    1060    1070    1100    1115    1125    1150
143          RY    1294    1292    1290    1288    1288    1290    1292    1294

144          KK     22A
145          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 22A
146          BA     .50
147          LG     .15     .29    3.74     .29    12.9
148          UI     74.    286.    436.    640.    862.    603.    424.    253.    126.     79.
149          UI     30.     23.     23.      0.      0.      0.      0.      0.      0.      0.
150          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

151          KK  I1C22A
152          KM        ADD HYDROGRAPHS AT CP22A
153          HC       2

154          KK   CP22A
155          KM        ADD HYDROGRAPHS AT CP22A
156          HC       2

157          KK    R22A
158          KM        ROUTE COMBINED HYDROGRAPHS AT CP22A TO CP25
159          RS       4              -1       0
160          RC     .03     .03     .05    7022   .0079
161          RX    1000    1030    1040    1047    1070    1097    1120    1200
162          RY    1255    1254    1250    1248    1250    1252    1254    1255
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

163          KK      25
164          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 25
165          BA     .46
166          LG     .15     .31    4.27     .49    25.9
167          UI     53.    137.    254.    327.    437.    640.    505.    389.    295.    207.
168          UI    106.     80.     53.     22.     16.     16.     16.      0.      0.      0.
169          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

170          KK  I1CP25
171          KM        ADD HYDROGRAPHS AT CP25
172          HC       2

173          KK      24
174          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 24
175          BA     .14
176          LG     .35     .31    3.77     .31    30.9
177          UI     21.     85.    128.    193.    241.    165.    115.     61.     34.     20.
178          UI      7.      7.      7.      0.      0.      0.      0.      0.      0.      0.
179          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

180          KK     D24
181          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN IN BASIN 25
182          KO       1
183          DT    DF24
184          DI       0     225
185          DQ       0     225
             *   SR24
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP24
             *      1    STOR       0       0
             *      0     .46    2.96    16.6      86  221.55  282.99  306.59  357.02
             *      0       0       0       0       0       0       0      50    2598
             *   1210    1214    1216    1220    1230    1240    1243    1244    1246

186          KK     R24
187          KM        ROUTE REMAINDER OF FLOW AT CP24 TO CP25
188          RS       1              -1       0
189          RC     .05     .03     .05    1326    .021
190          RX    1000    1040    1070    1100    1200    1220    1245    1265
191          RY    1234    1232    1230    1228    1228    1230    1232    1234

192          KK    25CP
193          KM        COMBINE HYDROGRAPHS AT CP25
194          HC       2

195          KK     D25
196          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN IN BASIN 25
197          KO       1
198          DT    DF25
199          DI       0     700    5000
200          DQ       0       0    4300
             *   SR25
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP25
             *      1    STOR       0       0
             *      0    5.61   10.27   13.15   16.62   26.62
             *      0       0       0       0     125    2273
             *   1204    1210    1212    1213    1214    1216
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

201          KK      26
202          KM        RUNOFF FROM SUB-BASIN 26
203          BA    1.16
204          LG     .17     .30    3.97     .68    12.4
205          UI    103.    163.    401.    532.    639.    787.   1092.   1251.    956.    788.
206          UI    637.    510.    359.    200.    171.    117.     99.     32.     32.     32.
207          UI     32.     32.      0.      0.      0.      0.      0.      0.      0.      0.
208          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

209          KK     D26
210          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN IN #26
211          KO       1
212          DT    DF26
213          DI       0     200    5000
214          DQ       0       0    4800

215          KK     R26
216          KM        ROUTE FLOW FROM CP26 TO CP27
217          RS       4              -1       0
218          RC     .05     .03     .05    7020   .0157
219          RX    1000    1012    1025    1040    1090    1105    1112    1120
220          RY    1250    1248    1245    1242    1242    1244    1247    1250

221          KK      27
222          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 27
```

```
 223          BA    1.00
 224          LG     .15     .31    4.27     .48    20.7
 225          UI    101.    206.    438.    567.    705.    970.   1225.    936.    750.    587.
 226          UI    450.    256.    172.    129.     99.     31.     31.     31.     31.      0.
 227          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 228          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 229          KK  I1CP27
 230          KM        ADD HYDROGRAPHS AT CP27
 231          HC       2
              *   SR27
              *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP27
              *      1    STOR       0       0
              *      0     .13    5.77    9.37   11.42   13.71   19.21
              *      0       0       0       0       0     550    4546
              *   1203    1204    1210    1212    1213    1214    1216

 232          KK    CP27
 233          KM        ADD REMAINING FLOW OF CP25 & CP27 AT CP27
 234          KO       1
 235          HC       2

 236          KK     R27
 237          KM        ROUTE COMBINED REMAINDER FLOW AT CP27 TO CP39
 238          RS       3              -1       0
 239          RC     .03     .03     .05    5928   .0084
 240          RX    1000    1010    1020    1025    1055    1085    1175    1250
 241          RY    1210    1210    1210    1202    1202    1204    1206    1208
1                                          HEC-1 INPUT                                                    PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 242          KK      34
 243          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 34
 244          BA     .36
 245          LG     .20     .34    3.21    1.14   10.00
 246          UI     57.    229.    343.    530.    615.    416.    284.    139.     81.     43.
 247          UI     17.     17.      0.      0.      0.      0.      0.      0.      0.      0.
 248          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 249          KK      33
 250          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 33
 251          BA     .65
 252          LG     .20     .34    3.21    1.14   10.00
 253          UI     99.    392.    591.    888.   1120.    769.    535.    290.    159.     93.
 254          UI     30.     30.     30.      0.      0.      0.      0.      0.      0.      0.
 255          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 256          KK    CP33
 257          KM        ADD HYDROGRAPHS AT CP33
 258          HC       2

 259          KK     R33
 260          KM        ROUTE COMBINED HYDROGRAPHS AT CP33 TO CP35
 261          RS       2              -1       0
 262          RC     .08     .05     .08    4680   .0427
 263          RX    1000    1015    1022    1035    1050    1068    1092    1100
 264          RY    1800    1760    1720    1680    1680    1720    1760    1800

 265          KK      35
 266          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 35
 267          BA     .39
 268          LG     .20     .34    3.21    1.14    14.2
 269          UI     72.    272.    410.    672.    631.    428.    270.    119.     74.     28.
 270          UI     20.     20.      0.      0.      0.      0.      0.      0.      0.      0.
 271          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 272          KK  I1CP35
 273          KM        ADD HYDROGRAPHS AT CP35
 274          HC       2

 275          KK      32
 276          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 32
 277          BA    1.29
 278          LG     .20     .34    3.21    1.14    11.1
 279          UI    130.    270.    570.    738.    919.   1268.   1585.   1202.    963.    753.
 280          UI    575.    317.    221.    161.    121.     40.     40.     40.     40.      0.
 281          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 282          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 283          KK    CP35
 284          KM        ADD HYDROGRAPHS AT CP35
 285          HC       2
1                                          HEC-1 INPUT                                                    PAGE  8

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 286          KK     R35
 287          KM        ROUTE COMBINED HYDROGRAPHS AT CP35 TO CP36
 288          RS       2              -1       0
 289          RC     .06    .035      .06    5070   .0355
 290          RX    1000    1012    1023    1034    1045    1056    1067    1079
 291          RY    1429    1428    1426    1424    1424    1426    1428    1429

 292          KK      36
 293          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 36
 294          BA     .24
 295          LG     .16     .34    2.38    1.41    14.2
 296          UI     34.    127.    197.    278.    409.    297.    212.    140.     65.     43.
 297          UI     22.     11.     11.      0.      0.      0.      0.      0.      0.      0.
 298          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 299          KK  I1CP36
 300          KM        ADD HYDROGRAPHS AT CP36
 301          HC       2

 302          KK      37
 303          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 37
 304          BA     .95
 305          LG     .19     .34    3.24    1.08     9.7
 306          UI     90.    167.    373.    488.    598.    764.   1104.    941.    747.    598.
 307          UI    475.    344.    190.    151.    103.     81.     28.     28.     28.     28.
 308          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 309          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

```
310          KK    CP36
311          KM       ADD HYDROGRAPHS AT CP 36
312          HC       2

313          KK     R36
314          KM       ROUTE COMBINED HYDROGRAPHS AT CP36 TO CP38
315          RS       2              -1       0
316          RC     .05     .03     .05    4836   .0198
317          RX    1000    1008    1020    1032    1050    1112    1135    1183
318          RY    1344    1342    1340    1338    1338    1340    1342    1344

319          KK      38
320          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 38
321          BA     .76
322          LG     .17     .34    3.21     .97    16.4
323          UI    103.    354.    568.    770.   1209.    983.    720.    513.    270.    168.
324          UI    103.     36.     32.     32.      0.      0.      0.      0.      0.      0.
325          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

326          KK    CP38
327          KM       ADD HYDROGRAPHS AT CP38
328          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

329          KK     D38
330          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN IN BASIN 38
331          KO       1
332          DT     D38
333          DI       0     400    5000
334          DQ       0       0    4600
             *   SR38
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP38
             *      1    STOR       0       0
             *      0    1.83   15.38   39.25   41.76   47.45   60.58
             *      0       0       0       0      44    2223    6550
             *   1275    1280    1290  1297.5    1298    1300    1301

335          KK     R38
336          KM       ROUTE REMAINDER OF FLOW AT CP38 TO CP39
337          RS       3              -1       0
338          RC     .05     .03     .05    5438   .0167
339          RX    1000    1005    1010    1025    1055    1085    1175    1250
340          RY    1212    1211    1210    1202    1202    1204    1206    1208

341          KK      39
342          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 39
343          BA     .77
344          LG     .15     .34    3.81     .63    30.0
345          UI     64.     82.    232.    313.    372.    450.    565.    791.    683.    550.
346          UI    460.    376.    308.    213.    122.    106.     77.     64.     29.     20.
347          UI     20.     20.     20.     20.      0.      0.      0.      0.      0.      0.
348          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

349          KK  I1CP39
350          KM       ADD HYDROGRAPHS AT CP39
351          HC       2

352          KK    CP39
353          KM       ADD HYDROGRAPHS AT CP39
354          HC       2

355          KK     R39
356          KM       ROUTE COMBINED HYDROGRAPH AT CP39 TO CP42
357          RS       2              -1       0
358          RC     .03     .03     .05    4836   .0141
359          RX    1000    1005    1015    1025    1055    1070    1087    1130
360          RY    1143    1142    1140    1132    1132    1136    1140    1142

361          KK      40
362          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 40
363          BA     .52
364          LG     .18     .34    3.54     .89      18
365          UI     73.    258.    407.    562.    862.    658.    478.    331.    158.    104.
366          UI     61.     22.     22.     22.      0.      0.      0.      0.      0.      0.
367          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

368          KK     D40
369          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN IN #40
370          KO       1
371          DT    DF40
372          DI       0     206    2000
373          DQ       0       0    1794

374          KK     R40
375          KM       ROUTE FLOW FROM CP40 TO CP42
376          RS       4              -1       0
377          RC     .05     .03     .05    6396   .0086
378          RX    1000    1010    1065    1095    1135    1155    1215    1220
379          RY    1115    1114    1112    1110    1110    1112    1113    1113

380          KK      42
381          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 42
382          BA    1.18
383          LG     .21     .32    4.21     .45    39.3
384          UI     98.    128.    359.    483.    575.    696.    878.   1223.   1042.    840.
385          UI    701.    573.    467.    322.    182.    163.    115.     98.     39.     30.
386          UI     30.     30.     30.     30.      0.      0.      0.      0.      0.      0.
387          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

388          KK  I1CP42
389          KM       ADD HYDROGRAPHS AT CP42
390          HC       2

391          KK    CP42
392          KM       ADD HYDROGRAPHS AT CP42
393          HC       2

394          KK     D42
395          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN IN #42
396          KO       1
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397          DT    DF42
398          DI       0    1350   10000
399          DQ       0       0    8650
             *   SR42
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP42
             *      1     STOR       0       0
             *      0      .11   10.43   41.63    69.9   77.34    94.2  113.66   134.7  160.78
             *      0        0       0       0       0     163     844    2096    4630   13500
             * 1071.5     1072    1080    1090    1095    1096    1098    1100    1102    1104

400          KK     R42
401          KM        ROUTE REMAINDER OF HYDROGRAPH AT CP42 TO CP43
402          KO       1                       1
403          RS       1               -1       0
404          RC     .03     .03     .05     858   .0151
405          RX     900     950    1000    1030    1060    1075    1080    1090
406          RY    1090    1088    1086    1084    1084    1086    1088    1090
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

407          KK    41A1
408          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A1.
409          BA     .02
410          LG     .35     .31    3.70     .31     .00
411          UI     35.     87.     28.      4.      0.      0.      0.      0.      0.      0.
412          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

413          KK  SR41A1
414          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6255+85 ON I-10.
415          RS       1    STOR       0       0
416          SV       0     .43     .53     .63     .74    1.24    1.65    3.40    6.20
417          SQ       0      10      14      18      23      29      33     869    6050
418          SE  1133.4 1134.91 1135.23 1135.58 1135.97 1137.62  1139.0  1140.3 1143.85

419          KK  CP41A1
420          KM        DIVERT FLOW FROM CP41A1 TO CP303
421          DT   1D303
422          DI       0      14      23      33     869    6050
423          DQ       0      14      23      33      35      42

424          KK   R41A1
425          KM        ROUTE REMAINDER FROM CP41A1 TO CP41A2.
426          RS       1               -1       0
427          RC     .06     .03     .04     580   .0093
428          RX     600     800     900     965    1000    1020    1030    1040
429          RY    1147    1143    1142    1141    1141    1143    1145    1145

430          KK    41A2
431          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A2.
432          BA     .03
433          LG     .35     .34    3.91     .57     .00
434          UI     46.    124.     51.      9.      0.      0.      0.      0.      0.      0.
435          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

436          KK  CP41A2
437          KM        ADD HYDROGRAPHS AT CP41A2.
438          HC       2     .05

439          KK  SR41A2
440          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6261+65 ON I-10.
441          RS       1    STOR       0       0
442          SV       0     .10     .24     .31     .62    1.72
443          SQ       0       8      19      24     624    2104
444          SE  1132.7 1134.07 1134.98 1135.56 1137.34 1139.65

445          KK  CP41A2
446          KM        DIVERT FLOW FROM CP41A2 TO CP303
447          DT   2D303
448          DI       0       8      19      24     624    2104
449          DQ       0       8      19      24      30      36
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

450          KK   R41A2
451          KM        ROUTE REMAINDER FROM CP41A2 TO CP41A3.
452          RS       1               -1       0
453          RC     .06     .03     .04     595   .0093
454          RX     600     800     900     965    1000    1020    1030    1040
455          RY    1140    1136    1135    1134    1134    1136    1138    1140

456          KK    41A3
457          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A3.
458          BA     .03
459          LG     .35     .31    3.64     .30     .00
460          UI     38.    112.     64.     14.      4.      0.      0.      0.      0.      0.
461          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

462          KK  CP41A3
463          KM        ADD HYDROGRAPHS AT CP41A3.
464          HC       2     .08

465          KK  SR41A3
466          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6267+60 ON I-10
467          RS       1    STOR       0       0
468          SV       0     .86    1.05    1.25    1.48    2.51    2.84    4.15    5.46    8.08
469          SQ       0      10      14      18      23      29      32     254     654     896
470          SE  1128.6 1130.13 1130.45 1130.80 1131.19 1132.94  1133.5  1134.0  1134.5 1135.57

471          KK  CP41A3
472          KM        DIVERT FLOW FROM CP41A3 TO CP303
473          DT   3D303
474          DI       0      10      14      18      23      29      32     254     659    1896
475          DQ       0      10      14      18      23      29      32      33      34      35

476          KK   R41A3
477          KM        ROUTE REMAINDER FROM CP41A3 TO CP41A.
478          RS       1               -1       0
479          RC     .06     .03     .04     628   .0093
480          RX     600     800     900     965    1000    1020    1030    1040
481          RY    1135    1131    1130    1129    1129    1131    1133    1133

482          KK     41A
483          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A.
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484          BA     .05
485          LG     .35      .34     4.01      .53      .00
486          UI     44.     136.     137.      51.      14.       5.       0.       0.       0.       0.
487          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

488          KK   CP41A
489          KM        ADD HYDROGRAPHS AT CP41A.
490          HC       2     .13
1                                    HEC-1 INPUT                                                          PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


491          KK   SR41A
492          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6273+88 ON I-10
493          RS       1    STOR       0       0
494          SV       0    1.22    2.65    3.07    3.20    4.78    6.37    7.96    9.57
495          SQ       0      10      36      44      45     312     799    1429    2047
496          SE  1124.4 1125.75 1127.38 1127.86  1128.0  1128.5  1129.0  1129.5 1129.92

497          KK   CP41A
498          KM        DIVERT FLOW FROM CP41A TO CP303
499          DT   4D303
500          DI       0      10      36      44      45     312     799    1429    2047
501          DQ       0      10      36      44      45      47      49      51      52

502          KK    R41A
503          KM        ROUTE REMAINDER FROM CP41A TO CP41-1.
504          RS       1              -1       0
505          RC     .06     .03     .04    1437   .0093
506          RX     600     800     900     965    1000    1020    1030    1040
507          RY    1122    1118    1117    1116    1116    1118    1120    1120

508          KK    41-1
509          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41-1
510          BA     .15
511          LG     .35      .35     3.78      .62      .00
512          UI     45.     148.     244.     325.     203.     111.      46.      21.       9.       9.
513          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
514          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

515          KK  CP41-1
516          KM        ADD HYDROGRAPHS AT CP41-1
517          HC       2     .28

518          KK  SR41-1
519          KM        STORAGE ROUTE THROUGH 2-36" CMP AT STA 6288+25 ON I-10.
520          RS       1    STOR       0       0
521          SV       0     .73    3.47    3.94    4.53    5.12    5.71
522          SQ       0      10      36      44     489    1300    2348
523          SE  1112.7 1114.08 1115.71    1116  1116.5    1117  1117.5

524          KK  CP41-1
525          KM        DIVERT FLOW FROM CP41-1 TO CP303
526          DT   5D303
527          DI       0      10      36      44     489    1300    2348
528          DQ       0      10      36      44      47      50      52

529          KK   R41-1
530          KM        ROUTE REMAINDER FROM CP41-1 TO CP41-2.
531          RS       1              -1       0
532          RC     .06     .03     .04    1697   .0075
533          RX     600     800     900     965    1000    1020    1030    1040
534          RY    1104    1102    1101    1100    1100    1102    1104    1105
1                                    HEC-1 INPUT                                                          PAGE 14

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


535          KK    41-2
536          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41-2
537          BA     .10
538          LG     .35      .35     3.87      .58      .30
539          UI     31.     101.     169.     216.     133.      69.      30.      13.       6.       0.
540          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
541          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

542          KK  CP41-2
543          KM        ADD HYDROGRAPHS AT CP41-2
544          HC       2     .38

545          KK  SR41-2
546          KM        STORAGE ROUTE THROUGH 2-42" CMP AT STA 6305+22 ON I-10.
547          RS       1    STOR       0       0
548          SV       0     .84    1.23    1.78    2.46    3.31    4.34    5.61    7.63   11.57
549          SV   13.47   15.30   19.63   23.76
550          SQ       0      10      14      18      23      29      35      42      50      56
551          SQ     201     419     469    1836
552          SE  1099.2 1100.45 1100.70 1100.96 1101.23 1101.52 1101.83 1102.17 1102.83  1103.5
553          SE  1103.8    1104  1104.5 1104.95

554          KK  CP41-2
555          KM        DIVERT FLOW FROM CP41-2 TO CP303
556          DT   6D303
557          DI       0      10      14      18      23      29      35      42      50      56
558          DI     201     419     469    1836
559          DQ       0      10      14      18      23      29      35      42      50      56
560          DQ      59      61      64      68

561          KK   R41-2
562          KM        ROUTE REMAINDER FROM CP41-2 TO CP41.
563          RS       1              -1       0
564          RC     .06     .03     .04     978   .0053
565          RX     650     800     850     965    1000    1020    1030    1040
566          RY    1100    1099    1098    1096    1096    1098    1100    1101

567          KK      41
568          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41
569          BA     .58
570          LG     .21      .34     4.24      .44      3.2
571          UI     56.     108.     237.     308.     380.     493.     696.     562.     450.     357.
572          UI    282.     193.     103.      90.      56.      38.      17.      17.      17.      17.
573          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
574          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

575          KK     D41
576          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
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```
 577          DT     D41
 578          DI       0     576
 579          DQ       0      11
1                                        HEC-1 INPUT                                                    PAGE 15

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 580          KK    CP41
 581          KM        ADD HYDROGRAPHS AT CP41
 582          HC       2     .68

 583          KK    SR41
 584          KM        STORAGE ROUTE THROUGH 2-36" CMP AT STA 6315+00 ON I-10.
 585          RS       1    STOR       0       0
 586          SV       0     .09     .37     .86    2.15    2.99    4.92    5.83    7.92   11.06
 587          SV   15.07
 588          SQ       0       8      11      15      24      30      36      42      43     400
 589          SQ    1219
 590          SE  1094.6 1095.91 1096.15 1096.42 1096.99 1097.30 1097.91 1099.12  1099.5  1100.0
 591          SE  1100.6

 592          KK    CP41
 593          KM        DIVERT FLOW FROM CP41 TO CP303
 594          DT   7D303
 595          DI       0       8      11      15      24      30      36      42      43     400
 596          DI    1219
 597          DQ       0       8      11      15      24      30      36      42      43      46
 598          DQ      50

 599          KK     R41
 600          KM        ROUTE REMAINDER FROM CP41 TO CP43-1.
 601          RS       1              -1       0
 602          RC     .06     .03     .04     700   .0053
 603          RX     650     800     850     965    1000    1020    1030    1040
 604          RY    1098    1097    1096    1094    1094    1096    1098    1099

 605          KK    43-1
 606          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-1
 607          BA     .04
 608          LG     .35     .35    4.29     .40    49.8
 609          UI     25.     74.    117.     63.     21.      7.      3.      0.      0.      0.
 610          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 611          KK  CP43-1
 612          KM        ADD HYDROGRAPHS AT CP43-1
 613          HC       2     1.0

 614          KK  SR43-1
 615          KM        STORAGE ROUTE THROUGH 5-48" CMP FROM STA 6319+32 TO STA 6324+32 ON I-10.
 616          RS       1    STOR       0       0
 617          SV       0     .37     .80    1.58    2.71    4.54    5.86    7.60   12.33   14.79
 618          SV   21.44
 619          SQ       0      32      60     102     120     220     260     301     357     501
 620          SQ    1057
 621          SE  1091.7 1092.82 1093.25 1093.72 1094.21 1094.77 1095.08 1095.43 1096.19  1096.5
 622          SE  1097.0
1                                        HEC-1 INPUT                                                    PAGE 16

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 623          KK   D43-1
 624          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 625          DT   D43-1
 626          DI       0     286
 627          DQ       0       4

 628          KK  CP43-1
 629          KM        DIVERT FLOW FROM CP43-1 TO CP303A
 630          DT  1D303A
 631          DI       0      32      60     102     120     220     260     301     357     501
 632          DI    1057
 633          DQ       0      32      60     102     120     220     260     301     357     378
 634          DQ     417

 635          KK   R43-1
 636          KM        ROUTE REMAINDER FROM CP43-1 TO CP43-2.
 637          RS       1              -1       0
 638          RC     .06     .03     .04     500    .005
 639          RX     600     725     800     965    1000    1020    1030    1040
 640          RY    1095    1094  1093.5    1093    1093    1094    1096    1097

 641          KK    43-2
 642          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-2
 643          BA     .01
 644          LG     .35     .35    4.25     .42    81.3
 645          UI      9.     28.     27.     10.      2.      1.      0.      0.      0.      0.
 646          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 647          KK  CP43-2
 648          KM        ADD HYDROGRAPHS AT CP43-2
 649          HC       2    1.01

 650          KK  SR43-2
 651          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6326+40 ON I-10.
 652          RS       1    STOR       0       0
 653          SV       0     .12     .38     .71    1.11    1.61    3.12    3.95    5.19    6.02
 654          SQ       0       8      12      15      20      24      36      38     128     222
 655          SE  1092.0 1093.28 1093.52 1093.78 1094.05 1094.35 1095.13  1095.5  1096.0  1096.3

 656          KK   D43-2
 657          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 658          DT   D43-2
 659          DI       0      12
 660          DQ       0       2

 661          KK  CP43-2
 662          KM        DIVERT FLOW FROM CP43-2 TO CP303A
 663          DT  2D303A
 664          DI       0       8      12      15      20      24      36      38     128     222
 665          DQ       0       8      12      15      20      24      36      38      40      43
1                                        HEC-1 INPUT                                                    PAGE 17

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
666          KK   R43-2
667          KM        ROUTE REMAINDER FROM CP43-2 TO CP43-3.
668          RS       1              -1       0
669          RC     .06     .03     .04    1000    .003
670          RX     750     800     900     965    1000    1020    1030    1040
671          RY  1096.5    1096    1094    1093    1093    1094    1096    1097

672          KK    43-3
673          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-3
674          BA     .05
675          LG     .35     .35    4.30     .40    80.9
676          UI     68.    195.     98.     20.      0.      0.      0.      0.      0.      0.
677          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

678          KK  CP43-3
679          KM        ADD HYDROGRAPHS AT CP43-3.
680          HC       2    1.06
             * SR43-3
             *       STORAGE ROUTE THROUGH 3-36" CMPS FROM STA 6330+50 TO STA 6340+10 ON I-10
             *      1    STOR       0       0
             *      0    2.47    3.51    4.85    6.37    8.27   10.69   13.89   18.76   30.99
             *      0      27      36      48      63      78      93     165     364     951
             * 1092.8 1094.12 1094.37 1094.65 1094.93 1095.24 1095.59    1096 1096.56 1097.79

681          KK   D43-3
682          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
683          DT   D43-3
684          DI       0     130
685          DQ       0     107

686          KK  CP43-3
687          KM        DIVERT FLOW FROM CP43-3 TO CP303A
688          DT  3D303A
689          DI       0      27      36      48      63      78      93     165     364     951
690          DQ       0      27      36      48      63      78      93     102     114     135

691          KK   R43-3
692          KM        ROUTE REMAINDER FROM CP43-3 TO CP43-4.
693          RS       1              -1       0
694          RC     .06     .03     .04     800    .018
695          RX     800     850     930     965    1000    1020    1030    1040
696          RY  1096.5    1096    1094    1093    1093    1096    1097  1097.5

697          KK    43-4
698          KM        RUNOFF HYDROGRAP FROM SUB-BASIN 43-4
699          BA     .03
700          LG     .35     .35    4.28     .41    80.8
701          UI     43.    121.     54.     10.      0.      0.      0.      0.      0.      0.
702          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

703          KK  CP43-4
704          KM        ADD HYDROGRAPHS AT CP43-4
705          HC       2    1.09
             * SR43-4
             *       STORAGE ROUTE THROUGH 2-36" CMPS FROM STA 6343+25 TO STA 6345+65 ON I10
             *      1    STOR       0       0
             *      0     .89    1.27     1.8    2.43    3.24    3.31    4.75    7.05   12.83
             *      0      18      24      32      42      52      62     131     326     906
             * 1092.8 1094.12 1094.37 1094.65 1094.93 1095.24 1095.59    1096 1096.56 1097.79

706          KK   D43-4
707          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
708          DT   D43-4
709          DI       0      78
710          DQ       0      57

711          KK  CP43-4
712          KM        DIVERT FLOW AT STA 6345+65
713          DT  DI43-4
714          DI       0      18      24      32      42      52      62     131     326     906
715          DQ       0      18      24      32      42      52      62      68      76      90

716          KK   R43-4
717          KM        ROUTE REMAINDER FROM CP43-4 TO CP43-5
718          RS       1              -1       0
719          RC     .06     .03     .04     500    .018
720          RX     800     850     930     965    1000    1020    1030    1040
721          RY  1096.5    1096    1094    1093    1093    1096    1097  1097.5

722          KK    43-5
723          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-5
724          BA     .02
725          LG     .35     .35    4.25     .39      80
726          UI     27.     79.     39.      8.      0.      0.      0.      0.      0.      0.
727          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

728          KK  CP43-5
729          KM        ADD HYDROGRAPHS AT CP43-5
730          HC       2    1.11
             * SR43-5
             *       STORAGE ROUTE THROUGH 36" CMP AT STA 6349+45 ON I-10
             *      1    STOR       0       0
             *      0     .09     .24     .44     .69     1.0    1.42    2.14    2.76    3.73
             *   4.84    5.94
             *      0       9      13      17      22      27      34      40      42      44
             *    134     276
             * 1089.8 1091.09 1091.35 1091.64 1091.94 1092.26 1092.62 1093.13  1093.5    1094
             * 1094.5 1094.94
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

731          KK   D43-5
732          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
733          DT   D43-5
734          DI       0      52
735          DQ       0      33

736          KK  CP43-5
737          KM        DIVERT FLOW AT STA 6349+45.
738          DT  DI43-5
739          DI       0       9      13      17      22      27      34      40      42      44
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740          DI     134     276
741          DQ       0       9      13      17      22      27      34      40      42      44
742          DQ      46      48

743          KK   R43-5
744          KM        ROUTE REMAINDER FROM CP43-5 TO CP43-6
745          RS       1              -1       0
746          RC     .06     .03     .04     455   .0068
747          RX     800     850     930     965    1000    1020    1030    1040
748          RY    1096    1094    1093    1092    1092    1094    1096  1097.5

749          KK    43-6
750          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-6
751          BA     .02
752          LG     .35     .35    4.17     .38      80
753          UI     36.     87.     27.      4.      0.      0.      0.      0.      0.      0.
754          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

755          KK  CP43-6
756          KM        ADD HYDROGRAPHS AT CP43-6
757          HC       2    1.13
             * SR43-6
             *        STORAGE ROUTE THROUGH 36" CMP AT STA 6354+00 ON I-10
             *      1    STOR       0       0
             *      0    1.59    2.29    3.18    4.29    5.62    7.39    9.53   14.20   30.25
             *  32.52    38.0   43.84   49.83   55.96   59.96
             *      0       9      13      17      22      27      33      39      47      55
             *     56     141     325     811    1440    2714
             * 1089.3 1090.58 1090.84 1091.12 1091.42 1091.73 1092.09 1092.47 1093.23 1095.27
             * 1095.5  1096.0  1096.5  1097.0  1097.5 1097.82

758          KK   D43-6
759          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
760          DT   D43-6
761          DI       0      54
762          DQ       0      48

763          KK  CP43-6
764          KM        DIVERT FLOW AT STA 6354+00.
765          DT  DI43-6
766          DI       0       9      13      17      22      27      33      39      47      55
767          DI      56     141     325     811    1440    2714
768          DQ       0       9      13      17      22      27      33      39      47      55
769          DQ      56      58      60      61      62      64
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

770          KK   R43-6
771          KM        ROUTE REMAINDER FROM CP43-6 TO CP43-7
772          RS       1              -1       0
773          RC     .06     .03     .04     300   .0162
774          RX     750     800     930     965    1000    1020    1030    1040
775          RY    1096    1094    1092    1090    1090    1092    1096  1097.5

776          KK    43-7
777          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-7
778          BA     .02
779          LG     .35     .35    4.25     .39      80
780          UI     49.     90.     14.      0.      0.      0.      0.      0.      0.      0.
781          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

782          KK  CP43-7
783          KM        ADD HYDROGRAPHS AT CP43-7
784          HC       2    1.15
             * SR43-7
             *        STORAGE ROUTE THROUGH 36" CMP AT STA 6357+00 ON I-10
             *      1    STOR       0       0
             *      0     .27     .39     .55     .74     .98    1.30    1.78    2.23    5.12
             *      0      10      13      18      23      29      35      38     101     892
             * 1087.6 1088.93 1089.20 1089.49 1089.80 1090.13 1090.51  1091.0 1091.39 1093.26

785          KK   D43-7
786          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
787          DT   D43-7
788          DI       0      54
789          DQ       0      34

790          KK  CP43-7
791          KM        DIVERT FLOW AT STA 6357+00.
792          DT  DI43-7
793          DI       0      10      13      18      23      29      35      38     101     892
794          DQ       0      10      13      18      23      29      35      38      40      42

795          KK   R43-7
796          KM        ROUTE REMAINDER FROM CP43-7 TO CP43-8
797          RS       1              -1       0
798          RC     .06     .03     .04     385    .018
799          RX     700     800     850     965    1000    1020    1030    1040
800          RY    1094    1093    1092    1090    1090    1092    1096  1097.5

801          KK    43-8
802          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-8
803          BA     .01
804          LG     .35     .35    4.25     .39      80
805          UI     36.     37.      4.      0.      0.      0.      0.      0.      0.      0.
806          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

807          KK  CP43-8
808          KM        ADD HYDROGRAPHS AT CP43-8
809          HC       2    1.16
             * SR43-8
             *        STORAGE ROUTE THROUGH 36" CMP AT STA 6360+85 ON I-10
             *      1    STOR       0       0
             *      0     .22     .32     .46     .63     .89    1.74    3.41    4.93     6.3
             *   6.87
             *      0       8      12      15      20      24      30      36      39     129
             *    186
             * 1085.1 1086.38 1086.62 1086.88 1087.15 1087.48 1088.28 1089.33  1090.0  1090.5
             * 1090.7

810          KK   D43-8
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811          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
812          DT   D43-8
813          DI       0      27
814          DQ       0      15

815          KK  CP43-8
816          KM        DIVERT FLOW AT STA 6360+85.
817          DT  DI43-8
818          DI       0       8      12      15      20      24      30      36      39     129
819          DI     186
820          DQ       0       8      12      15      20      24      30      36      39      41
821          DQ      43

822          KK   R43-8
823          KM        ROUTE REMAINDER FROM CP43-8 TO CP43.
824          RS       1              -1       0
825          RC     .06     .03     .04     600    .008
826          RX     800     850     930     965    1000    1020    1030    1040
827          RY    1096    1092    1090    1088    1088    1090    1096  1097.5

828          KK      43
829          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43
830          BA     .01
831          LG     .35     .35    4.29     .41    80.6
832          UI     25.     45.      7.      0.      0.      0.      0.      0.      0.      0.
833          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

834          KK  I1CP43
835          KM        ADD HYDROGRAPHS AT CP43
836          HC       2    1.17

837          KK    CP43     .03
838          KM        ADD HYDROGRAPHS AT CP43.
839          KO       1
840          HC       2   13.90
             *   SR43
             *       STORAGE ROUTE THROUGH 4-10X8 BC'S AT STA 6366+85 ON I-10.
             *      1    STOR       0       0
             *      0     .52    4.33   16.22   24.89   28.79   33.09   37.88   56.95   84.90
             *      0     920    1824    2976    3396    3713    4176    4734    6464    9000
             * 1081.2 1085.18 1087.60 1090.19  1091.5  1092.0  1092.5  1093.0 1094.81
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

841          KK    CP43
842          KM        DIVERT FLOW AT STA 6366+85 ON I-10 (TUTHILL DIKE).
843          KO       1
844          DT    DI43
845          DI       0     920    1824    2976    3396    3713    4176    4734    6464
846          DQ       0       0       0       0       0     177     500     918    2096

847          KK    RD43
848          KM        ROUTE REMAINDER FROM FROM CP43 TO CPWT4.
849          RS       2              -1       0
850          RC     .05     .03     .05    4000   .0083
851          RX     800     900     965    1000    1050    1100    1200    1300
852          RY    1076    1075    1075    1064    1064    1071    1071    1075

853          KK  CP43-4
854          KM        RETURN DIVERT AT CP43-4
855          DR  DI43-4

856          KK  RD43-4
857          KM        ROUTE DIVERTED FLOW FROM CP43-4 TO CPWT4
858          RS       2              -1       0
859          RC    .045     .03    .045    4200   .0067
860          RX     910     940     970     990    1000    1020    1060    1100
861          RY    1064    1063    1062    1060    1060    1062    1063    1064

862          KK  CP43-5
863          KM        RETURN DIVERT AT CP43-5
864          DR  DI43-5

865          KK  RD43-5
866          KM        ROUTE DIVERTED FLOW FROM CP43-5 TO CPWT4
867          RS       2              -1       0
868          RC    .045     .03    .045    4100   .0067
869          RX     910     940     970     990    1000    1020    1060    1100
870          RY    1064    1063    1062    1060    1060    1062    1063    1064

871          KK  I1CWT4
872          KM        ADD HYDROGRAPHS AT CPWT4
873          HC       2     .05

874          KK  CP43-6
875          KM        RETURN DIVERT AT CP43-6
876          DR  DI43-6

877          KK  RD43-6
878          KM        ROUTE DIVERTED FLOW FROM CP43-6 TO CPWT4
879          RS       2              -1       0
880          RC    .045     .03    .045    4000   .0067
881          RX     910     940     970     990    1000    1020    1060    1100
882          RY    1064    1063    1062    1060    1060    1062    1063    1064
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

883          KK  I2CWT4
884          KM        ADD HYDROGRAPHS AT CPWT4
885          HC       2     .07

886          KK  CP43-7
887          KM        RETURN DIVERT AT CP43-7
888          DR  DI43-7

889          KK  RD43-7
890          KM        ROUTE DIVERTED FLOW FROM CP43-7 TO CPWT4
891          RS       2              -1       0
892          RC    .045     .03    .045    4000   .0067
893          RX     910     940     970     990    1000    1020    1060    1100
894          RY    1064    1063    1062    1060    1060    1062    1063    1064

895          KK  I3CWT4
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```
896          KM        ADD HYDROGRAPHS AT CPWT4
897          HC       2     .09

898          KK  CP43-8
899          KM        RETURN DIVERT AT CP43-8
900          DR  DI43-8

901          KK  RD43-8
902          KM        ROUTE DIVERTED FLOW FROM CP43-8 TO CPWT4
903          RS       2              -1       0
904          RC    .045     .03    .045    4000   .0067
905          RX     910     940     970     990    1000    1020    1060    1100
906          RY    1064    1063    1062    1060    1060    1062    1063    1064

907          KK  I4CWT4
908          KM        ADD HYDROGRAPHS AT CPWT4
909          HC       2     .10

910          KK      44
911          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 44
912          BA     .22
913          LG     .35     .35    4.14     .37     .00
914          UI     33.    133.    200.    301.    379.    260.    181.     98.     54.     31.
915          UI     10.     10.     10.      0.      0.      0.      0.      0.      0.      0.
916          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

917          KK  I5CWT4
918          KM        ADD HYDROGRAPHS AT CPWT4
919          HC       2     .32

920          KK  I6CWT4
921          KM        ADD HYDROGRAPHS AT CPWT4.
922          HC       2   14.12
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

923          KK    45-1
924          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 45-1
925          BA     .08
926          LG     .21     .34    4.19     .38     .60
927          UI     33.    102.    189.    155.     86.     31.     13.      6.      0.      0.
928          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

929          KK    CP43
930          KM        RETURN DIVERT AT CP43
931          DR    DI43

932          KK  CP45-1
933          KM        ADD HYDROGRAPHS AT CP45-1
934          HC       2   13.98

935          KK  SR45-1
936          KM        STORAGE ROUTE THROUGH 1-12X12 BC, 2-42" CMP AND 3-36" CMP FROM STA. 6368
937          KM        +00 TO STA. 6375+20 ON I-10 (100' TO 800' EAST OF TUTHILL RD.).
938          RS       1    STOR       0       0
939          SV       0     .85    2.23    5.73   11.22   14.61   19.71
940          SQ       0      51     156    1200    3130    4161    5509
941          SE  1083.1 1084.78  1086.0  1087.4  1089.0  1089.5  1090.0

942          KK  CP45-1
943          KM        DIVERT FLOW AT STA 6375+20
944          DT  DI45-1
945          DI       0      51     156    1200    3130    4161    5509
946          DQ       0      51     156     305     480     543     610

947          KK   R45-1
948          KM        ROUTE REMAINDER FROM CP45-1 TO CP45
949          RS       1              -1       0
950          RC     .04     .03     .04    1200   .0042
951          RX     850     900     930     965    1000    1020    1030    1040
952          RY    1086    1085    1084    1083    1083    1086    1090    1091

953          KK      45
954          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 45
955          BA     .38
956          LG     .17     .33    3.94     .34     .20
957          UI     36.     64.    145.    190.    232.    293.    427.    384.    301.    244.
958          UI    194.    148.     82.     60.     45.     36.     13.     11.     11.     11.
959          UI     11.      0.      0.      0.      0.      0.      0.      0.      0.      0.
960          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

961          KK    CP45
962          KM        ADD HYDROGRAPHS AT CP45
963          HC       2   14.36
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

964          KK    SR45
965          KM        STORAGE ROUTE THROUGH 9-36" CMP'S FROM STA 6379+84 TO STA 6390+50 ON
966          KM        I-10.
967          RS       1    STOR       0       0
968          SV       0    1.84    5.95   18.55   23.27   29.04
969          SQ       0      41     132     317    1462    3517
970          SE  1081.1 1082.74  1084.0  1086.0  1086.5  1087.0

971          KK    CP45
972          KM        DIVERT FLOW AT STA 6390+50.
973          DT    DI45
974          DI       0      41     132     317    1462    3517
975          DQ       0      41     132     317     362     392

976          KK     R45
977          KM        ROUTE REMAINDER FROM CP45 TO CP46-1.
978          RS       1              -1       0
979          RC     .04     .03     .04    1500   .0031
980          RX     850     900     930     965    1000    1020    1030    1040
981          RY    1083    1082    1081    1080    1080    1082    1083    1084

982          KK    46-1
983          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 46-1
984          BA     .15
985          LG     .19     .35    4.23     .39     .60
986          UI     19.     60.    101.    133.    203.    208.    151.    111.     75.     37.
```

```
 987          UI     26.     16.      6.      6.      6.      0.      0.      0.      0.      0.
 988          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 989          KK  CP46-1
 990          KM        ADD HYDROGRAPHS AT CP46-1
 991          HC       2   14.51

 992          KK  SR46-1
 993          KM        STORAGE ROUTE THROUGH 5-36 CMP'S FROM STA 6395+75 TO STA 6400+60 ON
 994          KM        I-10.
 995          RS       1    STOR       0       0
 996          SV       0    1.07    4.71     9.0    11.7   14.88   18.65   23.01
 997          SQ       0      39     128     183     199     610    1351    2310
 998          SE  1078.3  1080.0  1081.5  1082.5  1083.0  1083.5  1084.0  1084.5

 999          KK  CP46-1
1000          KM        DIVERT FLOW AT STA 6400+60.
1001          DT  DI46-1
1002          DI       0      39     128     183     199     610    1351    2310
1003          DQ       0      39     128     183     199     210     225     244

1004          KK   R46-1
1005          KM        ROUTE REMAINDER FROM CP46-1 TO CP46.
1006          RS       1              -1       0
1007          RC     .04     .03     .04    2355   .0057
1008          RX     700     900     930     965    1000    1020    1030    1040
1009          RY    1076  1075.5    1075    1074    1074    1078    1080    1082
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1010          KK      46
1011          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 46
1012          BA     .85
1013          LG     .19     .34    4.25     .45     .40
1014          UI     61.     61.    184.    265.    322.    373.    441.    539.    741.    706.
1015          UI    567.    488.    409.    345.    291.    208.    129.    104.     94.     61.
1016          UI     61.     19.     19.     19.     19.     19.     19.     19.      0.      0.
1017          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1018          KK  I1CP46
1019          KM        ADD HYDROGRAPHS AT CP46
1020          HC       2   15.36

1021          KK      28
1022          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 28
1023          BA     .86
1024          LG     .15     .35    4.02     .52     .10
1025          UI     76.    119.    295.    392.    470.    578.    798.    929.    711.    587.
1026          UI    473.    381.    272.    153.    127.     89.     76.     24.     23.     23.
1027          UI     23.     23.      0.      0.      0.      0.      0.      0.      0.      0.
1028          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1029          KK     R28
1030          KM        ROUTE FLOW FROM CP28 TO CP30
1031          RS       2              -1
1032          RC     .03     .03     .05    2400    .027
1033          RX    1000    1001    1035    1050    1065    1075    1085    1095
1034          RY    1165    1165    1164    1162    1162    1164    1166    1168

1035          KK      30
1036          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 30
1037          BA     .28
1038          LG     .15     .35    3.27     .97    31.9
1039          UI     36.    116.    193.    257.    400.    380.    277.    203.    132.     63.
1040          UI     45.     26.     11.     11.     11.      0.      0.      0.      0.      0.
1041          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1042          KK  I1CP30
1043          KM        ADD HYDROGRAPHS AT CP30
1044          HC       2

1045          KK      29
1046          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 29
1047          BA     .22
1048          LG     .15     .35    3.52     .78    31.7
1049          UI     31.    113.    176.    245.    370.    276.    199.    135.     64.     42.
1050          UI     23.     10.     10.     10.      0.      0.      0.      0.      0.      0.
1051          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1052          KK    SR29
1053          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP29
1054          RS       1    STOR       0       0
1055          SV       0    0.99   12.73   23.45   36.25   50.68   54.76   59.33   83.20
1056          SQ       0       0       0       0       0       0       0      88    6226
1057          SE  1164.5    1166    1170    1172    1174    1176  1177.5    1178    1180

1058          KK     R29
1059          KM        ROUTE REMAINDER OF FLOW AT CP29 TO CP30
1060          RS       1              -1       0
1061          RC     .05     .03     .05    1200   .0021
1062          RX    1000    1042    1052    1060    1082    1090    1140    1170
1063          RY    1171    1170    1168    1166    1166    1168    1170    1172

1064          KK    CP30
1065          KM        ADD HYDROGRAPHS AT CP30
1066          HC       2

1067          KK     D30
1068          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN OF CP29
1069          DT     D30
1070          DI       0     935
1071          DQ       0     110

1072          KK     R30
1073          KM        ROUTE COMBINED HYDROGRAPHS AT CP30 TO CP31
1074          RS       4              -1       0
1075          RC     .03     .03     .05    6770   .0069
1076          RX    1000    1025    1045    1070    1095    1110    1200    1550
1077          RY    1157    1156    1154    1152    1152    1154    1156    1158

1078          KK      31
```

```
1079          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 31
1080          BA     .71
1081          LG     .19      .35     3.76      .68      .20
1082          UI     60.      83.     224.     299.     358.     434.     565.     752.     613.     500.
1083          UI    413.     336.     268.     171.     105.      98.      60.      52.      18.      18.
1084          UI     18.      18.      18.      0.       0.       0.       0.       0.       0.       0.
1085          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.

1086          KK    CP31
1087          KM        ADD HYDROGRAPHS AT CP31
1088          HC       2

1089          KK     R31
1090          KM        ROUTE COMBINED HYDROGRAPH AT CP31 TO CP46
1091          RS       5              -1       0
1092          RC     .03      .03      .05    5800    .0082
1093          RX    1000     1012     1024    1035     1045     1053     1065     1098
1094          RY    1093     1092     1090    1088     1088     1090     1092     1094
1                                          HEC-1 INPUT                                                    PAGE 28

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1095          KK    CP46
1096          KM        ADD HYDROGRAPHS AT CP46.
1097          HC       2   17.43

1098          KK    SR46
1099          KM        STORAGE ROUTE THROUGH 5-10'X4' BC'S AT STA 6419+30 ON I-10.
1100          RS       1    STOR       0       0
1101          SV       0    1.08    3.13    4.28    5.18    7.54   12.96
1102          SQ       0     730    1460    1680    1834    2090    2420
1103          SE  1065.4 1068.42 1070.53  1071.4  1072.0  1073.0  1074.3

1104          KK     R46
1105          KM        ROUTE REMAINDER OF FLOW AT CP46 TO CPWT4
1106          RS       2              -1       0
1107          RC     .03      .03      .05    6800    .0067
1108          RX     910      930      940     950     1000     1020     1200     1400
1109          RY    1065     1064     1064    1060     1060     1064     1064     1065

1110          KK  CP45-1
1111          KM        RETURN DIVERT AT  CP45-1
1112          DR  DI45-1

1113          KK  RD45-1
1114          KM        ROUTE DIVERTED FLOW FROM CP45-1 TO CPWT4
1115          RS       2              -1       0
1116          RC    .045      .03     .045    4100    .0067
1117          RX     910      940      970     990     1000     1020     1060     1100
1118          RY    1064     1063     1062    1060     1060     1062     1063     1064

1119          KK    CP45
1120          KM        RETURN DIVERT AT CP45
1121          DR    DI45

1122          KK    RD45
1123          KM        ROUTE DIVERTED FLOW FROM  CP45  TO CPWT4.
1124          RS       2              -1       0
1125          RC    .045      .03     .045    4200    .0067
1126          RX     910      940      970     990     1000     1020     1060     1100
1127          RY    1064     1063     1062    1060     1060     1062     1063     1064

1128          KK  I7CWT4
1129          KM        ADD HYDROGRAPHS AT CPWT4
1130          HC       2   14.36

1131          KK  CP46-1
1132          KM        RETURN DIVERT AT CP46-1
1133          DR  DI46-1

1134          KK  RD46-1
1135          KM        ROUTE DIVERTED FLOW FROM CP46-1 TO CPWT4
1136          RS       3              -1       0
1137          RC    .045      .03     .045    4900    .0067
1138          RX     910      940      970     990     1000     1020     1060     1100
1139          RY    1064     1063     1062    1060     1060     1062     1063     1064
1                                          HEC-1 INPUT                                                    PAGE 29

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1140          KK  I8CWT4
1141          KM        ADD HYDROGRAPHS AT CPWT4
1142          HC       2   14.51

1143          KK     WT4
1144          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN WT4
1145          BA     .77
1146          LG     .35      .35     4.17      .38      .40
1147          UI    108.     384.     604.     835.    1279.     973.     707.     488.     232.     153.
1148          UI     90.      33.      33.      33.      0.       0.       0.       0.       0.       0.
1149          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.

1150          KK  I9CWT4
1151          KM        ADD HYDROGRAPHS AT CPWT4
1152          HC       2   15.28

1153          KK  I10WT4
1154          KM        ADD HYDROGRAPHS AT CPWT4
1155          HC       2    18.2

1156          KK   CPWT4
1157          KM        ADD ENTIRE FLOW TOGETHER THAT GETS TO WHITE TANKS STRUCTURE NO 4.
1158          KO       1
1159          HC       2   18.57

1160          KK    RS47
1161          KM        STORAGE ROUTE TROUGH WHITE TANKS STRUCTURE NO. 4.
1162          KO       1
1163          RS       1    STOR       0       0
1164          SV       0    2.81      51     148     277     543    1269    1396    1690    2045
1165          SV    2246
1166          SQ       0       0       0       0       0       0       0     375    2600    6150
1167          SQ   14700
1168          SE     997    1000    1010    1020    1030    1040    1049    1050    1052    1054
1169          SE    1055
```

```
1170          KK  CP43-1
1171          KM       RETURN DIVERT AT CP43-1
1172          DR  1D303A

1173          KK   R43-1
1174          KM       ROUTE REMAINDER FROM CP43-1 TO CP303A
1175          RS      48              -1       0
1176          RC    .035    .035    .035    5300   .0091
1177          RX    1000    1090    1170    1250    1380    1400    1450    1630
1178          RY    1077  1075.8  1076.5    1076    1076  1076.5    1076    1077

1179          KK  CP43-2
1180          KM       RETURN DIVERT AT CP43-2
1181          DR  2D303A
1                                   HEC-1 INPUT                                          PAGE 30

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1182          KK   R43-2
1183          KM       ROUTE REMAINDER FROM CP43-2 TO CP303A
1184          RS       8              -1       0
1185          RC    .035    .035    .035    5300   .0091
1186          RX    1000    1090    1170    1250    1380    1400    1450    1630
1187          RY    1077  1075.8  1076.5    1076    1076  1076.5    1076    1077

1188          KK  CP43-3
1189          KM       RETURN DIVERT AT CP43-3
1190          DR  3D303A

1191          KK   R43-3
1192          KM       ROUTE REMAINDER FROM CP43-3 TO CP303A
1193          RS      13              -1       0
1194          RC    .035    .035    .035    4840   .0091
1195          RX    1000    1170    1240    1270    1440    1470    1490    1550
1196          RY    1069    1068  1068.5    1068    1068  1068.5  1067.8  1068.5

1197          KK    303A
1198          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 303A
1199          BA     .42
1200          LG     .35     .35    4.08     .36     8.4
1201          UI     56.    182.    299.    400.    629.    559.    409.    297.    178.     95.
1202          UI     63.     32.     17.     17.     17.      0.      0.      0.      0.      0.
1203          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1204          KK   D303A
1205          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN OF CP303A
1206          DT   D303A
1207          DI       0     549
1208          DQ       0      23

1209          KK  1C303A
1210          KM       ADD HYDROGRAPHS AT CP303A
1211          HC       4    1.48

1212          KK  CP303A
1213          KM       ADD HYDROGRAPHS AT CP303A
1214          HC       2   18.99

1215          KK   D41A1
1216          KM       RETURN DIVERT AT CP41A1
1217          DR   1D303

1218          KK   R41A1
1219          KM       ROUTE FLOW FROM CP41A1 TO CP303
1220          RS      18              -1       0
1221          RC    .035    .035    .035    7180    .014
1222          RX    1000    1210    1450    1530    1620    1690    1849    1850
1223          RY    1106  1105.5    1106    1104    1104    1106    1107    1107
1                                   HEC-1 INPUT                                          PAGE 31

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1224          KK   D41A2
1225          KM       RETURN DIVERT AT CP41A2
1226          DR   2D303

1227          KK   R41A2
1228          KM       ROUTE FLOW FROM CP41A2 TO CP303
1229          RS      19              -1       0
1230          RC    .035    .035    .035    7330    .014
1231          RX    1000    1210    1450    1530    1620    1690    1849    1850
1232          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1233          KK   1I303
1234          KM       ADD HYDROGRAPHS AT CP303
1235          HC       2     .05

1236          KK   D41A3
1237          KM       RETURN DIVERT AT CP41A3
1238          DR   3D303

1239          KK   R41A3
1240          KM       ROUTE FLOW FROM CP41A3 TO CP303
1241          RS      25              -1       0
1242          RC    .035    .035    .035    9360    .010
1243          RX    1000    1210    1450    1530    1620    1690    1849    1850
1244          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1245          KK   2I303
1246          KM       ADD HYDROGRAPHS AT CP303
1247          HC       2     .08

1248          KK    D41A
1249          KM       RETURN DIVERT AT CP41A
1250          DR   4D303

1251          KK    R41A
1252          KM       ROUTE FLOW FROM CP41A TO CP303
1253          RS      26              -1       0
1254          RC    .035    .035    .035    9360   .0095
1255          RX    1000    1210    1450    1530    1620    1690    1849    1850
1256          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1257          KK   3I303
```

```
1258          KM        ADD HYDROGRAPHS AT CP303
1259          HC       2     .13

1260          KK   D41-1
1261          KM        RETURN DIVERT AT CP41-1
1262          DR   5D303
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1263          KK   R41-1
1264          KM        ROUTE FLOW FROM CP41-1 TO CP303
1265          RS      28              -1       0
1266          RC    .035    .035    .035    9200   .0079
1267          RX    1000    1300    1510    1660    1850    1890    1940    2100
1268          RY  1080.5    1079  1080.5    1080    1080    1081  1080.5    1081

1269          KK   4I303
1270          KM        ADD HYDROGRAPHS AT CP303
1271          HC       2     .28

1272          KK   D41-2
1273          KM        RETURN DIVERT AT CP41-2
1274          DR   6D303

1275          KK   R41-2
1276          KM        ROUTE FLOW FROM CP41-2 TO CP303
1277          RS      33              -1       0
1278          RC    .035    .035    .035    9360   .0065
1279          RX    1000    1300    1510    1660    1850    1890    1940    2100
1280          RY  1080.5    1079  1080.5    1080    1080    1081  1080.5    1081

1281          KK   5I303
1282          KM        ADD HYDROGRAPHS AT CP303
1283          HC       2     .38

1284          KK     D41
1285          KM        RETURN DIVERT AT CP41
1286          DR   7D303

1287          KK     R41
1288          KM        ROUTE FLOW FROM CP41 TO CP303
1289          RS      30              -1       0
1290          RC    .035    .035    .035    9830   .0056
1291          RX    1000    1300    1510    1660    1850    1890    1940    2100
1292          RY  1080.5    1079  1080.5    1080    1080    1081  1080.5    1081

1293          KK   6I303
1294          KM        ADD HYDROGRAPHS AT CP303
1295          HC       2     .96

1296          KK     303
1297          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 303
1298          BA    1.21
1299          LG     .35     .34    4.19     .39     1.0
1300          UI     81.     81.    207.    332.    407.    470.    543.    636.    835.   1022.
1301          UI    868.    725.    631.    534.    457.    388.    290.    187.    141.    133.
1302          UI     92.     81.     54.     25.     25.     25.     25.     25.     25.     25.
1303          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1304          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1305          KK    D303
1306          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN OF CP303
1307          DT    D303
1308          DI       0     914
1309          DQ       0       4

1310          KK   CP303
1311          KM        ADD HYDROGRAPHS AT CP303
1312          HC       2    2.17
1313          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   37          18
                V
                V
   44         R18
                .
                .
   50           .          19
                .           .
                .           .
   57       CP19............
                V
                V
   60         R19
                .
                .
   66           .          21
                .           .
                .           .
   73     I1CP21............
                .
                .
   76           .          20
                .           V
                .           V
   83           .         R20
                .           .
                .           .
   89       CP21............
                .
                .
   95           .------->     D21
   92         D21
                V
                V
   98         R21
                .
                .
  104           .          23
                .           .
                .           .
  110       CP23............
                .
                .
  116           .------->    DF23
  113         D23
                V
                V
  119         R23
                .
                .
  125           .          22
                .           .
                .           .
  135           .           .------->    DF22
  132           .         D22
                .           V
                .           V
  138           .         R22
                .           .
                .           .
  144           .           .         22A
                .           .           .
                .           .           .
  151           .      I1C22A............
                .           .
                .           .
  154      CP22A............
                V
                V
  157       R22A
                .
                .
  163           .          25
                .           .
                .           .
  170     I1CP25............
                .
                .
  173           .          24
                .           .
                .           .
  183           .           .------->    DF24
  180           .         D24
                .           V
                .           V
  186           .         R24
                .           .
                .           .
  192       25CP............
                .
                .
  198           .------->    DF25
  195         D25
                .
                .
  201           .          26
                .           .
                .           .
  212           .           .------->    DF26
  209           .         D26
                .           V
                .           V
  215           .         R26
                .           .
                .           .
  221           .           .         27
                .           .           .
                .           .           .
  229           .      I1CP27............
                .           .
```

```
                .           .
232        CP27............
              V
              V
236         R27
              .
              .
242           .          34
              .           .
              .           .
249           .           .          33
              .           .           .
              .           .           .
256           .        CP33............
              .           V
              .           V
259           .         R33
              .           .
              .           .
265           .           .          35
              .           .           .
              .           .           .
272           .      I1CP35............
              .           .
              .           .
275           .           .          32
              .           .           .
              .           .           .
283           .        CP35............
              .           V
              .           V
286           .         R35
              .           .
              .           .
292           .           .          36
              .           .           .
              .           .           .
299           .      I1CP36............
              .           .
              .           .
302           .           .          37
              .           .           .
              .           .           .
310           .        CP36............
              .           V
              .           V
313           .         R36
              .           .
              .           .
319           .           .          38
              .           .           .
              .           .           .
326           .        CP38............
              .           .
              .           .
332           .           .------->     D38
329           .         D38
              .           V
              .           V
335           .         R38
              .           .
              .           .
341           .           .          39
              .           .           .
              .           .           .
349           .      I1CP39............
              .           .
              .           .
352        CP39............
              V
              V
355         R39
              .
              .
361           .          40
              .           .
              .           .
371           .           .------->    DF40
368           .         D40
              .           V
              .           V
374           .         R40
              .           .
              .           .
380           .           .          42
              .           .           .
              .           .           .
388           .      I1CP42............
              .           .
              .           .
391        CP42............
              .
              .
397           .------->    DF42
394         D42
              V
              V
400         R42
              .
              .
407           .        41A1
              .           V
              .           V
413           .      SR41A1
              .           .
              .           .
421           .           .------->   1D303
419           .      CP41A1
              .           V
              .           V
424           .       R41A1
              .           .
              .           .
430           .           .        41A2
              .           .           .
              .           .           .
436           .      CP41A2............
```

```
                .          V
                .          V
439             .     SR41A2
                .          .
                .          .
447             .          .-------->   2D303
445             .     CP41A2
                .          V
                .          V
450             .      R41A2
                .          .
                .          .
456             .          .        41A3
                .          .          .
                .          .          .
462             .     CP41A3............
                .          V
                .          V
465             .     SR41A3
                .          .
                .          .
473             .          .-------->   3D303
471             .     CP41A3
                .          V
                .          V
476             .      R41A3
                .          .
                .          .
482             .          .         41A
                .          .          .
                .          .          .
488             .      CP41A............
                .          V
                .          V
491             .      SR41A
                .          .
                .          .
499             .          .-------->   4D303
497             .      CP41A
                .          V
                .          V
502             .       R41A
                .          .
                .          .
508             .          .        41-1
                .          .          .
                .          .          .
515             .     CP41-1............
                .          V
                .          V
518             .     SR41-1
                .          .
                .          .
526             .          .-------->   5D303
524             .     CP41-1
                .          V
                .          V
529             .      R41-1
                .          .
                .          .
535             .          .        41-2
                .          .          .
                .          .          .
542             .     CP41-2............
                .          V
                .          V
545             .     SR41-2
                .          .
                .          .
556             .          .-------->   6D303
554             .     CP41-2
                .          V
                .          V
561             .      R41-2
                .          .
                .          .
567             .          .          41
                .          .          .
                .          .          .
577             .          .          .-------->     D41
575             .          .         D41
                .          .          .
                .          .          .
580             .       CP41............
                .          V
                .          V
583             .       SR41
                .          .
                .          .
594             .          .-------->   7D303
592             .       CP41
                .          V
                .          V
599             .        R41
                .          .
                .          .
605             .          .        43-1
                .          .          .
                .          .          .
611             .     CP43-1............
                .          V
                .          V
614             .     SR43-1
                .          .
                .          .
625             .          .-------->   D43-1
623             .      D43-1
                .          .
                .          .
630             .          .-------->  1D303A
628             .     CP43-1
                .          V
                .          V
635             .      R43-1
                .          .
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641             .          .        43-2
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                .           .
                .           .
647             .      CP43-2............
                .           V
                .           V
650             .      SR43-2
                .           .
                .           .
658             .           .-------->   D43-2
656             .       D43-2
                .           .
                .           .
663             .           .-------->  2D303A
661             .      CP43-2
                .           V
                .           V
666             .       R43-2
                .           .
                .           .
672             .           .        43-3
                .           .           .
                .           .           .
678             .      CP43-3............
                .           .
                .           .
683             .           .-------->   D43-3
681             .       D43-3
                .           .
                .           .
688             .           .-------->  3D303A
686             .      CP43-3
                .           V
                .           V
691             .       R43-3
                .           .
                .           .
697             .           .        43-4
                .           .           .
                .           .           .
703             .      CP43-4............
                .           .
                .           .
708             .           .-------->   D43-4
706             .       D43-4
                .           .
                .           .
713             .           .-------->  DI43-4
711             .      CP43-4
                .           V
                .           V
716             .       R43-4
                .           .
                .           .
722             .           .        43-5
                .           .           .
                .           .           .
728             .      CP43-5............
                .           .
                .           .
733             .           .-------->   D43-5
731             .       D43-5
                .           .
                .           .
738             .           .-------->  DI43-5
736             .      CP43-5
                .           V
                .           V
743             .       R43-5
                .           .
                .           .
749             .           .        43-6
                .           .           .
                .           .           .
755             .      CP43-6............
                .           .
                .           .
760             .           .-------->   D43-6
758             .       D43-6
                .           .
                .           .
765             .           .-------->  DI43-6
763             .      CP43-6
                .           V
                .           V
770             .       R43-6
                .           .
                .           .
776             .           .        43-7
                .           .           .
                .           .           .
782             .      CP43-7............
                .           .
                .           .
787             .           .-------->   D43-7
785             .       D43-7
                .           .
                .           .
792             .           .-------->  DI43-7
790             .      CP43-7
                .           V
                .           V
795             .       R43-7
                .           .
                .           .
801             .           .        43-8
                .           .           .
                .           .           .
807             .      CP43-8............
                .           .
                .           .
812             .           .-------->   D43-8
810             .       D43-8
                .           .
                .           .
817             .           .-------->  DI43-8
815             .      CP43-8
                .           V
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                .          V
822             .       R43-8
                .          .
                .          .
828             .          .          43
                .          .           .
                .          .           .
834             .      I1CP43...........
                .          .
                .          .
837         CP43...........
                .
                .
844             .------->    DI43
841         CP43
               V
               V
847         RD43
                .
                .
855             .          .<-------  DI43-4
853             .      CP43-4
                .          V
                .          V
856             .      RD43-4
                .          .
                .          .
864             .          .          .<-------  DI43-5
862             .          .      CP43-5
                .          .          V
                .          .          V
865             .          .      RD43-5
                .          .          .
                .          .          .
871             .      I1CWT4...........
                .          .
                .          .
876             .          .          .<-------  DI43-6
874             .          .      CP43-6
                .          .          V
                .          .          V
877             .          .      RD43-6
                .          .          .
                .          .          .
883             .      I2CWT4...........
                .          .
                .          .
888             .          .          .<-------  DI43-7
886             .          .      CP43-7
                .          .          V
                .          .          V
889             .          .      RD43-7
                .          .          .
                .          .          .
895             .      I3CWT4...........
                .          .
                .          .
900             .          .          .<-------  DI43-8
898             .          .      CP43-8
                .          .          V
                .          .          V
901             .          .      RD43-8
                .          .          .
                .          .          .
907             .      I4CWT4...........
                .          .
                .          .
910             .          .          44
                .          .           .
                .          .           .
917             .      I5CWT4...........
                .          .
                .          .
920     I6CWT4...........
                .
                .
923             .        45-1
                .          .
                .          .
931             .          .          .<-------    DI43
929             .          .        CP43
                .          .           .
                .          .           .
932             .      CP45-1...........
                .          V
                .          V
935             .      SR45-1
                .          .
                .          .
944             .          .------->  DI45-1
942             .      CP45-1
                .          V
                .          V
947             .       R45-1
                .          .
                .          .
953             .          .          45
                .          .           .
                .          .           .
961             .        CP45...........
                .          V
                .          V
964             .        SR45
                .          .
                .          .
973             .          .------->    DI45
971             .        CP45
                .          V
                .          V
976             .         R45
                .          .
                .          .
982             .          .        46-1
                .          .           .
                .          .           .
989             .      CP46-1...........
                .          V
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                .          V
 992            .      SR46-1
                .          .
                .          .
1001            .          .-------> DI46-1
 999            .      CP46-1
                .          V
                .          V
1004            .       R46-1
                .          .
                .          .
1010            .          .          46
                .          .           .
                .          .           .
1018            .      I1CP46............
                .          .
                .          .
1021            .          .          28
                .          .           V
                .          .           V
1029            .          .         R28
                .          .           .
                .          .           .
1035            .          .           .          30
                .          .           .           .
                .          .           .           .
1042            .          .      I1CP30............
                .          .           .
                .          .           .
1045            .          .           .          29
                .          .           .           V
                .          .           .           V
1052            .          .           .        SR29
                .          .           .           V
                .          .           .           V
1058            .          .           .         R29
                .          .           .           .
                .          .           .           .
1064            .          .        CP30............
                .          .           .
                .          .           .
1069            .          .           .------->     D30
1067            .          .         D30
                .          .           V
                .          .           V
1072            .          .         R30
                .          .           .
                .          .           .
1078            .          .           .          31
                .          .           .           .
                .          .           .           .
1086            .          .        CP31............
                .          .           V
                .          .           V
1089            .          .         R31
                .          .           .
                .          .           .
1095            .        CP46............
                .          V
                .          V
1098            .        SR46
                .          V
                .          V
1104            .         R46
                .          .
                .          .
1112            .          .           .<-------  DI45-1
1110            .          .      CP45-1
                .          .           V
                .          .           V
1113            .          .      RD45-1
                .          .           .
                .          .           .
1121            .          .           .           .<-------    DI45
1119            .          .           .        CP45
                .          .           .           V
                .          .           .           V
1122            .          .           .        RD45
                .          .           .           .
                .          .           .           .
1128            .          .      I7CWT4............
                .          .           .
                .          .           .
1133            .          .           .           .<-------  DI46-1
1131            .          .           .      CP46-1
                .          .           .           V
                .          .           .           V
1134            .          .           .      RD46-1
                .          .           .           .
                .          .           .           .
1140            .          .      I8CWT4............
                .          .           .
                .          .           .
1143            .          .           .         WT4
                .          .           .           .
                .          .           .           .
1150            .          .      I9CWT4............
                .          .           .
                .          .           .
1153            .      I10WT4............
                .          .
                .          .
1156       CPWT4............
               V
               V
1160        RS47
                .
                .
1172            .          .<-------  1D303A
1170            .      CP43-1
                .          V
                .          V
1173            .       R43-1
                .          .
                .          .
1181            .          .           .<-------  2D303A
1179            .          .      CP43-2
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                .           .           V
                .           .           V
1182            .           .       R43-2
                .           .           .
                .           .           .
1190            .           .           .<-------  3D303A
1188            .           .           .      CP43-3
                .           .           .           V
                .           .           .           V
1191            .           .           .       R43-3
                .           .           .           .
                .           .           .           .
1197            .           .           .           .        303A
                .           .           .           .           .
                .           .           .           .           .
1206            .           .           .           .           .------->   D303A
1204            .           .           .           .       D303A
                .           .           .           .           .
                .           .           .           .           .
1209            .      1C303A.................................
                .           .
                .           .
1212      CP303A............
                .
                .
1217            .           .<-------   1D303
1215            .       D41A1
                .           V
                .           V
1218            .       R41A1
                .           .
                .           .
1226            .           .           .<-------   2D303
1224            .           .       D41A2
                .           .           V
                .           .           V
1227            .           .       R41A2
                .           .           .
                .           .           .
1233            .       1I303............
                .           .
                .           .
1238            .           .           .<-------   3D303
1236            .           .       D41A3
                .           .           V
                .           .           V
1239            .           .       R41A3
                .           .           .
                .           .           .
1245            .       2I303............
                .           .
                .           .
1250            .           .           .<-------   4D303
1248            .           .        D41A
                .           .           V
                .           .           V
1251            .           .        R41A
                .           .           .
                .           .           .
1257            .       3I303............
                .           .
                .           .
1262            .           .           .<-------   5D303
1260            .           .       D41-1
                .           .           V
                .           .           V
1263            .           .       R41-1
                .           .           .
                .           .           .
1269            .       4I303............
                .           .
                .           .
1274            .           .           .<-------   6D303
1272            .           .       D41-2
                .           .           V
                .           .           V
1275            .           .       R41-2
                .           .           .
                .           .           .
1281            .       5I303............
                .           .
                .           .
1286            .           .           .<-------   7D303
1284            .           .         D41
                .           .           V
                .           .           V
1287            .           .         R41
                .           .           .
                .           .           .
1293            .       6I303............
                .           .
                .           .
1296            .           .         303
                .           .           .
                .           .           .
1307            .           .           .------->    D303
1305            .           .        D303
                .           .           .
                .           .           .
1310            .       CP303............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

PLATE 2.1, 2.2, 2.3 & 2.4

FEMA

Flood Insurance Rate Maps

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991           *
*           VERSION 4.0.1E          *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  05/12/99  TIME  07:10:54   *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 551-1748          *
*                                   *
*************************************
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                    FUTURE CONDITIONS MODEL AT SPECIFIC LOCATIONS
                    MINIMUM FEMA DISTURBANCE MODEL

                    FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
                    100-YEAR, 24-HOUR STORM                          WTADMS.24

                    EXISTING CONDITIONS FOR CATERPILLAR PROPERTY EXTRACTED
                    FROM WHITE TANKS ADMS    3/30/99        FILE: CATADMS2.DAT

                    FUTURE CONDITIONS FOR CATERPILLAR PROPERTY
                    PLANNING AREAS I THRU VII IMPERVIOUS CALCS.
                    REVISED 4/26/99 FILE: FUTDIV7.DAT

                    REVISED FUTURE CONDITIONS MODEL FOR CATERPILLAR
                    NO BASINS ONSITE DRAIN TO WT#4
                    REVISED 5/11/99                ALTERNATIVE 'A'
                     4/26/99 FILE: FUTDIV10.DAT

 20 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ       1200  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      5   0  ENDING DATE
                   NDTIME       0355  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL    0.08 HOURS
                     TOTAL TIME BASE   99.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

 22 JD        INDEX STORM NO. 1
                     STRM        4.03  PRECIPITATION DEPTH
                     TRDA        0.00  TRANSPOSITION DRAINAGE AREA

 23 PI          PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01      0.00      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.03      0.03
                   0.03      0.09      0.09      0.09      0.01      0.01      0.01      0.01      0.01      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

 33 JD        INDEX STORM NO. 2
                     STRM        3.99  PRECIPITATION DEPTH
                     TRDA       10.00  TRANSPOSITION DRAINAGE AREA

  0 PI          PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01      0.00      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.03      0.03
                   0.03      0.09      0.09      0.09      0.01      0.01      0.01      0.01      0.01      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
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0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

34 JD INDEX STORM NO. 3

STRM 3.83 PRECIPITATION DEPTH
TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

35 JD INDEX STORM NO. 4

STRM 3.76 PRECIPITATION DEPTH
TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

36 JD INDEX STORM NO. 5

STRM 3.70 PRECIPITATION DEPTH
TRDA 200.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	18	934.	12.17	75.	21.	7.	0.81		
+	ROUTED TO	R18	761.	12.33	75.	21.	7.	0.81		
+	HYDROGRAPH AT	19	649.	12.42	79.	23.	8.	0.79		
+	2 COMBINED AT	CP19	1392.	12.33	154.	44.	15.	1.60		
+	ROUTED TO	R19	1289.	12.42	153.	44.	15.	1.60		
+	HYDROGRAPH AT	21	741.	12.42	90.	26.	9.	0.79		
+	2 COMBINED AT	I1CP21	2027.	12.42	243.	70.	23.	2.39		
+	HYDROGRAPH AT	20	875.	12.33	101.	28.	9.	1.07		
+	ROUTED TO	R20	832.	12.50	100.	28.	9.	1.07		
+	2 COMBINED AT	CP21	2776.	12.42	343.	98.	33.	3.46		
+	DIVERSION TO	D21	2776.	12.42	343.	98.	33.	3.46		
+	HYDROGRAPH AT	D21	0.	0.08	0.	0.	0.	3.46		
+	ROUTED TO	R21	0.	0.08	0.	0.	0.	3.46		
+	HYDROGRAPH AT	23	295.	12.08	20.	6.	2.	0.16		
+	2 COMBINED AT	CP23	293.	12.08	20.	6.	2.	3.62		
+	DIVERSION TO	DF23	293.	12.08	20.	6.	2.	3.62		
+	HYDROGRAPH AT	D23	0.	0.08	0.	0.	0.	3.62		
+	ROUTED TO	R23	0.	0.08	0.	0.	0.	3.62		
+	HYDROGRAPH AT	22	553.	12.25	57.	16.	6.	0.57		
+	DIVERSION TO	DF22	453.	12.25	32.	8.	3.	0.57		
+	HYDROGRAPH AT	D22	100.	11.92	25.	8.	3.	0.57		
+	ROUTED TO	R22	100.	12.67	25.	8.	3.	0.57		
+	HYDROGRAPH AT	22A	785.	12.25	79.	22.	7.	0.50		
+	2 COMBINED AT	I1C22A	871.	12.25	104.	30.	10.	1.07		
+	2 COMBINED AT	CP22A	869.	12.25	104.	30.	10.	4.69		
+	ROUTED TO	R22A	768.	12.42	104.	30.	10.	4.69		
+	HYDROGRAPH AT	25	568.	12.33	73.	22.	7.	0.46		
+	2 COMBINED AT	I1CP25	1304.	12.42	177.	52.	17.	5.15		
+	HYDROGRAPH AT	24	225.	12.25	26.	8.	3.	0.14		
+	DIVERSION TO	DF24	225.	12.25	26.	8.	3.	0.14		
+	HYDROGRAPH AT	D24	0.	0.08	0.	0.	0.	0.14		
+	ROUTED TO	R24	0.	0.08	0.	0.	0.	0.14		
+	2 COMBINED AT	25CP	1304.	12.42	177.	52.	17.	5.29		
+	DIVERSION TO	DF25	603.	12.42	32.	8.	3.	5.29		
+	HYDROGRAPH AT	D25	700.	12.17	144.	44.	15.	5.29		
+	HYDROGRAPH AT	26	1011.	12.50	138.	39.	13.	1.16		

+ DIVERSION TO	DF26	811.	12.50	76.	19.	6.	1.16
+ HYDROGRAPH AT	D26	200.	12.00	61.	20.	7.	1.16
+ ROUTED TO	R26	200.	13.00	61.	20.	7.	1.16
+ HYDROGRAPH AT	27	1109.	12.42	150.	44.	15.	1.00
+ 2 COMBINED AT	I1CP27	1296.	12.42	211.	64.	21.	2.16
+ 2 COMBINED AT	CP27	1994.	12.42	355.	107.	36.	7.45
+ ROUTED TO	R27	1885.	12.58	355.	107.	36.	7.45
+ HYDROGRAPH AT	34	361.	12.25	33.	9.	3.	0.36
+ HYDROGRAPH AT	33	643.	12.25	59.	17.	6.	0.65
+ 2 COMBINED AT	CP33	1003.	12.25	91.	26.	9.	1.01
+ ROUTED TO	R33	955.	12.33	91.	26.	9.	1.01
+ HYDROGRAPH AT	35	416.	12.25	39.	12.	4.	0.39
+ 2 COMBINED AT	I1CP35	1313.	12.25	131.	37.	13.	1.40
+ HYDROGRAPH AT	32	968.	12.42	120.	34.	11.	1.29
+ 2 COMBINED AT	CP35	2182.	12.33	250.	72.	24.	2.69
+ ROUTED TO	R35	2115.	12.42	250.	72.	24.	2.69
+ HYDROGRAPH AT	36	226.	12.25	23.	7.	2.	0.24
+ 2 COMBINED AT	I1CP36	2267.	12.42	273.	79.	26.	2.93
+ HYDROGRAPH AT	37	682.	12.42	88.	25.	8.	0.95
+ 2 COMBINED AT	CP36	2947.	12.42	360.	103.	34.	3.88
+ ROUTED TO	R36	2871.	12.50	360.	103.	34.	3.88
+ HYDROGRAPH AT	38	797.	12.25	85.	25.	8.	0.76
+ 2 COMBINED AT	CP38	3390.	12.42	445.	128.	43.	4.64
+ DIVERSION TO	D38	2990.	12.42	289.	72.	24.	4.64
+ HYDROGRAPH AT	D38	400.	12.00	155.	56.	19.	4.64
+ ROUTED TO	R38	400.	12.75	155.	56.	19.	4.64
+ HYDROGRAPH AT	39	727.	12.50	122.	38.	13.	0.77
+ 2 COMBINED AT	I1CP39	1125.	12.50	277.	93.	31.	5.41
+ 2 COMBINED AT	CP39	2979.	12.58	627.	199.	67.	12.86
+ ROUTED TO	R39	2934.	12.67	627.	199.	67.	12.86
+ HYDROGRAPH AT	40	576.	12.25	61.	18.	6.	0.52
+ DIVERSION TO	DF40	370.	12.25	21.	5.	2.	0.52
+ HYDROGRAPH AT	D40	206.	12.00	40.	13.	4.	0.52
+ ROUTED TO	R40	201.	12.67	40.	13.	4.	0.52
+ HYDROGRAPH AT	42	1262.	12.50	221.	70.	23.	1.18
+ 2 COMBINED AT	I1CP42	1454.	12.50	260.	82.	28.	1.70
+ 2 COMBINED AT	CP42	4328.	12.58	882.	279.	94.	14.56
+ DIVERSION TO	DF42	2978.	12.58	325.	81.	27.	14.56
+ HYDROGRAPH AT	D42	1350.	12.17	557.	198.	67.	14.56

Alternative "A"

Not increasing volume behind WT#4

+	ROUTED TO R42	1352.	12.25	557.	198.	67.	14.56
+	HYDROGRAPH AT 41A1	48.	12.00	3.	1.	0.	0.02
+	ROUTED TO SR41A1	23.	12.17	3.	1.	0.	0.02
+	DIVERSION TO 1D303	23.	12.17	3.	1.	0.	0.02
+	HYDROGRAPH AT CP41A1	0.	0.08	0.	0.	0.	0.02
+	ROUTED TO R41A1	0.	0.08	0.	0.	0.	0.02
+	HYDROGRAPH AT 41A2	60.	12.00	3.	1.	0.	0.03
+	2 COMBINED AT CP41A2	60.	12.00	3.	1.	0.	0.05
+	ROUTED TO SR41A2	60.	12.00	3.	1.	0.	0.05
+	DIVERSION TO 2D303	24.	12.00	2.	0.	0.	0.05
+	HYDROGRAPH AT CP41A2	36.	12.00	1.	0.	0.	0.05
+	ROUTED TO R41A2	25.	12.08	1.	0.	0.	0.05
+	HYDROGRAPH AT 41A3	69.	12.00	4.	1.	0.	0.03
+	2 COMBINED AT CP41A3	86.	12.08	5.	1.	0.	0.08
+	ROUTED TO SR41A3	24.	12.25	5.	1.	0.	0.08
+	DIVERSION TO 3D303	24.	12.25	5.	1.	0.	0.08
+	HYDROGRAPH AT CP41A3	0.	0.08	0.	0.	0.	0.08
+	ROUTED TO R41A3	0.	0.08	0.	0.	0.	0.08
+	HYDROGRAPH AT 41A	91.	12.08	5.	1.	0.	0.05
+	2 COMBINED AT CP41A	91.	12.08	5.	1.	0.	0.13
+	ROUTED TO SR41A	23.	12.25	5.	1.	0.	0.13
+	DIVERSION TO 4D303	23.	12.25	5.	1.	0.	0.13
+	HYDROGRAPH AT CP41A	0.	0.08	0.	0.	0.	0.13
+	ROUTED TO R41A	0.	0.08	0.	0.	0.	0.13
+	HYDROGRAPH AT 41-1	208.	12.17	14.	3.	1.	0.15
+	2 COMBINED AT CP41-1	208.	12.17	14.	3.	1.	0.28
+	ROUTED TO SR41-1	148.	12.33	14.	3.	1.	0.28
+	DIVERSION TO 5D303	45.	12.33	11.	3.	1.	0.28
+	HYDROGRAPH AT CP41-1	103.	12.33	2.	1.	0.	0.28
+	ROUTED TO R41-1	38.	12.42	2.	1.	0.	0.28
+	HYDROGRAPH AT 41-2	143.	12.17	9.	2.	1.	0.10
+	2 COMBINED AT CP41-2	143.	12.17	12.	3.	1.	0.38
+	ROUTED TO SR41-2	33.	12.50	12.	3.	1.	0.38
+	DIVERSION TO 6D303	33.	12.50	12.	3.	1.	0.38
+	HYDROGRAPH AT CP41-2	0.	0.08	0.	0.	0.	0.38
+	ROUTED TO R41-2	0.	0.08	0.	0.	0.	0.38
+	HYDROGRAPH AT 41	576.	12.42	68.	17.	6.	0.58
+	DIVERSION TO D41	11.	12.42	1.	0.	0.	0.58
+	HYDROGRAPH AT D41	565.	12.42	66.	17.	6.	0.58

+	2 COMBINED AT	CP41	565.	12.42	66.	17.	6.	0.68
+	ROUTED TO	SR41	530.	12.50	66.	17.	6.	0.68
+	DIVERSION TO	7D303	47.	12.50	28.	8.	3.	0.68
+	HYDROGRAPH AT	CP41	483.	12.50	38.	10.	3.	0.68
+	ROUTED TO	R41	465.	12.58	38.	10.	3.	0.68
+	HYDROGRAPH AT	43-1	88.	12.08	8.	3.	1.	0.04
+	2 COMBINED AT	CP43-1	470.	12.58	47.	12.	4.	1.00
+	ROUTED TO	SR43-1	286.	12.83	47.	12.	4.	1.00
+	DIVERSION TO	D43-1	4.	12.83	1.	0.	0.	1.00
+	HYDROGRAPH AT	D43-1	282.	12.83	46.	12.	4.	1.00
+	DIVERSION TO	1D303A	282.	12.83	46.	12.	4.	1.00
+	HYDROGRAPH AT	CP43-1	0.	0.08	0.	0.	0.	1.00
+	ROUTED TO	R43-1	0.	0.08	0.	0.	0.	1.00
+	HYDROGRAPH AT	43-2	24.	12.00	3.	1.	0.	0.01
+	2 COMBINED AT	CP43-2	24.	12.00	3.	1.	0.	1.01
+	ROUTED TO	SR43-2	12.	12.17	3.	1.	0.	1.01
+	DIVERSION TO	D43-2	2.	12.17	0.	0.	0.	1.01
+	HYDROGRAPH AT	D43-2	10.	12.17	2.	1.	0.	1.01
+	DIVERSION TO	2D303A	10.	12.17	2.	1.	0.	1.01
+	HYDROGRAPH AT	CP43-2	0.	0.08	0.	0.	0.	1.01
+	ROUTED TO	R43-2	0.	0.08	0.	0.	0.	1.01
+	HYDROGRAPH AT	43-3	130.	12.00	13.	5.	2.	0.05
+	2 COMBINED AT	CP43-3	130.	12.00	13.	5.	2.	1.06
+	DIVERSION TO	D43-3	107.	12.00	11.	4.	1.	1.06
+	HYDROGRAPH AT	D43-3	23.	12.00	2.	1.	0.	1.06
+	DIVERSION TO	3D303A	23.	12.00	2.	1.	0.	1.06
+	HYDROGRAPH AT	CP43-3	0.	0.08	0.	0.	0.	1.06
+	ROUTED TO	R43-3	0.	0.08	0.	0.	0.	1.06
+	HYDROGRAPH AT	43-4	78.	12.00	8.	3.	1.	0.03
+	2 COMBINED AT	CP43-4	78.	12.00	8.	3.	1.	1.09
+	DIVERSION TO	D43-4	57.	12.00	6.	2.	1.	1.09
+	HYDROGRAPH AT	D43-4	21.	12.00	2.	1.	0.	1.09
+	DIVERSION TO	DI43-4	21.	12.00	2.	1.	0.	1.09
+	HYDROGRAPH AT	CP43-4	0.	0.08	0.	0.	0.	1.09
+	ROUTED TO	R43-4	0.	0.08	0.	0.	0.	1.09
+	HYDROGRAPH AT	43-5	52.	12.00	5.	2.	1.	0.02
+	2 COMBINED AT	CP43-5	52.	12.00	5.	2.	1.	1.11
+	DIVERSION TO	D43-5	33.	12.00	3.	1.	0.	1.11
+	HYDROGRAPH AT	D43-5	19.	12.00	2.	1.	0.	1.11

	DIVERSION TO						
+		DI43-5	19.	12.00	2.	1.	0.	1.11
	HYDROGRAPH AT						
+		CP43-5	0.	0.08	0.	0.	0.	1.11
	ROUTED TO						
+		R43-5	0.	0.08	0.	0.	0.	1.11
	HYDROGRAPH AT						
+		43-6	54.	12.00	5.	2.	1.	0.02
	2 COMBINED AT						
+		CP43-6	54.	12.00	5.	2.	1.	1.13
	DIVERSION TO						
+		D43-6	48.	12.00	5.	2.	1.	1.13
	HYDROGRAPH AT						
+		D43-6	6.	12.00	1.	0.	0.	1.13
	DIVERSION TO						
+		DI43-6	6.	12.00	1.	0.	0.	1.13
	HYDROGRAPH AT						
+		CP43-6	0.	0.08	0.	0.	0.	1.13
	ROUTED TO						
+		R43-6	0.	0.08	0.	0.	0.	1.13
	HYDROGRAPH AT						
+		43-7	54.	12.00	5.	2.	1.	0.02
	2 COMBINED AT						
+		CP43-7	54.	12.00	5.	2.	1.	1.15
	DIVERSION TO						
+		D43-7	34.	12.00	3.	1.	0.	1.15
	HYDROGRAPH AT						
+		D43-7	20.	12.00	2.	1.	0.	1.15
	DIVERSION TO						
+		DI43-7	20.	12.00	2.	1.	0.	1.15
	HYDROGRAPH AT						
+		CP43-7	0.	0.08	0.	0.	0.	1.15
	ROUTED TO						
+		R43-7	0.	0.08	0.	0.	0.	1.15
	HYDROGRAPH AT						
+		43-8	27.	12.00	3.	1.	0.	0.01
	2 COMBINED AT						
+		CP43-8	27.	12.00	3.	1.	0.	1.16
	DIVERSION TO						
+		D43-8	15.	12.00	1.	1.	0.	1.16
	HYDROGRAPH AT						
+		D43-8	12.	12.00	1.	0.	0.	1.16
	DIVERSION TO						
+		DI43-8	12.	12.00	1.	0.	0.	1.16
	HYDROGRAPH AT						
+		CP43-8	0.	0.08	0.	0.	0.	1.16
	ROUTED TO						
+		R43-8	0.	0.08	0.	0.	0.	1.16
	HYDROGRAPH AT						
+		43	27.	12.00	3.	1.	0.	0.01
	2 COMBINED AT						
+		I1CP43	27.	12.00	3.	1.	0.	1.17
	2 COMBINED AT						
+		CP43	1355.	12.25	560.	199.	67.	13.90
	DIVERSION TO						
+		DI43	0.	0.08	0.	0.	0.	13.90
	HYDROGRAPH AT						
+		CP43	1355.	12.25	560.	199.	67.	13.90
	ROUTED TO						
+		RD43	1353.	12.50	560.	199.	67.	13.90
	HYDROGRAPH AT						
+		CP43-4	21.	12.00	2.	1.	0.	1.09
	ROUTED TO						
+		RD43-4	9.	12.33	2.	1.	0.	1.09
	HYDROGRAPH AT						
+		CP43-5	19.	12.00	2.	1.	0.	1.11
	ROUTED TO						
+		RD43-5	9.	12.33	2.	1.	0.	1.11
	2 COMBINED AT						
+		I1CWT4	18.	12.33	4.	1.	0.	0.05
	HYDROGRAPH AT						
+		CP43-6	6.	12.00	1.	0.	0.	1.13
	ROUTED TO						
+		RD43-6	2.	12.42	1.	0.	0.	1.13
	2 COMBINED AT						
+		I2CWT4	20.	12.33	5.	2.	1.	0.07
	HYDROGRAPH AT						
+		CP43-7	20.	12.00	2.	1.	0.	1.15

+	ROUTED TO	RD43-7	9.	12.25	2.	1.	0.	1.15
+	2 COMBINED AT	I3CWT4	29.	12.33	7.	2.	1.	0.09
+	HYDROGRAPH AT	CP43-8	12.	12.00	1.	0.	0.	1.16
+	ROUTED TO	RD43-8	5.	12.33	1.	0.	0.	1.16
+	2 COMBINED AT	I4CWT4	33.	12.33	8.	3.	1.	0.10
+	HYDROGRAPH AT	44	300.	12.25	25.	6.	2.	0.22
+	2 COMBINED AT	I5CWT4	333.	12.25	33.	9.	3.	0.32
+	2 COMBINED AT	I6CWT4	1625.	12.33	592.	208.	70.	14.12
+	HYDROGRAPH AT	45-1	143.	12.08	9.	2.	1.	0.08
+	HYDROGRAPH AT	CP43	0.	0.08	0.	0.	0.	13.90
+	2 COMBINED AT	CP45-1	143.	12.08	9.	2.	1.	13.98
+	ROUTED TO	SR45-1	105.	12.25	9.	2.	1.	13.98
+	DIVERSION TO	DI45-1	105.	12.25	9.	2.	1.	13.98
+	HYDROGRAPH AT	CP45-1	0.	0.08	0.	0.	0.	13.98
+	ROUTED TO	R45-1	0.	0.08	0.	0.	0.	13.98
+	HYDROGRAPH AT	45	401.	12.42	48.	12.	4.	0.38
+	2 COMBINED AT	CP45	394.	12.42	47.	12.	4.	14.36
+	ROUTED TO	SR45	206.	12.75	47.	12.	4.	14.36
+	DIVERSION TO	DI45	206.	12.75	47.	12.	4.	14.36
+	HYDROGRAPH AT	CP45	0.	0.08	0.	0.	0.	14.36
+	ROUTED TO	R45	0.	0.08	0.	0.	0.	14.36
+	HYDROGRAPH AT	46-1	184.	12.25	18.	4.	1.	0.15
+	2 COMBINED AT	CP46-1	180.	12.25	17.	4.	1.	14.51
+	ROUTED TO	SR46-1	105.	12.50	17.	4.	1.	14.51
+	DIVERSION TO	DI46-1	105.	12.50	17.	4.	1.	14.51
+	HYDROGRAPH AT	CP46-1	0.	0.08	0.	0.	0.	14.51
+	ROUTED TO	R46-1	0.	0.08	0.	0.	0.	14.51
+	HYDROGRAPH AT	46	651.	12.58	94.	24.	8.	0.85
+	2 COMBINED AT	I1CP46	637.	12.58	92.	23.	8.	15.36
+	HYDROGRAPH AT	28	747.	12.50	89.	22.	7.	0.86
+	ROUTED TO	R28	738.	12.50	89.	22.	7.	0.86
+	HYDROGRAPH AT	30	320.	12.33	41.	13.	4.	0.28
+	2 COMBINED AT	I1CP30	935.	12.50	131.	35.	12.	1.14
+	HYDROGRAPH AT	29	284.	12.25	34.	11.	4.	0.22
+	ROUTED TO	SR29	0.	0.08	0.	0.	0.	0.22
+	ROUTED TO	R29	0.	0.08	0.	0.	0.	0.22
+	2 COMBINED AT	CP30	935.	12.50	131.	35.	12.	1.36
+	DIVERSION TO	D30	110.	12.50	15.	4.	1.	1.36
+	HYDROGRAPH AT	D30	825.	12.50	115.	31.	10.	1.36

+	ROUTED TO	R30	771.	12.67	115.	31.	10.	1.36
+	HYDROGRAPH AT	31	525.	12.50	63.	16.	5.	0.71
+	2 COMBINED AT	CP31	1235.	12.58	178.	47.	16.	2.07
+	ROUTED TO	R31	1197.	12.75	178.	47.	16.	2.07
+	2 COMBINED AT	CP46	1740.	12.67	264.	69.	23.	17.43
+	ROUTED TO	SR46	1702.	12.75	264.	69.	23.	17.43
+	ROUTED TO	R46	1591.	12.92	264.	69.	23.	17.43
+	HYDROGRAPH AT	CP45-1	105.	12.25	9.	2.	1.	13.98
+	ROUTED TO	RD45-1	74.	12.50	9.	2.	1.	13.98
+	HYDROGRAPH AT	CP45	206.	12.75	47.	12.	4.	14.36
+	ROUTED TO	RD45	196.	13.00	47.	12.	4.	14.36
+	2 COMBINED AT	I7CWT4	226.	12.83	56.	14.	5.	14.36
+	HYDROGRAPH AT	CP46-1	105.	12.50	17.	4.	1.	14.51
+	ROUTED TO	RD46-1	93.	12.83	17.	4.	1.	14.51
+	2 COMBINED AT	I8CWT4	318.	12.83	73.	18.	6.	14.51
+	HYDROGRAPH AT	WT4	997.	12.25	88.	22.	7.	0.77
+	2 COMBINED AT	I9CWT4	1048.	12.25	159.	40.	13.	15.28
+	2 COMBINED AT	I10WT4	1930.	12.92	421.	108.	36.	18.20
+	2 COMBINED AT	CPWT4	3301.	12.92	1009.	315.	106.	18.57
+	ROUTED TO	RS47	0.	0.08	0.	0.	0.	18.57
+	HYDROGRAPH AT	CP43-1	282.	12.83	46.	12.	4.	1.00
+	ROUTED TO	R43-1	294.	13.42	46.	12.	4.	1.00
+	HYDROGRAPH AT	CP43-2	10.	12.17	2.	1.	0.	1.01
+	ROUTED TO	R43-2	6.	14.08	2.	1.	0.	1.01
+	HYDROGRAPH AT	CP43-3	23.	12.00	2.	1.	0.	1.06
+	ROUTED TO	R43-3	7.	13.83	2.	1.	0.	1.06
+	HYDROGRAPH AT	303A	549.	12.25	56.	15.	5.	0.42
+	DIVERSION TO	D303A	23.	12.25	2.	1.	0.	0.42
+	HYDROGRAPH AT	D303A	526.	12.25	53.	14.	5.	0.42
+	4 COMBINED AT	1C303A	530.	12.25	103.	28.	9.	1.48
+	2 COMBINED AT	CP303A	516.	12.25	100.	27.	9.	18.99
+	HYDROGRAPH AT	D41A1	23.	12.17	3.	1.	0.	0.02
+	ROUTED TO	R41A1	13.	13.58	3.	1.	0.	0.02
+	HYDROGRAPH AT	D41A2	24.	12.00	2.	0.	0.	0.05
+	ROUTED TO	R41A2	12.	13.50	2.	0.	0.	0.05
+	2 COMBINED AT	1I303	25.	13.58	5.	1.	0.	0.05
+	HYDROGRAPH AT	D41A3	24.	12.25	5.	1.	0.	0.08
+	ROUTED TO	R41A3	15.	14.50	5.	1.	0.	0.08
+	2 COMBINED AT	2I303	27.	13.67	9.	2.	1.	0.08

+	HYDROGRAPH AT	D41A	23.	12.25	5.	1.	0.	0.13
+	ROUTED TO	R41A	13.	14.67	5.	1.	0.	0.13
+	2 COMBINED AT	3I303	32.	14.42	14.	4.	1.	0.13
+	HYDROGRAPH AT	D41-1	45.	12.33	11.	3.	1.	0.28
+	ROUTED TO	R41-1	33.	14.25	11.	3.	1.	0.28
+	2 COMBINED AT	4I303	65.	14.25	25.	6.	2.	0.28
+	HYDROGRAPH AT	D41-2	33.	12.50	12.	3.	1.	0.38
+	ROUTED TO	R41-2	29.	14.58	11.	3.	1.	0.38
+	2 COMBINED AT	5I303	90.	14.50	35.	9.	3.	0.38
+	HYDROGRAPH AT	D41	47.	12.50	28.	8.	3.	0.68
+	ROUTED TO	R41	44.	14.58	27.	8.	3.	0.68
+	2 COMBINED AT	6I303	133.	14.50	61.	17.	6.	0.96
+	HYDROGRAPH AT	303	914.	12.67	139.	35.	12.	1.21
+	DIVERSION TO	D303	4.	12.67	1.	0.	0.	1.21
+	HYDROGRAPH AT	D303	910.	12.67	138.	35.	12.	1.21
+	2 COMBINED AT	CP303	911.	12.67	194.	52.	17.	2.17

*** NORMAL END OF HEC-1 ***

ALTERNATIVE 'B'

HEC-1 OUTPUT

```
1*************************************
 *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              MAY   1991           *
 *           VERSION 4.0.1E          *
 *     Lahey F77L-EM/32 version 5.01     *
 *       Dodson & Associates, Inc.       *
 *  RUN DATE  05/12/99  TIME  07:12:12   *
 *************************************
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 551-1748          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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1                                          HEC-1 INPUT                                                    PAGE  1

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID        FUTURE CONDITIONS MODEL AT SPECIFIC LOCATIONS
   2          ID        MINIMUM FEMA DISTURBANCE MODEL
   3          ID
   4          ID        FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
   5          ID        100-YEAR, 24-HOUR STORM                            WTADMS.24
   6          ID
   7          ID        EXISTING CONDITIONS FOR CATERPILLAR PROPERTY EXTRACTED
   8          ID        FROM WHITE TANKS ADMS    3/30/99        FILE: CATADMS2.DAT
   9          ID
  10          ID        FUTURE CONDITIONS FOR CATERPILLAR PROPERTY
  11          ID        PLANNING AREAS I THRU VII IMPERVIOUS CALCS.
  12          ID        REVISED 4/26/99 FILE: FUTDIV7.DAT
  13          ID
  14          ID        REVISED FUTURE CONDITIONS MODEL FOR CATERPILLAR
  15          ID        MAXIMUM Q100 AND VOLUME TO WHITE TANKS #4
  16          ID        NO DRAINING OF ONSITE BASINS TO WT#4
  17          ID        4/27/99  FILE: FUTDIV11.DAT            ALTERNATIVE 'B'
  18          ID
              *DIAGRAM
  19          IT       5                    1200
  20          IO       5
  21          IN      15
  22          JD    4.03    .001
  23          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
  24          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
  25          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
  26          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
  27          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
  28          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
  29          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
  30          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
  31          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
  32          PC    .983    .986    .989    .992    .995    .998    1.00   1.000   1.000   1.000
  33          JD    3.99      10
  34          JD    3.83      50
  35          JD    3.76     100
  36          JD    3.70     200

  37          KK      18
  38          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 18.
  39          BA     .81
  40          LG     .20     .34    3.25    1.12    10.7
  41          UI    213.    719.   1128.   1731.   1159.    722.    301.    171.     49.     47.
  42          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  43          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  44          KK     R18
  45          KM        ROUTE FLOW FROM CP18 TO CP19.
  46          RS       2              -1       0
  47          RC     .08     .05     .08    7800   .0615
  48          RX    1000    1030    1080    1097    1120    1140    1205    1218
  49          RY    1520    1518    1514    1510    1510    1512    1518    1520
1                                          HEC-1 INPUT                                                    PAGE  2

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  50          KK      19
  51          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 19.
  52          BA     .79
  53          LG     .19     .33    3.31    1.07    12.8
  54          UI     84.    195.    385.    496.    632.    936.    940.    708.    553.    427.
  55          UI    278.    147.    120.     84.     32.     26.     26.     26.      0.      0.
  56          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  57          KK    CP19
  58          KM        ADD HYDROGRAPHS AT CP19.
  59          HC       2

  60          KK     R19
  61          KM        ROUTE COMBINED HYDROGRPAH AT CP19 TO CP21.
  62          RS       2              -1       0
  63          RC     .06     .04     .06    5772   .0246
  64          RX    1000    1010    1025    1040    1055    1069    1080    1100
  65          RY    1466    1464    1460    1458    1458    1460    1466    1467

  66          KK      21
  67          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 21.
  68          BA     .79
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 69          LG     .19     .31    3.81     .78    13.9
 70          UI     84.    191.    380.    491.    623.    915.    948.    711.    558.    430.
 71          UI    291.    149.    124.     84.     37.     26.     26.     26.      0.      0.
 72          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 73          KK  I1CP21
 74          KM        ADD HYDROGRAPHS AT CP21.
 75          HC       2

 76          KK      20
 77          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 20.
 78          BA    1.07
 79          LG     .19     .33    3.33    1.05     9.9
 80          UI    119.    294.    560.    721.    938.   1414.   1211.    931.    714.    535.
 81          UI    286.    200.    132.     83.     36.     36.     36.     36.      0.      0.
 82          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *   SR20
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP20.
             *      1    STOR       0       0
             *      0    1.05    9.43   26.91   54.31   92.89  138.67  176.47  190.08  219.05
             * 249.57
             *      0       0       0       0       0       0       0       0     265    1377
             *   2963
             *   1443    1446    1450    1454    1458    1462    1466    1469    1470    1472
             *   1474

 83          KK     R20
 84          KM        ROUTE REMAINDER OF FLOW AT CP20  TO CP21
 85          RS       4              -1       0
 86          RC     .06    .045     .06    6240   .0208
 87          RX    1000    1012    1025    1032    1050    1057    1070    1092
 88          RY    1424    1422    1420    1418    1418    1420    1422    1424
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 89          KK    CP21
 90          KM        ADD HYDROGRAPHS AT CP21.
 91          HC       2

 92          KK     D21
 93          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 94          KO       1
 95          DT     D21
 96          DI       0     800    5000
 97          DQ       0       0    4200
             *   SR21
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP21
             *      1    STOR       0       0
             *      0     .68   20.68   57.58   95.91  102.34  117.65     130
             *      0       0       0       0       0     265    1377    2000
             *   1319    1320    1330    1340    1347    1348    1350    1351

 98          KK     R21
 99          KM        ROUTE REMAINDER OF FLOW AT CP21 TO CP23
100          RS       1              -1       0
101          RC     .03     .03     .05    2340   .0196
102          RX    1000    1030    1050    1070    1145    1212    1225    1250
103          RY    1310    1306    1304    1302    1302    1304    1306    1310

104          KK      23
105          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 23.
106          BA     .16
107          LG     .18     .32    4.04     .65    15.3
108          UI    111.    327.    471.    228.     68.     20.      0.      0.      0.      0.
109          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

110          KK    CP23
111          KM        ADD HYDROGRAPHS AT CP23
112          HC       2
             *    D23
             *       DIVERT FLOW TO A RETENTION BASIN IN 21
             *      1
             *   DF23
             *      0    1000
             *      0    1000
             *   SR23
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP23.
             *      1    STOR       0       0
             *      0    6.04   20.38   53.82  120.38  216.24  325.98  455.42   606.1  645.49
             * 685.61  767.98
             *      0       0       0       0       0       0       0       0       0       0
             *    928    8950
             *   1272    1276    1280    1284    1288    1292    1296    1300    1304    1305
             *   1306    1308
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

113          KK     R23
114          KM        ROUTE REMAINDER OF FLOW AT CP23 TO CP22A
115          RS       4              -1       0
116          RC     .05     .03     .05    4992    .005    1400
117          RX     930     975    1000    1010    1030    1040    1041    1042
118          RY    1397  1396.5    1396    1394    1394    1396  1396.5    1397

119          KK      22
120          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 22
121          BA     .57
122          LG     .19     .33    3.38    1.03    12.5
123          UI     77.    258.    418.    563.    888.    745.    546.    395.    215.    129.
124          UI     79.     34.     24.     24.      0.      0.      0.      0.      0.      0.
125          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

126          KK     D22
127          KM        DIVERT FLOW TO OFFLINE RETENION BASIN IN #22
128          KO       1
129          DT    DF22
130          DI       0     300    2000
131          DQ       0       0    1700

132          KK     R22
133          KM        ROUTE FLOW FROM CP22 TO CP22A
134          RS       3              -1       0
135          RC     .05     .03     .05    6230    .025
```

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136          RX    1000    1030    1060    1070    1100    1115    1125    1150
137          RY    1294    1292    1290    1288    1288    1290    1292    1294

138          KK     22A
139          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 22A
140          BA     .50
141          LG     .15     .29    3.74     .29    12.9
142          UI     74.    286.    436.    640.    862.    603.    424.    253.    126.     79.
143          UI     30.     23.     23.      0.      0.      0.      0.      0.      0.      0.
144          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

145          KK  I1C22A
146          KM       ADD HYDROGRAPHS AT CP22A
147          HC       2

148          KK   CP22A
149          KM       ADD HYDROGRAPHS AT CP22A
150          HC       2

151          KK    R22A
152          KM       ROUTE COMBINED HYDROGRAPHS AT CP22A TO CP25
153          RS       4              -1       0
154          RC     .03     .03     .05    7022   .0079
155          RX    1000    1030    1040    1047    1070    1097    1120    1200
156          RY    1255    1254    1250    1248    1250    1252    1254    1255
1                                          HEC-1 INPUT                                                    PAGE  5

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

157          KK      25
158          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 25
159          BA     .46
160          LG     .15     .31    4.27     .49    25.9
161          UI     53.    137.    254.    327.    437.    640.    505.    389.    295.    207.
162          UI    106.     80.     53.     22.     16.     16.     16.      0.      0.      0.
163          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

164          KK  I1CP25
165          KM       ADD HYDROGRAPHS AT CP25
166          HC       2

167          KK      24
168          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 24
169          BA     .14
170          LG     .35     .31    3.77     .31    30.9
171          UI     21.     85.    128.    193.    241.    165.    115.     61.     34.     20.
172          UI      7.      7.      7.      0.      0.      0.      0.      0.      0.      0.
173          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

174          KK     D24
175          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN IN BASIN 25
176          KO       1
177          DT    DF24
178          DI       0     225
179          DQ       0     225
             *   SR24
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP24
             *      1    STOR       0       0
             *      0     .46    2.96    16.6      86  221.55  282.99  306.59  357.02
             *      0       0       0       0       0       0       0      50    2598
             *   1210    1214    1216    1220    1230    1240    1243    1244    1246

180          KK     R24
181          KM       ROUTE REMAINDER OF FLOW AT CP24 TO CP25
182          RS       1              -1       0
183          RC     .05     .03     .05    1326    .021
184          RX    1000    1040    1070    1100    1200    1220    1245    1265
185          RY    1234    1232    1230    1228    1228    1230    1232    1234

186          KK    25CP
187          KM       COMBINE HYDROGRAPHS AT CP25
188          HC       2

189          KK     D25
190          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN IN BASIN 25
191          KO       1
192          DT    DF25
193          DI       0    1300    5000
194          DQ       0       0    3700
             *   SR25
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP25
             *      1    STOR       0       0
             *      0    5.61   10.27   13.15   16.62   26.62
             *      0       0       0       0     125    2273
             *   1204    1210    1212    1213    1214    1216
1                                          HEC-1 INPUT                                                    PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

195          KK      26
196          KM       RUNOFF FROM SUB-BASIN 26
197          BA    1.16
198          LG     .17     .30    3.97     .68    12.4
199          UI    103.    163.    401.    532.    639.    787.   1092.   1251.    956.    788.
200          UI    637.    510.    359.    200.    171.    117.     99.     32.     32.     32.
201          UI     32.     32.      0.      0.      0.      0.      0.      0.      0.      0.
202          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

203          KK     D26
204          KM       DIVERT FLOW TO OFFLINE RETENTION BASIN IN #26
205          KO       1
206          DT    DF26
207          DI       0     400    5000
208          DQ       0       0    4600

209          KK     R26
210          KM       ROUTE FLOW FROM CP26 TO CP27
211          RS       4              -1       0
212          RC     .05     .03     .05    7020   .0157
213          RX    1000    1012    1025    1040    1090    1105    1112    1120
214          RY    1250    1248    1245    1242    1242    1244    1247    1250

215          KK      27
216          KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 27
217          BA    1.00
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 218          LG     .15     .31    4.27     .48    20.7
 219          UI    101.    206.    438.    567.    705.    970.   1225.    936.    750.    587.
 220          UI    450.    256.    172.    129.     99.     31.     31.     31.     31.      0.
 221          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 222          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 223          KK  I1CP27
 224          KM        ADD HYDROGRAPHS AT CP27
 225          HC       2
              *   SR27
              *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP27
              *      1    STOR       0       0
              *      0     .13    5.77    9.37   11.42   13.71   19.21
              *      0       0       0       0       0     550    4546
              *   1203    1204    1210    1212    1213    1214    1216

 226          KK    CP27
 227          KM        ADD REMAINING FLOW OF CP25 & CP27 AT CP27
 228          KO       1
 229          HC       2

 230          KK     R27
 231          KM        ROUTE COMBINED REMAINDER FLOW AT CP27 TO CP39
 232          RS       3              -1       0
 233          RC     .03     .03     .05    5928   .0084
 234          RX    1000    1010    1020    1025    1055    1085    1175    1250
 235          RY    1210    1210    1210    1202    1202    1204    1206    1208
1                                          HEC-1 INPUT                                                    PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 236          KK      34
 237          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 34
 238          BA     .36
 239          LG     .20     .34    3.21    1.14   10.00
 240          UI     57.    229.    343.    530.    615.    416.    284.    139.     81.     43.
 241          UI     17.     17.      0.      0.      0.      0.      0.      0.      0.      0.
 242          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 243          KK      33
 244          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 33
 245          BA     .65
 246          LG     .20     .34    3.21    1.14   10.00
 247          UI     99.    392.    591.    888.   1120.    769.    535.    290.    159.     93.
 248          UI     30.     30.     30.      0.      0.      0.      0.      0.      0.      0.
 249          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 250          KK    CP33
 251          KM        ADD HYDROGRAPHS AT CP33
 252          HC       2

 253          KK     R33
 254          KM        ROUTE COMBINED HYDROGRAPHS AT CP33 TO CP35
 255          RS       2              -1       0
 256          RC     .08     .05     .08    4680   .0427
 257          RX    1000    1015    1022    1035    1050    1068    1092    1100
 258          RY    1800    1760    1720    1680    1680    1720    1760    1800

 259          KK      35
 260          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 35
 261          BA     .39
 262          LG     .20     .34    3.21    1.14    14.2
 263          UI     72.    272.    410.    672.    631.    428.    270.    119.     74.     28.
 264          UI     20.     20.      0.      0.      0.      0.      0.      0.      0.      0.
 265          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 266          KK  I1CP35
 267          KM        ADD HYDROGRAPHS AT CP35
 268          HC       2

 269          KK      32
 270          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 32
 271          BA    1.29
 272          LG     .20     .34    3.21    1.14    11.1
 273          UI    130.    270.    570.    738.    919.   1268.   1585.   1202.    963.    753.
 274          UI    575.    317.    221.    161.    121.     40.     40.     40.     40.      0.
 275          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 276          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 277          KK    CP35
 278          KM        ADD HYDROGRAPHS AT CP35
 279          HC       2
1                                          HEC-1 INPUT                                                    PAGE  8

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 280          KK     R35
 281          KM        ROUTE COMBINED HYDROGRAPHS AT CP35 TO CP36
 282          RS       2              -1       0
 283          RC     .06    .035     .06    5070   .0355
 284          RX    1000    1012    1023    1034    1045    1056    1067    1079
 285          RY    1429    1428    1426    1424    1424    1426    1428    1429

 286          KK      36
 287          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 36
 288          BA     .24
 289          LG     .16     .34    2.38    1.41    14.2
 290          UI     34.    127.    197.    278.    409.    297.    212.    140.     65.     43.
 291          UI     22.     11.     11.      0.      0.      0.      0.      0.      0.      0.
 292          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 293          KK  I1CP36
 294          KM        ADD HYDROGRAPHS AT CP36
 295          HC       2

 296          KK      37
 297          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 37
 298          BA     .95
 299          LG     .19     .34    3.24    1.08     9.7
 300          UI     90.    167.    373.    488.    598.    764.   1104.    941.    747.    598.
 301          UI    475.    344.    190.    151.    103.     81.     28.     28.     28.     28.
 302          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 303          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 304          KK    CP36
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 305          KM        ADD HYDROGRAPHS AT CP 36
 306          HC       2

 307          KK     R36
 308          KM        ROUTE COMBINED HYDROGRAPHS AT CP36 TO CP38
 309          RS       2             -1        0
 310          RC     .05     .03     .05    4836   .0198
 311          RX    1000    1008    1020    1032    1050    1112    1135    1183
 312          RY    1344    1342    1340    1338    1338    1340    1342    1344

 313          KK      38
 314          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 38
 315          BA     .76
 316          LG     .17     .34    3.21     .97    16.4
 317          UI    103.    354.    568.    770.   1209.    983.    720.    513.    270.    168.
 318          UI    103.     36.     32.     32.      0.      0.      0.      0.      0.      0.
 319          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 320          KK    CP38
 321          KM        ADD HYDROGRAPHS AT CP38
 322          HC       2
1                                        HEC-1 INPUT                                          PAGE  9

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 323          KK     D38
 324          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN IN BASIN 38
 325          KO       1
 326          DT     D38
 327          DI       0    1500    5000
 328          DQ       0       0    3500
              *    SR38
              *        STORAGE ROUTE THROUGH RETENTION BASIN AT CP38
              *      1    STOR       0       0
              *      0    1.83   15.38   39.25   41.76   47.45   60.58
              *      0       0       0       0      44    2223    6550
              *   1275    1280    1290  1297.5    1298    1300    1301

 329          KK     R38
 330          KM        ROUTE REMAINDER OF FLOW AT CP38 TO CP39
 331          RS       3             -1        0
 332          RC     .05     .03     .05    5438   .0167
 333          RX    1000    1005    1010    1025    1055    1085    1175    1250
 334          RY    1212    1211    1210    1202    1202    1204    1206    1208

 335          KK      39
 336          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 39
 337          BA     .77
 338          LG     .15     .34    3.81     .63    30.0
 339          UI     64.     82.    232.    313.    372.    450.    565.    791.    683.    550.
 340          UI    460.    376.    308.    213.    122.    106.     77.     64.     29.     20.
 341          UI     20.     20.     20.     20.      0.      0.      0.      0.      0.      0.
 342          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 343          KK  I1CP39
 344          KM        ADD HYDROGRAPHS AT CP39
 345          HC       2

 346          KK    CP39
 347          KM        ADD HYDROGRAPHS AT CP39
 348          HC       2

 349          KK     R39
 350          KM        ROUTE COMBINED HYDROGRAPH AT CP39 TO CP42
 351          RS       2             -1        0
 352          RC     .03     .03     .05    4836   .0141
 353          RX    1000    1005    1015    1025    1055    1070    1087    1130
 354          RY    1143    1142    1140    1132    1132    1136    1140    1142

 355          KK      40
 356          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 40
 357          BA     .52
 358          LG     .18     .34    3.54     .89      18
 359          UI     73.    258.    407.    562.    862.    658.    478.    331.    158.    104.
 360          UI     61.     22.     22.     22.      0.      0.      0.      0.      0.      0.
 361          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                        HEC-1 INPUT                                          PAGE 10

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 362          KK     D40
 363          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN IN #40
 364          KO       1
 365          DT    DF40
 366          DI       0     400    2000
 367          DQ       0       0    1600

 368          KK     R40
 369          KM        ROUTE FLOW FROM CP40 TO CP42
 370          RS       4             -1        0
 371          RC     .05     .03     .05    6396   .0086
 372          RX    1000    1010    1065    1095    1135    1155    1215    1220
 373          RY    1115    1114    1112    1110    1110    1112    1113    1113

 374          KK      42
 375          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 42
 376          BA    1.18
 377          LG     .21     .32    4.21     .45    39.3
 378          UI     98.    128.    359.    483.    575.    696.    878.   1223.   1042.    840.
 379          UI    701.    573.    467.    322.    182.    163.    115.     98.     39.     30.
 380          UI     30.     30.     30.     30.      0.      0.      0.      0.      0.      0.
 381          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 382          KK  I1CP42
 383          KM        ADD HYDROGRAPHS AT CP42
 384          HC       2

 385          KK    CP42
 386          KM        ADD HYDROGRAPHS AT CP42
 387          HC       2

 388          KK     D42
 389          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN IN #42
 390          KO       1
 391          DT    DF42
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392          DI       0    4275   10000
393          DQ       0       0    5725
             *   SR42
             *       STORAGE ROUTE THROUGH RETENTION BASIN AT CP42
             *      1    STOR       0       0
             *      0     .11   10.43   41.63    69.9   77.34    94.2  113.66   134.7  160.78
             *      0       0       0       0       0     163     844    2096    4630   13500
             * 1071.5    1072    1080    1090    1095    1096    1098    1100    1102    1104

394          KK     R42
395          KM        ROUTE REMAINDER OF HYDROGRAPH AT CP42 TO CP43
396          KO       1                    1
397          RS       1               -1       0
398          RC     .03     .03     .05     858   .0151
399          RX     900     950    1000    1030    1060    1075    1080    1090
400          RY    1090    1088    1086    1084    1084    1086    1088    1090
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

401          KK    41A1
402          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A1.
403          BA     .02
404          LG     .35     .31    3.70     .31     .00
405          UI     35.     87.     28.      4.      0.      0.      0.      0.      0.      0.
406          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

407          KK  SR41A1
408          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6255+85 ON I-10.
409          RS       1    STOR       0       0
410          SV       0     .43     .53     .63     .74    1.24    1.65    3.40    6.20
411          SQ       0      10      14      18      23      29      33     869    6050
412          SE  1133.4 1134.91 1135.23 1135.58 1135.97 1137.62  1139.0  1140.3 1143.85

413          KK  CP41A1
414          KM        DIVERT FLOW FROM CP41A1 TO CP303
415          DT   1D303
416          DI       0      14      23      33     869    6050
417          DQ       0      14      23      33      35      42

418          KK   R41A1
419          KM        ROUTE REMAINDER FROM CP41A1 TO CP41A2.
420          RS       1               -1       0
421          RC     .06     .03     .04     580   .0093
422          RX     600     800     900     965    1000    1020    1030    1040
423          RY    1147    1143    1142    1141    1141    1143    1145    1145

424          KK    41A2
425          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A2.
426          BA     .03
427          LG     .35     .34    3.91     .57     .00
428          UI     46.    124.     51.      9.      0.      0.      0.      0.      0.      0.
429          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

430          KK  CP41A2
431          KM        ADD HYDROGRAPHS AT CP41A2.
432          HC       2     .05

433          KK  SR41A2
434          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6261+65 ON I-10.
435          RS       1    STOR       0       0
436          SV       0     .10     .24     .31     .62    1.72
437          SQ       0       8      19      24     624    2104
438          SE  1132.7 1134.07 1134.98 1135.56 1137.34 1139.65

439          KK  CP41A2
440          KM        DIVERT FLOW FROM CP41A2 TO CP303
441          DT   2D303
442          DI       0       8      19      24     624    2104
443          DQ       0       8      19      24      30      36
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

444          KK   R41A2
445          KM        ROUTE REMAINDER FROM CP41A2 TO CP41A3.
446          RS       1               -1       0
447          RC     .06     .03     .04     595   .0093
448          RX     600     800     900     965    1000    1020    1030    1040
449          RY    1140    1136    1135    1134    1134    1136    1138    1140

450          KK    41A3
451          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A3.
452          BA     .03
453          LG     .35     .31    3.64     .30     .00
454          UI     38.    112.     64.     14.      4.      0.      0.      0.      0.      0.
455          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

456          KK  CP41A3
457          KM        ADD HYDROGRAPHS AT CP41A3.
458          HC       2     .08

459          KK  SR41A3
460          KM        STORAGE ROUTE THROUGH 30" CMP AT STA 6267+60 ON I-10
461          RS       1    STOR       0       0
462          SV       0     .86    1.05    1.25    1.48    2.51    2.84    4.15    5.46    8.08
463          SQ       0      10      14      18      23      29      32     254     654     896
464          SE  1128.6 1130.13 1130.45 1130.80 1131.19 1132.94  1133.5  1134.0  1134.5 1135.57

465          KK  CP41A3
466          KM        DIVERT FLOW FROM CP41A3 TO CP303
467          DT   3D303
468          DI       0      10      14      18      23      29      32     254     659    1896
469          DQ       0      10      14      18      23      29      32      33      34      35

470          KK   R41A3
471          KM        ROUTE REMAINDER FROM CP41A3 TO CP41A.
472          RS       1               -1       0
473          RC     .06     .03     .04     628   .0093
474          RX     600     800     900     965    1000    1020    1030    1040
475          RY    1135    1131    1130    1129    1129    1131    1133    1133

476          KK     41A
477          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41A.
478          BA     .05
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 479          LG     .35     .34    4.01     .53     .00
 480          UI     44.    136.    137.     51.     14.      5.      0.      0.      0.      0.
 481          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 482          KK   CP41A
 483          KM        ADD HYDROGRAPHS AT CP41A.
 484          HC       2     .13
1                                        HEC-1 INPUT                                                PAGE 13

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 485          KK   SR41A
 486          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6273+88 ON I-10
 487          RS       1    STOR       0       0
 488          SV       0    1.22    2.65    3.07    3.20    4.78    6.37    7.96    9.57
 489          SQ       0      10      36      44      45     312     799    1429    2047
 490          SE  1124.4 1125.75 1127.38 1127.86  1128.0  1128.5  1129.0  1129.5 1129.92

 491          KK   CP41A
 492          KM        DIVERT FLOW FROM CP41A TO CP303
 493          DT   4D303
 494          DI       0      10      36      44      45     312     799    1429    2047
 495          DQ       0      10      36      44      45      47      49      51      52

 496          KK    R41A
 497          KM        ROUTE REMAINDER FROM CP41A TO CP41-1.
 498          RS       1              -1       0
 499          RC     .06     .03     .04    1437   .0093
 500          RX     600     800     900     965    1000    1020    1030    1040
 501          RY    1122    1118    1117    1116    1116    1118    1120    1120

 502          KK    41-1
 503          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41-1
 504          BA     .15
 505          LG     .35     .35    3.78     .62     .00
 506          UI     45.    148.    244.    325.    203.    111.     46.     21.      9.      9.
 507          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 508          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 509          KK  CP41-1
 510          KM        ADD HYDROGRAPHS AT CP41-1
 511          HC       2     .28

 512          KK  SR41-1
 513          KM        STORAGE ROUTE THROUGH 2-36" CMP AT STA 6288+25 ON I-10.
 514          RS       1    STOR       0       0
 515          SV       0     .73    3.47    3.94    4.53    5.12    5.71
 516          SQ       0      10      36      44     489    1300    2348
 517          SE  1112.7 1114.08 1115.71    1116  1116.5    1117  1117.5

 518          KK  CP41-1
 519          KM        DIVERT FLOW FROM CP41-1 TO CP303
 520          DT   5D303
 521          DI       0      10      36      44     489    1300    2348
 522          DQ       0      10      36      44      47      50      52

 523          KK   R41-1
 524          KM        ROUTE REMAINDER FROM CP41-1 TO CP41-2.
 525          RS       1              -1       0
 526          RC     .06     .03     .04    1697   .0075
 527          RX     600     800     900     965    1000    1020    1030    1040
 528          RY    1104    1102    1101    1100    1100    1102    1104    1105
1                                        HEC-1 INPUT                                                PAGE 14

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 529          KK    41-2
 530          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41-2
 531          BA     .10
 532          LG     .35     .35    3.87     .58     .30
 533          UI     31.    101.    169.    216.    133.     69.     30.     13.      6.      0.
 534          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 535          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 536          KK  CP41-2
 537          KM        ADD HYDROGRAPHS AT CP41-2
 538          HC       2     .38

 539          KK  SR41-2
 540          KM        STORAGE ROUTE THROUGH 2-42" CMP AT STA 6305+22 ON I-10.
 541          RS       1    STOR       0       0
 542          SV       0     .84    1.23    1.78    2.46    3.31    4.34    5.61    7.63   11.57
 543          SV   13.47   15.30   19.63   23.76
 544          SQ       0      10      14      18      23      29      35      42      50      56
 545          SQ     201     419     469    1836
 546          SE  1099.2 1100.45 1100.70 1100.96 1101.23 1101.52 1101.83 1102.17 1102.83  1103.5
 547          SE  1103.8    1104  1104.5 1104.95

 548          KK  CP41-2
 549          KM        DIVERT FLOW FROM CP41-2 TO CP303
 550          DT   6D303
 551          DI       0      10      14      18      23      29      35      42      50      56
 552          DI     201     419     469    1836
 553          DQ       0      10      14      18      23      29      35      42      50      56
 554          DQ      59      61      64      68

 555          KK   R41-2
 556          KM        ROUTE REMAINDER FROM CP41-2 TO CP41.
 557          RS       1              -1       0
 558          RC     .06     .03     .04     978   .0053
 559          RX     650     800     850     965    1000    1020    1030    1040
 560          RY    1100    1099    1098    1096    1096    1098    1100    1101

 561          KK      41
 562          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 41
 563          BA     .58
 564          LG     .21     .34    4.24     .44     3.2
 565          UI     56.    108.    237.    308.    380.    493.    696.    562.    450.    357.
 566          UI    282.    193.    103.     90.     56.     38.     17.     17.     17.     17.
 567          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 568          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 569          KK     D41
 570          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 571          DT     D41
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 572          DI       0     576
 573          DQ       0      11
1                                        HEC-1 INPUT                                                    PAGE 15

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 574          KK    CP41
 575          KM        ADD HYDROGRAPHS AT CP41
 576          HC       2     .68

 577          KK    SR41
 578          KM        STORAGE ROUTE THROUGH 2-36" CMP AT STA 6315+00 ON I-10.
 579          RS       1    STOR       0       0
 580          SV       0     .09     .37     .86    2.15    2.99    4.92    5.83    7.92   11.06
 581          SV   15.07
 582          SQ       0       8      11      15      24      30      36      42      43     400
 583          SQ    1219
 584          SE  1094.6 1095.91 1096.15 1096.42 1096.99 1097.30 1097.91 1099.12  1099.5  1100.0
 585          SE  1100.6

 586          KK    CP41
 587          KM        DIVERT FLOW FROM CP41 TO CP303
 588          DT   7D303
 589          DI       0       8      11      15      24      30      36      42      43     400
 590          DI    1219
 591          DQ       0       8      11      15      24      30      36      42      43      46
 592          DQ      50

 593          KK     R41
 594          KM        ROUTE REMAINDER FROM CP41 TO CP43-1.
 595          RS       1              -1       0
 596          RC     .06     .03     .04     700   .0053
 597          RX     650     800     850     965    1000    1020    1030    1040
 598          RY    1098    1097    1096    1094    1094    1096    1098    1099

 599          KK    43-1
 600          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-1
 601          BA     .04
 602          LG     .35     .35    4.29     .40    49.8
 603          UI     25.     74.    117.     63.     21.      7.      3.      0.      0.      0.
 604          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 605          KK  CP43-1
 606          KM        ADD HYDROGRAPHS AT CP43-1
 607          HC       2     1.0

 608          KK  SR43-1
 609          KM        STORAGE ROUTE THROUGH 5-48" CMP FROM STA 6319+32 TO STA 6324+32 ON I-10.
 610          RS       1    STOR       0       0
 611          SV       0     .37     .80    1.58    2.71    4.54    5.86    7.60   12.33   14.79
 612          SV   21.44
 613          SQ       0      32      60     102     120     220     260     301     357     501
 614          SQ    1057
 615          SE  1091.7 1092.82 1093.25 1093.72 1094.21 1094.77 1095.08 1095.43 1096.19  1096.5
 616          SE  1097.0
1                                        HEC-1 INPUT                                                    PAGE 16

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 617          KK   D43-1
 618          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 619          DT   D43-1
 620          DI       0     286
 621          DQ       0       4

 622          KK  CP43-1
 623          KM        DIVERT FLOW FROM CP43-1 TO CP303A
 624          DT  1D303A
 625          DI       0      32      60     102     120     220     260     301     357     501
 626          DI    1057
 627          DQ       0      32      60     102     120     220     260     301     357     378
 628          DQ     417

 629          KK   R43-1
 630          KM        ROUTE REMAINDER FROM CP43-1 TO CP43-2.
 631          RS       1              -1       0
 632          RC     .06     .03     .04     500    .005
 633          RX     600     725     800     965    1000    1020    1030    1040
 634          RY    1095    1094  1093.5    1093    1093    1094    1096    1097

 635          KK    43-2
 636          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-2
 637          BA     .01
 638          LG     .35     .35    4.25     .42    81.3
 639          UI      9.     28.     27.     10.      2.      1.      0.      0.      0.      0.
 640          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 641          KK  CP43-2
 642          KM        ADD HYDROGRAPHS AT CP43-2
 643          HC       2    1.01

 644          KK  SR43-2
 645          KM        STORAGE ROUTE THROUGH 36" CMP AT STA 6326+40 ON I-10.
 646          RS       1    STOR       0       0
 647          SV       0     .12     .38     .71    1.11    1.61    3.12    3.95    5.19    6.02
 648          SQ       0       8      12      15      20      24      36      38     128     222
 649          SE  1092.0 1093.28 1093.52 1093.78 1094.05 1094.35 1095.13  1095.5  1096.0  1096.3

 650          KK   D43-2
 651          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
 652          DT   D43-2
 653          DI       0      12
 654          DQ       0       2

 655          KK  CP43-2
 656          KM        DIVERT FLOW FROM CP43-2 TO CP303A
 657          DT  2D303A
 658          DI       0       8      12      15      20      24      36      38     128     222
 659          DQ       0       8      12      15      20      24      36      38      40      43
1                                        HEC-1 INPUT                                                    PAGE 17

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 660          KK   R43-2
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661          KM        ROUTE REMAINDER FROM CP43-2 TO CP43-3.
662          RS       1              -1       0
663          RC     .06     .03     .04    1000    .003
664          RX     750     800     900     965    1000    1020    1030    1040
665          RY  1096.5    1096    1094    1093    1093    1094    1096    1097

666          KK    43-3
667          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-3
668          BA     .05
669          LG     .35     .35    4.30     .40    80.9
670          UI     68.    195.     98.     20.      0.      0.      0.      0.      0.      0.
671          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

672          KK  CP43-3
673          KM        ADD HYDROGRAPHS AT CP43-3.
674          HC       2    1.06
             * SR43-3
             *       STORAGE ROUTE THROUGH 3-36" CMPS FROM STA 6330+50 TO STA 6340+10 ON I-10
             *      1    STOR       0       0
             *      0    2.47    3.51    4.85    6.37    8.27   10.69   13.89   18.76   30.99
             *      0      27      36      48      63      78      93     165     364     951
             * 1092.8 1094.12 1094.37 1094.65 1094.93 1095.24 1095.59    1096 1096.56 1097.79

675          KK   D43-3
676          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
677          DT   D43-3
678          DI       0     130
679          DQ       0     107

680          KK  CP43-3
681          KM        DIVERT FLOW FROM CP43-3 TO CP303A
682          DT  3D303A
683          DI       0      27      36      48      63      78      93     165     364     951
684          DQ       0      27      36      48      63      78      93     102     114     135

685          KK   R43-3
686          KM        ROUTE REMAINDER FROM CP43-3 TO CP43-4.
687          RS       1              -1       0
688          RC     .06     .03     .04     800    .018
689          RX     800     850     930     965    1000    1020    1030    1040
690          RY  1096.5    1096    1094    1093    1093    1096    1097  1097.5

691          KK    43-4
692          KM        RUNOFF HYDROGRAP FROM SUB-BASIN 43-4
693          BA     .03
694          LG     .35     .35    4.28     .41    80.8
695          UI     43.    121.     54.     10.      0.      0.      0.      0.      0.      0.
696          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

697          KK  CP43-4
698          KM        ADD HYDROGRAPHS AT CP43-4
699          HC       2    1.09
             * SR43-4
             *       STORAGE ROUTE THROUGH 2-36" CMPS FROM STA 6343+25 TO STA 6345+65 ON I10
             *      1    STOR       0       0
             *      0     .89    1.27     1.8    2.43    3.24    3.31    4.75    7.05   12.83
             *      0      18      24      32      42      52      62     131     326     906
             * 1092.8 1094.12 1094.37 1094.65 1094.93 1095.24 1095.59    1096 1096.56 1097.79

700          KK   D43-4
701          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
702          DT   D43-4
703          DI       0      78
704          DQ       0      57

705          KK  CP43-4
706          KM        DIVERT FLOW AT STA 6345+65
707          DT  DI43-4
708          DI       0      18      24      32      42      52      62     131     326     906
709          DQ       0      18      24      32      42      52      62      68      76      90

710          KK   R43-4
711          KM        ROUTE REMAINDER FROM CP43-4 TO CP43-5
712          RS       1              -1       0
713          RC     .06     .03     .04     500    .018
714          RX     800     850     930     965    1000    1020    1030    1040
715          RY  1096.5    1096    1094    1093    1093    1096    1097  1097.5

716          KK    43-5
717          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-5
718          BA     .02
719          LG     .35     .35    4.25     .39      80
720          UI     27.     79.     39.      8.      0.      0.      0.      0.      0.      0.
721          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

722          KK  CP43-5
723          KM        ADD HYDROGRAPHS AT CP43-5
724          HC       2    1.11
             * SR43-5
             *       STORAGE ROUTE THROUGH 36" CMP AT STA 6349+45 ON I-10
             *      1    STOR       0       0
             *      0     .09     .24     .44     .69     1.0    1.42    2.14    2.76    3.73
             *   4.84    5.94
             *      0       9      13      17      22      27      34      40      42      44
             *    134     276
             * 1089.8 1091.09 1091.35 1091.64 1091.94 1092.26 1092.62 1093.13  1093.5    1094
             * 1094.5 1094.94
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

725          KK   D43-5
726          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
727          DT   D43-5
728          DI       0      52
729          DQ       0      33

730          KK  CP43-5
731          KM        DIVERT FLOW AT STA 6349+45.
732          DT  DI43-5
733          DI       0       9      13      17      22      27      34      40      42      44
734          DI     134     276
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735          DQ       0       9      13      17      22      27      34      40      42      44
736          DQ      46      48

737          KK   R43-5
738          KM        ROUTE REMAINDER FROM CP43-5 TO CP43-6
739          RS       1              -1       0
740          RC     .06     .03     .04     455   .0068
741          RX     800     850     930     965    1000    1020    1030    1040
742          RY    1096    1094    1093    1092    1092    1094    1096  1097.5

743          KK    43-6
744          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-6
745          BA     .02
746          LG     .35     .35    4.17     .38      80
747          UI     36.     87.     27.      4.      0.      0.      0.      0.      0.      0.
748          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

749          KK  CP43-6
750          KM        ADD HYDROGRAPHS AT CP43-6
751          HC       2    1.13
             * SR43-6
             *       STORAGE ROUTE THROUGH 36" CMP AT STA 6354+00 ON I-10
             *      1    STOR       0       0
             *      0    1.59    2.29    3.18    4.29    5.62    7.39    9.53   14.20   30.25
             *  32.52    38.0   43.84   49.83   55.96   59.96
             *      0       9      13      17      22      27      33      39      47      55
             *     56     141     325     811    1440    2714
             * 1089.3 1090.58 1090.84 1091.12 1091.42 1091.73 1092.09 1092.47 1093.23 1095.27
             * 1095.5  1096.0  1096.5  1097.0  1097.5 1097.82

752          KK   D43-6
753          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
754          DT   D43-6
755          DI       0      54
756          DQ       0      48

757          KK  CP43-6
758          KM        DIVERT FLOW AT STA 6354+00.
759          DT  DI43-6
760          DI       0       9      13      17      22      27      33      39      47      55
761          DI      56     141     325     811    1440    2714
762          DQ       0       9      13      17      22      27      33      39      47      55
763          DQ      56      58      60      61      62      64
1                                        HEC-1 INPUT                                          PAGE 20

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

764          KK   R43-6
765          KM        ROUTE REMAINDER FROM CP43-6 TO CP43-7
766          RS       1              -1       0
767          RC     .06     .03     .04     300   .0162
768          RX     750     800     930     965    1000    1020    1030    1040
769          RY    1096    1094    1092    1090    1090    1092    1096  1097.5

770          KK    43-7
771          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-7
772          BA     .02
773          LG     .35     .35    4.25     .39      80
774          UI     49.     90.     14.      0.      0.      0.      0.      0.      0.      0.
775          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

776          KK  CP43-7
777          KM        ADD HYDROGRAPHS AT CP43-7
778          HC       2    1.15
             * SR43-7
             *       STORAGE ROUTE THROUGH 36" CMP AT STA 6357+00 ON I-10
             *      1    STOR       0       0
             *      0     .27     .39     .55     .74     .98    1.30    1.78    2.23    5.12
             *      0      10      13      18      23      29      35      38     101     892
             * 1087.6 1088.93 1089.20 1089.49 1089.80 1090.13 1090.51  1091.0 1091.39 1093.26

779          KK   D43-7
780          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
781          DT   D43-7
782          DI       0      54
783          DQ       0      34

784          KK  CP43-7
785          KM        DIVERT FLOW AT STA 6357+00.
786          DT  DI43-7
787          DI       0      10      13      18      23      29      35      38     101     892
788          DQ       0      10      13      18      23      29      35      38      40      42

789          KK   R43-7
790          KM        ROUTE REMAINDER FROM CP43-7 TO CP43-8
791          RS       1              -1       0
792          RC     .06     .03     .04     385    .018
793          RX     700     800     850     965    1000    1020    1030    1040
794          RY    1094    1093    1092    1090    1090    1092    1096  1097.5

795          KK    43-8
796          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43-8
797          BA     .01
798          LG     .35     .35    4.25     .39      80
799          UI     36.     37.      4.      0.      0.      0.      0.      0.      0.      0.
800          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                        HEC-1 INPUT                                          PAGE 21

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

801          KK  CP43-8
802          KM        ADD HYDROGRAPHS AT CP43-8
803          HC       2    1.16
             * SR43-8
             *       STORAGE ROUTE THROUGH 36" CMP AT STA 6360+85 ON I-10
             *      1    STOR       0       0
             *      0     .22     .32     .46     .63     .89    1.74    3.41    4.93     6.3
             *   6.87
             *      0       8      12      15      20      24      30      36      39     129
             *    186
             * 1085.1 1086.38 1086.62 1086.88 1087.15 1087.48 1088.28 1089.33  1090.0  1090.5
             * 1090.7

804          KK   D43-8
805          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN
```

```
806          DT   D43-8
807          DI       0      27
808          DQ       0      15

809          KK  CP43-8
810          KM        DIVERT FLOW AT STA 6360+85.
811          DT  DI43-8
812          DI       0       8      12      15      20      24      30      36      39     129
813          DI     186
814          DQ       0       8      12      15      20      24      30      36      39      41
815          DQ      43

816          KK   R43-8
817          KM        ROUTE REMAINDER FROM CP43-8 TO CP43.
818          RS       1              -1       0
819          RC     .06     .03     .04     600    .008
820          RX     800     850     930     965    1000    1020    1030    1040
821          RY    1096    1092    1090    1088    1088    1090    1096  1097.5

822          KK      43
823          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 43
824          BA     .01
825          LG     .35     .35    4.29     .41    80.6
826          UI     25.     45.      7.      0.      0.      0.      0.      0.      0.      0.
827          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

828          KK  I1CP43
829          KM        ADD HYDROGRAPHS AT CP43
830          HC       2    1.17

831          KK    CP43     .03
832          KM        ADD HYDROGRAPHS AT CP43.
833          KO       1
834          HC       2   13.90
             *   SR43
             *        STORAGE ROUTE THROUGH 4-10X8 BC'S AT STA 6366+85 ON I-10.
             *      1    STOR       0       0
             *      0     .52    4.33   16.22   24.89   28.79   33.09   37.88   56.95   84.90
             *      0     920    1824    2976    3396    3713    4176    4734    6464    9000
             * 1081.2 1085.18 1087.60 1090.19  1091.5  1092.0  1092.5  1093.0 1094.81
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

835          KK    CP43
836          KM        DIVERT FLOW AT STA 6366+85 ON I-10 (TUTHILL DIKE).
837          KO       1
838          DT    DI43
839          DI       0     920    1824    2976    3396    3713    4176    4734    6464
840          DQ       0       0       0       0       0     177     500     918    2096

841          KK    RD43
842          KM        ROUTE REMAINDER FROM FROM CP43 TO CPWT4.
843          RS       2              -1       0
844          RC     .05     .03     .05    4000   .0083
845          RX     800     900     965    1000    1050    1100    1200    1300
846          RY    1076    1075    1075    1064    1064    1071    1071    1075

847          KK  CP43-4
848          KM        RETURN DIVERT AT CP43-4
849          DR  DI43-4

850          KK  RD43-4
851          KM        ROUTE DIVERTED FLOW FROM CP43-4 TO CPWT4
852          RS       2              -1       0
853          RC    .045     .03    .045    4200   .0067
854          RX     910     940     970     990    1000    1020    1060    1100
855          RY    1064    1063    1062    1060    1060    1062    1063    1064

856          KK  CP43-5
857          KM        RETURN DIVERT AT CP43-5
858          DR  DI43-5

859          KK  RD43-5
860          KM        ROUTE DIVERTED FLOW FROM CP43-5 TO CPWT4
861          RS       2              -1       0
862          RC    .045     .03    .045    4100   .0067
863          RX     910     940     970     990    1000    1020    1060    1100
864          RY    1064    1063    1062    1060    1060    1062    1063    1064

865          KK  I1CWT4
866          KM        ADD HYDROGRAPHS AT CPWT4
867          HC       2     .05

868          KK  CP43-6
869          KM        RETURN DIVERT AT CP43-6
870          DR  DI43-6

871          KK  RD43-6
872          KM        ROUTE DIVERTED FLOW FROM CP43-6 TO CPWT4
873          RS       2              -1       0
874          RC    .045     .03    .045    4000   .0067
875          RX     910     940     970     990    1000    1020    1060    1100
876          RY    1064    1063    1062    1060    1060    1062    1063    1064
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

877          KK  I2CWT4
878          KM        ADD HYDROGRAPHS AT CPWT4
879          HC       2     .07

880          KK  CP43-7
881          KM        RETURN DIVERT AT CP43-7
882          DR  DI43-7

883          KK  RD43-7
884          KM        ROUTE DIVERTED FLOW FROM CP43-7 TO CPWT4
885          RS       2              -1       0
886          RC    .045     .03    .045    4000   .0067
887          RX     910     940     970     990    1000    1020    1060    1100
888          RY    1064    1063    1062    1060    1060    1062    1063    1064

889          KK  I3CWT4
890          KM        ADD HYDROGRAPHS AT CPWT4
```

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891          HC       2     .09

892          KK  CP43-8
893          KM        RETURN DIVERT AT CP43-8
894          DR  DI43-8

895          KK  RD43-8
896          KM        ROUTE DIVERTED FLOW FROM CP43-8 TO CPWT4
897          RS       2              -1       0
898          RC    .045     .03    .045    4000   .0067
899          RX     910     940     970     990    1000    1020    1060    1100
900          RY    1064    1063    1062    1060    1060    1062    1063    1064

901          KK  I4CWT4
902          KM        ADD HYDROGRAPHS AT CPWT4
903          HC       2     .10

904          KK      44
905          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 44
906          BA     .22
907          LG     .35     .35    4.14     .37     .00
908          UI     33.    133.    200.    301.    379.    260.    181.     98.     54.     31.
909          UI     10.     10.     10.      0.      0.      0.      0.      0.      0.      0.
910          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

911          KK  I5CWT4
912          KM        ADD HYDROGRAPHS AT CPWT4
913          HC       2     .32

914          KK  I6CWT4
915          KM        ADD HYDROGRAPHS AT CPWT4.
916          HC       2   14.12
1                                    HEC-1 INPUT                                                    PAGE 24

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

917          KK    45-1
918          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 45-1
919          BA     .08
920          LG     .21     .34    4.19     .38     .60
921          UI     33.    102.    189.    155.     86.     31.     13.      6.      0.      0.
922          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

923          KK    CP43
924          KM        RETURN DIVERT AT CP43
925          DR    DI43

926          KK  CP45-1
927          KM        ADD HYDROGRAPHS AT CP45-1
928          HC       2   13.98

929          KK  SR45-1
930          KM        STORAGE ROUTE THROUGH 1-12X12 BC, 2-42" CMP AND 3-36" CMP FROM STA. 6368
931          KM        +00 TO STA. 6375+20 ON I-10 (100' TO 800' EAST OF TUTHILL RD.).
932          RS       1    STOR       0       0
933          SV       0     .85    2.23    5.73   11.22   14.61   19.71
934          SQ       0      51     156    1200    3130    4161    5509
935          SE  1083.1 1084.78  1086.0  1087.4  1089.0  1089.5  1090.0

936          KK  CP45-1
937          KM        DIVERT FLOW AT STA 6375+20
938          DT  DI45-1
939          DI       0      51     156    1200    3130    4161    5509
940          DQ       0      51     156     305     480     543     610

941          KK   R45-1
942          KM        ROUTE REMAINDER FROM CP45-1 TO CP45
943          RS       1              -1       0
944          RC     .04     .03     .04    1200   .0042
945          RX     850     900     930     965    1000    1020    1030    1040
946          RY    1086    1085    1084    1083    1083    1086    1090    1091

947          KK      45
948          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 45
949          BA     .38
950          LG     .17     .33    3.94     .34     .20
951          UI     36.     64.    145.    190.    232.    293.    427.    384.    301.    244.
952          UI    194.    148.     82.     60.     45.     36.     13.     11.     11.     11.
953          UI     11.      0.      0.      0.      0.      0.      0.      0.      0.      0.
954          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

955          KK    CP45
956          KM        ADD HYDROGRAPHS AT CP45
957          HC       2   14.36
1                                    HEC-1 INPUT                                                    PAGE 25

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

958          KK    SR45
959          KM        STORAGE ROUTE THROUGH 9-36" CMP'S FROM STA 6379+84 TO STA 6390+50 ON
960          KM        I-10.
961          RS       1    STOR       0       0
962          SV       0    1.84    5.95   18.55   23.27   29.04
963          SQ       0      41     132     317    1462    3517
964          SE  1081.1 1082.74  1084.0  1086.0  1086.5  1087.0

965          KK    CP45
966          KM        DIVERT FLOW AT STA 6390+50.'
967          DT    DI45
968          DI       0      41     132     317    1462    3517
969          DQ       0      41     132     317     362     392

970          KK     R45
971          KM        ROUTE REMAINDER FROM CP45 TO CP46-1.
972          RS       1              -1       0
973          RC     .04     .03     .04    1500   .0031
974          RX     850     900     930     965    1000    1020    1030    1040
975          RY    1083    1082    1081    1080    1080    1082    1083    1084

976          KK    46-1
977          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 46-1
978          BA     .15
979          LG     .19     .35    4.23     .39     .60
980          UI     19.     60.    101.    133.    203.    208.    151.    111.     75.     37.
981          UI     26.     16.      6.      6.      6.      0.      0.      0.      0.      0.
```

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 982          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 983          KK  CP46-1
 984          KM        ADD HYDROGRAPHS AT CP46-1
 985          HC       2   14.51

 986          KK  SR46-1
 987          KM        STORAGE ROUTE THROUGH 5-36 CMP'S FROM STA 6395+75 TO STA 6400+60 ON
 988          KM        I-10.
 989          RS       1    STOR       0       0
 990          SV       0    1.07    4.71     9.0    11.7   14.88   18.65   23.01
 991          SQ       0      39     128     183     199     610    1351    2310
 992          SE  1078.3  1080.0  1081.5  1082.5  1083.0  1083.5  1084.0  1084.5

 993          KK  CP46-1
 994          KM        DIVERT FLOW AT STA 6400+60.
 995          DT  DI46-1
 996          DI       0      39     128     183     199     610    1351    2310
 997          DQ       0      39     128     183     199     210     225     244

 998          KK   R46-1
 999          KM        ROUTE REMAINDER FROM CP46-1 TO CP46.
1000          RS       1              -1       0
1001          RC     .04     .03     .04    2355   .0057
1002          RX     700     900     930     965    1000    1020    1030    1040
1003          RY    1076  1075.5    1075    1074    1074    1078    1080    1082
1                                         HEC-1 INPUT                                          PAGE 26

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1004          KK      46
1005          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 46
1006          BA     .85
1007          LG     .19     .34    4.25     .45     .40
1008          UI     61.     61.    184.    265.    322.    373.    441.    539.    741.    706.
1009          UI    567.    488.    409.    345.    291.    208.    129.    104.     94.     61.
1010          UI     61.     19.     19.     19.     19.     19.     19.     19.      0.      0.
1011          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1012          KK  I1CP46
1013          KM        ADD HYDROGRAPHS AT CP46
1014          HC       2   15.36

1015          KK      28
1016          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 28
1017          BA     .86
1018          LG     .15     .35    4.02     .52     .10
1019          UI     76.    119.    295.    392.    470.    578.    798.    929.    711.    587.
1020          UI    473.    381.    272.    153.    127.     89.     76.     24.     23.     23.
1021          UI     23.     23.      0.      0.      0.      0.      0.      0.      0.      0.
1022          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1023          KK     R28
1024          KM        ROUTE FLOW FROM CP28 TO CP30
1025          RS       2              -1
1026          RC     .03     .03     .05    2400    .027
1027          RX    1000    1001    1035    1050    1065    1075    1085    1095
1028          RY    1165    1165    1164    1162    1162    1164    1166    1168

1029          KK      30
1030          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 30
1031          BA     .28
1032          LG     .15     .35    3.27     .97    31.9
1033          UI     36.    116.    193.    257.    400.    380.    277.    203.    132.     63.
1034          UI     45.     26.     11.     11.     11.      0.      0.      0.      0.      0.
1035          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1036          KK  I1CP30
1037          KM        ADD HYDROGRAPHS AT CP30
1038          HC       2

1039          KK      29
1040          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 29
1041          KO       1
1042          BA     .22
1043          LG     .15     .35    3.52     .78    31.7
1044          UI     31.    113.    176.    245.    370.    276.    199.    135.     64.     42.
1045          UI     23.     10.     10.     10.      0.      0.      0.      0.      0.      0.
1046          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                         HEC-1 INPUT                                          PAGE 27

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1047          KK    SR29
1048          KM        STORAGE ROUTE THROUGH RETENTION BASIN AT CP29
1049          KO       1
1050          RS       1    STOR       0       0
1051          SV       0    0.99   12.73   23.45   36.25   50.68   54.76   59.33   83.20
1052          SQ       0       0       0       0       0       0       0      88    6226
1053          SE  1164.5    1166    1170    1172    1174    1176  1177.5    1178    1180

1054          KK     R29
1055          KM        ROUTE REMAINDER OF FLOW AT CP29 TO CP30
1056          RS       1              -1       0
1057          RC     .05     .03     .05    1200   .0021
1058          RX    1000    1042    1052    1060    1082    1090    1140    1170
1059          RY    1171    1170    1168    1166    1166    1168    1170    1172

1060          KK    CP30
1061          KM        ADD HYDROGRAPHS AT CP30
1062          HC       2

1063          KK     D30
1064          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN OF CP29
1065          KO       1
1066          DT     D30
1067          DI       0     935
1068          DQ       0     110

1069          KK     R30
1070          KM        ROUTE COMBINED HYDROGRAPHS AT CP30 TO CP31
1071          RS       4              -1       0
1072          RC     .03     .03     .05    6770   .0069
1073          RX    1000    1025    1045    1070    1095    1110    1200    1550
1074          RY    1157    1156    1154    1152    1152    1154    1156    1158
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1075          KK      31
1076          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 31
1077          BA     .71
1078          LG     .19      .35     3.76      .68      .20
1079          UI     60.      83.     224.     299.     358.     434.     565.     752.     613.     500.
1080          UI    413.     336.     268.     171.     105.      98.      60.      52.      18.      18.
1081          UI     18.      18.      18.      0.       0.       0.       0.       0.       0.       0.
1082          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.

1083          KK    CP31
1084          KM        ADD HYDROGRAPHS AT CP31
1085          HC       2

1086          KK     R31
1087          KM        ROUTE COMBINED HYDROGRAPH AT CP31 TO CP46
1088          RS       5              -1       0
1089          RC     .03      .03      .05    5800    .0082
1090          RX    1000     1012     1024    1035     1045     1053     1065     1098
1091          RY    1093     1092     1090    1088     1088     1090     1092     1094
1                                            HEC-1 INPUT                                                    PAGE 28

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1092          KK    CP46
1093          KM        ADD HYDROGRAPHS AT CP46.
1094          HC       2   17.43

1095          KK    SR46
1096          KM        STORAGE ROUTE THROUGH 5-10'X4' BC'S AT STA 6419+30 ON I-10.
1097          RS       1    STOR       0       0
1098          SV       0    1.08    3.13    4.28    5.18    7.54   12.96
1099          SQ       0     730    1460    1680    1834    2090    2420
1100          SE  1065.4 1068.42 1070.53  1071.4  1072.0  1073.0  1074.3

1101          KK     R46
1102          KM        ROUTE REMAINDER OF FLOW AT CP46 TO CPWT4
1103          RS       2              -1       0
1104          RC     .03      .03      .05    6800    .0067
1105          RX     910      930      940     950     1000     1020     1200     1400
1106          RY    1065     1064     1064    1060     1060     1064     1064     1065

1107          KK  CP45-1
1108          KM        RETURN DIVERT AT  CP45-1
1109          DR  DI45-1

1110          KK  RD45-1
1111          KM        ROUTE DIVERTED FLOW FROM CP45-1 TO CPWT4
1112          RS       2              -1       0
1113          RC    .045      .03     .045    4100    .0067
1114          RX     910      940      970     990     1000     1020     1060     1100
1115          RY    1064     1063     1062    1060     1060     1062     1063     1064

1116          KK    CP45
1117          KM        RETURN DIVERT AT CP45
1118          DR    DI45

1119          KK    RD45
1120          KM        ROUTE DIVERTED FLOW FROM  CP45  TO CPWT4.
1121          RS       2              -1       0
1122          RC    .045      .03     .045    4200    .0067
1123          RX     910      940      970     990     1000     1020     1060     1100
1124          RY    1064     1063     1062    1060     1060     1062     1063     1064

1125          KK  I7CWT4
1126          KM        ADD HYDROGRAPHS AT CPWT4
1127          HC       2   14.36

1128          KK  CP46-1
1129          KM        RETURN DIVERT AT CP46-1
1130          DR  DI46-1

1131          KK  RD46-1
1132          KM        ROUTE DIVERTED FLOW FROM CP46-1 TO CPWT4
1133          RS       3              -1       0
1134          RC    .045      .03     .045    4900    .0067
1135          RX     910      940      970     990     1000     1020     1060     1100
1136          RY    1064     1063     1062    1060     1060     1062     1063     1064
1                                            HEC-1 INPUT                                                    PAGE 29

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1137          KK  I8CWT4
1138          KM        ADD HYDROGRAPHS AT CPWT4
1139          HC       2   14.51

1140          KK     WT4
1141          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN WT4
1142          BA     .77
1143          LG     .35      .35     4.17      .38      .40
1144          UI    108.     384.     604.     835.    1279.     973.     707.     488.     232.     153.
1145          UI     90.      33.      33.      33.      0.       0.       0.       0.       0.       0.
1146          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.

1147          KK  I9CWT4
1148          KM        ADD HYDROGRAPHS AT CPWT4
1149          HC       2   15.28

1150          KK  I10WT4
1151          KM        ADD HYDROGRAPHS AT CPWT4
1152          HC       2    18.2

1153          KK   CPWT4
1154          KM        ADD ENTIRE FLOW TOGETHER THAT GETS TO WHITE TANKS STRUCTURE NO 4.
1155          KO       1
1156          HC       2   18.57

1157          KK    RS47
1158          KM        STORAGE ROUTE TROUGH WHITE TANKS STRUCTURE NO. 4.
1159          KO       1
1160          RS       1    STOR       0       0
1161          SV       0    2.81      51     148     277     543    1269    1396    1690    2045
1162          SV    2246
1163          SQ       0       0       0       0       0       0       0     375    2600    6150
1164          SQ   14700
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1165          SE     997    1000    1010    1020    1030    1040    1049    1050    1052    1054
1166          SE    1055

1167          KK  CP43-1
1168          KM        RETURN DIVERT AT CP43-1
1169          DR  1D303A

1170          KK   R43-1
1171          KM        ROUTE REMAINDER FROM CP43-1 TO CP303A
1172          RS      48              -1       0
1173          RC    .035    .035    .035    5300   .0091
1174          RX    1000    1090    1170    1250    1380    1400    1450    1630
1175          RY    1077  1075.8  1076.5    1076    1076  1076.5    1076    1077

1176          KK  CP43-2
1177          KM        RETURN DIVERT AT CP43-2
1178          DR  2D303A
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1179          KK   R43-2
1180          KM        ROUTE REMAINDER FROM CP43-2 TO CP303A
1181          RS       8              -1       0
1182          RC    .035    .035    .035    5300   .0091
1183          RX    1000    1090    1170    1250    1380    1400    1450    1630
1184          RY    1077  1075.8  1076.5    1076    1076  1076.5    1076    1077

1185          KK  CP43-3
1186          KM        RETURN DIVERT AT CP43-3
1187          DR  3D303A

1188          KK   R43-3
1189          KM        ROUTE REMAINDER FROM CP43-3 TO CP303A
1190          RS      13              -1       0
1191          RC    .035    .035    .035    4840   .0091
1192          RX    1000    1170    1240    1270    1440    1470    1490    1550
1193          RY    1069    1068  1068.5    1068    1068  1068.5  1067.8  1068.5

1194          KK    303A
1195          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 303A
1196          BA     .42
1197          LG     .35     .35    4.08     .36     8.4
1198          UI     56.    182.    299.    400.    629.    559.    409.    297.    178.     95.
1199          UI     63.     32.     17.     17.     17.      0.      0.      0.      0.      0.
1200          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1201          KK   D303A
1202          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN OF CP303A
1203          DT   D303A
1204          DI       0     549
1205          DQ       0      23

1206          KK  1C303A
1207          KM        ADD HYDROGRAPHS AT CP303A
1208          HC       4    1.48

1209          KK  CP303A
1210          KM        ADD HYDROGRAPHS AT CP303A
1211          HC       2   18.99

1212          KK   D41A1
1213          KM        RETURN DIVERT AT CP41A1
1214          DR   1D303

1215          KK   R41A1
1216          KM        ROUTE FLOW FROM CP41A1 TO CP303
1217          RS      18              -1       0
1218          RC    .035    .035    .035    7180    .014
1219          RX    1000    1210    1450    1530    1620    1690    1849    1850
1220          RY    1106  1105.5    1106    1104    1104    1106    1107    1107
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1221          KK   D41A2
1222          KM        RETURN DIVERT AT CP41A2
1223          DR   2D303

1224          KK   R41A2
1225          KM        ROUTE FLOW FROM CP41A2 TO CP303
1226          RS      19              -1       0
1227          RC    .035    .035    .035    7330    .014
1228          RX    1000    1210    1450    1530    1620    1690    1849    1850
1229          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1230          KK   1I303
1231          KM        ADD HYDROGRAPHS AT CP303
1232          HC       2     .05

1233          KK   D41A3
1234          KM        RETURN DIVERT AT CP41A3
1235          DR   3D303

1236          KK   R41A3
1237          KM        ROUTE FLOW FROM CP41A3 TO CP303
1238          RS      25              -1       0
1239          RC    .035    .035    .035    9360    .010
1240          RX    1000    1210    1450    1530    1620    1690    1849    1850
1241          RY    1106  1105.5    1106    1104    1104    1106    1107    1107

1242          KK   2I303
1243          KM        ADD HYDROGRAPHS AT CP303
1244          HC       2     .08

1245          KK    D41A
1246          KM        RETURN DIVERT AT CP41A
1247          DR   4D303

1248          KK    R41A
1249          KM        ROUTE FLOW FROM CP41A TO CP303
1250          RS      26              -1       0
1251          RC    .035    .035    .035    9360   .0095
1252          RX    1000    1210    1450    1530    1620    1690    1849    1850
1253          RY    1106  1105.5    1106    1104    1104    1106    1107    1107
```

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

34 JD INDEX STORM NO. 3
STRM 3.83 PRECIPITATION DEPTH
TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

35 JD INDEX STORM NO. 4
STRM 3.76 PRECIPITATION DEPTH
TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

36 JD INDEX STORM NO. 5
STRM 3.70 PRECIPITATION DEPTH
TRDA 200.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03
0.03	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

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1*************************************                    *************************************
*                                   *                    *                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS    *
*              MAY   1991           *                    *   HYDROLOGIC ENGINEERING CENTER   *
*           VERSION 4.0.1E          *                    *         609 SECOND STREET         *
*     Lahey F77L-EM/32 version 5.01 *                    *      DAVIS, CALIFORNIA 95616      *
*       Dodson & Associates, Inc.   *                    *          (916) 551-1748           *
*  RUN DATE  05/12/99  TIME  07:12:12 *                    *                                   *
*************************************                    *************************************
```

FUTURE CONDITIONS MODEL AT SPECIFIC LOCATIONS
MINIMUM FEMA DISTURBANCE MODEL

FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
100-YEAR, 24-HOUR STORM WTADMS.24

EXISTING CONDITIONS FOR CATERPILLAR PROPERTY EXTRACTED
FROM WHITE TANKS ADMS 3/30/99 FILE: CATADMS2.DAT

FUTURE CONDITIONS FOR CATERPILLAR PROPERTY
PLANNING AREAS I THRU VII IMPERVIOUS CALCS.
REVISED 4/26/99 FILE: FUTDIV7.DAT

REVISED FUTURE CONDITIONS MODEL FOR CATERPILLAR
MAXIMUM Q100 AND VOLUME TO WHITE TANKS #4
NO DRAINING OF ONSITE BASINS TO WT#4
4/27/99 FILE: FUTDIV11.DAT ALTERNATIVE 'B'

```
20 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ       1200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      5   0  ENDING DATE
                    NDTIME       0355  ENDING TIME
                     ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   99.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

22 JD          INDEX STORM NO. 1
                      STRM       4.03  PRECIPITATION DEPTH
                      TRDA       0.00  TRANSPOSITION DRAINAGE AREA

23 PI            PRECIPITATION PATTERN
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.01   0.00   0.01
                 0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.03   0.03
                 0.03   0.09   0.09   0.09   0.01   0.01   0.01   0.01   0.01   0.01
                 0.01   0.01   0.01   0.01   0.01   0.01   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00

33 JD          INDEX STORM NO. 2
                      STRM       3.99  PRECIPITATION DEPTH
                      TRDA      10.00  TRANSPOSITION DRAINAGE AREA

 0 PI            PRECIPITATION PATTERN
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.01   0.00   0.01
                 0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.03   0.03
                 0.03   0.09   0.09   0.09   0.01   0.01   0.01   0.01   0.01   0.01
                 0.01   0.01   0.01   0.01   0.01   0.01   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
                 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
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SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   37          18
                V
                V
   44         R18
                .
                .
   50           .          19
                .           .
                .           .
   57       CP19............
                V
                V
   60         R19
                .
                .
   66           .          21
                .           .
                .           .
   73     I1CP21............
                .
                .
   76           .          20
                .           V
                .           V
   83           .         R20
                .           .
                .           .
   89       CP21............
                .
                .
   95           .------->     D21
   92         D21
                V
                V
   98         R21
                .
                .
  104           .          23
                .           .
                .           .
  110       CP23............
                V
                V
  113         R23
                .
                .
  119           .          22
                .           .
                .           .
  129           .           .------->    DF22
  126           .         D22
                .           V
                .           V
  132           .         R22
                .           .
                .           .
  138           .           .         22A
                .           .           .
                .           .           .
  145           .      I1C22A............
                .           .
                .           .
  148      CP22A............
                V
                V
  151       R22A
                .
                .
  157           .          25
                .           .
                .           .
  164     I1CP25............
                .
                .
  167           .          24
                .           .
                .           .
  177           .           .------->    DF24
  174           .         D24
                .           V
                .           V
  180           .         R24
                .           .
                .           .
  186       25CP............
                .
                .
  192           .------->    DF25
  189         D25
                .
                .
  195           .          26
                .           .
                .           .
  206           .           .------->    DF26
  203           .         D26
                .           V
                .           V
  209           .         R26
                .           .
                .           .
  215           .           .          27
                .           .           .
                .           .           .
  223           .      I1CP27............
                .           .
                .           .
  226       CP27............
                V
                V
```

```
1254          KK   3I303
1255          KM        ADD HYDROGRAPHS AT CP303
1256          HC       2     .13

1257          KK   D41-1
1258          KM        RETURN DIVERT AT CP41-1
1259          DR   5D303
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1260          KK   R41-1
1261          KM        ROUTE FLOW FROM CP41-1 TO CP303
1262          RS      28              -1       0
1263          RC    .035    .035    .035    9200   .0079
1264          RX    1000    1300    1510    1660    1850    1890    1940    2100
1265          RY  1080.5    1079  1080.5    1080    1080    1081  1080.5    1081

1266          KK   4I303
1267          KM        ADD HYDROGRAPHS AT CP303
1268          HC       2     .28

1269          KK   D41-2
1270          KM        RETURN DIVERT AT CP41-2
1271          DR   6D303

1272          KK   R41-2
1273          KM        ROUTE FLOW FROM CP41-2 TO CP303
1274          RS      33              -1       0
1275          RC    .035    .035    .035    9360   .0065
1276          RX    1000    1300    1510    1660    1850    1890    1940    2100
1277          RY  1080.5    1079  1080.5    1080    1080    1081  1080.5    1081

1278          KK   5I303
1279          KM        ADD HYDROGRAPHS AT CP303
1280          HC       2     .38

1281          KK     D41
1282          KM        RETURN DIVERT AT CP41
1283          DR   7D303

1284          KK     R41
1285          KM        ROUTE FLOW FROM CP41 TO CP303
1286          RS      30              -1       0
1287          RC    .035    .035    .035    9830   .0056
1288          RX    1000    1300    1510    1660    1850    1890    1940    2100
1289          RY  1080.5    1079  1080.5    1080    1080    1081  1080.5    1081

1290          KK   6I303
1291          KM        ADD HYDROGRAPHS AT CP303
1292          HC       2     .96

1293          KK     303
1294          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 303
1295          BA    1.21
1296          LG     .35     .34    4.19     .39     1.0
1297          UI     81.     81.    207.    332.    407.    470.    543.    636.    835.   1022.
1298          UI    868.    725.    631.    534.    457.    388.    290.    187.    141.    133.
1299          UI     92.     81.     54.     25.     25.     25.     25.     25.     25.     25.
1300          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1301          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1302          KK    D303
1303          KM        DIVERT FLOW TO OFFLINE RETENTION BASIN OF CP303
1304          DT    D303
1305          DI       0     914
1306          DQ       0       4

1307          KK   CP303
1308          KM        ADD HYDROGRAPHS AT CP303
1309          HC       2    2.17
1310          ZZ
```

```
822          .           .          43
             .           .           .
             .           .           .
828          .      I1CP43...........
             .           .
             .           .
831       CP43...........
             .
             .
838          .------->    DI43
835       CP43
             V
             V
841       RD43
             .
             .
849          .           .<-------  DI43-4
847          .      CP43-4
             .           V
             .           V
850          .      RD43-4
             .           .
             .           .
858          .           .           .<-------  DI43-5
856          .           .      CP43-5
             .           .           V
             .           .           V
859          .           .      RD43-5
             .           .           .
             .           .           .
865          .      I1CWT4...........
             .           .
             .           .
870          .           .           .<-------  DI43-6
868          .           .      CP43-6
             .           .           V
             .           .           V
871          .           .      RD43-6
             .           .           .
             .           .           .
877          .      I2CWT4...........
             .           .
             .           .
882          .           .           .<-------  DI43-7
880          .           .      CP43-7
             .           .           V
             .           .           V
883          .           .      RD43-7
             .           .           .
             .           .           .
889          .      I3CWT4...........
             .           .
             .           .
894          .           .           .<-------  DI43-8
892          .           .      CP43-8
             .           .           V
             .           .           V
895          .           .      RD43-8
             .           .           .
             .           .           .
901          .      I4CWT4...........
             .           .
             .           .
904          .           .          44
             .           .           .
             .           .           .
911          .      I5CWT4...........
             .           .
             .           .
914       I6CWT4...........
             .
             .
917          .        45-1
             .           .
             .           .
925          .           .           .<-------    DI43
923          .           .        CP43
             .           .           .
             .           .           .
926          .      CP45-1...........
             .           V
             .           V
929          .      SR45-1
             .           .
             .           .
938          .           .------->  DI45-1
936          .      CP45-1
             .           V
             .           V
941          .       R45-1
             .           .
             .           .
947          .           .          45
             .           .           .
             .           .           .
955          .        CP45...........
             .           V
             .           V
958          .        SR45
             .           .
             .           .
967          .           .------->    DI45
965          .        CP45
             .           V
             .           V
970          .         R45
             .           .
             .           .
976          .           .        46-1
             .           .           .
             .           .           .
983          .      CP46-1...........
             .           V
             .           V
986          .      SR46-1
             .           .
             .           .
```

```
                 .          V
644              .     SR43-2
                 .          .
                 .          .
652              .          .-------->   D43-2
650              .      D43-2
                 .          .
                 .          .
657              .          .-------->  2D303A
655              .     CP43-2
                 .          V
                 .          V
660              .      R43-2
                 .          .
                 .          .
666              .          .        43-3
                 .          .           .
                 .          .           .
672              .     CP43-3............
                 .          .
                 .          .
677              .          .-------->   D43-3
675              .      D43-3
                 .          .
                 .          .
682              .          .-------->  3D303A
680              .     CP43-3
                 .          V
                 .          V
685              .      R43-3
                 .          .
                 .          .
691              .          .        43-4
                 .          .           .
                 .          .           .
697              .     CP43-4............
                 .          .
                 .          .
702              .          .-------->   D43-4
700              .      D43-4
                 .          .
                 .          .
707              .          .-------->  DI43-4
705              .     CP43-4
                 .          V
                 .          V
710              .      R43-4
                 .          .
                 .          .
716              .          .        43-5
                 .          .           .
                 .          .           .
722              .     CP43-5............
                 .          .
                 .          .
727              .          .-------->   D43-5
725              .      D43-5
                 .          .
                 .          .
732              .          .-------->  DI43-5
730              .     CP43-5
                 .          V
                 .          V
737              .      R43-5
                 .          .
                 .          .
743              .          .        43-6
                 .          .           .
                 .          .           .
749              .     CP43-6............
                 .          .
                 .          .
754              .          .-------->   D43-6
752              .      D43-6
                 .          .
                 .          .
759              .          .-------->  DI43-6
757              .     CP43-6
                 .          V
                 .          V
764              .      R43-6
                 .          .
                 .          .
770              .          .        43-7
                 .          .           .
                 .          .           .
776              .     CP43-7............
                 .          .
                 .          .
781              .          .-------->   D43-7
779              .      D43-7
                 .          .
                 .          .
786              .          .-------->  DI43-7
784              .     CP43-7
                 .          V
                 .          V
789              .      R43-7
                 .          .
                 .          .
795              .          .        43-8
                 .          .           .
                 .          .           .
801              .     CP43-8............
                 .          .
                 .          .
806              .          .-------->   D43-8
804              .      D43-8
                 .          .
                 .          .
811              .          .-------->  DI43-8
809              .     CP43-8
                 .          V
                 .          V
816              .      R43-8
                 .          .
                 .          .
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                .          .          .
1187            .          .          .          .<-------  3D303A
1185            .          .          .      CP43-3
                .          .          .          V
                .          .          .          V
1188            .          .          .      R43-3
                .          .          .          .
                .          .          .          .
1194            .          .          .          .        303A
                .          .          .          .          .
                .          .          .          .          .
1203            .          .          .          .          .------->   D303A
1201            .          .          .          .      D303A
                .          .          .          .          .
                .          .          .          .          .
1206            .      1C303A.................................
                .          .
                .          .
1209      CP303A............
                .
                .
1214            .          .<-------   1D303
1212            .      D41A1
                .          V
                .          V
1215            .      R41A1
                .          .
                .          .
1223            .          .          .<-------   2D303
1221            .          .      D41A2
                .          .          V
                .          .          V
1224            .          .      R41A2
                .          .          .
                .          .          .
1230            .      1I303............
                .          .
                .          .
1235            .          .          .<-------   3D303
1233            .          .      D41A3
                .          .          V
                .          .          V
1236            .          .      R41A3
                .          .          .
                .          .          .
1242            .      2I303............
                .          .
                .          .
1247            .          .          .<-------   4D303
1245            .          .       D41A
                .          .          V
                .          .          V
1248            .          .       R41A
                .          .          .
                .          .          .
1254            .      3I303............
                .          .
                .          .
1259            .          .          .<-------   5D303
1257            .          .      D41-1
                .          .          V
                .          .          V
1260            .          .      R41-1
                .          .          .
                .          .          .
1266            .      4I303............
                .          .
                .          .
1271            .          .          .<-------   6D303
1269            .          .      D41-2
                .          .          V
                .          .          V
1272            .          .      R41-2
                .          .          .
                .          .          .
1278            .      5I303............
                .          .
                .          .
1283            .          .          .<-------   7D303
1281            .          .        D41
                .          .          V
                .          .          V
1284            .          .        R41
                .          .          .
                .          .          .
1290            .      6I303............
                .          .
                .          .
1293            .          .        303
                .          .          .
                .          .          .
1304            .          .          .------->    D303
1302            .          .       D303
                .          .          .
                .          .          .
1307            .      CP303............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
 995          .          .-------> DI46-1
 993          .      CP46-1
              .           V
              .           V
 998          .       R46-1
              .           .
              .           .
1004          .           .          46
              .           .           .
              .           .           .
1012          .      I1CP46............
              .           .
              .           .
1015          .           .          28
              .           .           V
              .           .           V
1023          .           .         R28
              .           .           .
              .           .           .
1029          .           .           .          30
              .           .           .           .
              .           .           .           .
1036          .           .      I1CP30............
              .           .           .
              .           .           .
1039          .           .           .          29
              .           .           .           V
              .           .           .           V
1047          .           .           .        SR29
              .           .           .           V
              .           .           .           V
1054          .           .           .         R29
              .           .           .           .
              .           .           .           .
1060          .           .        CP30............
              .           .           .
              .           .           .
1066          .           .           .-------> D30
1063          .           .         D30
              .           .           V
              .           .           V
1069          .           .         R30
              .           .           .
              .           .           .
1075          .           .           .          31
              .           .           .           .
              .           .           .           .
1083          .           .        CP31............
              .           .           V
              .           .           V
1086          .           .         R31
              .           .           .
              .           .           .
1092          .        CP46............
              .           V
              .           V
1095          .        SR46
              .           V
              .           V
1101          .         R46
              .           .
              .           .
1109          .           .           .<------- DI45-1
1107          .           .      CP45-1
              .           .           V
              .           .           V
1110          .           .      RD45-1
              .           .           .
              .           .           .
1118          .           .           .           .<------- DI45
1116          .           .           .        CP45
              .           .           .           V
              .           .           .           V
1119          .           .           .        RD45
              .           .           .           .
              .           .           .           .
1125          .           .      I7CWT4............
              .           .           .
              .           .           .
1130          .           .           .           .<------- DI46-1
1128          .           .           .      CP46-1
              .           .           .           V
              .           .           .           V
1131          .           .           .      RD46-1
              .           .           .           .
              .           .           .           .
1137          .           .      I8CWT4............
              .           .           .
              .           .           .
1140          .           .           .         WT4
              .           .           .           .
              .           .           .           .
1147          .           .      I9CWT4............
              .           .           .
              .           .           .
1150          .      I10WT4............
              .           .
              .           .
1153       CPWT4............
              V
              V
1157        RS47
              .
              .
1169          .           .<------- 1D303A
1167          .      CP43-1
              .           V
              .           V
1170          .       R43-1
              .           .
              .           .
1178          .           .           .<------- 2D303A
1176          .           .      CP43-2
              .           .           V
              .           .           V
1179          .           .       R43-2
              .           .           .
```

```
441          .           .
             .           .-------->   2D303
439          .      CP41A2
             .           V
             .           V
444          .       R41A2
             .           .
             .           .
450          .           .        41A3
             .           .           .
             .           .           .
456          .      CP41A3............
             .           V
             .           V
459          .      SR41A3
             .           .
             .           .
467          .           .-------->   3D303
465          .      CP41A3
             .           V
             .           V
470          .       R41A3
             .           .
             .           .
476          .           .         41A
             .           .           .
             .           .           .
482          .       CP41A............
             .           V
             .           V
485          .       SR41A
             .           .
             .           .
493          .           .-------->   4D303
491          .       CP41A
             .           V
             .           V
496          .        R41A
             .           .
             .           .
502          .           .        41-1
             .           .           .
             .           .           .
509          .      CP41-1............
             .           V
             .           V
512          .      SR41-1
             .           .
             .           .
520          .           .-------->   5D303
518          .      CP41-1
             .           V
             .           V
523          .       R41-1
             .           .
             .           .
529          .           .        41-2
             .           .           .
             .           .           .
536          .      CP41-2............
             .           V
             .           V
539          .      SR41-2
             .           .
             .           .
550          .           .-------->   6D303
548          .      CP41-2
             .           V
             .           V
555          .       R41-2
             .           .
             .           .
561          .           .          41
             .           .           .
             .           .           .
571          .           .           .-------->     D41
569          .           .         D41
             .           .           .
             .           .           .
574          .        CP41............
             .           V
             .           V
577          .        SR41
             .           .
             .           .
588          .           .-------->   7D303
586          .        CP41
             .           V
             .           V
593          .         R41
             .           .
             .           .
599          .           .        43-1
             .           .           .
             .           .           .
605          .      CP43-1............
             .           V
             .           V
608          .      SR43-1
             .           .
             .           .
619          .           .-------->   D43-1
617          .       D43-1
             .           .
             .           .
624          .           .-------->  1D303A
622          .      CP43-1
             .           V
             .           V
629          .       R43-1
             .           .
             .           .
635          .           .        43-2
             .           .           .
             .           .           .
641          .      CP43-2............
             .           V
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230         R27
              .
              .
236           .          34
              .           .
              .           .
243           .           .          33
              .           .           .
              .           .           .
250           .        CP33............
              .           V
              .           V
253           .         R33
              .           .
              .           .
259           .           .          35
              .           .           .
              .           .           .
266           .      I1CP35............
              .           .
              .           .
269           .           .          32
              .           .           .
              .           .           .
277           .        CP35............
              .           V
              .           V
280           .         R35
              .           .
              .           .
286           .           .          36
              .           .           .
              .           .           .
293           .      I1CP36............
              .           .
              .           .
296           .           .          37
              .           .           .
              .           .           .
304           .        CP36............
              .           V
              .           V
307           .         R36
              .           .
              .           .
313           .           .          38
              .           .           .
              .           .           .
320           .        CP38............
              .           .
              .           .
326           .           .-------->     D38
323           .         D38
              .           V
              .           V
329           .         R38
              .           .
              .           .
335           .           .          39
              .           .           .
              .           .           .
343           .      I1CP39............
              .           .
              .           .
346        CP39............
              V
              V
349         R39
              .
              .
355           .          40
              .           .
              .           .
365           .           .-------->    DF40
362           .         D40
              .           V
              .           V
368           .         R40
              .           .
              .           .
374           .           .          42
              .           .           .
              .           .           .
382           .      I1CP42............
              .           .
              .           .
385        CP42............
              .
              .
391           .-------->    DF42
388         D42
              V
              V
394         R42
              .
              .
401           .        41A1
              .           V
              .           V
407           .      SR41A1
              .           .
              .           .
415           .           .-------->   1D303
413           .      CP41A1
              .           V
              .           V
418           .       R41A1
              .           .
              .           .
424           .           .        41A2
              .           .           .
              .           .           .
430           .      CP41A2............
              .           V
              .           V
433           .      SR41A2
              .           .
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	18	934.	12.17	75.	21.	7.	0.81		
+	ROUTED TO	R18	761.	12.33	75.	21.	7.	0.81		
+	HYDROGRAPH AT	19	649.	12.42	79.	23.	8.	0.79		
+	2 COMBINED AT	CP19	1392.	12.33	154.	44.	15.	1.60		
+	ROUTED TO	R19	1289.	12.42	153.	44.	15.	1.60		
+	HYDROGRAPH AT	21	741.	12.42	90.	26.	9.	0.79		
+	2 COMBINED AT	I1CP21	2027.	12.42	243.	70.	23.	2.39		
+	HYDROGRAPH AT	20	875.	12.33	101.	28.	9.	1.07		
+	ROUTED TO	R20	832.	12.50	100.	28.	9.	1.07		
+	2 COMBINED AT	CP21	2776.	12.42	343.	98.	33.	3.46		
+	DIVERSION TO	D21	1976.	12.42	144.	36.	12.	3.46		
+	HYDROGRAPH AT	D21	800.	12.17	199.	62.	21.	3.46		
+	ROUTED TO	R21	800.	12.92	199.	62.	21.	3.46		
+	HYDROGRAPH AT	23	295.	12.08	20.	6.	2.	0.16		
+	2 COMBINED AT	CP23	848.	12.25	219.	68.	23.	3.62		
+	ROUTED TO	R23	811.	12.67	219.	68.	23.	3.62		
+	HYDROGRAPH AT	22	553.	12.25	57.	16.	6.	0.57		
+	DIVERSION TO	DF22	253.	12.25	12.	3.	1.	0.57		
+	HYDROGRAPH AT	D22	300.	12.08	45.	14.	5.	0.57		
+	ROUTED TO	R22	300.	12.50	45.	14.	5.	0.57		
+	HYDROGRAPH AT	22A	785.	12.25	79.	22.	7.	0.50		
+	2 COMBINED AT	I1C22A	1036.	12.25	125.	35.	12.	1.07		
+	2 COMBINED AT	CP22A	1613.	12.33	343.	103.	34.	4.69		
+	ROUTED TO	R22A	1546.	12.50	343.	103.	34.	4.69		
+	HYDROGRAPH AT	25	568.	12.33	73.	22.	7.	0.46		
+	2 COMBINED AT	I1CP25	2014.	12.42	415.	125.	42.	5.15		
+	HYDROGRAPH AT	24	225.	12.25	26.	8.	3.	0.14		
+	DIVERSION TO	DF24	225.	12.25	26.	8.	3.	0.14		
+	HYDROGRAPH AT	D24	0.	0.08	0.	0.	0.	0.14		
+	ROUTED TO	R24	0.	0.08	0.	0.	0.	0.14		
+	2 COMBINED AT	25CP	2014.	12.42	415.	125.	42.	5.29		
+	DIVERSION TO	DF25	713.	12.42	40.	10.	3.	5.29		
+	HYDROGRAPH AT	D25	1300.	12.25	375.	115.	38.	5.29		
+	HYDROGRAPH AT	26	1011.	12.50	138.	39.	13.	1.16		
+	DIVERSION TO	DF26	611.	12.50	45.	11.	4.	1.16		
+	HYDROGRAPH AT	D26	400.	12.08	93.	28.	9.	1.16		

Alternative "B"

+	ROUTED TO	R26	400.	12.83	93.	28.	9.	1.16
+	HYDROGRAPH AT	27	1109.	12.42	150.	44.	15.	1.00
+	2 COMBINED AT	I1CP27	1494.	12.42	242.	71.	24.	2.16
+	2 COMBINED AT	CP27	2792.	12.42	617.	186.	62.	7.45
+	ROUTED TO	R27	2645.	12.58	617.	186.	62.	7.45
+	HYDROGRAPH AT	34	361.	12.25	33.	9.	3.	0.36
+	HYDROGRAPH AT	33	643.	12.25	59.	17.	6.	0.65
+	2 COMBINED AT	CP33	1003.	12.25	91.	26.	9.	1.01
+	ROUTED TO	R33	955.	12.33	91.	26.	9.	1.01
+	HYDROGRAPH AT	35	416.	12.25	39.	12.	4.	0.39
+	2 COMBINED AT	I1CP35	1313.	12.25	131.	37.	13.	1.40
+	HYDROGRAPH AT	32	968.	12.42	120.	34.	11.	1.29
+	2 COMBINED AT	CP35	2182.	12.33	250.	72.	24.	2.69
+	ROUTED TO	R35	2115.	12.42	250.	72.	24.	2.69
+	HYDROGRAPH AT	36	226.	12.25	23.	7.	2.	0.24
+	2 COMBINED AT	I1CP36	2267.	12.42	273.	79.	26.	2.93
+	HYDROGRAPH AT	37	682.	12.42	88.	25.	8.	0.95
+	2 COMBINED AT	CP36	2947.	12.42	360.	103.	34.	3.88
+	ROUTED TO	R36	2871.	12.50	360.	103.	34.	3.88
+	HYDROGRAPH AT	38	797.	12.25	85.	25.	8.	0.76
+	2 COMBINED AT	CP38	3390.	12.42	445.	128.	43.	4.64
+	DIVERSION TO	D38	1890.	12.42	126.	31.	10.	4.64
+	HYDROGRAPH AT	D38	1500.	12.17	319.	97.	32.	4.64
+	ROUTED TO	R38	1503.	12.42	319.	97.	32.	4.64
+	HYDROGRAPH AT	39	727.	12.50	122.	38.	13.	0.77
+	2 COMBINED AT	I1CP39	2225.	12.50	440.	134.	45.	5.41
+	2 COMBINED AT	CP39	4837.	12.58	1051.	318.	107.	12.86
+	ROUTED TO	R39	4798.	12.67	1051.	318.	107.	12.86
+	HYDROGRAPH AT	40	576.	12.25	61.	18.	6.	0.52
+	DIVERSION TO	DF40	176.	12.25	6.	2.	1.	0.52
+	HYDROGRAPH AT	D40	400.	12.17	55.	17.	6.	0.52
+	ROUTED TO	R40	373.	12.58	55.	17.	6.	0.52
+	HYDROGRAPH AT	42	1262.	12.50	221.	70.	23.	1.18
+	2 COMBINED AT	I1CP42	1633.	12.50	275.	86.	29.	1.70
+	2 COMBINED AT	CP42	6312.	12.58	1318.	401.	135.	14.56
+	DIVERSION TO	DF42	2037.	12.58	142.	36.	12.	14.56
+	HYDROGRAPH AT	D42	4275.	12.42	1176.	366.	123.	14.56
+	ROUTED TO	R42	4365.	12.42	1176.	366.	123.	14.56
+	HYDROGRAPH AT	41A1	48.	12.00	3.	1.	0.	0.02

+	ROUTED TO	SR41A1	23.	12.17	3.	1.	0.	0.02
+	DIVERSION TO	1D303	23.	12.17	3.	1.	0.	0.02
+	HYDROGRAPH AT	CP41A1	0.	0.08	0.	0.	0.	0.02
+	ROUTED TO	R41A1	0.	0.08	0.	0.	0.	0.02
+	HYDROGRAPH AT	41A2	60.	12.00	3.	1.	0.	0.03
+	2 COMBINED AT	CP41A2	60.	12.00	3.	1.	0.	0.05
+	ROUTED TO	SR41A2	60.	12.00	3.	1.	0.	0.05
+	DIVERSION TO	2D303	24.	12.00	2.	0.	0.	0.05
+	HYDROGRAPH AT	CP41A2	36.	12.00	1.	0.	0.	0.05
+	ROUTED TO	R41A2	25.	12.08	1.	0.	0.	0.05
+	HYDROGRAPH AT	41A3	69.	12.00	4.	1.	0.	0.03
+	2 COMBINED AT	CP41A3	86.	12.08	5.	1.	0.	0.08
+	ROUTED TO	SR41A3	24.	12.25	5.	1.	0.	0.08
+	DIVERSION TO	3D303	24.	12.25	5.	1.	0.	0.08
+	HYDROGRAPH AT	CP41A3	0.	0.08	0.	0.	0.	0.08
+	ROUTED TO	R41A3	0.	0.08	0.	0.	0.	0.08
+	HYDROGRAPH AT	41A	91.	12.08	5.	1.	0.	0.05
+	2 COMBINED AT	CP41A	91.	12.08	5.	1.	0.	0.13
+	ROUTED TO	SR41A	23.	12.25	5.	1.	0.	0.13
+	DIVERSION TO	4D303	23.	12.25	5.	1.	0.	0.13
+	HYDROGRAPH AT	CP41A	0.	0.08	0.	0.	0.	0.13
+	ROUTED TO	R41A	0.	0.08	0.	0.	0.	0.13
+	HYDROGRAPH AT	41-1	208.	12.17	14.	3.	1.	0.15
+	2 COMBINED AT	CP41-1	208.	12.17	14.	3.	1.	0.28
+	ROUTED TO	SR41-1	148.	12.33	14.	3.	1.	0.28
+	DIVERSION TO	5D303	45.	12.33	11.	3.	1.	0.28
+	HYDROGRAPH AT	CP41-1	103.	12.33	2.	1.	0.	0.28
+	ROUTED TO	R41-1	38.	12.42	2.	1.	0.	0.28
+	HYDROGRAPH AT	41-2	143.	12.17	9.	2.	1.	0.10
+	2 COMBINED AT	CP41-2	143.	12.17	12.	3.	1.	0.38
+	ROUTED TO	SR41-2	33.	12.50	12.	3.	1.	0.38
+	DIVERSION TO	6D303	33.	12.50	12.	3.	1.	0.38
+	HYDROGRAPH AT	CP41-2	0.	0.08	0.	0.	0.	0.38
+	ROUTED TO	R41-2	0.	0.08	0.	0.	0.	0.38
+	HYDROGRAPH AT	41	576.	12.42	68.	17.	6.	0.58
+	DIVERSION TO	D41	11.	12.42	1.	0.	0.	0.58
+	HYDROGRAPH AT	D41	565.	12.42	66.	17.	6.	0.58
+	2 COMBINED AT	CP41	565.	12.42	66.	17.	6.	0.68
+	ROUTED TO	SR41	530.	12.50	66.	17.	6.	0.68

+	DIVERSION TO	7D303	47.	12.50	28.	8.	3.	0.68
+	HYDROGRAPH AT	CP41	483.	12.50	38.	10.	3.	0.68
+	ROUTED TO	R41	465.	12.58	38.	10.	3.	0.68
+	HYDROGRAPH AT	43-1	88.	12.08	8.	3.	1.	0.04
+	2 COMBINED AT	CP43-1	470.	12.58	47.	12.	4.	1.00
+	ROUTED TO	SR43-1	286.	12.83	47.	12.	4.	1.00
+	DIVERSION TO	D43-1	4.	12.83	1.	0.	0.	1.00
+	HYDROGRAPH AT	D43-1	282.	12.83	46.	12.	4.	1.00
+	DIVERSION TO	1D303A	282.	12.83	46.	12.	4.	1.00
+	HYDROGRAPH AT	CP43-1	0.	0.08	0.	0.	0.	1.00
+	ROUTED TO	R43-1	0.	0.08	0.	0.	0.	1.00
+	HYDROGRAPH AT	43-2	24.	12.00	3.	1.	0.	0.01
+	2 COMBINED AT	CP43-2	24.	12.00	3.	1.	0.	1.01
+	ROUTED TO	SR43-2	12.	12.17	3.	1.	0.	1.01
+	DIVERSION TO	D43-2	2.	12.17	0.	0.	0.	1.01
+	HYDROGRAPH AT	D43-2	10.	12.17	2.	1.	0.	1.01
+	DIVERSION TO	2D303A	10.	12.17	2.	1.	0.	1.01
+	HYDROGRAPH AT	CP43-2	0.	0.08	0.	0.	0.	1.01
+	ROUTED TO	R43-2	0.	0.08	0.	0.	0.	1.01
+	HYDROGRAPH AT	43-3	130.	12.00	13.	5.	2.	0.05
+	2 COMBINED AT	CP43-3	130.	12.00	13.	5.	2.	1.06
+	DIVERSION TO	D43-3	107.	12.00	11.	4.	1.	1.06
+	HYDROGRAPH AT	D43-3	23.	12.00	2.	1.	0.	1.06
+	DIVERSION TO	3D303A	23.	12.00	2.	1.	0.	1.06
+	HYDROGRAPH AT	CP43-3	0.	0.08	0.	0.	0.	1.06
+	ROUTED TO	R43-3	0.	0.08	0.	0.	0.	1.06
+	HYDROGRAPH AT	43-4	78.	12.00	8.	3.	1.	0.03
+	2 COMBINED AT	CP43-4	78.	12.00	8.	3.	1.	1.09
+	DIVERSION TO	D43-4	57.	12.00	6.	2.	1.	1.09
+	HYDROGRAPH AT	D43-4	21.	12.00	2.	1.	0.	1.09
+	DIVERSION TO	DI43-4	21.	12.00	2.	1.	0.	1.09
+	HYDROGRAPH AT	CP43-4	0.	0.08	0.	0.	0.	1.09
+	ROUTED TO	R43-4	0.	0.08	0.	0.	0.	1.09
+	HYDROGRAPH AT	43-5	52.	12.00	5.	2.	1.	0.02
+	2 COMBINED AT	CP43-5	52.	12.00	5.	2.	1.	1.11
+	DIVERSION TO	D43-5	33.	12.00	3.	1.	0.	1.11
+	HYDROGRAPH AT	D43-5	19.	12.00	2.	1.	0.	1.11
+	DIVERSION TO	DI43-5	19.	12.00	2.	1.	0.	1.11
+	HYDROGRAPH AT	CP43-5	0.	0.08	0.	0.	0.	1.11

+	ROUTED TO	R43-5	0.	0.08	0.	0.	0.	1.11
+	HYDROGRAPH AT	43-6	54.	12.00	5.	2.	1.	0.02
+	2 COMBINED AT	CP43-6	54.	12.00	5.	2.	1.	1.13
+	DIVERSION TO	D43-6	48.	12.00	5.	2.	1.	1.13
+	HYDROGRAPH AT	D43-6	6.	12.00	1.	0.	0.	1.13
+	DIVERSION TO	DI43-6	6.	12.00	1.	0.	0.	1.13
+	HYDROGRAPH AT	CP43-6	0.	0.08	0.	0.	0.	1.13
+	ROUTED TO	R43-6	0.	0.08	0.	0.	0.	1.13
+	HYDROGRAPH AT	43-7	54.	12.00	5.	2.	1.	0.02
+	2 COMBINED AT	CP43-7	54.	12.00	5.	2.	1.	1.15
+	DIVERSION TO	D43-7	34.	12.00	3.	1.	0.	1.15
+	HYDROGRAPH AT	D43-7	20.	12.00	2.	1.	0.	1.15
+	DIVERSION TO	DI43-7	20.	12.00	2.	1.	0.	1.15
+	HYDROGRAPH AT	CP43-7	0.	0.08	0.	0.	0.	1.15
+	ROUTED TO	R43-7	0.	0.08	0.	0.	0.	1.15
+	HYDROGRAPH AT	43-8	27.	12.00	3.	1.	0.	0.01
+	2 COMBINED AT	CP43-8	27.	12.00	3.	1.	0.	1.16
+	DIVERSION TO	D43-8	15.	12.00	1.	1.	0.	1.16
+	HYDROGRAPH AT	D43-8	12.	12.00	1.	0.	0.	1.16
+	DIVERSION TO	DI43-8	12.	12.00	1.	0.	0.	1.16
+	HYDROGRAPH AT	CP43-8	0.	0.08	0.	0.	0.	1.16
+	ROUTED TO	R43-8	0.	0.08	0.	0.	0.	1.16
+	HYDROGRAPH AT	43	27.	12.00	3.	1.	0.	0.01
+	2 COMBINED AT	I1CP43	27.	12.00	3.	1.	0.	1.17
+	2 COMBINED AT	CP43	4368.	12.42	1180.	367.	123.	13.90
+	DIVERSION TO	DI43	644.	12.42	75.	19.	6.	13.90
+	HYDROGRAPH AT	CP43	3724.	12.42	1105.	348.	117.	13.90
+	ROUTED TO	RD43	3715.	12.50	1105.	348.	117.	13.90
+	HYDROGRAPH AT	CP43-4	21.	12.00	2.	1.	0.	1.09
+	ROUTED TO	RD43-4	9.	12.33	2.	1.	0.	1.09
+	HYDROGRAPH AT	CP43-5	19.	12.00	2.	1.	0.	1.11
+	ROUTED TO	RD43-5	9.	12.33	2.	1.	0.	1.11
+	2 COMBINED AT	I1CWT4	18.	12.33	4.	1.	0.	0.05
+	HYDROGRAPH AT	CP43-6	6.	12.00	1.	0.	0.	1.13
+	ROUTED TO	RD43-6	2.	12.42	1.	0.	0.	1.13
+	2 COMBINED AT	I2CWT4	20.	12.33	5.	2.	1.	0.07
+	HYDROGRAPH AT	CP43-7	20.	12.00	2.	1.	0.	1.15
+	ROUTED TO	RD43-7	9.	12.25	2.	1.	0.	1.15
+	2 COMBINED AT	I3CWT4	29.	12.33	7.	2.	1.	0.09

+	HYDROGRAPH AT	CP43-8	12.	12.00	1.	0.	0.	1.16
+	ROUTED TO	RD43-8	5.	12.33	1.	0.	0.	1.16
+	2 COMBINED AT	I4CWT4	33.	12.33	8.	3.	1.	0.10
+	HYDROGRAPH AT	44	300.	12.25	25.	6.	2.	0.22
+	2 COMBINED AT	I5CWT4	333.	12.25	33.	9.	3.	0.32
+	2 COMBINED AT	I6CWT4	3844.	12.50	1137.	357.	120.	14.12
+	HYDROGRAPH AT	45-1	143.	12.08	9.	2.	1.	0.08
+	HYDROGRAPH AT	CP43	644.	12.42	75.	19.	6.	13.90
+	2 COMBINED AT	CP45-1	659.	12.42	84.	21.	7.	13.98
+	ROUTED TO	SR45-1	604.	12.50	84.	21.	7.	13.98
+	DIVERSION TO	DI45-1	220.	12.50	40.	10.	3.	13.98
+	HYDROGRAPH AT	CP45-1	384.	12.50	44.	11.	4.	13.98
+	ROUTED TO	R45-1	360.	12.75	44.	11.	4.	13.98
+	HYDROGRAPH AT	45	401.	12.42	48.	12.	4.	0.38
+	2 COMBINED AT	CP45	667.	12.58	91.	23.	8.	14.36
+	ROUTED TO	SR45	479.	12.92	91.	23.	8.	14.36
+	DIVERSION TO	DI45	323.	12.92	84.	21.	7.	14.36
+	HYDROGRAPH AT	CP45	156.	12.92	7.	2.	1.	14.36
+	ROUTED TO	R45	97.	13.08	7.	2.	1.	14.36
+	HYDROGRAPH AT	46-1	184.	12.25	18.	4.	1.	0.15
+	2 COMBINED AT	CP46-1	180.	12.25	24.	6.	2.	14.51
+	ROUTED TO	SR46-1	105.	12.50	24.	6.	2.	14.51
+	DIVERSION TO	DI46-1	105.	12.50	24.	6.	2.	14.51
+	HYDROGRAPH AT	CP46-1	0.	0.08	0.	0.	0.	14.51
+	ROUTED TO	R46-1	0.	0.08	0.	0.	0.	14.51
+	HYDROGRAPH AT	46	651.	12.58	94.	24.	8.	0.85
+	2 COMBINED AT	I1CP46	637.	12.58	92.	23.	8.	15.36
+	HYDROGRAPH AT	28	747.	12.50	89.	22.	7.	0.86
+	ROUTED TO	R28	738.	12.50	89.	22.	7.	0.86
+	HYDROGRAPH AT	30	320.	12.33	41.	13.	4.	0.28
+	2 COMBINED AT	I1CP30	935.	12.50	131.	35.	12.	1.14
+	HYDROGRAPH AT	29	284.	12.25	34.	11.	4.	0.22
+	ROUTED TO	SR29	0.	0.08	0.	0.	0.	0.22
+	ROUTED TO	R29	0.	0.08	0.	0.	0.	0.22
+	2 COMBINED AT	CP30	935.	12.50	131.	35.	12.	1.36
+	DIVERSION TO	D30	110.	12.50	15.	4.	1.	1.36
+	HYDROGRAPH AT	D30	825.	12.50	115.	31.	10.	1.36
+	ROUTED TO	R30	771.	12.67	115.	31.	10.	1.36
+	HYDROGRAPH AT	31	525.	12.50	63.	16.	5.	0.71

+	2 COMBINED AT	CP31	1235.	12.58	178.	47.	16.	2.07
+	ROUTED TO	R31	1197.	12.75	178.	47.	16.	2.07
+	2 COMBINED AT	CP46	1740.	12.67	264.	69.	23.	17.43
+	ROUTED TO	SR46	1702.	12.75	264.	69.	23.	17.43
+	ROUTED TO	R46	1591.	12.92	264.	69.	23.	17.43
+	HYDROGRAPH AT	CP45-1	220.	12.50	40.	10.	3.	13.98
+	ROUTED TO	RD45-1	215.	13.00	40.	10.	3.	13.98
+	HYDROGRAPH AT	CP45	323.	12.92	84.	21.	7.	14.36
+	ROUTED TO	RD45	319.	13.17	84.	21.	7.	14.36
+	2 COMBINED AT	I7CWT4	530.	13.08	124.	31.	10.	14.36
+	HYDROGRAPH AT	CP46-1	105.	12.50	24.	6.	2.	14.51
+	ROUTED TO	RD46-1	93.	12.83	24.	6.	2.	14.51
+	2 COMBINED AT	I8CWT4	613.	13.08	148.	37.	12.	14.51
+	HYDROGRAPH AT	WT4	997.	12.25	88.	22.	7.	0.77
+	2 COMBINED AT	I9CWT4	1048.	12.25	233.	59.	20.	15.28
+	2 COMBINED AT	I10WT4	2211.	12.92	495.	127.	42.	18.20
+	2 COMBINED AT	CPWT4	5931.	12.92	1626.	482.	162.	18.57
+	ROUTED TO	RS47	0.	0.08	0.	0.	0.	18.57
+	HYDROGRAPH AT	CP43-1	282.	12.83	46.	12.	4.	1.00
+	ROUTED TO	R43-1	294.	13.42	46.	12.	4.	1.00
+	HYDROGRAPH AT	CP43-2	10.	12.17	2.	1.	0.	1.01
+	ROUTED TO	R43-2	6.	14.08	2.	1.	0.	1.01
+	HYDROGRAPH AT	CP43-3	23.	12.00	2.	1.	0.	1.06
+	ROUTED TO	R43-3	7.	13.83	2.	1.	0.	1.06
+	HYDROGRAPH AT	303A	549.	12.25	56.	15.	5.	0.42
+	DIVERSION TO	D303A	23.	12.25	2.	1.	0.	0.42
+	HYDROGRAPH AT	D303A	526.	12.25	53.	14.	5.	0.42
+	4 COMBINED AT	1C303A	530.	12.25	103.	28.	9.	1.48
+	2 COMBINED AT	CP303A	516.	12.25	100.	27.	9.	18.99
+	HYDROGRAPH AT	D41A1	23.	12.17	3.	1.	0.	0.02
+	ROUTED TO	R41A1	13.	13.58	3.	1.	0.	0.02
+	HYDROGRAPH AT	D41A2	24.	12.00	2.	0.	0.	0.05
+	ROUTED TO	R41A2	12.	13.50	2.	0.	0.	0.05
+	2 COMBINED AT	1I303	25.	13.58	5.	1.	0.	0.05
+	HYDROGRAPH AT	D41A3	24.	12.25	5.	1.	0.	0.08
+	ROUTED TO	R41A3	15.	14.50	5.	1.	0.	0.08
+	2 COMBINED AT	2I303	27.	13.67	9.	2.	1.	0.08
+	HYDROGRAPH AT	D41A	23.	12.25	5.	1.	0.	0.13
+	ROUTED TO	R41A	13.	14.67	5.	1.	0.	0.13

	2 COMBINED AT							
+		3I303	32.	14.42	14.	4.	1.	0.13
	HYDROGRAPH AT							
+		D41-1	45.	12.33	11.	3.	1.	0.28
	ROUTED TO							
+		R41-1	33.	14.25	11.	3.	1.	0.28
	2 COMBINED AT							
+		4I303	65.	14.25	25.	6.	2.	0.28
	HYDROGRAPH AT							
+		D41-2	33.	12.50	12.	3.	1.	0.38
	ROUTED TO							
+		R41-2	29.	14.58	11.	3.	1.	0.38
	2 COMBINED AT							
+		5I303	90.	14.50	35.	9.	3.	0.38
	HYDROGRAPH AT							
+		D41	47.	12.50	28.	8.	3.	0.68
	ROUTED TO							
+		R41	44.	14.58	27.	8.	3.	0.68
	2 COMBINED AT							
+		6I303	133.	14.50	61.	17.	6.	0.96
	HYDROGRAPH AT							
+		303	914.	12.67	139.	35.	12.	1.21
	DIVERSION TO							
+		D303	4.	12.67	1.	0.	0.	1.21
	HYDROGRAPH AT							
+		D303	910.	12.67	138.	35.	12.	1.21
	2 COMBINED AT							
+		CP303	911.	12.67	194.	52.	17.	2.17

*** NORMAL END OF HEC-1 ***

HEC-1 FILE SUMMARY

Filename	Description	Storm Frequency, Duration
CATADMS2.OUT	Existing Conditions	100-Year, 24-hour storm
FUTDIV10.OUT	Alternative 'A'	100-Year, 24-hour storm
FUTDIV11.OUT	Alternative 'B'	100-Year, 24-hour storm

APPENDIX C

INFILTRATION & TRANSMISSION LOSSES CALCULATIONS

Western Technologies Inc.
The Quality People
Since 1955

3737 East Broadway Road
Phoenix, Arizona 85040-2966
(602) 437-3737 • fax 470-1341

RECEIVED
AUG 3 – 1999
WOOD / PATEL

August 2, 1999

DMB Associates, Inc
4201 North 24th Street, Suite 120
Phoenix, Arizona 85016

Attn: Mr. David Nilsen

Re: Caterpillar Property Percolation Tests
Maricopa County, Arizona

Job No. 2128JI276

As requested, Western Technologies Inc. (WT) is presenting percolation results for five percolation tests performed in general accordance to ADEQ Bulletin 12 inside a cased test hole as indicated on NAVFAC DM 7.1 Table 15, Condition D. The percolation tests were performed on July 30, 1999 near the locations shown on the diagram included in our May 12, 1999 letter for the previously completed, uncased percolation test holes. The following tabulation presents the stabilized percolation rates.

TEST NUMBER	TEST DEPTH, ft.	PERCOLATION RATE, $(ft^3/hr)/ft^2$
P1	5	0.2
P2	5	0.1
P3	3	> 0.3
P4	5	0.1
P5	5	0.08

Where the rate indicated is greater than 0.3 $(ft^3/hr)/ft^2$, WT recommends using a minimum rate of 0.3 $(ft^3/hr)/ft^2$ for calculation purposes.

If you have any questions regarding this information, or if we may be of further assistance, please contact us.

Sincerely,
WESTERN TECHNOLOGIES INC.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
27947
RANDOLPH
MARWIG
Date Signed 8/2/99
ARIZONA, U.S.A.

Jodi Winney, E.I.T.
Geotechnical Engineer

Randolph Marwig, P.E.
Senior Geotechnical Engineer

Copies: Addressee (5)
Wood-Patel (2)

G:\LETTERS\8JI276-3.PRC

Transmission Losses per Retention Basin
for
Alternative 'A' & 'B'

Per the 404 Permit wash delineations, the existing wash reach length, bottom width and resulting transmission loss as they pertain to the draining of each individual retention basin are:

Basin #21 - 2 miles of reach length: a 1/2 mile at a 5' bottom width = 1.4 ac-ft., and 1-1/2 miles at a 50' bottom width = 39.3 ac-ft.=> a total of approx. **41 ac.-ft. of transmission losses**.

Basin #21 volume = 206 ac.-ft., less transmission losses = 165 ac.-ft.; transmission losses = 20% of total volume.

For a 165 ac.-ft. basin at a depth of 3.5' (using 2.5' due to side slopes) = 66 acres. Using a conservative 60% of the basin, or approx. 40 acres, the additional 41 ac.-ft. will be approx. 1.0' of additional depth; thus the basin will be 4.5' deep.

Discharge Outlet for the retention basin is: 41 ac.-ft. x 43560 = 1785960 cu.ft./ 36 hrs. = 49610 cu.ft./hr. / 3600 sec. = **13.8 cfs**.

Basin #22 - a one mile reach with a 5' bottom width = **2.8 ac-ft. of transmission losses**.

Basin #22 volume = 16 ac.-ft., less transmission losses = 13.2 ac.-ft.; transmission losses = 17.5% of total volume.

For a 13.2 ac.-ft. basin at a depth of 3.5' (using 2.5' due to side slopes) = 5.3 acres. Using a conservative 60% of the basin, or 3.2 acres, the additional 3 ac.-ft. will be approx. 0.9' of additional depth; thus the basin will be 4.4' deep.

Discharge Outlet for the retention basin is: 2.8 ac.-ft. x 43560 = 121968 cu.ft./ 36 hrs. = 3388 cu.ft./hr. / 3600 sec. = **1.0 cfs**.

Basin #25 - a 1/2 mile reach with a 30' bottom width = approx. **8 ac.-ft. of transmission losses**.

Basin #25 volume = 31 ac.-ft., less transmission losses = 23 ac.-ft.; transmission losses = 26% of total volume.

For a 23 ac.-ft. basin at a depth of 3.5' (using 2.5' due to side slopes) = 9.2 acres. Using a conservative 60% of the basin, or 5.5 acres, the additional 8 ac.-ft. will be approx. 1.5' of additional depth; thus the basin will be 5' deep.

Discharge Outlet for the retention basin is: 8 ac.-ft. x 43560 = 348480 cu.ft./ 36 hrs. = 9680 cu.ft./hr. / 3600 sec. = **2.7 cfs**.

Basin #26 - 1-1/2 miles of reach length: a 1/2 mile at a 15' bottom width = 4 ac-ft., and a 1/2 mile at a 20' bottom width = 5.3 ac.-ft., and a 1/2 mile at a 25' bottom width = 6.6 ac-ft.=> a total of approx. **16 ac.-ft. of transmission losses.**

Basin #26 volume = 38 ac.-ft., less transmission losses = 22 ac.-ft.; transmission losses = 42% of total volume.

For a 22 ac.-ft. basin at a depth of 3.5' (using 2.5' due to side slopes) = 8.8 acres. Using a conservative 60% of the basin, or 5.3 acres, the additional 16 ac.-ft. will be approx. 3.0' of additional depth; thus the basin will be 6.5' deep.

Discharge Outlet for the retention basin is: 16 ac.-ft. x 43560 = 696960 cu.ft./ 36 hrs. = 19360 cu.ft./hr. / 3600 sec. = **5.4 cfs**.

Basin #38 - 2-1/4 miles of reach length: a 1/4 mile at a 30' bottom width = 4 ac.-ft., and a 1/2 mile at a 20' bottom width = 5.3 ac-ft., and a 1/2 mile at a 30' bottom width = 8 ac.-ft., and 1 mile at a 45' bottom width = 23.6 ac-ft.=> a total of approx. **41 ac.-ft. of transmission losses.**

Basin #38 volume = 144 ac.-ft., less transmission losses = 103 ac.-ft.; transmission losses = 28.5% of total volume.

For a 103 ac.-ft. basin at a depth of 3.5' (using 2.5' due to side slopes) = 41.2 acres. Using a conservative 60% of the basin, or 24.7 acres, the additional 41 ac.-ft. will be approx. 1.7' of additional depth; thus the basin will be 5.2'.

Discharge Outlet for the retention basin is: 16 ac.-ft. x 43560 = 1785960 cu.ft./ 36 hrs. = 49610 cu.ft./hr. / 3600 sec. = **13.8 cfs**.

Basin #40 - a one mile reach with a 5' bottom width = **2.8 ac-ft. of transmission losses**.

Basin #40 volume = 11 ac.-ft., less transmission losses = 8.2 ac.-ft.; transmission losses = 25.5% of total volume.

For a 8.2 ac.-ft. basin at a depth of 3.5' (using 2.5' due to side slopes) = 3.3 acres. Using a conservative 60% of the basin, or 2 acres, the additional 2.8 ac.-ft. will be approx. 1.4' of additional depth; thus the basin will be 4.9' deep.

Discharge Outlet for the retention basin is: 2.8 ac.-ft. x 43560 = 121968 cu.ft./ 36 hrs. = 3388 cu.ft./hr. / 3600 sec. = **1.0 cfs**

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
NATIONAL ENGINEERING HANDBOOK

SECTION 4 - HYDROLOGY
CHAPTER 19 - TRANSMISSION LOSSES

K (in./hr.)	VOLUME P (ac.-ft.)	DURATION D (hrs.)	CHANNEL BOTTOM WIDTH w (ft.)	WASH REACH LENGTH x (miles)	PEAK RATE OF INFLOW p (cfs)	a(D) (ac.-ft.)	k(D,P) (ft.-miles)^-1	b	b(x,w)	a(x,w) (ac.-ft)	Po(x,w)	OUTFLOW VOLUME Q(x,w) (ac.-ft.)	OUTFLOW PEAK RATE q(x,w) (cfs)
2	300	36	30	6.7	100	-0.335	0.0014	0.999	0.751	-58.548	77.99	166.660	30.3
2	2.82	36	5	1	0.95	-0.335	0.1633	0.849	0.442	-1.240	2.81	0.006	0.0
2	5.415	36	10	1	1.82	-0.335	0.0820	0.921	0.440	-2.380	5.40	0.005	0.0
2	8.01	36	15	1	2.7	-0.335	0.0548	0.947	0.440	-3.520	8.00	0.004	0.0
2	10.61	36	20	1	3.57	-0.335	0.0411	0.960	0.440	-4.661	10.60	0.005	0.0
2	13.21	36	25	1	4.4	-0.335	0.0329	0.968	0.440	-5.802	13.20	0.006	0.0
2	15.8	36	30	1	5.3	-0.335	0.0274	0.973	0.439	-6.941	15.80	0.001	0.0
2	18.4	36	35	1	6.2	-0.335	0.0235	0.977	0.439	-8.082	18.39	0.002	0.0
2	21	36	40	1	7	-0.335	0.0206	0.980	0.439	-9.223	20.99	0.003	0.0
2	23.6	36	45	1	7.9	-0.335	0.0183	0.982	0.439	-10.364	23.59	0.005	0.0
2	26.2	36	50	1	8.8	-0.335	0.0164	0.984	0.439	-11.506	26.19	0.006	0.0

SYMBOLS & NOTATIONS:
K = effective hydraulic conductivity (inches per hour)
P = inflow volume (acre-feet)
D = duration of streamflow (hours)
x = length of reach (miles)
w = average width of flow (feet)
p = peak rate of inflow (cubic feet per second)
a(D) = regression intercept for unit channel with a flow of duration D (acre-feet)
k(D,P) = decay factor for unit channel with a flow duration D and volume P (foot-miles)^-1
b = regression slope for unit channel
b(x,w) = regression slope for a channel reach of length x and width w
a(x,w) = regression intercept for a channel reach of length x and width w
Po(x,w) = threshold volume for a channel reach of length x and width w (acre-feet)
Q(x,w) = outflow volume (acre-feet)
q(x,w) = peak rate of outflow (cubic feet per second)

EQUATIONS:
a(D) = -0.00465KD
k(D,P) = -1.09ln(1-0.00545KD/P)
b = e^-k
b(x,w) = e^-kxw
a(x,w) = a/1-b(1-b(x,w))
Po(x,w) = -a(x,w)/b(x,w)
Q(x,w) = a(x,w) + b(x,w)P
q(x,w) = 12.1/D(a(x,w) - [1-b(x,w)P]) + b(x,w)p

5/28/99
By:JCD
Job #: 97678

Jack Moody

United States
Department of
Agriculture

Soil
Conservation
Service

National Engineering Handbook

Section 4

Hydrology

Chapter 19

Transmission Losses

7. Lateral inflow can be either lumped at points of tributary inflow or uniform with distance along the channel.

8. For volume and peak discharge calculations, lateral inflow is assumed to occur during the same time as the upstream inflow.

Limitations

The main limitations of the procedures are:

1. Hydrographs are not specifically routed along the stream channels; predictions are made for volume and peak discharge.
2. Peak flow equations do not consider storage attenuation effects or steepening of the hydrograph rise.
3. Analyses on which the procedures are based represent average conditions or overall trends.
4. Influences of antecedent flow and sediment concentration in the streamflow have not been quantified.
5. Estimates of effective hydraulic conductivity in the streambed are empirically based and represent average rates.
6. Peak discharge of outflow is decreased by the average loss rate for the duration of flow.
7. Procedures for out-of-bank flow are based on the assumption of a weighted average for the effective hydraulic conductivity.

Symbols and Notation

Upstream Inflow

D = duration of inflow (hours)
P = inflow volume (acre-feet)
p = peak rate of inflow (cubic feet per second)

Lateral Inflow

Q_L = lateral inflow volume (acre-feet per mile)
q_L = peak rate of lateral inflow (cubic feet per second per foot)

Outflow

Q(x,w) = outflow volume (acre-feet)
q(x,w) = peak rate of outflow (cubic feet per second)

Channel Reach

D = duration of streamflow (hours)
K = effective hydraulic conductivity (inches per hour)
V = total available storage volume of alluvium in the channel reach (acre-feet)
w = average width of flow (feet)
x = length of reach (miles)

Prediction Equations (Parameters)

a = regression intercept for unit channel (acre-feet)
a(D) = regression intercept for unit channel with a flow of duration D (acre-feet)
a(x,w) = regression intercept for a channel reach of length x and width w (acre-feet)
b = regression slope for unit channel
b(x,w) = regression slope for a channel reach of length x and width w
k = decay factor $(\text{foot-miles})^{-1}$
k(D,P) = decay factor for unit channel with a flow duration D and volume P $(\text{foot-miles})^{-1}$
P_o = threshold volume for a unit channel (acre-feet)
$P_o(x,w)$ = threshold volume for a channel reach of length x and width w (acre-feet)

The simplified procedures are summarized here; additional details and derivations are given in the appendices. Methods have been developed for two situations: (1) when observed inflow-outflow data are available and (2) when no observed data are available.

Summary of Procedure

The prediction equation for outflow volume, without lateral inflow, is

$$Q(x,w) = \begin{cases} 0 & P \leq P_o(x,w) \\ a(x,w) + b(x,w)P & P > P_o(x,w), \end{cases} \tag{19–1}$$

where the threshold volume is

$$P_o(x,w) = \frac{-a(x,w)}{b(x,w)}. \tag{19–2}$$

The corresponding equation for peak discharge is

$$q(x,w) = \begin{cases} 0 & Q(x,w) = 0 \\ \frac{12.1}{D}(a(x,w) & Q(x,w) > 0, \\ \quad - [1 - b(x,w)]P) & \\ \quad + b(x,w)p & \end{cases} \tag{19–3}$$

where 12.1 converts from acre-feet per hour to cubic feet per second.

If lateral inflow is uniform, the volume equation becomes

$$Q(x,w) = \begin{cases} 0 & b(x,w)P + \frac{Q_L}{kw}[1 - b(x,w)] \leq -a(x,w) \\ a(x,w) + b(x,w)P + \frac{Q_L}{kw}[1 - b(x,w)]. & \end{cases} \tag{19–4}$$

The corresponding equation for peak discharge is

$$q(x,w) = \begin{cases} 0 & Q(x,w) = 0 \\ \frac{12.1}{D}(a(x,w) - [1 - b(x,w)]P) & \\ \quad + b(x,w)p + \frac{q_L(5{,}280)}{kw} & \\ \quad [1 - b(x,w)]. & \end{cases} \tag{19–5}$$

The factor 5,280 converts cubic feet per second per foot to cubic feet per second per mile. Derivations and background information are found in Appendix 1.

For a channel reach with only tributary lateral inflow, equations 19–1 and 19–3 would be applied on the tributary channel and the main channel to the point of tributary inflow. Then the sum of the outflows from these two channel reaches would be the inflow to the lower reach of the main channel.

The procedures described by equations 19–1, 19–3, 19–4, and 19–5 require that the upstream inflow and lateral inflow along the channel reach be estimated by use of procedures described in Chapter 10. Peak rates and durations are estimated by use of procedures described in Chapter 16.

Estimating Parameters From Observed Inflow-Outflow Data

If one assumes a channel reach of length x and average width w, then n observations on P_i and Q_i (without lateral inflow) can be used to estimate the parameters in equation 19–1. Parameters of the linear regression equation can be estimated as

$$b(x,w) = \frac{\sum_{i=1}^{n} (Q_i - \overline{Q})(P_i - \overline{P})}{\sum_{i=1}^{n} (P_i - \overline{P})^2} \tag{19–6}$$

and

$$a(x,w) = \overline{Q} - b(x,w)\overline{P}, \tag{19–7}$$

where $\overline{Q}$ is the mean outflow volume and $\overline{P}$ is the mean inflow volume. Alternative formulas recommended for computation are

$$\sum_{i=1}^{n} (Q_i - \overline{Q})(P_i - \overline{P}) = \frac{n\sum_{i=1}^{n} P_iQ_i - \left(\sum_{i=1}^{n} P_i\right)\left(\sum_{i=1}^{n} Q_i\right)}{n} \tag{19–8}$$

and

$$\sum_{i=1}^{n} (P_i - \overline{P})^2 = \frac{n\sum_{i=1}^{n} P_i^2 - \left(\sum_{i=1}^{n} P_i\right)^2}{n}. \tag{19–9}$$

Linear regression procedures are available on most computer systems and on many hand-held calculators. Constraints on the parameters are

$$a(x,w) < 0$$

and

$$0 \leq b(x,w) \leq 1.$$

When one or both of the constraints are not met, the following procedure is suggested:

1. Plot the observed data on rectangular coordinate paper: P_i on the X-axis and Q_i on the Y-axis.
2. Plot the derived regression equation on the graph with the data.
3. Check the data for errors (events with lateral inflow, computational errors, etc.). Pay particular attention to any data points very far from the regression line, especially those points that may be strongly influencing the slope or intercept.
4. Correct data points that are in error; remove points that are not representative.
5. Recompute the regression slope and intercept using equations 19–6 to 19–9 and the corrected data.

A great deal of care and engineering judgment must be exercised in finding and eliminating errors from the set of observed inflow-outflow observations.

Unit Channels

A unit channel is defined as a channel of length x = 1 mi and width w = 1 ft. Parameters for the unit channel are required to compute parameters for channel reaches with arbitrary length and width. The unit channel parameters are computed by the following equations:

$$k = -\frac{\ln b(x,w)}{x\,w} \qquad (19\text{–}10)$$

$$b = e^{-k} \qquad (19\text{–}11)$$

$$a = \frac{a(x,w)(1 - b)}{[1 - b(x,w)]}, \qquad (19\text{–}12)$$

where a(x,w) and b(x,w) are the regression parameters derived from the observed data. In this case, the length x and width w are fixed known values. Particular care must be taken to maintain the maximum number of significant digits in determining k, b, and a. Otherwise, significant round-off errors can result.

Reaches of Arbitrary Length and Width

Given parameters for a unit channel, parameters for a channel reach of arbitrary length x and arbitrary width w are computed by the following equations:

$$b(x,w) = e^{-kxw}, \qquad (19\text{–}13)$$

$$a(x,w) = \frac{a}{1 - b}[1 - b(x,w)], \qquad (19\text{–}14)$$

$$P_o(x,w) = \frac{-a(x,w)}{b(x,w)}. \qquad (19\text{–}2)$$

Estimating Parameters in the Absence of Observed Inflow-Outflow Data

When inflow-outflow data are not available, an estimate of effective hydraulic conductivity is needed to predict transmission losses. Effective hydraulic conductivity, K, is the infiltration rate averaged over the total area wetted by the flow and over the total duration of flow. Because effective hydraulic conductivity represents a space-time average infiltration rate, it incorporates the influence of temperature, sediment concentration, flow irregularities, errors in the data, and variations in wetted area. For this reason, it is not the same as the saturated hydraulic conductivity for clear water under steady-state conditions.

Analysis of observed data resulted in equations of the form

$$a(D) = -0.00465KD \qquad (19\text{–}15)$$

for the unit channel intercept and

$$k(D,P) = -1.09 \ln\left[1.0 - \overset{0.00545}{\cancel{0.0545}}\frac{KD}{P}\right] \qquad (19\text{–}16)$$

for the decay factor on ungaged reaches. Given values of a and k from equations 19–15 and 19–16, equations 19–13, 19–14, and 19–2 are used to compute parameters for a particular x and w.

Derived relationships between bed material characteristics, effective hydraulic conductivity, and the unit channel parameters a and k are shown in table 19–1. These data can be used to estimate parameters for ungaged channel reaches.

Table 19–1.—Relationships between bed material characteristics and parameters for a unit channel (average antecedent conditions)

Bed material group	Bed material characteristics	Effective hydraulic conductivity,[1] K	Unit channel parameters	
			Intercept,[2] a	Decay factor,[3] k
		in/hr	*acre-ft*	*(ft-mi)*$^{-1}$
1 Very high loss rate	Very clean gravel and large sand	>5	< −0.023	>0.030
2 High loss rate	Clean sand and gravel, field conditions	2.0–5.0	−0.0093 to −0.023	0.0120 to 0.030
3 Moderately high loss rate	Sand and gravel mixture with low silt-clay content	1.0–3.0	−0.0047 to −0.014	0.0060 to 0.018
4 Moderate loss rate	Sand and gravel mixture with high silt-clay content	0.25–1.0	−0.0012 to −0.0047	0.0015 to 0.0060
5 Insignificant to low loss rate	Consolidated bed material; high silt-clay content	0.001–0.10	-5×10^{-6} to -5×10^{-4}	6×10^{-6} to 6×10^{-4}

[1] See Appendix 3 for sources of basic data.
[2] Values are for unit duration, D = 1 hr. For other durations, a(D) = −0.00465KD.
[3] Values are for unit duration and volume, D/P = 1. For other durations and volumes, use $k(D,P) = -1.09 \ln \left[1.0 - 0.00545 \frac{KD}{P}\right]$.

Summary of Parameter Estimation Techniques

Suggested procedures for use when observed data are available are summarized in table 19–2. Procedures for use on ungaged channel reaches are summarized in table 19–3. Again, whatever procedure is used, the parameter estimates must satisfy the constraints $a(x,w) < 0$ and $0 \leq b(x,w) \leq 1$.

Table 19–2.—Procedures to use when observed inflow-outflow data are available

Step	Source	Result
1. Perform regression analysis	Eqs. 19–6, 19–7, 19–2	Prediction equations for the particular reach
2. Derive unit channel parameters	Eqs. 19–10 to 19–12	Unit channel parameters
3. Calculate parameters	Eqs. 19–13, 19–14, 19–2	Parameters of the prediction equations for arbitrary x and w

Table 19–3.—Procedures to use when no observed inflow-outflow data are available

Step	Source	Result
1. Estimate inflow	Hydrologic analysis	Mean duration of flow, D, and volume of inflow, P
2. Identify bed material	Table 19–1	Effective hydraulic conductivity, K
3. Derive unit channel parameters	Eqs. 19–15, 19–16, 19–11	Unit channel parameters
4. Calculate parameters	Eqs. 19–13, 19–14, 19–2	Parameters of the prediction equations for arbitrary x and w

Examples

The following examples illustrate application of the procedures for several cases under a variety of circumstances. As in any analysis, it was impossible to consider all possible combinations of circumstances, but the examples presented here should provide an overview of useful applications of the procedures. Use of these procedures requires judgment and experience. At each step of the process, care should be taken to ensure that the results are reasonable and consistent with sound engineering practice.

Example 1. No Lateral Inflow or Out-of-Bank Flow

Given: A channel reach of length x = 5.0 mi, of average width w = 70 ft, and with bed material consisting of sand and gravel with a small percentage of silt and clay. Assume a mean flow duration D = 4 hr and a mean inflow volume of P = 34 acre-ft.

Find: The prediction equations for the channel reach. Estimate the outflow volume and peak for an inflow P = 50 acre-ft and p = 1,000 cfs.

Case 1. Observed Inflow-Outflow Data

Observed Inflow-Outflow Data (acre-ft)

P_i	20.	100.	25.	10.	15.	$\overline{P} = 34$
Q_i	6.0	75.	9.0	0.1	2.5	$\overline{Q} = 18.52$

Solution: Follow the procedure outlined in table 19–2, Step 1, for x = 5.0 mi and w = 70 ft.

$$b(x,w) = \frac{\Sigma(Q_i - \overline{Q})(P_i - \overline{P})}{\Sigma(P_i - \overline{P})^2} = 0.850$$

$$a(x,w) = \overline{Q} - b(x,w)\overline{P}$$
$$= 18.52 - 0.850(34) = -10.38 \text{ acre-ft}$$

$$P_o(x,w) = \frac{-a(x,w)}{b(x,w)} = \frac{10.38}{0.850} = 12.21 \text{ acre-ft}$$

Substituting these values in equation 19–1, the prediction equation for volume is

$$Q(x,w) = \begin{cases} 0 & P \leq 12.21 \\ -10.38 + 0.850P & P > 12.21 \end{cases}$$

and the prediction equation (from equation 19–3) for peak discharge is

$$q(x,w) = \begin{cases} 0 & Q(x,w) = 0 \\ -31.4 - 0.454P + 0.850p & Q(x,w) > 0. \end{cases}$$

For an inflow volume P = 50 acre-ft and an inflow peak rate p = 1,000 cfs, the predicted outflow volume is

$$Q(x,w) = -10.38 + 0.850(50) = 32.1 \text{ acre-ft}$$

and the predicted peak rate of outflow is

$$q(x,w) = -31.4 - 0.454(50) + 0.850(1{,}000)$$
$$= 796 \text{ cfs.}$$

Case 2. No Observed Inflow-Outflow Data

Solution: Follow the procedures outlined in table 19–3.

From table 19–1, estimate K = 1.0 in/hr, with D = 4.0 hr, P = 34 acre-ft. So

$$a = -0.00465KD = -0.01860 \text{ acre-ft},$$

$$k = -1.09 \ln\left[1.0 - 0.00545 \frac{KD}{P}\right]$$
$$= 0.000699 \text{ (ft-mi)}^{-1},$$

and

$$b = e^{-k} = e^{-0.000699} = 0.999301$$

are the unit channel parameters. From equations 19–13, 19–14, and 19–2, the parameters for the given reach with x = 5.0 mi and w = 70 ft are

$$b(x,w) = e^{-kxw} = e^{-(0.000699)(5.0)(70)}$$
$$= 0.783,$$

$$a(x,w) = \frac{a}{1-b}[1 - b(x,w)]$$
$$= \frac{-0.01860}{(1 - 0.999301)}[1 - 0.783]$$
$$= -5.78 \text{ acre-ft},$$

and

$$P_o(x,w) = \frac{-a(x,w)}{b(x,w)}$$

$$= -\frac{(-5.78)}{0.783} = 7.38 \text{ acre-ft.}$$

The prediction equation for the volume is

$$Q(x,w) = \begin{cases} 0 & P < 7.38 \\ -5.78 + 0.783P, & P > 7.38 \end{cases}$$

and the prediction equation for peak discharge is

$$q(x,w) = \begin{cases} 0 & Q(x,w) = 0 \\ -17.5 - 0.656P \\ \quad + 0.783p & Q(x,w) > 0. \end{cases}$$

For an inflow volume of P = 50 acre-ft and an inflow peak rate of p = 1,000 cfs, the predicted outflow volume is

$$Q(x,w) = -5.78 + 0.783(50) = 33.4 \text{ acre-ft,}$$

and the predicted peak rate of outflow is

$$q(x,w) = -17.5 - 0.656(50) + 0.783(1{,}000)$$
$$= 733 \text{ cfs.}$$

This example illustrates application of the procedures with and without observed data when flow is within the channel banks and there is no lateral inflow. The next example is for the same channel reach but is based on assumption of uniform lateral inflow between the inflow and outflow stations.

Example 2. Uniform Lateral Inflow

Given: The channel reach parameters from Example 1 and a lateral inflow of 21.3 acre-ft at a peak rate of 500 cfs. Assume the lateral inflow is uniformly distributed.

Find: The volume of outflow and peak rate of outflow if P = 50 acre-ft and p = 1,000 cfs.

Solution: Compute the lateral rates as follows:

$$Q_L = \frac{21.3 \text{ acre-ft}}{5.0 \text{ mi}} = 4.26 \text{ acre-ft/mi}$$

and

$$q_L = \frac{500 \text{ cfs}}{(5.0 \text{ mi})(5{,}280 \text{ ft/mi})} = 0.0189 \text{ cfs/ft.}$$

Using a(x,w) = −5.78, b(x,w) = 0.783, k = 0.000699, and w = 70 from Case 2 of Example 1 in equation 19–4, the result is

$$Q(x,w) = -5.78 + 0.783P + \frac{Q_L}{kw}(1 - 0.783)$$
$$= 52.3 \text{ acre-ft.}$$

The corresponding calculations for peak discharge of the outflow hydrograph (eq. 19–5) are

$$q(x,w) = -17.5 - 0.656P + 0.783p$$
$$+ \frac{q_L\,(5{,}280)}{kw}[1 - 0.783]$$
$$= 1{,}175 \text{ cfs.}$$

Example 3. Approximations for Out-of-Bank Flow

In this example, approximations for out-of-bank flow are described and discussed.

Given: A channel reach of length x = 10 mi and an average width of in-bank flow w_1 = 150 ft with in-bank flow up to a discharge of 3,000 cfs. Once the flow exceeds 3,000 cfs, out-of-bank flow rapidly covers wide areas. The bed material consists of clean sand and gravel, and the out-of-bank material is sandy with significant amounts of silt-clay.

Find: The outflow if the inflow is P = 700 acre-ft with a peak rate of p = 4,000 cfs. Assume the mean duration of flow is 12 hr and the total average width of out-of-bank flow is 400 ft. Also, estimate the distance downstream before the flow is back within the channel banks.

APPENDIX D

Geomorphological Evaluation of Landforms

RECEIVED
AUG 1 1 1999
WOOD / PATEL

JE Fuller/ Hydrology & Geomorphology, Inc.

Jonathan Fuller, P.E., P.H.
Brian Iserman, P.E.
John Wallace, P.E.
Ted Lehman

5235 So. Kyrene Rd., Suite 105
Tempe, Arizona 85283
480-752-2124 (voice)
480-839-2193 (fax)
www.jefuller.com

August 10, 1999

Ashok Patel, P.E.
Wood, Patel, & Associates, Inc.
1550 East Missouri, Suite 203
Phoenix, AZ 85014
(602) 234-1344

Re: Evaluation of Landforms for White Tank Mountains East Area

Dear Mr. Patel:

JE Fuller/ Hydrology & Geomorphology, Inc. (JEF) has investigated the nature of the landforms for the following 5 sites per your request (see also Location Map):

1 - on the North Fork White Granite Wash where it enters Sec. 12 in T2N, R3W at the section line between Sec. 11 and 12
2 - on White Granite Wash where it enters Sec. 13 in T2N, R3W at the section line between Sec. 13 and 14
3 - at the unnamed wash (north tributary to Osborn Road Wash) near the center of Sec. 23 in T2N, R3W
4 - on Osborn Road Wash where it enters Sec. 25 in T2N, R3W at the section line between Sec. 25 and 26
5 - on Bulldozer Wash where it enters Sec. 31 in T2N, R2W near the ¼ corner on the section line between Sec. 31 and 36 of T2N, R3W.

Note that after closer examination of the maps at Wood/Patel (Wood/Patel, 1999), site 5 was moved from the location noted in our original proposal.

JEF investigated the washes at the 5 sites to determine whether they are or are not active alluvial fans at these locations. The NRCS Soil Surveys (Camp, 1986; Hartman, 1977), Arizona Geological Survey report (Field and Pearthree, 1992), and existing aerial photographs (Landiscor, 1999) and maps (Wood/Patel, 1999) were examined. Additionally, a site visit to each of the sites was conducted to verify information contained in the various published material.

The findings of our investigation for each site are summarized below.

Site 1

Site 1 is located along the wash which follows the steep test road leading to the communications towers on the White Tank East Peak. The wash is confined between a tall (approximately 20 feet) natural terrace on the channel right (south) bank and the road embankment on the channel left (north) bank. The channel itself is braided and active between the toe of these two banks. However, due to the height of these banks and the size of the drainage area, this channel is not expected to avulse or otherwise relocate itself. The channel remains confined to two high natural

terraces at its crossing of the road near the center of the north half of Sec. 13, T2N, R3W. The FEMA FIRM (Panel 04013C1570 E, September 30, 1995) also shows the floodplain confined to a single channel above and below this road crossing. Limited local exposures along the natural terraces along the south side of the wash show deep reddened soils. The reddish soils indicate a surface that is very old and one that has been stable for thousands of years. The natural channel banks are generally smooth and rounded in shape despite the height of the bank, giving further evidence of their locational stability. The SCS soil maps show map unit 48, Ebon-Pinamt complex 3-20% slopes for this area. The Ebon-Pinamt complex is described as being "on fan terraces". The AZGS OFR 91-10 report classifies the flood hazard in this reach as "L2", "Lowest; restricted to small channels and localized sheetflooding", with "dendritic tributary drainages".

The North Fork White Granite Wash at Site 1 is not considered to be an active alluvial fan.

Site 2

Site 2 is located at the section line between Sec. 13 and 14 in T2N, R3W. The active wash bottom is also confined between relatively high (about 10 feet) terrace surfaces where it crosses the road near the property boundary. As at Site 1, Site 2 is located in SCS soil map unit 48 and AZGS flood hazard unit L2.

The White Granite Wash at Site 2 is not considered to be an active alluvial fan.

Site 3

Site 3 is located downstream of the confluence of two highly entrenched washes near the center of Sec. 23, T2N, R3W. This wash is a tributary to Osborn Road Wash. The wash is braided and active across the bottom of this 20 foot deep arroyo. The tops of the adjacent surfaces are covered with heavily darkened varnished boulders indicating the long-term stability of this surface. As at Site 1 and 2, Site 3 is located in SCS soil map unit 48 and AZGS flood hazard unit L2.

The unnamed wash at Site 3 is not considered to be an active alluvial fan.

Site 4

Site 4 is located at the west boundary of the NW1/4 of Sec. 25, T2N, R3W. The AZGS report classifies an area about ¼ mile wide as zone "H1" crossing into the property at this site. "H1" is identified as "highest flood hazard" in "entrenched reaches of major drainages and distributary flow areas". Channel patterns are "braided (anastomosing) or distributary". The SCS soil map shows the area as starting in unit 48 (fan terraces) and entering into unit 3 – Antho-Carrizo-Maripo complex which are generally associated with floodplains and drainageways.

Field investigation revealed a significant amount of grading and berming in and immediately east of the most active portions of the wash. These activities obscure the natural channel pattern in a very critical area near the intersection of the Indian School Road alignment and the west section line of Sec. 25 (see Site 4 Map). Several berms composed of sand, gravel, and large rock presently prevent floodwaters from overflowing toward the southeast to an area which historically received floodwaters at higher discharges. The USGS quadrangle shows the wash stopping near the SE corner of Sec. 23. The FIRM appears to follow the continuous blue line shown on the

quadrangle into Sec. 26. However, the wash from the north in Sec. 23 has a larger drainage area and is, in my judgment, the more significant drainage to Site 4.

The existing channels to the SE of this critical area appear moderately entrenched with the degree of entrenchment increasing from 1-2 feet near the earthen berm to 5-6 feet where they rejoin the main channel near the center of the NW1/4 of Sec. 25. The surface is also inhabited by a fair number of large saguaro cactus, indicating the relatively stable nature of these distributary channels.

It is my judgment that this location is an actively entrenching alluvial fan. Without the earthen berms, infrequent large floods may be capable of delivering large amount of water and sediment into the distributary channels SE of the point where the wash crosses the Indian School Road alignment. Field evidence suggests that the existing distributary channels in the east portion of this distributary area have been relatively stable over the past few hundred years and that perhaps 20% of the 100-year discharge might overflow into these channels if the berms were not present.

These berms are simple unengineered piles of earth and should not be considered adequeate permanent protection from distributary flooding at this site. However, it is likely that feasible engineering solutions could be designed to prevent floodwaters from flowing into the cutoff distributary channels. Structural solutions could be constructed on the property to protect downstream areas from potential failure of the existing unengineered berms.

Finally, it is also my judgement that the existing floodplain delineation of Osborn Road Wash shown on FIRM Panel 04013C2035 F dated September 30, 1995 near the west edge of Sec. 25 probably does not adequately represent the location of all significant inflows to Sec. 25 in this area. Floodwaters pass through the existing line of large rocks (see Site 4 Map) north of the existing floodplain limit shown on the FIRM. Again, it is likely that onsite structural engineering solutions could be feasibly designed to pick up these floodwaters and control them in a reasonable manner.

Site 5

The original site 5 at the south edge of Sec. 25 is a small entrenched channel from a dendritic tributary basin with a relatively small drainage area (less than 0.5 square mile). The new site 5 is located where this same wash reenters the property about ½ mile north of McDowell Road along the section line between Sec. 36, T2N, R3W and Sec. 31, T2N, R2W. At this location the wash remains confined between relatively high local relief. The wash is entrenched into the surrounding alluvial surface about 7 feet. The FIRM panel (04013C2035 F, September 30, 1995) indicates that the 100-year floodplain is confined to this entrenched reach.

The AZGS flood hazard map classifies this area as "H2", moderately high flood hazard, but confines the moderately high hazard limit to the narrow width of the existing channel. Though the AZGS map stops at the section line, the H2 area matches up to the FEMA floodplain suggesting, the continuity of the channel in this location. The SCS soil maps show soil type 10 west of the road (Camp, 1986) matching up to soil type TB with soil AL to the S and SW (Hartman, 1977). Soil type 10 is Brios-Carrizo complex with 1-5 percent slopes and is generally associated with floodplains and drainageways. Soil type TB is Torriofluvents which generallyh associated with young alluvial fans. Soil AL is also characteristized in association with alluvial fans.

The topographic maps also show smooth contour lines in this area indicating lower local relief and a lack of entrenchment south and east of the channel. However, the FEMA FIRM Panel 04013C2035 F indicates that the 100-year flood discharge is topographically contained within the existing wash. It is likely that the transition from a confined corridor to a less confined area takes place not far east of the section line. Definitive evaluation of this area is hindered due to the extent of disturbance of the surface in this area. Nevertheless, it is my judgment that at the property boundary along the section line, Bulldozer Wash at Site 5 should not be considered an active alluvial fan.

Summary

Sites 1-3 are clearly not active alluvial fans. Site 5, while shown on the SCS soil maps as having soils generally associated with young alluvial fans, exhibits significant relief local to the channel and is therefore not considered an active alluvial fan at this location where it enters the Caterpillar property. Site 4 exhibits the most active characteristics of any of the sites. However, it is likely that feasible onsite structural engineering solutions could be designed to intercept flood flows at this site.

References

Camp, P.D., 1986, Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona: U.S. Soil Conservation Service Report, 306 p.

FEMA, 1995, Flood Insurance Rate Maps, Panels, 04013C1570 E, 04013C1590 F, 04013C2035 F, and 04013C2055 E.

Field, John J. and Pearthree, Philip P., 1992, Geologic Mapping of Flood Hazards in Arizona: An Example from the White Tank Mountains Area, Maricopa County: Arizona Geological Survey OFR 91-10, 16 p.

Hartman, G. W., 1977, Soil Survey of Maricopa, Arizona, Central Part: U. S. Soil Conservation Service Report, 117 p.

Hjalmarson, H.W., 1998, Piedmont flood hazard assessment for flood plain management for Maricopa County, Arizona – DRAFT of August 1998: Flood Control District of Maricopa County, 158 p.

National Research Council, 1996, Alluvial Fan Flooding: Washington. D.C., National Academy Press, 172 p.

Wood/Patel, 1999, Exhibit Maps from the 404 Waters of the US Application to the US Army Corps of Engineers.

If you have any questions regarding our investigation, please do not hesitate to contact me. Thank you again for this opportunity to provide our services to Wood/Patel.

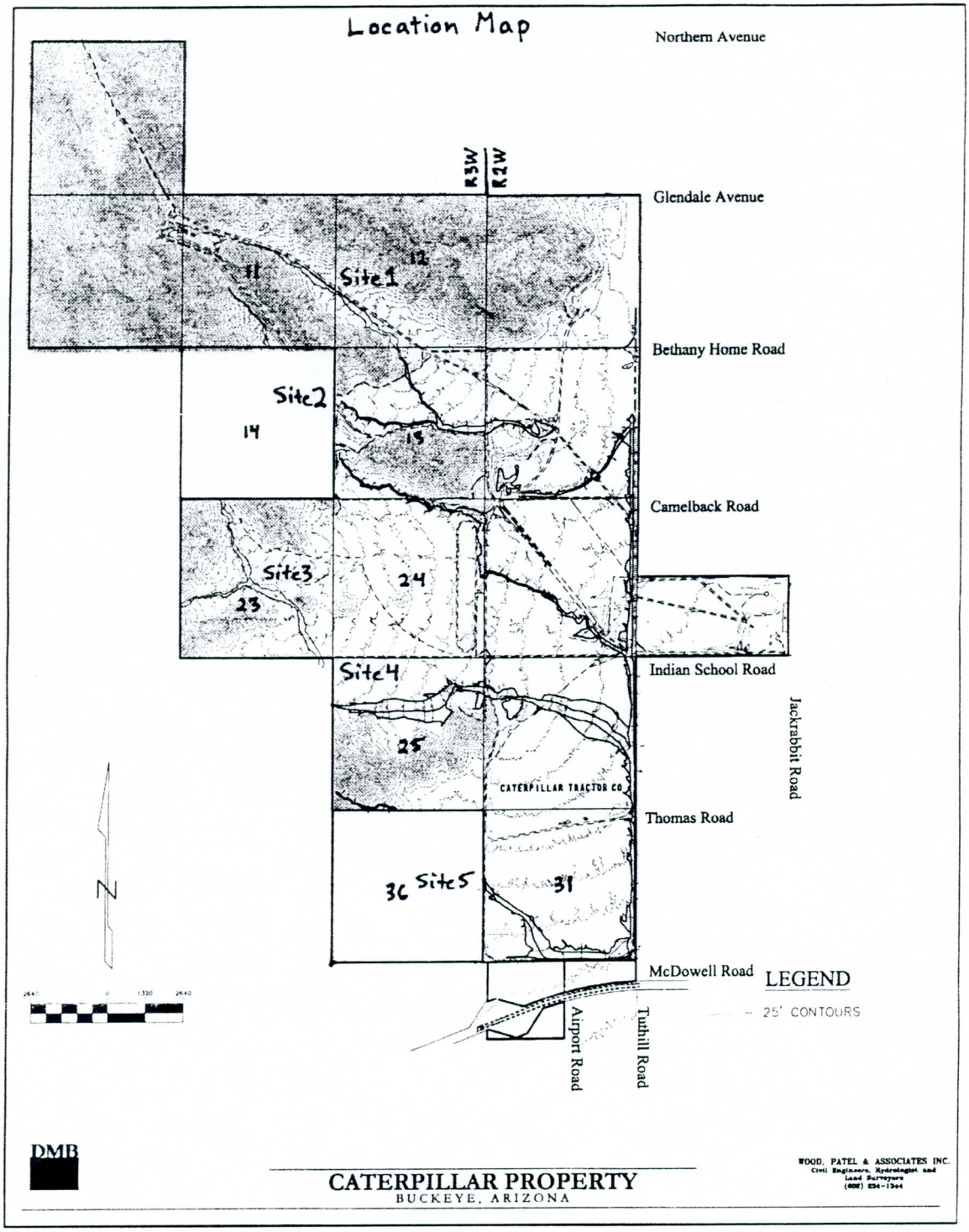
Sincerely,
JE Fuller / Hydrology & Geomorphology, Inc.

Brian R. Iserman

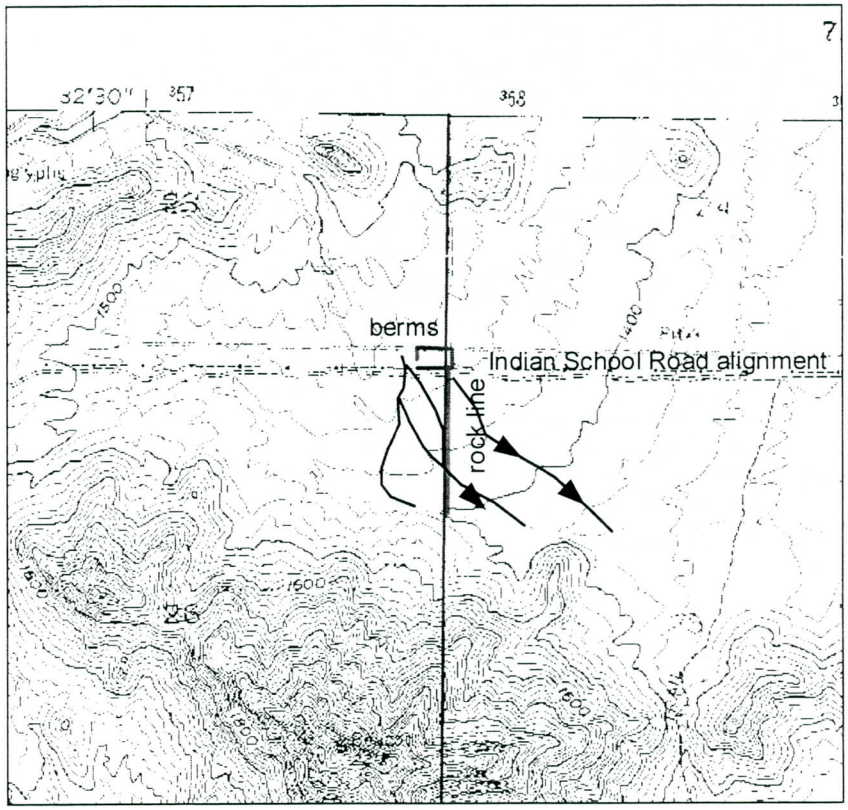
Brian Iserman, P. E.
Hydrologist

Registered Professional Engineer (Civil)
CERTIFICATE NO.
29325
BRIAN R.
ISERMAN
Date Signed 8/10/99
ARIZONA U.S.A.

Brian R. Iserman

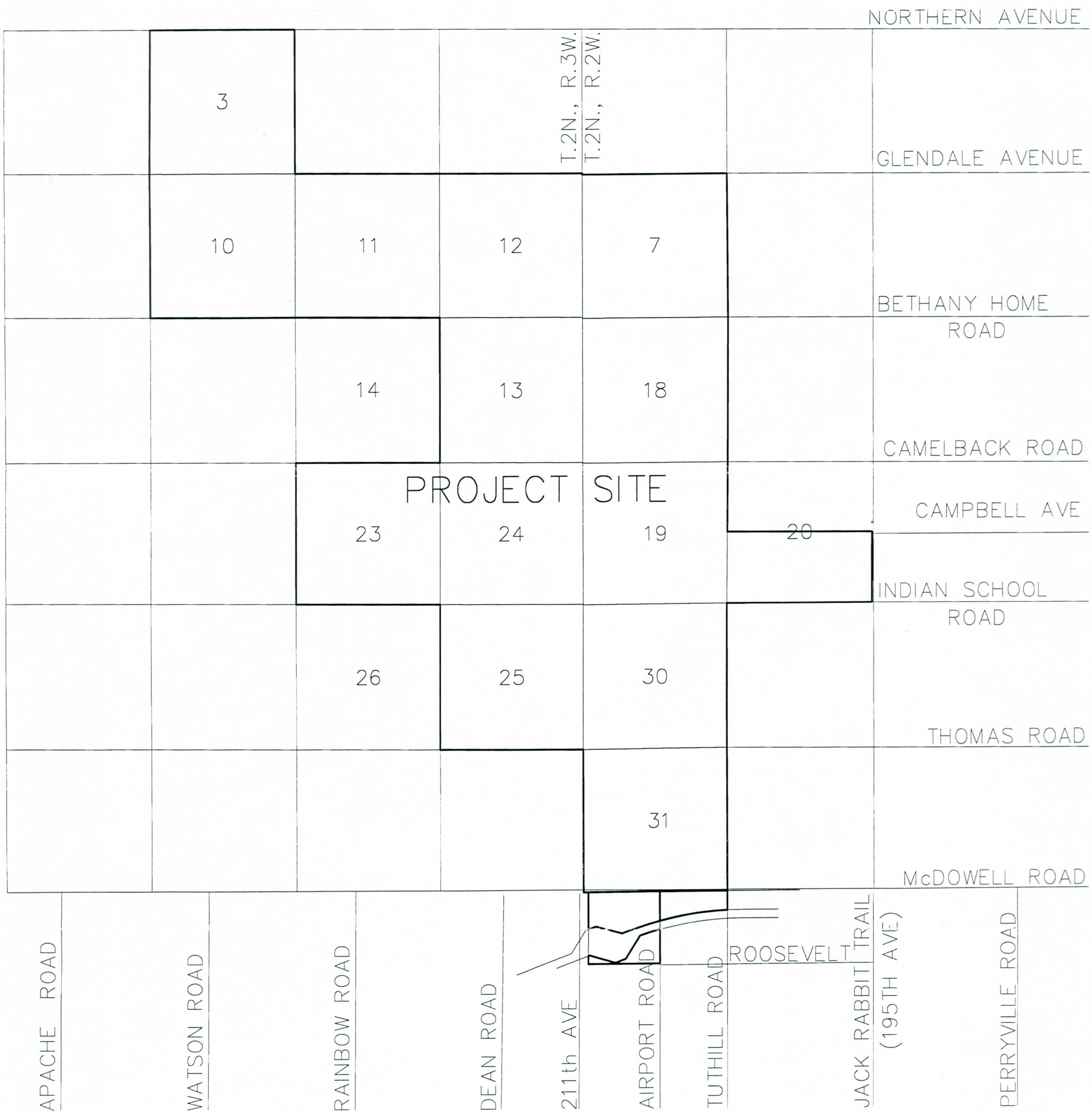

Location Map
Northern Avenue
R3W
R2W
Glendale Avenue
Site 1
11
12
Bethany Home Road
Site 2
14
13
Camelback Road
Site 3
23
24
Indian School Road
Site 4
25
CATERPILLAR TRACTOR CO.
Jackrabbit Road
Thomas Road
36
Site 5
31
McDowell Road
LEGEND
25' CONTOURS
Airport Road
Tuthill Road
N
DMB
CATERPILLAR PROPERTY
BUCKEYE, ARIZONA
WOOD, PATEL & ASSOCIATES INC.
Civil Engineers, Hydrologist and Land Surveyors
(602) 234-1344

Site 4 Map



approximately 1 mile

PLATES



DMB

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VICINITY MAP
PLATE 1

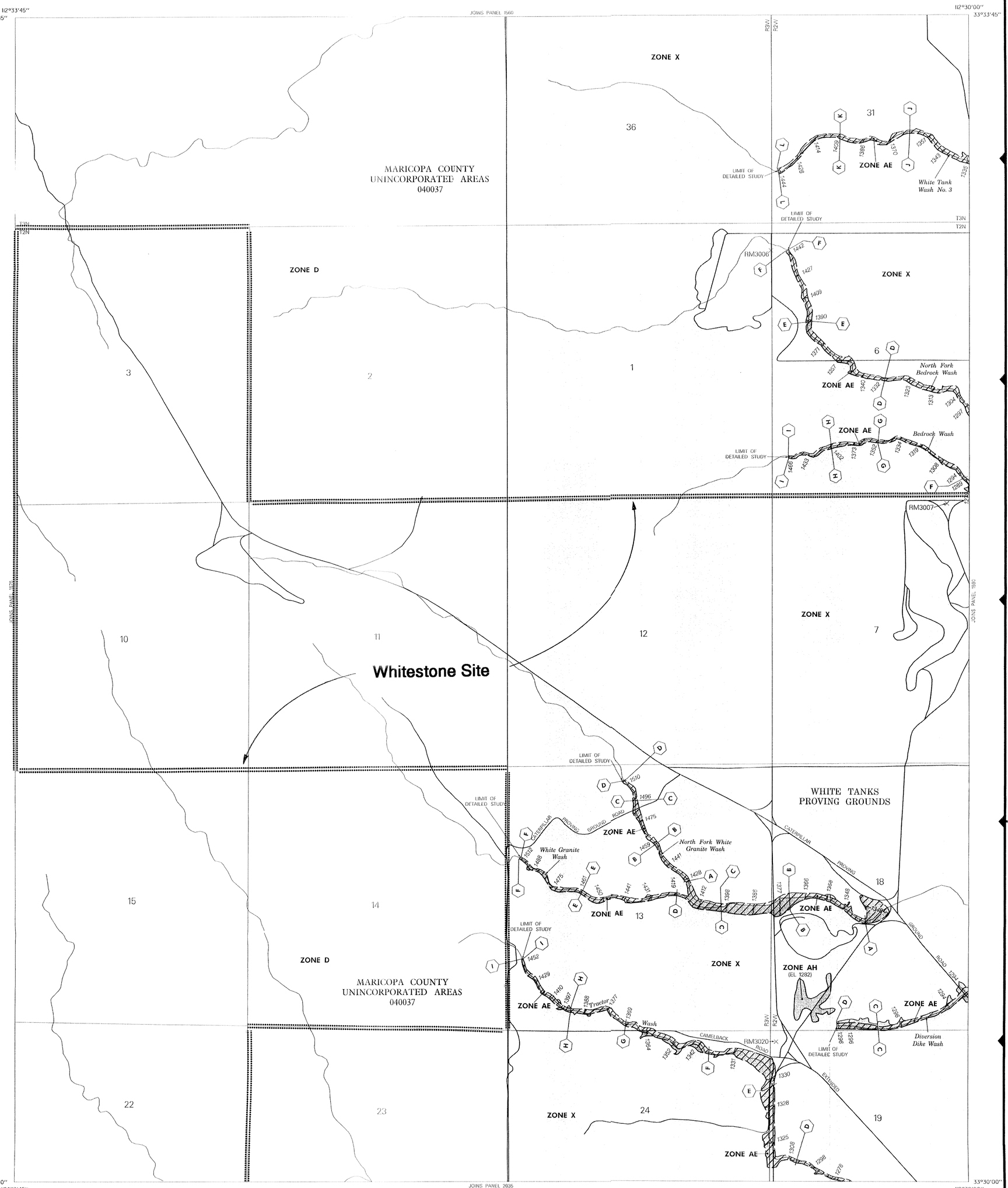
CATERPILLAR PROPERTY
MARICOPA COUNTY, ARIZONA

0 1/2 1
1 MILE

WOOD,PATEL ASSOCIATES INC.
Civil Engineers, Hydrologist and Land Surveyors
(602) 234-1344

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3006	1474.15	National Geodetic Survey benchmark in stone stamped N475 1981 2.5 miles west of Beardsley Canal along Northern Avenue near northwest corner, section 6, T2N, R2W.
RM3007	1304.52	3-inch aluminum cap at south side of dirt road [Glendale Avenue extended] 0.37 mile west of Tuthill Road extended, 0.37 mile west of southwest corner, section 5, T2N, R2W.
RM3020	1396.55	Chiseled X in highest boulder q 130 feet south and 30 feet east of southwest corner, section 18 in top of a small hill near southwest corner, section 18, T2N, R2W.



LEGEND

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

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERM's shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242 or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 — Elevation Reference Mark

• M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at V20 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 30, 1995

Map revised July 19, 2001 to update corporate limits, to change base flood elevations, to add base flood elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1570 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY UNINCORPORATED AREAS	040037	1570	F

MAP NUMBER 04013C1570 F

MAP REVISED: JULY 19, 2001

PLATE 2.1

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3008	1218.83	Chiseled square in concrete base electrical transformer W5C 363 at southeast corner of intersection of Perryville Road and Northern Avenue, near southeast corner section 33, T3N, R2W.
RM3009	1182.66	1-4-inch iron pin in pothole, Perryville Road and Glendale Avenue, southeast corner section 4, T2N, R2W.
RM3010	1264.23	National Geodetic Survey benchmark - stainless-steel rod encased in pipe and stamped L475 1981 0.7 mile west of Beardsley Canal along Northern Avenue, q 1050 feet west of northeast corner section 5, T2N, R2W.
RM3011	1213.89	Iron pin at centerline intersection of Glendale Avenue and Jackrabbit Trail, southeast corner section 5, T2N, R2W.
RM3021	1262.08	Inverted aluminum cap at southwest corner of section 17, southwest corner section 17, T2N, R2W.
RM3022	1153.06	1-inch iron pipe flush with pavement, Perryville and Bethany Home Roads, southeast corner section 9, T2N, R2W.
RM3023	1185.68	40d nail in west face of power pole on east side of Jackrabbit Trail approximately 1000 feet south of Medlock Drive, near southeast corner section 17, T2N, R2W.
RM3035	1132.41	Iron rod flush with pavement, Perryville and Camelback Roads, southeast corner section 16, T2N, R2W.

Whitestone Site

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

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ZONE AE Base flood elevations determined.

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ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by federal flood protection system under construction; no base flood elevations determined.

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FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

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Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

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D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 × — Elevation Reference Mark

• M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and/or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 4, 1991 SEPTEMBER 30, 1996

Map revised July 19, 2001 to update corporate limits, to change base flood elevations, to add base flood elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

APPROXIMATE SCALE IN FEET
1000 0 1000

LEGEND

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

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1590 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
GLENDALE, CITY OF	040045	1590	G
GOODYEAR, CITY OF	040046	1590	G
MARICOPA COUNTY UNINCORPORATED AREAS	040037	1590	G

MAP NUMBER
04013C1590 G

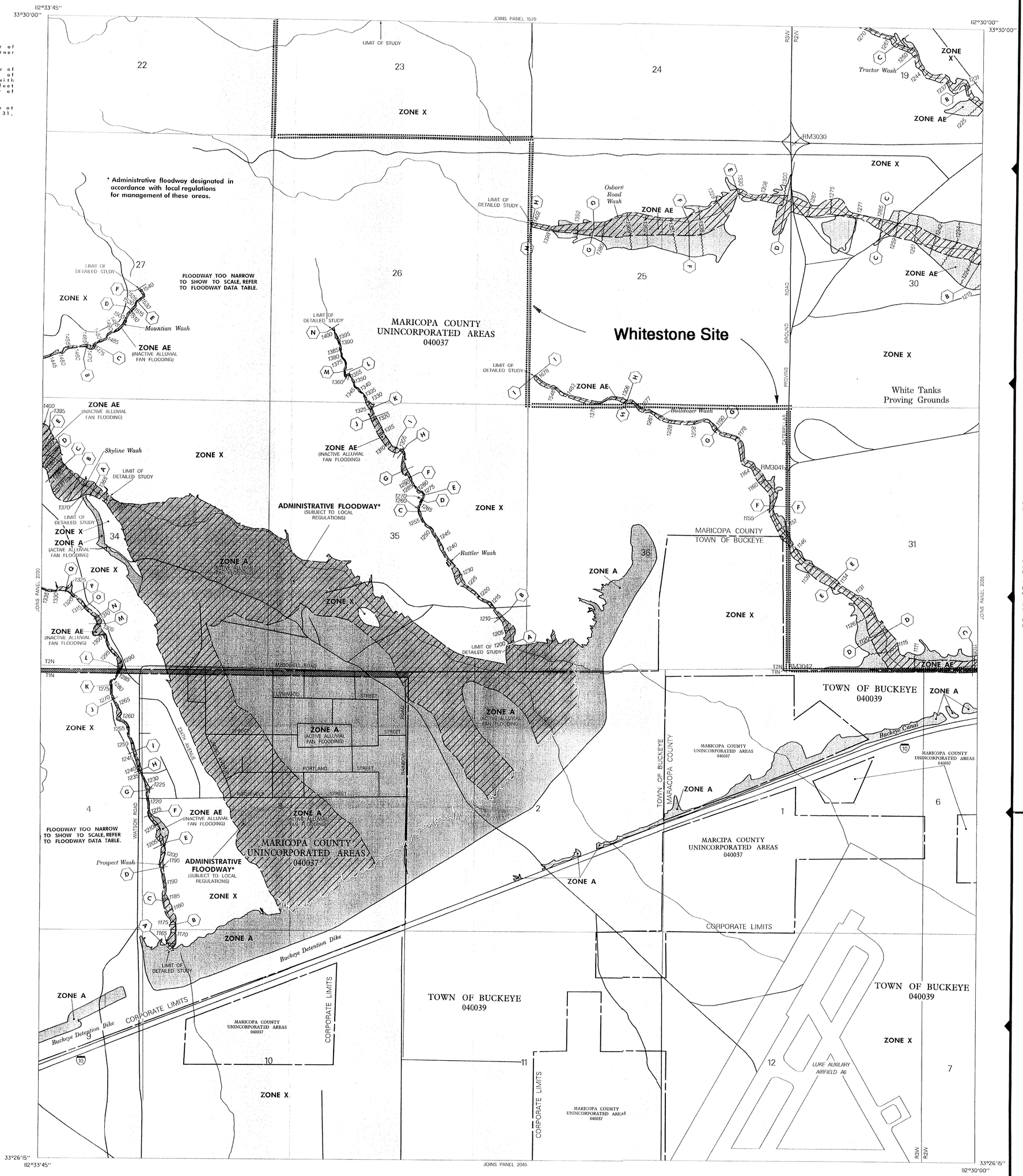
MAP REVISED:
JULY 19, 2001

PLATE 2.2

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3030	1308.77	Brass cap at southwest corner of section 19, southwest corner section 17, T2N, R2W.
RM3041	1184.64	3-inch aluminum cap at west side of dirt road along west side of section 31, at intersection with dirt road to northeast q 1200 feet south of the northwest corner of section 31, T2N, R2W.
RM3042	1114.76	Steel pin 0.8 foot below surface at southwest corner of section 31, T2N, R2W.



LEGEND

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

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and /or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction ; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 — Identified 1990 — Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 × — Elevation Reference Mark

• M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (P.L. 101-591).

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 4, 1991, SEPTEMBER 30, 1995

Map revised July 19, 2001 to update corporate limits, to change base flood elevations, to add base flood elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to update map format, to add roads and road names, and to incorporate previously issued Letter of Map Revision.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2035 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2035	G
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2035	G

MAP NUMBER
04013C2035 G

MAP REVISED:
JULY 19, 2001

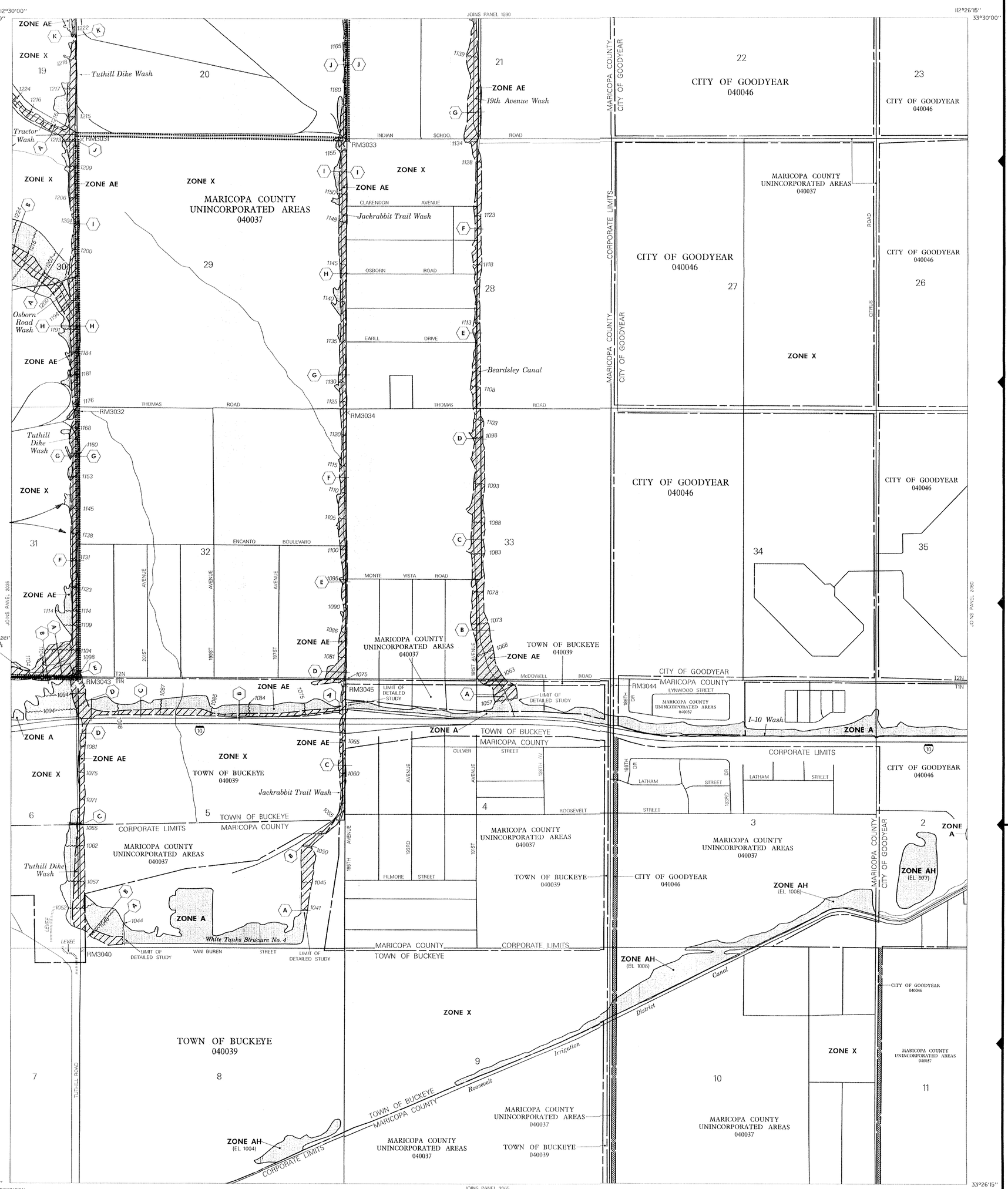
PLATE 2.3

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3031	1218.28	3-inch aluminum cap at southeast corner of intersection of Tuthill and Indian School Roads, near southwest corner section 20, T2N, R2W.
RM3032	1176.94	3-inch aluminum cap in top of berm on west side of Tuthill Road at intersection of road to southwest q 200 feet south of northwest corner section 32, T2N, R2W.
RM3033	1160.26	Brass cap in handhole, Jackrabbit Trail and Indian School Road, southeast corner section 20, T2N, R2W.
RM3034	1125.07	40d nail in southwest face of power pole (PS 177171) at northeast corner of intersection of Jackrabbit Trail and Thomas Road, near southeast corner section 29, T2N, R2W.
RM3040	1044.61	Cotton picker spindle in power pole southeast corner of intersection of Tuthill Road and Van Buren Street, near southeast corner section 6, T1N, R2W.
RM3043	1100.43	3-inch iron pipe at center of pavement on McDowell Road q 25 feet east of barricade at flood control channel, southwest corner section 31, T2N, R2W.
RM3044	1051.34	Brass cap in handhole, Perryville and McDowell Roads.
RM3045	1079.43	Brass cap in handhole at centerline intersection of McDowell Road and Jackrabbit Trail, southwest corner section 33, T2N, R2W.

Whitestone Site



LEGEND

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

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevaton information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFEs shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum

RM7 × — Elevation Reference Mark

• M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 120 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 30, 1995

Map revised July 19, 2001 to update corporate limits, to change base flood elevations, to add base flood elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2055 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2055	F
GOODYEAR, CITY OF	040046	2055	F
MARICOPA COUNTY UNINCORPORATED AREAS	040037	2055	F

MAP NUMBER
04013C2055 F

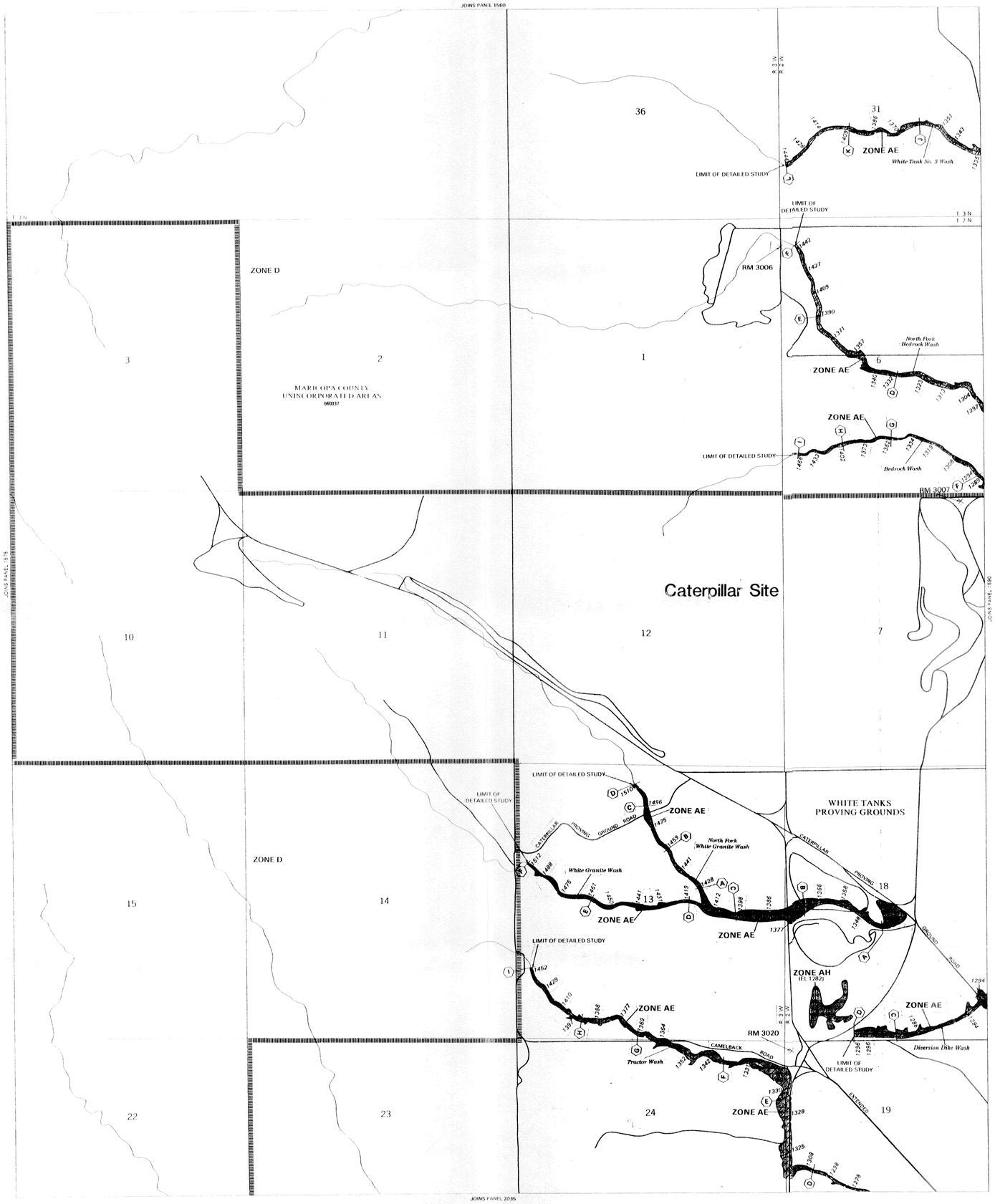
MAP REVISED:
JULY 19, 2001

PLATE 2.4

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT NGVD)	DESCRIPTION OF LOCATION
RM 3006	1474.15	National Geodetic Survey Bench Mark In Stone Stamped "M425 1981" 2.5 Miles West of Beardsley Canal along Northern Ave. Near Northwest Corner, Section 6, Township 2 North, Range 2 West
RM 3007	1304.52	3" Aluminum Cap at South Side of Dirt Road (Glendale Ave. Extended) 0.37 Miles West of Litchfield Rd. Extended 0.37 Miles West of Southwest Corner, Section 5, Township 2 North, Range 2 West
RM 3020	1396.55	Chiseled "X" In Highest Boulder ±130' South of and 30' East of Southwest Corner, Section 18 In the Top of a Small Hill Near Southwest Corner, Section 18, Township 2 North, Range 2 West



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100 YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year flood plain.
- **ZONE D** Areas in which flood hazards are undetermined.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

~~~513~~~ Base Flood Elevation Line; Elevation in Feet*

(D)———(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

BM7x Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Areas of special flood hazard (100-year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross-sections and interpolated between cross-sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Coastal base flood elevations apply only landward of the shoreline.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of the map.

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY

Refer to Repository Listing on Index Map

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 15, 1988

EFFECTIVE DATE (S) OF REVISION (S) TO THIS PANEL

Map revised: SEPTEMBER 30, 1995 to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to add and update roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision, and to incorporate previously issued letters of map amendment.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY UNINCORPORATED AREAS	040037	1570	E

MAP NUMBER
04013C1570 E

MAP REVISED:
SEPTEMBER 30, 1995

PLATE 2.1

Federal Emergency Management Agency
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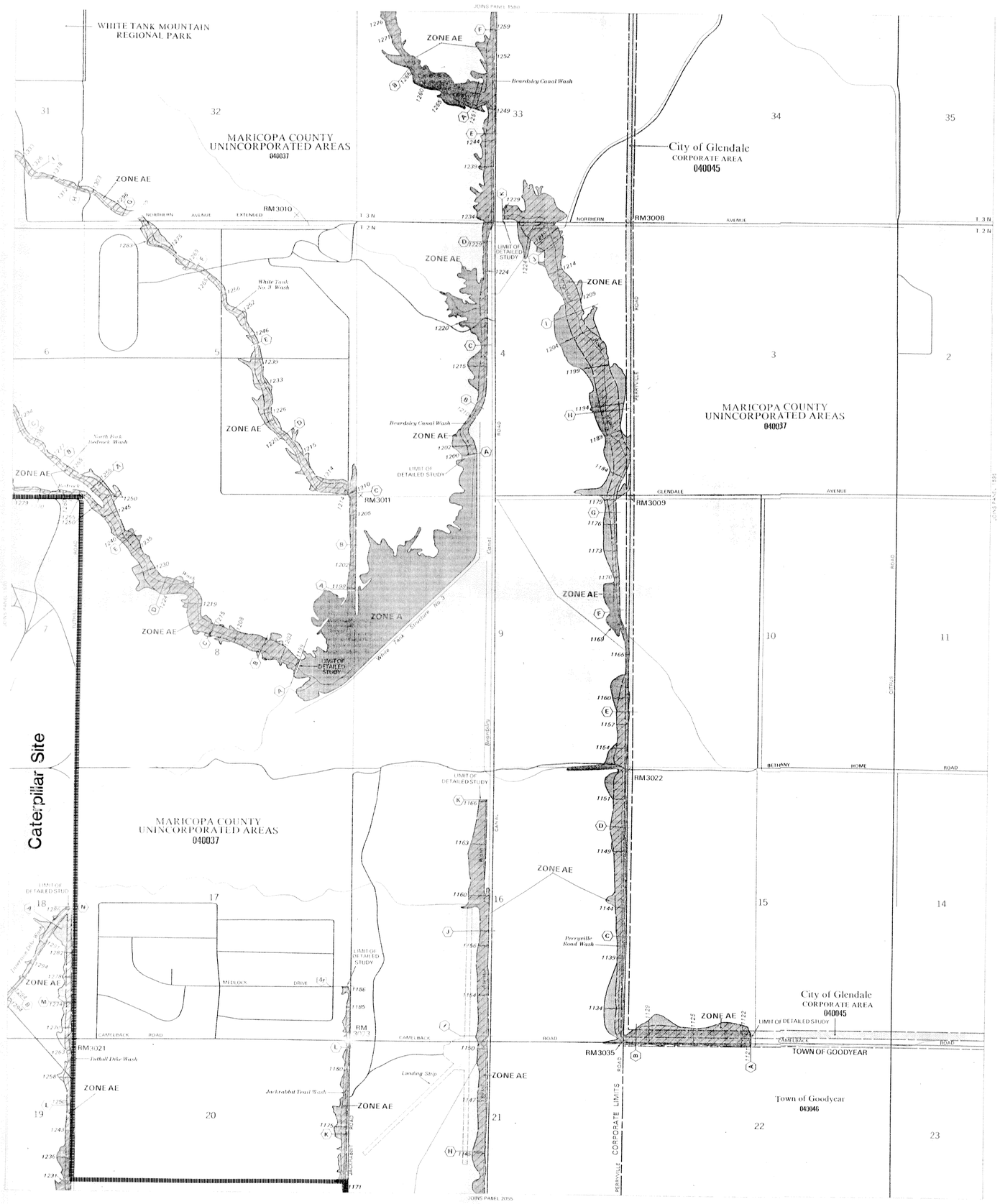


ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100 YEAR FLOOD

- ZONE A — No base flood elevations determined.
- ZONE AE — Base flood elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99 — To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- ZONE V — Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE — Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- ZONE X — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- ZONE X — Areas determined to be outside 500-year flood plain
- ZONE D — Areas in which flood hazards are undetermined.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet*

(D) — (D) Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone*

BM7 — Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

[illegible]

Areas of special flood hazard (100-year flood) are inside Zones A, AE, AH, AO, A99, V, VE or MH/VE.

Certain areas not in special flood hazard areas may be inundated by flood exceeding the base.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Elevations shown for flood elevations apply only landward of the shoreline.

Coastal flood hazard areas are delineated on the Flood Insurance Rate Map. The zone shown in the Flood Insurance Study Report is based on the 100-year stillwater elevation. Wave heights greater than or equal to 3 feet may occur in areas of coastal flood hazard designated on the map.

For commonly used vertical datum conversions, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels, see separately printed Map Index.

MAP REPOSITORY

Refer to Repository Listing on Index Map.

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 15, 1988
EFFECTIVE DATE (S) OF REVISION (S) TO THIS PANEL
SEPTEMBER 4, 1991

Map revised SEPTEMBER 30, 1995: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to add and update roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision, and to incorporate previously issued letters of map amendment.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

SPERRYVILLE — SAFFORD

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

CONTAINS

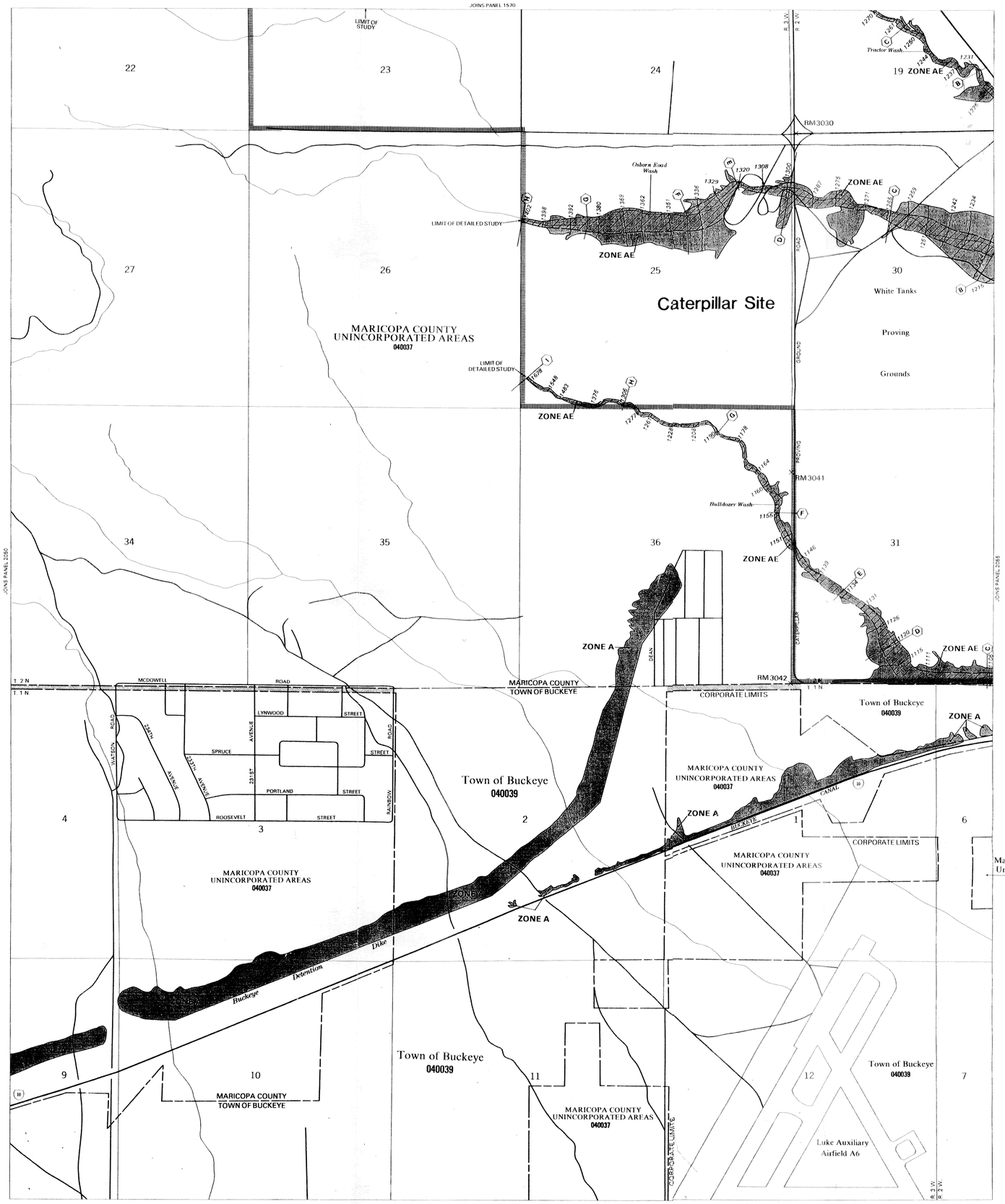
COMMUNITY	NUMBER	PANEL	SUFFIX
GLENDALE, CITY OF	040045	1590	F
GOODYEAR, TOWN OF	040046	1590	F
MARICOPA COUNTY UNINCORPORATED AREAS	040037	1590	F

MAP NUMBER
04013C1590 F

MAP REVISED:
SEPTEMBER 30, 1995

PLATE 2.2

Federal Emergency Management Agency



ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM 3030	1,308.77	Brass cap at southwest corner of Section 19, southwest corner Section 17, Township 2 North, Range 2 West
RM 3041	1,184.64	Three-inch aluminum cap at west side of dirt road along west side of Section 31, at intersection with dirt road to northeast ±1,200 feet south of the northwest corner of Section 31, Township 2 North, Range 2 West
RM 3042	1,114.76	Steel pin 0.8 foot below surface at southwest corner of Section 31, southwest corner Section 31, Township 2 North, Range 2 West

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** — No base flood elevations determined.
- **ZONE AE** — Base flood elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** — To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- **ZONE V** — Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** — Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside 500-year flood plain.
- **ZONE D** — Areas in which flood hazards are undetermined.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

~~~513~~~ Base Flood Elevation Line; Elevation in Feet*

(D)———(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM7$_X$ Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Areas of special flood hazard (100 year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Coastal base flood elevations apply only landward of the shoreline.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of the map.

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988
EFFECTIVE DATE (S) OF REVISION (S) TO THIS PANEL:
SEPTEMBER 4, 1991

Map revised SEPTEMBER 30, 1995 to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to add and update roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision, and to incorporate previously issued letters of map amendment.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2035 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2035	F
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2035	F

MAP NUMBER
04013C2035 F

MAP REVISED:
SEPTEMBER 30, 1995

PLATE 2.3

Federal Emergency Management Agency
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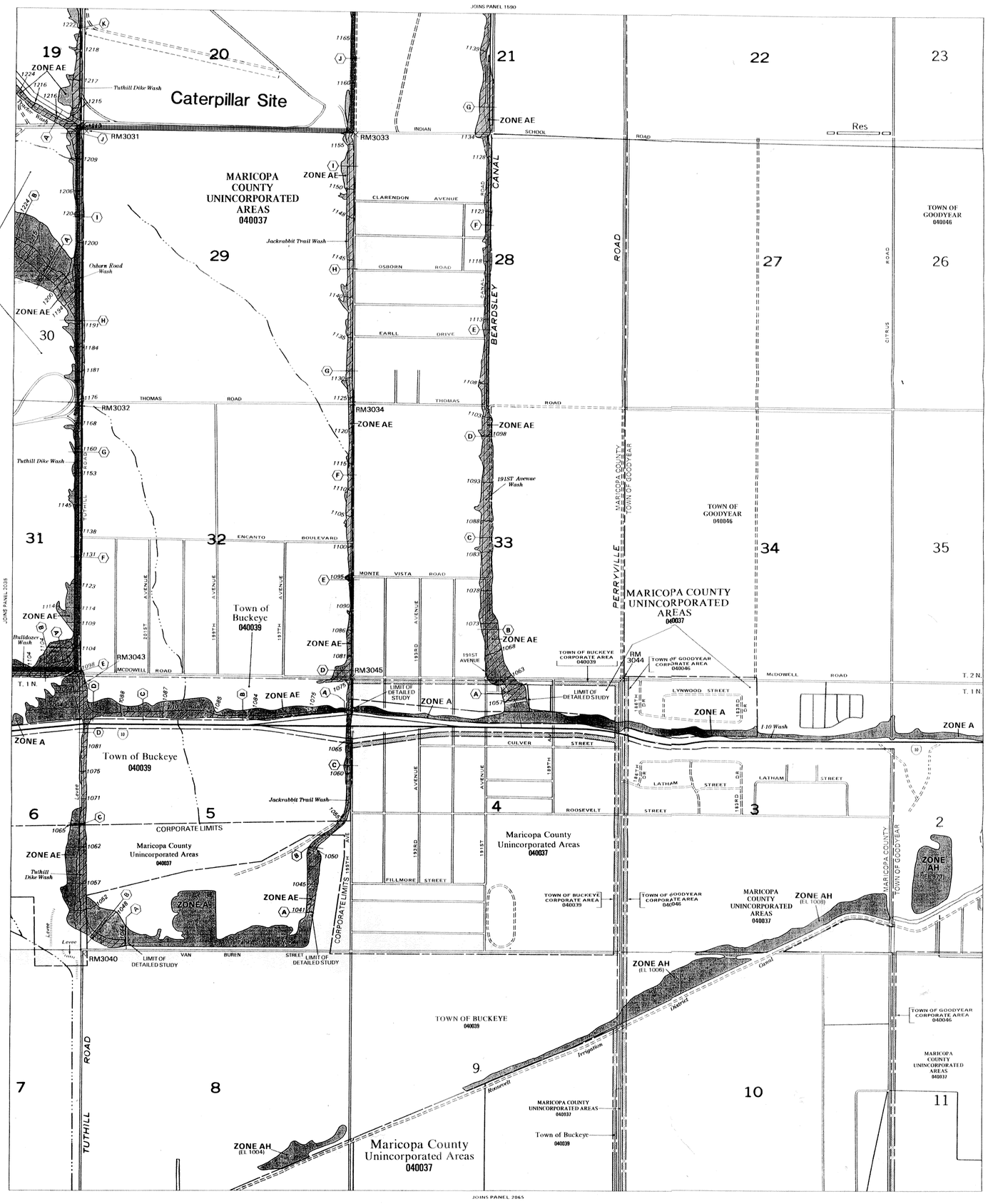

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM 3031	1,218.28	Three-inch aluminum cap at southeast corner of intersection of Tuthill Road and Indian School Road, near southwest corner Section 20, Township 2 North, Range 2 West
RM 3032	1,176.94	Three-inch aluminum cap on top of berm on west side of Tuthill Road at intersection of road to southwest ±200 feet south of northwest corner Section 32, Township 2 North, Range 2 West
RM 3033	1,160.26	Brass cap in handhole, Jackrabbit Trail and Indian School Road, southeast corner Section 20, Township 2 North, Range 2 West
RM 3034	1,125.07	40d nail in southwest face of power pole (PS 177178) at northeast corner of intersection of Jackrabbit Trail and Thomas Road, near southeast corner Section 29, Township 2 North, Range 2 West
RM 3040	1,044.61	Cotton picker spindle on power pole southeast corner of intersection of Tuthill Road and Van Buren Street, near southeast corner Section 6, Township 1 North, Range 2 West
RM 3043	1,100.43	Three-inch iron pipe at center of pavement on McDowell Road ±25 feet east of barricade at flood control channel, southwest corner Section 33, Township 2 North, Range 2 West
RM 3044	1,051.34	Brass cap in handhole, Perryville Road and McDowell Road
RM 3045	1,079.43	Brass cap in handhole at centerline intersection of McDowell Road and Jackrabbit Trail, southwest corner Section 33, Township 2 North, Range 2 West

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

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- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
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- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year flood plain.
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Floodway Boundary

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Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

~~~513~~~ Base Flood Elevation Line; Elevation in Feet*

(D)———(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM7/X Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Areas of special flood hazard (100-year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

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For adjoining map panels see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 15, 1988

EFFECTIVE DATE (S) OF REVISION (S) TO THIS PANEL

Map revised: SEPTEMBER 30, 1995 to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to add and update roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision, and to incorporate previously issued letters of map amendment.

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APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2055 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2055	E
GOODYEAR, TOWN OF	040046	2055	E
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2055	E

MAP NUMBER
04013C2055 E

MAP REVISED:
SEPTEMBER 30, 1995

PLATE 2.4

Federal Emergency Management Agency

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 1 NORTH, RANGE 2 WEST AND TOWNSHIP 2 NORTH, RANGE 2 WEST
~~~
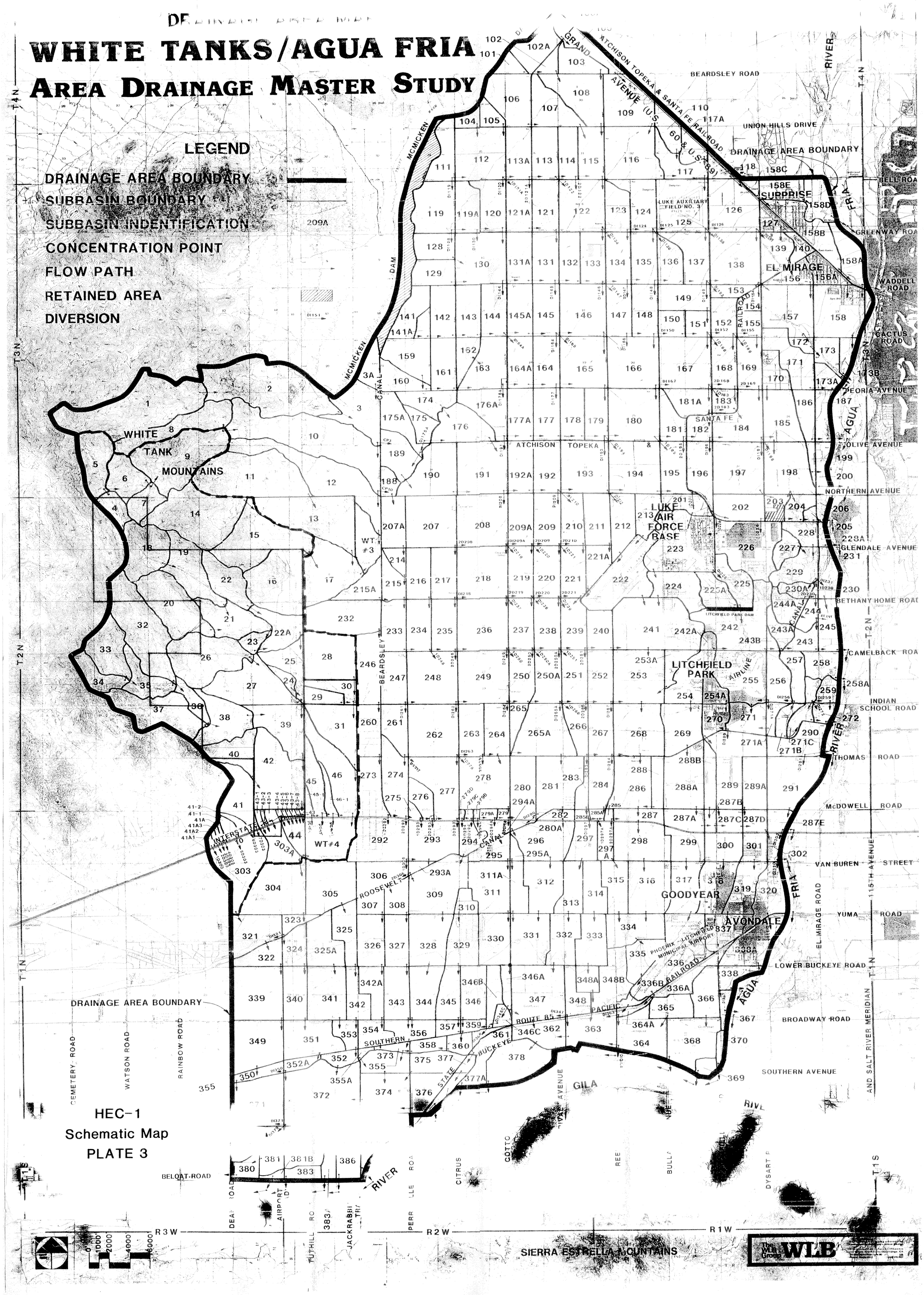
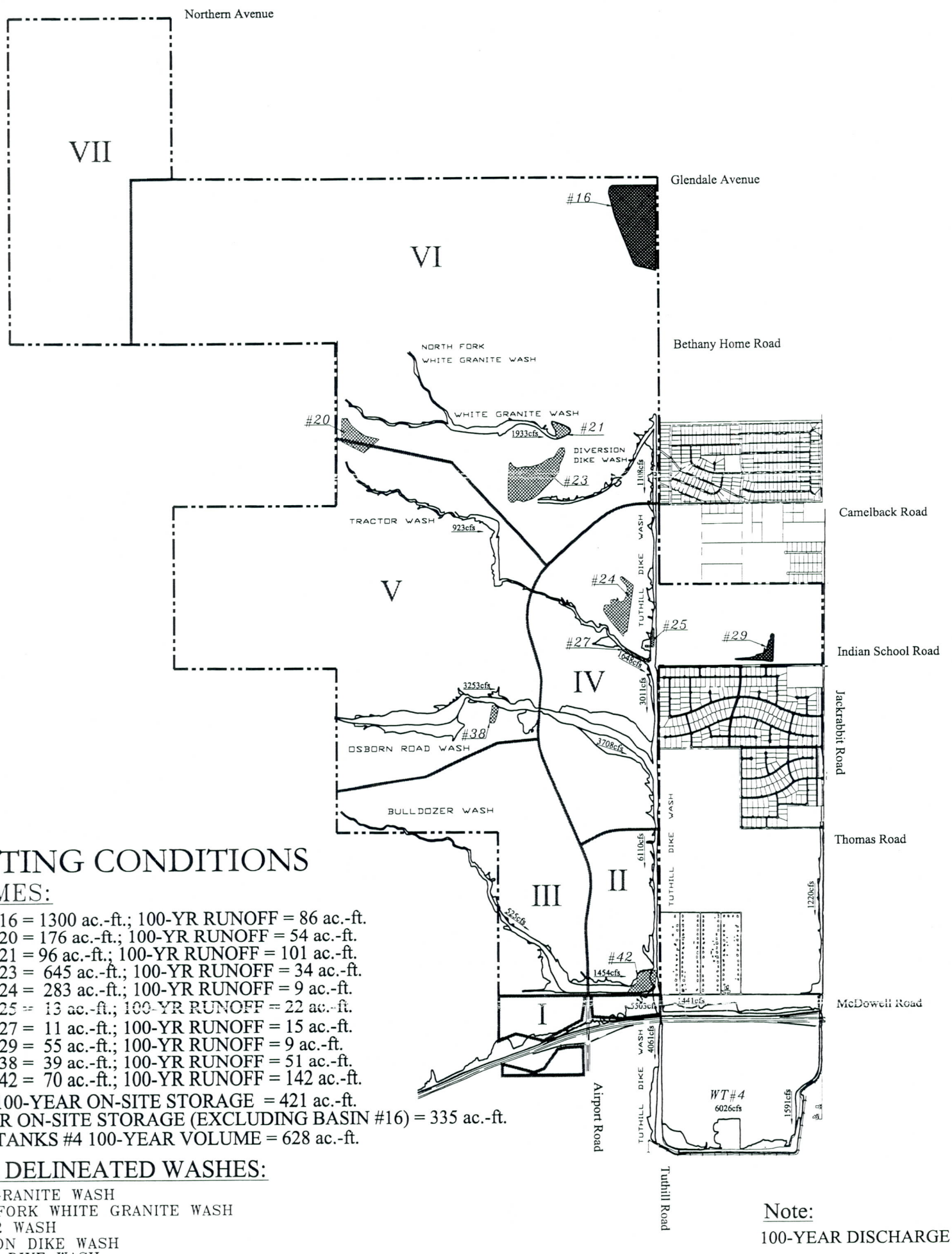

PLATE 3

HEC-1 SCHEMATIC MAP

WHITE TANKS/AGUA FRIA AREA DRAINAGE MASTER STUDY



HEC-1
Schematic Map
PLATE 3



EXISTING CONDITIONS

VOLUMES:

BASIN #16 = 1300 ac.-ft.; 100-YR RUNOFF = 86 ac.-ft.
BASIN #20 = 176 ac.-ft.; 100-YR RUNOFF = 54 ac.-ft.
BASIN #21 = 96 ac.-ft.; 100-YR RUNOFF = 101 ac.-ft.
BASIN #23 = 645 ac.-ft.; 100-YR RUNOFF = 34 ac.-ft.
BASIN #24 = 283 ac.-ft.; 100-YR RUNOFF = 9 ac.-ft.
BASIN #25 = 13 ac.-ft.; 100-YR RUNOFF = 22 ac.-ft.
BASIN #27 = 11 ac.-ft.; 100-YR RUNOFF = 15 ac.-ft.
BASIN #29 = 55 ac.-ft.; 100-YR RUNOFF = 9 ac.-ft.
BASIN #38 = 39 ac.-ft.; 100-YR RUNOFF = 51 ac.-ft.
BASIN #42 = 70 ac.-ft.; 100-YR RUNOFF = 142 ac.-ft.

TOTAL 100-YEAR ON-SITE STORAGE = 421 ac.-ft.
100-YEAR ON-SITE STORAGE (EXCLUDING BASIN #16) = 335 ac.-ft.
WHITE TANKS #4 100-YEAR VOLUME = 628 ac.-ft.

FEMA DELINEATED WASHES:

WHITE GRANITE WASH
NORTH FORK WHITE GRANITE WASH
TRACTOR WASH
DIVERSION DIKE WASH
TUTHILL DIKE WASH
BULLDOZER WASH
OSBORN ROAD WASH

Note:
100-YEAR DISCHARGE - 2000cfs

0 1000 2000 4000 6000

EXISTING CONDITIONS DRAINAGE MAP
PLATE 4

DMB

CATERPILLAR PROPERTY
MARICOPA COUNTY, ARIZONA

WOOD,PATEL ASSOCIATES INC.
Civil Engineers, Hydrologist and Land Surveyors
(602) 234-1344

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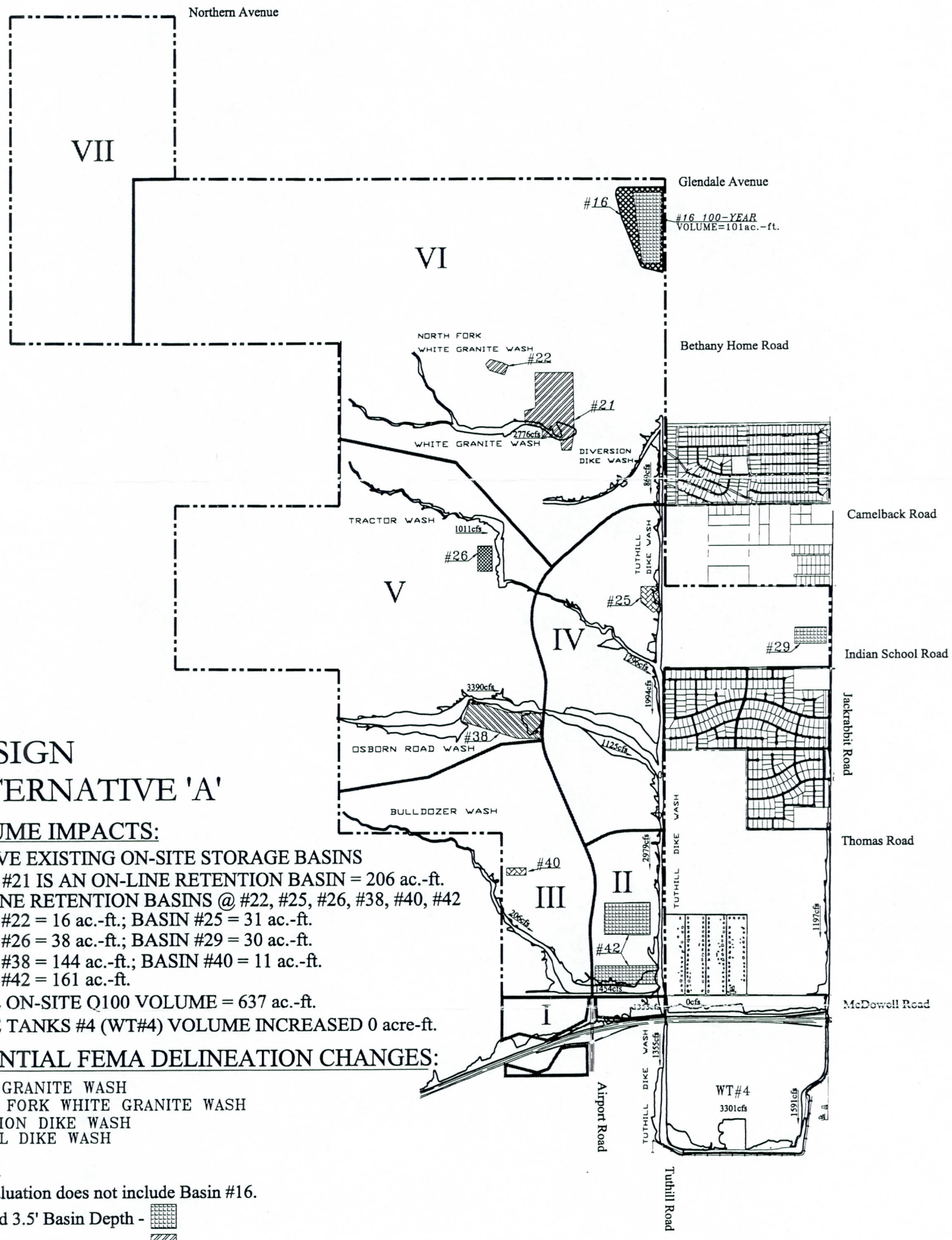

DESIGN ALTERNATIVE 'A'

VOLUME IMPACTS:

REMOVE EXISTING ON-SITE STORAGE BASINS
BASIN #21 IS AN ON-LINE RETENTION BASIN = 206 ac.-ft.
OFF-LINE RETENTION BASINS @ #22, #25, #26, #38, #40, #42
BASIN #22 = 16 ac.-ft.; BASIN #25 = 31 ac.-ft.
BASIN #26 = 38 ac.-ft.; BASIN #29 = 30 ac.-ft.
BASIN #38 = 144 ac.-ft.; BASIN #40 = 11 ac.-ft.
BASIN #42 = 161 ac.-ft.
TOTAL ON-SITE Q100 VOLUME = 637 ac.-ft.
WHITE TANKS #4 (WT#4) VOLUME INCREASED 0 acre-ft.

POTENTIAL FEMA DELINEATION CHANGES:

WHITE GRANITE WASH
NORTH FORK WHITE GRANITE WASH
DIVERSION DIKE WASH
TUTHILL DIKE WASH

Notes:

This evaluation does not include Basin #16.

Proposed 3.5' Basin Depth -
Proposed 4.5' Basin Depth -
Proposed 5.0' Basin Depth -
Proposed 5.5' Basin Depth -
Proposed 6.5' Basin Depth -

100-YEAR DISCHARGE - 2000cfs

0 1000 2000 4000 6000

ALTERNATIVE 'A'
DESIGN DRAINAGE MAP
PLATE 5

DMB

CATERPILLAR PROPERTY
MARICOPA COUNTY, ARIZONA

WOOD,PATEL ASSOCIATES INC.
Civil Engineers, Hydrologist and Land Surveyors
(602) 234-1344

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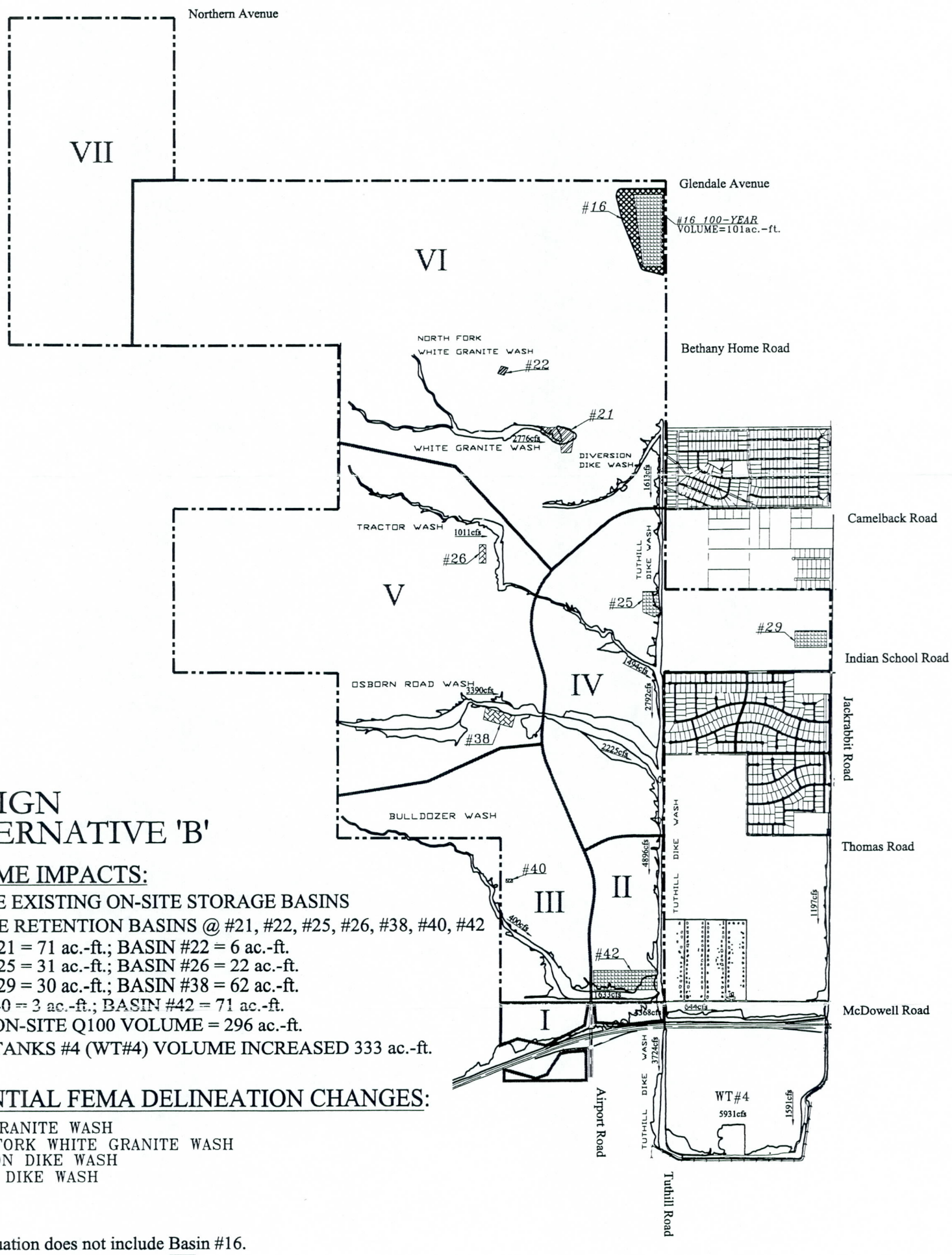

DESIGN ALTERNATIVE 'B'

VOLUME IMPACTS:

REMOVE EXISTING ON-SITE STORAGE BASINS
OFF-LINE RETENTION BASINS @ #21, #22, #25, #26, #38, #40, #42
BASIN #21 = 71 ac.-ft.; BASIN #22 = 6 ac.-ft.
BASIN #25 = 31 ac.-ft.; BASIN #26 = 22 ac.-ft.
BASIN #29 = 30 ac.-ft.; BASIN #38 = 62 ac.-ft.
BASIN#40 = 3 ac.-ft.; BASIN #42 = 71 ac.-ft.
TOTAL ON-SITE Q100 VOLUME = 296 ac.-ft.
WHITE TANKS #4 (WT#4) VOLUME INCREASED 333 ac.-ft.

POTENTIAL FEMA DELINEATION CHANGES:

WHITE GRANITE WASH
NORTH FORK WHITE GRANITE WASH
DIVERSION DIKE WASH
TUTHILL DIKE WASH

Notes:

This evaluation does not include Basin #16.
Proposed 3.5'-5.0' Basin Depth -
Proposed 7.0'-9.2' Basin Depth -
Proposed 12.8' Basin Depth -
100-YEAR DISCHARGE - 2000cfs

0 1000 2000 4000 6000

ALTERNATIVE 'B'
DESIGN DRAINAGE MAP
PLATE 6

DMB

CATERPILLAR PROPERTY
MARICOPA COUNTY, ARIZONA

WOOD,PATEL ASSOCIATES INC.
Civil Engineers, Hydrologist and Land Surveyors
(602) 234-1344

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